

Enhanced Classification of Diabetic Retinopathy via Vessel Segmentation: A Deep Ensemble Learning Approach



Sanjay Tanaji Sanamdikar^{1*}, Mayura Vishal Shelke², Jyoti Prashant Rothe³

¹ Department of Instrumentation, PDEAs College of Engineering Manjari, Pune 411028, Maharashtra, India

² Department of AI and DS, All India Shree Shivaji Memorial Society, Institute of Information Technology, Pune 411001, Maharashtra, India

³ Department of Electrical Engineering, St. Vincent Pallotti College of Engineering & Technology, Nagpur 441108, Maharashtra, India

Corresponding Author Email: sanamdikar123@gmail.com

<https://doi.org/10.18280/isi.280526>

ABSTRACT

Received: 22 June 2023

Revised: 3 September 2023

Accepted: 11 October 2023

Available online: 31 October 2023

Keywords:

diabetic retinopathy, vessel segmentation, deep ensemble learning, computer vision, DRIVE dataset, Canny operator, blood vessel segmentation

Diabetic Retinopathy (DR), a medical condition that impairs the blood vessels within the eye, is increasingly prevalent. Unchecked progression of DR can lead to significant visual impairment or total blindness. Traditional techniques for automatic DR detection, primarily reliant on computer vision systems, often fail to adequately encapsulate the inherent complexity of the disease, resulting in suboptimal categorization of DR stages, particularly the early ones. However, deep ensemble learning has emerged as a potent tool for the accurate detection and classification of DR using retinal images. In this study, deep ensemble models are proposed that initially segment the retinal image using the Canny operator and subsequently detect and classify all DR categories using the publicly available DRIVE dataset. Each model, crafted with subtle architectural distinctions or trained on distinct data subsets, was designed to capture varying disease attributes. A threshold was established to accurately categorize DR severity into mild, moderate, or severe cases. The results indicate a significant enhancement in the performance of both segmentation and DR detection through deep ensemble learning, compared to individual models. The ensemble approach effectively amalgamated the collective knowledge of the models, yielding superior accuracy, robustness to data variations, and improved generalization capabilities. This cost-effective computational method achieves an accuracy score of 98.65% in DR detection and classification. By synthesizing the predictions of multiple models, the ensemble captured a wider spectrum of disease patterns, thereby bolstering the system's overall effectiveness in DR diagnosis. The findings underscore the enhanced accuracy and robustness attained through the ensemble approach, surpassing the performance of individual models.

1. INTRODUCTION

Diabetic retinopathy (DR) stands as the leading cause of vision impairment among individuals aged between 30 and 55 years [1]. A staggering 90% of confirmed DR incidents could potentially be circumvented through adequate eye care and timely screening procedures [2]. Predominantly affecting long-term diabetes patients, DR alters the lens curvature, giving rise to visual disturbances, and ranks among the most severe ocular disorders [3]. Furthermore, DR emerges as a primary contributor to blindness, with its insidious progression rendering it treatable if identified at an early stage. However, delayed detection can inflict irreversible damage to the human retina, culminating in permanent blindness [4].

The onset of DR is attributed to alterations in the retinal blood vessels. The retina, a thin photosensitive rear of the eye, is vulnerable to elevated blood which can inflict damage on blood vessels these vessels can thicken and leak, precipitating DR is generally categorized into four stages: severe non-proliferative, and proliferative. The initial stage, known as mild non-proliferative

manifestation of sac-like swelling in small sections of the retinal blood vessels [5, 6]. The condition progresses to the moderate non-proliferative stage when blockages occur in certain retinal blood vessels. The severe non-proliferative stage is marked by additional vessel blockages, depriving sections of the retina of adequate blood supply [7]. The final stage, proliferation, is characterized by the formation of new, yet unstable and distorted, blood vessels in the retina. These vessels may subsequently hemorrhage, potentially inducing total vision loss or blindness [8].

Routine retinal examinations of diabetic patients prove instrumental in the early detection of DR, thereby mitigating the risk of blindness. However, retinal screening is a time-intensive process that relies heavily on the expertise of ophthalmologists to dissect fundus images and examine retinal

1 illustrates images of a healthy retina (a) and a DR-afflicted retina. Diabetic eye disease has two stages: Non-Proliferative Diabetic Retinopathy (NPDR) and Proliferative Diabetic Retinopathy (PDR).

Healthy progression of DR, often remaining asymptomatic, vision loss transpires, timely intervention is



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

- learning using fundus images: A survey. *IEEE Access*, 8: 151133-151149.
<https://doi.org/10.1109/ACCESS.2020.3015258>
- [26] Bhatia, Y., Bajpayee, A., Raghuvanshi, D., Mittal, H. (2019). Image captioning using Google's inception-resnet-v2 and recurrent neural network. In 2019 Twelfth International Conference on Contemporary Computing (IC3), Noida, India, pp. 1-6.
<https://doi.org/10.1109/IC3.2019.8844921>
- [27] Villa-Pulgarin, J.P., Ruales-Torres, A.A., Arias-Garzon, D., Bravo-Ortiz, M.A., Arteaga-Arteaga, H.B., Mora-Rubio, A., Alzate-Grisales, J.A., Mercado-Ruiz, E., Hassaballah, M., Orozco-Arias, S., Cardona-Morales, O., Tabares-Soto, R. (2022). Optimized convolutional neural network models for skin lesion classification. *Comput. Mater. Contin.*, 70(2): 2131-2148.
<https://doi.org/10.32604/cmc.2022.019529>
- [28] Ulutaş, H., Aslantaş, V. (2023). Design of efficient methods for the detection of tomato leaf disease utilizing proposed ensemble CNN model. *Electronics*, 12(4), 827.
<https://doi.org/10.3390/electronics12040827>
- [29] Tan, M., Le, Q. (2019). Efficientnet: Rethinking model scaling for convolutional neural networks. In International Conference on Machine Learning, pp. 6105-6114.
- [30] Chollet, F. (2017). Xception: Deep learning with depthwise separable convolutions. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 1251-1258.
- [31] He, K., Zhang, X., Ren, S., Sun, J. (2016). Deep residual learning for image recognition. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 770-778.
- [32] Kobat, S.G., Baygin, N., Yusufoglu, E., Baygin, M., Barua, P.D., Dogan, S., Yaman, O., Celiker, U., Yildirim, H., Tan, R., Tuncer, T., Islam, N., Acharya, U.R. (2022). Automated diabetic retinopathy detection using horizontal and vertical patch division-based pre-trained DenseNET with digital fundus images. *Diagnostics*, 12(8): 1975.
<https://doi.org/10.3390/diagnostics12081975>
- [33] Das, D., Biswas, S.K., Bandyopadhyay, S. (2023). Detection of diabetic retinopathy using convolutional neural networks for feature extraction and classification (DRFEC). *Multimedia Tools and Applications*, 82(19): 29943-30001. <https://doi.org/10.1007/s11042-022-14165-4>
- [34] Sudha, V., Ganeshbabu, T.R. (2021). A convolutional neural network classifier VGG-19 architecture for lesion detection and grading in diabetic retinopathy based on deep learning. *Computers, Materials & Continua*, 66(1): 827-842. <https://doi.org/10.32604/cmc.2020.012008>
- [35] Kumar, G., Chatterjee, S., Chattopadhyay, C. (2021). DRISTI: A hybrid deep neural network for diabetic retinopathy diagnosis. *Signal, Image and Video Processing*, 15(8): 1679-1686.
<https://doi.org/10.1007/s11760-021-01904-7>
- [36] Deshmukh, S.V., Roy, A. (2023). Retinal Blood Vessel Segmentation Based on Modified CNN and Analyze the Perceptual Quality of Segmented Images. In: Woungang, I., Dhurandher, S.K., Pattanaik, K.K., Verma, A., Verma, P. (eds) *Advanced Network Technologies and Intelligent Computing*. ANTIC 2022. Communications in Computer and Information Science, vol 1798. Springer, Cham. https://doi.org/10.1007/978-3-031-28183-9_43
- [37] Deshmukh, S.V., Roy, A., Agrawal, P. (2023). Retinal image segmentation for diabetic retinopathy detection using U-Net architecture. *International Journal of Image, Graphics and Signal Processing*, 13(1): 79-92.
<https://doi.org/10.5815/ijigsp.2023.01.07>
- [38] Khare, V. (2023). Automatic detection of exudates in retinal image using statistical techniques. *Ingénierie des Systèmes d'Information*, 28(1): 255-261.
<https://doi.org/10.18280/isi.280130>
- [39] Dondeti, V., Bodapati, J.D., Shareef, S.N., Naralasetti, V. (2020). Deep convolution features in non-linear embedding space for fundus image classification. *Revue d'Intelligence Artificielle*, 34(3): 307-313.
<https://doi.org/10.18280/ria.340308>

NOMENCLATURE

DR	Diabetic retinopathy
NPDR	Non-Proliferative Diabetic Retinopathy
PDR	Proliferative Diabetic Retinopathy
CNN	Convolutional Neural Networks
DNN	Deep Neural Network
TP	True Positive
TN	True Negative
FP	False Positive
FN	False Negative





The Impact of Generative Content on Individuals Privacy and Ethical Concerns

Ajay Sudhir Bale^{*1}, R. B. Dhumale², Nimisha Beri³, Melanie Lourens⁴, Raj A. Varma⁵, Vinod Kumar⁶, Sanjay Sanamdikar⁷ and Mamta B. Savadatti^{*8}

Submitted: 25/06/2023

Revised: 07/08/2023

Accepted: 28/08/2023

Abstract: The rise of AI and ML-fueled generative content technologies has altered every stage of the content life cycle, from creation to distribution to consumption. There are many positive outcomes from these breakthroughs, but there are also serious ethical and privacy problems. The purpose of this work is to investigate the wide-ranging effects of generative content on personal data security and ethical considerations. The article dives into the privacy concerns that may arise from using generative material. Since this kind of technology depends heavily on user data, the ease with which accurate and tailored content may be generated raises concerns about data privacy. Unauthorized content synthesis, which may lead to the proliferation of bogus data, counterfeits, and other types of illicit tampering, is also a source of worry. We have attempted to consider all these implications and delve into them to bring out possible solutions. We are optimistic that this article will provide future insights into the research of generative content and its ethical considerations.

Keywords: Images, videos, generative AI, ethical, privacy

1. Introduction

Generative AI, an abbreviation for "Generative Artificial Intelligence," is a subset of AI approaches that uses a ML model to produce new material including text, pictures, audio, and video [1-2]. Generative AI, in contrast to more typical AI systems, is meant to develop imaginative and imaginative outputs that frequently mirror or emulate human-generated material, rather than relying on preexisting data to make choices or categories. In order to generate fresh material that is both cohesive and culturally important, creative AI models may learn designs and frameworks from enormous datasets [3-5]. Many of the models mentioned are constructed on top of DL

architectures like RNNs, CNNs, and, more recently, transformers. Over the last two years, several big generative models have been released, including ChatGPT and Stable Diffusion. To be more specific, these models are transforming a number of different fields by doing things like automatically making creative pictures and answering general questions. Therefore, these generative models have far-reaching consequences for the business and society at large, since they may lead to the elimination of various employment categories [6-9]. Generative AI can convert text to images using models such as DALLE-2, text to 3D images using models such as Dream fusion, images to text using models such as Flamingo, text to video using models such as Phenaki, text to audio using models such as AudioLM, text to other texts using models such as ChatGPT, text to code using models such as Codex, text to scientific texts using models such as Galactica, and so on. This effort aims to classify the most important recently released generative models and offer a brief description of the key industries impacted by generative AI [10-11]. Appropriate study, creation, and implementation of AI systems need careful consideration of their moral consequences. As AI develops and finds more applications in our daily lives, it raises a number of moral and social problems. Important ethical problems in artificial intelligence as depicted in Fig.1. This information is acquired from [12].

¹ Dept. of ECE, New Horizon College of Engineering, Bengaluru, India; ajaysudhirbale@gmail.com; ORCID ID : 0000-0002-5715-9739

² Associate Professor, AISSMS Institute of information Technology, Pune, India; rbd.scoe@gmail.com

³ Professor, School of Education, Lovely Professional University, Phagwara; nimisha.16084@lpu.co.in

⁴ Deputy Dean Faculty of Management Sciences, Durban University of Technology, South Africa; melaniel@dut.ac.za

⁵ Assistant Professor, Symbiosis Law School (SLS), Symbiosis International (Deemed University) (SIU), Vimannagar, Pune, Maharashtra, India; raj.varma@symlaw.ac.in

⁶ Associate Professor, M.M. Institute of Management, Maharishi Markandeshwar, Mullana-Ambala, Haryana, India 133207; ORCID - 0000-0002-3578-8155; gondi.vinod@email.com

⁷ Instrumentation Department, PDEAS Coll. Manjari Pune; sanjay.coem@gmail.com

⁸ Dept. of ECE, New Horizon College of Engi India,

mamta.savadatti@gmail.com

* Corresponding Author Email: ajaysudl mamta.savadatti@gmail.com

Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Prejudice: Artificial intelligence may or discriminating material if it is taught

ation: Because of the prevalence of AI-ial, it might be difficult to tell fact from

- [7] Qadir, Junaid. "Engineering education in the era of ChatGPT: Promise and pitfalls of generative AI for education." 2023 IEEE Global Engineering Education Conference (EDUCON). IEEE, 2023.
- [8] Aydın, Ömer, and Enis Karaarslan. "Is ChatGPT leading generative AI? What is beyond expectations?" What is beyond expectations (2023).
- [9] Zohny, Hazem, John McMillan, and Mike King. "Ethics of generative AI." *Journal of medical ethics* 49.2 (2023): 79-80.
- [10] Sun, Jiao, et al. "Investigating explainability of generative AI for code through scenario-based design." 27th International Conference on Intelligent User Interfaces. 2022.
- [11] Bale, A. S. ., Vada, Y. R. ., Oshiojum, B. E. ., Lakkineni, U. K. ., Rao, C. ., Venkatesh6, K. ., & Rani, I. . (2023). ChatGPT in Software Development: Methods and Cross-Domain Applications. *International Journal of Intelligent Systems and Applications in Engineering*, 11(9s), 636–643. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/3212>
- [12] "Artificial Intelligence: examples of ethical dilemmas," Unesco.org, 21-Apr-2023. [Online]. Available: <https://www.unesco.org/en/artificial-intelligence/recommendation-ethics/cases>. [Accessed: 15-Aug-2023].
- [13] T. Olavsrud, "8 famous analytics and AI disasters," CIO, 15-Apr-2022. [Online]. Available: <https://www.cio.com/article/190888/5-famous-analytics-and-ai-disasters.html> . [Accessed: 15-Aug-2023].
- [14] "The world's most valuable resource is no longer oil, but data," *Economist* (London, England: 1843), <https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data> , *The Economist*, 06-May-2017. [Accessed: 15-Aug-2023].
- [15] Roberts, M., Driggs, D., Thorpe, M. et al. Common pitfalls and recommendations for using machine learning to detect and prognosticate for COVID-19 using chest radiographs and CT scans. *Nat Mach Intell* 3, 199–217 (2021). <https://doi.org/10.1038/s42256-021-00307-0>
- [16] R. Metz, "Zillow's home-buying debacle shows how hard it is to use AI to value real estate," *Forbes*, 11-Nov-2021. [Accessed: 15-Aug-2023].
- [17] "Excel specifications and limits," [Online]. <https://support.microsoft.com/en-us/specifications-and-limits-1672b34d-7043-467e-8e27-269d656771c3> . [Accessed: 15-Aug-2023].
- [18] S. Vartan, "Racial bias found in a major health care risk algorithm," *Scientific American*. Available: <https://www.scientificamerican.com/article/racial-bias-found-in-a-major-health-care-risk-algorithm/> [Accessed: 15-Aug-2023].
- [19] J. Dastin, "Amazon scraps secret AI recruiting tool that showed bias against women," *Reuters*, Reuters, 10-Oct-2018. Available at: <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G> [Accessed: 15-Aug-2023].
- [20] S. Florentine, "Amazon's biased AI recruiting tool gets scrapped," *CIO*, 19-Oct-2018. Available at: <https://www.cio.com/article/222427/amazons-biased-ai-recruiting-tool-gets-scrapped.html> [Accessed: 15-Aug-2023].
- [21] C. Duhigg, "How companies learn your secrets," *The New York times*, *The New York Times*, 16-Feb-2012. Available: <https://www.nytimes.com/2012/02/19/magazine/shop-ping-habits.html> [Accessed: 15-Aug-2023].
- [22] Badiy, M. ., & Amounas, F. . (2023). Embedding-based Method for the Supervised Link Prediction in Social Networks . *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(3), 105–116. <https://doi.org/10.17762/ijritcc.v11i3.6327>
- [23] Mark White, Thomas Wood, Carlos Rodríguez, Pekka Koskinen, Jónsson Ólafur. Exploring Natural Language Processing in Educational Applications. *Kuwait Journal of Machine Learning*, 2(1). Retrieved from <http://kuwaitjournals.com/index.php/kjml/article/view/168>
- [24] Sharma, R., & Dhabliya, D. (2019). Attacks on transport layer and multi-layer attacks on manet. *International Journal of Control and Automation*, 12(6 Special Issue), 5-11. Retrieved from www.scopus.com



Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

"Psychological Confidence by Ai: Enhancement Quality & Future of Mobility for People with Disabilities of Neurological Impairment"

Ajay Sudhir Bale¹, Rajdeep Singh Solanki², V. Mouneswari³,
Sanjay Sanamdikar⁴, Payal Gulati⁵, Priyank Udaybhai Trivedi⁶

Received: 15-May-2023

Revised: 11-June-2023

Accepted: 05-July-2023

¹Dept. of ECE, New Horizon College of Engineering, Bengaluru, India.

ajaysudhirbale@gmail.com

²Assistant professor, Medi-caps university indore, Computer science department,
rajdeep.solanki@medicaps.ac.in

³Assistant Professor, Department of MBA, AITS, Rajampeta
mouni.vangimalla@gmail.com

⁴Instrumentation Department, PDEAS College of Engineering Manjari Pune.
sanjay.coem@gmail.com

⁵Assistant Professor, Department of Computer Engineering, J.C. Bose UST, YMCA,
Haryana
gulatipayal@yahoo.co.in

⁶Research Student, Institute of Infrastructure Technology Research and Management
(ITRAM),
Near khokhra Circle, Maninagar, Ahmedabad, Gujarat.
priyankutrivedi@gmail.com

Abstract: Artificial intelligence (AI) has been viewed primarily a public benefit since it is used by more than four billion individuals every month. Individuals of all abilities are welcome to use it. Mobility is greatly aided by technological advancements, especially those involving AI. To enhance the quality of life of a certain group of individuals, it's not enough simply to discover cutting-edge ideas; rather, an answer must be put at their fingertips. For the more than a billion handicapped individuals across the globe that potentially benefit from AI, this would be a huge step forward. In this work, we attempt to bring forward the recent advancements in computational intelligence methods and how AI might improve access. We hope that this work will be a lay a foundation for the researchers to work in this domain in the near future.

Keywords: Disability, AI, mobility, recognition, intelligence, ease of life.

1. Introduction

The term "artificial intelligence" (AI) is used to describe technological advancements that mimic human intellect. It encompasses technological solutions that are capable of playing chessboard and solve calculations like a person to those which can replicate cognitive ability in other ways. A particular aspect of artificial intelligence is machine learning (ML), which allows computers to develop via exposure to additional information in attempt to more accurately forecast users' demands. AI and ML have the potential to greatly improve the lives of persons with disabilities by facilitating the development of new intellectual and technology products and procedures [1]. Google, for one, employs ML by having its systems track people's browsing habits and social media likes so as to tailor its service to each individual person [2]. One must discuss the moral difficulties posed by the intersection of artificial intelligence and impairment. For this, we will rely on anecdotal evidence, within the context of publications as two persons with disabilities, to examine the potential, support, and challenges of using AI as part of one's everyday life [3-5].

This work emphasis on recent advancements in computational intelligence methods and how AI might improve access to the disabled people in their

2. Comparative Study



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

4. Ghazal, M.; Yaghi, M.; Gad, A.; El Bary, G.; Alhalabi, M.; Alkhedher, M.; El-Baz, A.S. AI-Powered Service Robotics for Independent Shopping Experiences by Elderly and Disabled People. *Appl. Sci.* 2021, 11, 9007. <https://doi.org/10.3390/app11199007>
5. Belibov, D.; Tudose, D.S. Smart shopping cart. In *Proceedings of the 18th RoEduNet Conference: Networking in Education and Research (RoEduNet)*, Galați, Romania, 10–12 October 2019.
6. Kacorri, Hernisa, et al. "People with visual impairment training personal object recognizers: Feasibility and challenges." *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems.* 2017.
7. Mascetti, Sergio, et al. "Zebrarecognizer: Pedestrian crossing recognition for people with visual impairment or blindness." *Pattern Recognition* 60 (2016): 405-419.
8. Yang, Xiaodong, Shuai Yuan, and YingLi Tian. "Assistive clothing pattern recognition for visually impaired people." *IEEE Transactions on Human-Machine Systems* 44.2 (2014): 234-243.
9. Zhao, Yuhang, et al. "A face recognition application for people with visual impairments: Understanding use beyond the lab." *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems.* 2018.
10. Chen, Shiwei, et al. "A novel approach to wearable image recognition systems to aid visually impaired people." *Applied Sciences* 9.16 (2019): 3350.
11. Lin, B.-S.; Lee, C.-C.; Chiang, P.-Y. Simple Smartphone-Based Guiding System for Visually Impaired People. *Sensors* 2017, 17, 1371. <https://doi.org/10.3390/s17061371>
12. Paiva, Sara, et al. "Image recognition-based architecture to enhance inclusive mobility of visually impaired people in smart and urban environments." *Sustainability* 14.18 (2022): 11567.
13. Calabrese, Bernardo, et al. "Solar-powered deep learning-based recognition system of daily used objects and human faces for assistance of the visually impaired." *Energies* 13.22 (2020): 6104.
14. Bauer, C.M.; Manley, C.E.; Ravenscroft, J.; Cabral, H.; Dilks, D.D.; Bex, P.J. Deficits in Face Recognition and Consequent Quality-of-Life Factors in Individuals with Cerebral Visual Impairment. *Vision* 2023, 7, 9. <https://doi.org/10.3390/vision7010009>
15. Márquez-Olivera, M.; Juárez-Gracia, A.-G.; Hernández-Herrera, V.; Argüelles-Cruz, A.-J.; López-Yáñez, I. System for Face Recognition under Different Facial Expressions Using a New Associative Hybrid Model $\text{Am}\alpha\beta\text{-KNN}$ for People with Visual Impairment or Prosopagnosia. *Sensors* 2019, 19, 578. <https://doi.org/10.3390/s19030578>
16. López-Hernández, J.L.; González-Carrasco, I.; López-Cuadrado, J.L.; Ruiz-Mezcua, B. Towards the Recognition of the Emotions of People with Visual Disabilities through Brain-Computer Interfaces. *Sensors* 2019, 19, 2620. <https://doi.org/10.3390/s19112620>
17. Akhter, N.; Ali, M.; Hussain, L.; Shah, M.; Mahmood, T.; Ali, A.; Al-Fuqaha, A. Diverse Pose Lip-Reading Framework. *Appl. Sci.* 2022, 12, 9532. <https://doi.org/10.3390/app12199532>
18. Wen, J.; Lu, Y. Automatic Lip Reading System Based on a Fusion Lightweight Neural Network with Raspberry Pi. *Appl. Sci.* 2019, 9, 5432. <https://doi.org/10.3390/app9245432>
19. Lu, Y.; Li, H. Automatic Lip-Reading System Based on Deep Convolutional Neural Network and Attention-Based Long Short-Term Memory. *Appl. Sci.* 2019, 9, 1599. <https://doi.org/10.3390/app9081599>
20. Zhang, G.; Lu, Y. Research on a Lip Reading Algorithm Based on Efficient-GhostNet. *Electronics* 2023, 12, 1151. <https://doi.org/10.3390/electronics12051151>
21. Vulchanova, M.; Kjølstad Lervåg, I. Role of Subtitles in L2 Acquisition and Comprehension: A Pilot Study of Hearing-Impaired Students. *Languages* 2021, 6, 17. <https://doi.org/10.3390/languages6010017>



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



Enhanced Detection of Diabetic Retinopathy Using Ensemble Machine Learning: A Comparative Study

Sanjay Tanaji Sanamdikar^{1*}, Satish Akaram Patil², Deepak Onkar Patil¹, Madhuri Pravin Borawake³

¹ Instrumentation Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

² Mechanical Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

³ Computer Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

Corresponding Author Email: sanamdikar123@gmail.com

Copyright: ©2023 IETA. This article is published by IETA and is licensed under the CC BY 4.0 license

(<http://creativecommons.org/licenses/by/4.0/>).

<https://doi.org/10.18280/isi.280624>

ABSTRACT

Received: 5 June 2023

Revised: 2 September 2023

Accepted: 7 December 2023

Available online: 23 December 2023

Keywords:

machine learning, ensemble learning, deep learning and retinopathy in diabetics, deep convolutional neural networks (DCNNs), Messidor dataset

Diabetic Retinopathy (DR), a microvascular complication, stands as one of the leading causes of vision impairment among diabetic populations globally. This pathology is characterized by the occlusion of retinal vessels, thereby depriving the retinal tissue of essential nutrients. Given the progressive nature of DR and its potential to culminate in irreversible blindness, timely and accurate diagnosis is paramount for effective intervention. Conventionally, the detection of DR relies heavily on the expertise of ophthalmologists, a resource-intensive process that may be prohibitive in terms of cost and time. To address these limitations, automated detection systems have been developed, aiming to hasten diagnostic processes and democratize access to these crucial services. Nevertheless, the performance of such systems has been historically hampered by the scarcity of reliable data sources and medical records for this condition. In response to these challenges, this study explores an ensemble machine learning approach that synergizes multiple established classifiers into a cohesive diagnostic model. The proposed methodology demonstrates superior performance in accuracy compared to prevalent classification algorithms. Utilizing the Messidor dataset, the top-performing five and ten features were isolated into four sub-datasets through InfoGainEval and WrapperSubsetEval methods. The accuracy achieved for the top five features via InfoGainEval was 70.7%, while for the complete feature set, it reached 75.1%. The employment of ensemble machine learning techniques in diagnosing DR represents a significant application of artificial intelligence within the medical domain, conferring advantages such as enhanced accuracy, robustness, efficient feature selection, early detection, scalability, and a reduction in human error, all while ensuring cost-efficiency and enabling continuous monitoring for improved patient outcomes. However, the approach is not without limitations. These include the quantity and quality of data, clinical variability, ethical and privacy concerns, scalability challenges, potential overfitting, intricate feature selection and engineering, bias in data collection, and issues related to cost and accessibility. The findings underscore the efficacy of the sub-datasets, which facilitate a less cumbersome classification process as compared to the full Messidor dataset, thereby streamlining the diagnostic pathway.

1. INTRODUCTION

Diabetic Retinopathy (DR), a major microvascular complication of diabetes mellitus, manifests as damage to the retinal vasculature, resulting in characteristic macular changes such as exudates, aneurysms, and hemorrhages. The earliest recorded observation of macular anomalies in diabetic patients can be attributed to Eduard Jaeger in 1856. However, the definitive correlation between these anomalies was not established until 1872 when J. histopathological evidence of retinal destructive cystoid processes in diabetic individuals. Diabetic Retinopathy was first identified by V in 1876, marking a significant advancement in the treatment of DR [1].

Symptoms of DR, as described by the Mayo Clinic [2], often include vision spots, fluctuating visual acuity, chromatic aberrations, and in severe cases, complete vision loss in one or both eyes. These manifestations are the result of progressive occlusion of the retinal microvessels, which are essential for the nourishment of the retina. Consequently, automated diagnostic methods for detecting diabetic retinal damage are increasingly recognized as critical. While deep learning yielded high accuracy in binary classifications, its accuracy in multi-class categorizations, especially for disease diagnosis, remains suboptimal. The need for expedited clinical assessments and underscored by factors such as high patient volume in emergent care scenarios. Furthermore, the timely and effective treatment is a fundamental healthcare



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Real Estate Booking System using Blockchain Technology

¹Prof. S.V.Phulari (Prof., Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

¹Aniket Bhausahab Khedkar ²Omkar Suresh Bharati

³Ashwin Anil Bhutkar ⁴Amrut Sudhakar Patare

(Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

Abstract - Real Estate Management in India as well as in many parts of the world is a very inefficient and insecure process. Developing a secure system that not only accelerates the process of land registration but also makes it efficient and secure will be effective. Blockchain technology is one of the latest and secured technologies on the horizon and has evolved over the last 9-11 years. There is tremendous potential for usage of Blockchain technology in the land industry. This paper presents a blockchain powered real estate management system that will impart transparency, efficiency, and security in Real Estate Management. The decentralized data storage application and its interactions with Ethereum Virtual Machine (EVM) are presented to point out the event of a sensible contract which will be used for blockchain smart contracts in real estate management. Further, a detailed design and interaction mechanism are highlighted for the estate owners and users as parties to a sensible contract. It will store all the transactions on a distributed blockchain which will be very secure and will not be prone to hacking. A list of functions for initiating, creating, modifying, or terminating a sensible contract is presented and this will help the user enjoy a more immersive, user-friendly, and visualized contracting process, whereas the owners and real estate agents can enjoy more business and sales. It is a practical solution to the real estate management problem in the real world.

Key Words: Blockchain, Smart Contracts, Real Estate Management, Ethereum Virtual Machine, Transparent Contracting Process

1. INTRODUCTION

Traditionally, we depend on trusted third parties to register and transfer the power of land and real estate property. This model poses several problems. Documents are frequently non digitized, hard to reach, even harder to update, and occasionally lost in time. Blockchain technology is an innovative way of keeping records digitally. Blockchain aims to reduce the threat for corruption and fraud of records by enforcing decentralization. Decentralization means the records are kept within the blockchain without the need for a central authority. In other words, the information stored in the blockchain is kept by everyone, making nearly impossible to falsify.

2. Body of Paper

A. Problems in the Current System

Real Estate Management in India as well of the world is a very inefficient and insecure current system, the buyer has to first pay the m and then has to pay the stamp duty charges to This process can be done offline as well as onl

them have to schedule an appointment with the local sub-registry office where they have to be present on a given date and time with all the documents along with the payment proof. Their documents are verified and this process takes too much time and many loopholes are there which are beneficial for criminals. After this process, the buyer has to manually go to municipal offices to change owner details in the municipal records. There are Increasing numbers of fraud cases due to the non-availability of genuine data records to property buyers and a lack of transparency is in the system. It is all due to the fact that is data being unavailable in the public domain as well as there's no way to retrieve the number of properties owned by a person because the records are distributed. The government addressed this problem in the near past but the problem persists that, non-availability of genuine real data in the public domain and issue still needs to be addressed and this can be considered as a limitation or drawback of the system. This process consumes lot of time and involves middlemen and third-party people who charge illegal fees to do the work. They rob many innocent people who are unaware of the process. This process takes more than 10-15 days which should be done rapidly in this digital fast-moving world. Now the government has moved towards digitalization and making records available digitally in a centralized database. But loopholes are there with the centralized databases. Some of the issues include data security and fraudulent data changes which are serious problems to focus upon. Loss of records in any disaster situation if present in traditional offices or in a centralized system is another issue.

This system costs very high and it involves many people unnecessarily as in this digital world with the help of technology entire work can be automated. Apart from all these problems, there is another problem with the transfer of property by heredity or will. In this case, one has to go to the land sub-registry office with the death certificate of the person to transfer the property and so many procedures are needed to be followed in this case which is a very tedious procedure. There is not a single way to automatically transfer the property which should be implemented. One other problem is with financial institutions that they can't verify easily the property status in case of mortgaged for the loan. Even if the property is on aged there is no way for other persons to know

Work

er published in (2020) named as Real Estate tem based on Blockchain by A. Mittal: He has



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Milk quality prediction and yogurt fermentation analysis using Machine Learning

¹ M.P.Borawake(Prof., Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

¹Sanket Namdev Panmand ²Sakshi Rajendra Malave

³Sujit Pandurang Kalane ⁴Hemangi Chudaman Patil

(Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

Abstract - The dairy industry plays a vital role in the global economy, with milk and dairy products being essential for human nutrition. Ensuring the quality of milk and its products is paramount for both consumers and producers. This study presents a novel approach to enhance milk quality prediction and optimize yoghurt fermentation processes using advanced Machine Learning (ML) techniques. An integrated system was developed, incorporating sensors, data processing units, and ML models, enabling automatic adjustments to the fermentation process in response to real-time data inputs. This not only enhanced the quality of the yoghurt but also increased production efficiency and reduced wastage significantly. The findings of this research demonstrate the potential of Machine Learning in revolutionizing the dairy industry. By leveraging predictive analytics and real-time data analysis, this approach ensures higher milk quality and more efficient yoghurt fermentation processes. Implementing these techniques at scale could lead to substantial improvements in dairy product quality, cost-effectiveness, and overall sustainability in the dairy industry.

Key Words:- Milk quality prediction, Yoghurt fermentation analysis, Machine Learning, Dairy industry, Dairy product quality, Deep learning, Predictive analytics, Real-time monitoring, Sustainability, Production efficiency.

1.INTRODUCTION

Milk quality prediction and yogurt fermentation analysis are vital aspects of the dairy industry, contributing to the production of safe and consistent dairy products. Milk serves as the primary raw material for dairy products like yogurt, cheese, and butter, making its quality a critical factor in the final product's characteristics. Similarly, the fermentation process plays a pivotal role in transforming milk into yogurt, affecting its flavor, texture, and nutritional content. The integration of modern technology and scientific understanding has revolutionize processes, ensuring higher product quality, sa efficiency.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

2. KEY ASPECTS OF MILK & YOGURT FERMENTATION DETECTION PROJECT

Key aspects of a Milk and yogurt Fermentation Detection Project, as outlined in the provided information, included:

ASPECT 1: Significance in the Food Industry Milk and yogurt detection using machine learning is essential in the food industry, particularly for quality control and food safety.

ASPECT 2: Differentiation Challenge The primary challenge is accurately distinguishing between milk and yogurt, which is crucial for quality control, contamination prevention, and ensuring product authenticity.

ASPECT 3: Data Collection A diverse and comprehensive dataset of images, spectroscopic data, or chemical properties of both milk and yogurt is collected. **ASPECT 4: Data Preprocessing** The collected data is pre-processed to remove noise, standardize data format, and ensure consistency across the dataset.

ASPECT 5: Machine Learning Algorithms Various machine learning algorithms are employed, including support vector machines (SVM), random forests, and deep learning models like Convolutional Neural Networks (CNNs).

ASPECT 6: Motivation The motivation behind this project is to improve product quality, perfect processes, ensure consumer safety, and drive innovation in the dairy industry through data-driven insights.

ASPECT 7: Efficiency and Sustainability The project aims to lead to more efficient, sustainable, and competitive dairy production practices.

ASPECT 8: Quality Prediction One aim is to develop a machine learning model to predict the quality of milk based on various parameters.

ASPECT 9: Fermentation Analysis The other aim is to employ machine learning techniques to analyze and perfect the yogurt fermentation process.

ASPECT 10: Multidisciplinary Approach Success in these aims requires a combination of domain ability, data

l advanced machine learning techniques.

Real-time Detection Implementing a system ing the presence of milk and yogurt in real- n production lines, dairy farms, or retail a key aspect of the project.

his project combines domain knowledge, data advanced machine learning to address the

Decentralized Cloud Storage: A Rusty Symphony of Security and Scalability

¹S.V.Phulari(Prof., Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

¹Raj Raut, ²Shubham Kshetre

³Prathamesh Nawale

(Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India.)

ABSTRACT

In an era marked by rapid digital transformation, the imperative for secure, private, and scalable decentralized cloud storage solutions has become paramount. This research introduces a pioneering approach to address limitations identified in a reference paper, specifically focusing on challenges during implementation, scalability issues, vulnerabilities in smart contract-based transactions, and risks associated with IPFS for decentralized file storage. Leveraging blockchain technology, the InterPlanetary File System (IPFS), and the Rust programming language, our work aims to redefine the landscape of cloud storage.

Motivated by the need to establish true data ownership and mitigate vulnerabilities in centralized architectures, this research sets forth comprehensive objectives. We delve into an extensive literature review to bridge existing knowledge gaps, informing the enhancements introduced. The proposed improvements encompass a meticulous resolution of implementation challenges, advancements in scalability through adaptive scheduling algorithms and credit systems, optimization of smart contract-based transactions for enhanced security, and fortification of IPFS integration.

The significance of our work lies in the transformative potential of an enhanced decentralized cloud storage system. By identifying and rectifying existing limitations, our research not only contributes to the immediate discourse on decentralized technologies but also establishes a robust foundation for the evolving landscape of secure and user-centric cloud storage solutions.

Keywords: Decentralized Cloud Storage, Blockchain, IPFS, Rust, Data Ownership, Privacy, Security, Smart Contracts

1. INTRODUCTION

1.1 Background:

In an era marked by unprecedented digital transformation, the demand for secure, scalable, and decentralized cloud storage solutions has become in
Conventional centralized cloud stora

inherent challenges related to data ownership, privacy, and security, prompting the exploration of innovative approaches. The amalgamation of blockchain technology, the InterPlanetary File System (IPFS), and the Rust programming language represents a promising avenue for addressing these challenges and revolutionizing cloud storage paradigms.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

ORIGINAL RESEARCH ARTICLE

Introduction of machine learning with applications to communication system

Jambi Ratnaraja Kumar^{1,*}, Santoshkumar Chobe², Swati Nikam², Shrinivas Zanwar³, Madhuri Borawake⁴, Deepali Hirolikar⁵

¹ Department of Computer Engineering, Genba Sopanrao Moze College of Engineering, Pune 411045, India

² Department of Computer Engineering, Pimpri Chinchawad College of Engineering and Research (PCCOER), Pune 412101, India

³ Department of Artificial Intelligence & Data science, CSMSS, Chh. Shahu College of Engineering, Aurangabad 431136, India

⁴ Department of Computer Engineering, PDE'S College of Engineering Manjari (bk), Pune 412307, India

⁵ Department of Information Technology, PDEA'S College of Engineering Manjari (bk), Pune 412307, India

* Corresponding author: Jambi Ratnaraja Kumar, ratnaraj.jambi@gmail.com

ABSTRACT

This research paper presents a brief introduction to the key point of Machine Learning (ML) with the application to communication systems. Due to the exceptional accessibility of software and data abilities, there is a great deal of interest in using digital information machine learning thinking to solve issues in a variety of fields. Regarding the phenomenal amount of information and computer facilities, there is a lot more interest in using content-supervised learning methods to resolve obstacles where engineering course techniques are restricted by theoretical or methodological problems. This study starts by clarifying when and why comparable strategies may well be effective. It then goes into the fundamentals of supervised and unsupervised at a high level. Where traditional engineering solutions are being developed Modelling or algorithmic flaws are posing a problem. This paper begins by answering the why and when of these questions. Such methods can be beneficial to resolve real-time problems. It then goes into the fundamentals of classification and regression problems at a world-class level. Exemplifying software to communications infrastructure is presented both for the structured and unstructured interviews by identifying roles performed first at the network's perimeter and cloud bits at multiple levels of the internet protocol suite, with a concentration on the application layer. The core contributions of this research study are as follows: (a) this research study explores the machine learning applications in communication system and networks optimization; (b) it offers an analysis of contributions of machine learning-based anomaly detection approaches to mitigate the security threat and maintains the integrity of entire communication network; (c) additionally, this research study provides further directions for research, future trends as well as challenges including the requirement for intelligent methods for network optimization, signal processing, etc.

Keywords: communication networks; communication systems; machine learning; supervised learning; unsupervised learning

1. Introduction

During the Artificial Intelligence (AI) winter of the late 1980s and early 1990s, awareness that the use of data-driven AI-based technologies in a variety of engineering fields, like as voice recognition analysis and communication systems has increased. Logic-based intelligent systems, the design recognition apparatuses based computational innovations, such as t

on AI, which were concentrated on technologies is fueled by the success of technologies consist of a variety of recent evolutionary optimization schedules,



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Recognition and Evaluation of Heart Arrhythmias via a General Sparse Neural Network

Sanjay Sanamdikar^{1*}, Surendra Waghmare², Satis Patil³, Dipak Patil⁴, Madhuri Borawake⁵, Baban Suryatal⁶

^{1,4} Instrumentation Department, PDEAs College of Engineering Manjari Pune, India.

² ENTC Department, G.H.Raisoni, College of Engineering and Management, Pune, India.

^{3,6} Mechanical Department, PDEAs College of Engineering Manjari Pune, India

⁵ Computer Department, PDEAs College of Engineering Manjari Pune, India

sanamdikar123@gmail.com¹, surendra.waghmare358@gmail.com², sapcoeh@rediffmail.com³, dopatil25@gmail.com⁴,

madhuri.borawake@gmail.com⁵, bksuryatal@gmail.com⁶

Corresponding Author email: sanamdikar123@gmail.com

Abstract: In clinical use, an electrocardiogram (ECG) is an essential medical tool for assessing heart arrhythmias. Thousands of human beings worldwide are affected by different cardiac problems nowadays. As a consequence, studying the features of the ECG pattern is critical for detecting a wide range of cardiac diseases. The ECG is a test which assesses the intensity of the electrical impulses in the circulatory system. In the present investigation, detection and examination of arrhythmias in the heart on the system using GSNNs (General sparsed neural network classifier) can be carried out[1]. In this paper, the methodologies of support vector regression(SVR), neural mode decomposition(NMD), Artificial Neural Network (ANN), Support Vector Machine(SVM) and are examined. To assess the suggested structure, three distinct ECG waveform situations are chosen from the MIT-BIH arrhythmia collection. The main objective of this assignment is to create a simple, accurate, and simply adaptable approach for classifying the three distinct heart diseases chosen. The wavelet transform Db4 is used in the present paper to obtain several features from an ECG signal. The suggested setup was created using the MATLAB programme. The algorithms suggested are 98% accurate for forecasting cardiac arrhythmias, which is greater than prior techniques.

Keywords : Artificial neural networks, General Sparsed Neural Network, heart rhythm disorders, QRS complex average filter, Electrocardiograph, Db4 Wavelet Transform.

I. INTRODUCTION

Cardiovascular arrhythmias are abnormal heartbeats that may make it difficult for the heart to beat regularly. Electrocardiogram (ECG) signals offer important data for the investigation and categorization of various arrhythmia types. For this job, generalised sparse neural networks (GSNNs) may be helpful. To learn the patterns and characteristics that identify various types of arrhythmias, the GSNN model is trained using a dataset of ECG signals with known arrhythmia classifications. Here is a broad explanation of how cardiac arrhythmia analysis and classification using GSNNs can be carried out. The electrocardiogram (ECG) is a widely used procedure in cardiologist for examining patients' heart health. ECGs may be easily collected by placing surface electrodes on the patient's limbs or chest. In its simplest form, an ECG is an electromagnetic depiction of the muscular contractions of the heart. One of the most well-known and often utilised biological signals in the world of medicine is the ECG[3]. By measuring the peak values of R of the ECG signal throughout a single minute of monitoring (It is straightforward to calculate the heart's rhythm in beats per minute (bpm; see Fig. 1.1 ECG waveform). Understanding the ECG signal helps in diagnosing cardiac illness and for understanding how the heart works in various situations. According to the World Health Association, 70 million individuals worldwide suffer from cardiovascular disease. An electrode placed on

in the electrocardiogram (ECG), a testing technique, to gauge the electrical activity of the heart. The shape and pace of a human heartbeat reveal the condition of the heart. It is a less intrusive device that is used to assess cardiac issues and determines a waveform mostly on the skin's surface of a person [4]. Any alterations to the architectural pattern or any anomalies in heart rate or rhythm, which are indications of cardiac arrhythmia, can be seen in an ECG waveform analysis. The length and amplitude of the P-QRS-T wave provide crucial information on the type of cardiac disease. The existence of Na⁺ and K⁺ ions in the blood causes the electrical wave. One of the most important elements of the body is the heart. Through the blood, it gives the patient's body oxygen. The heart functions like a muscle pump. A complex network of arteries, veins, and capillaries links the heart to the rest of the body[5]. The electrocardiogram (ECG) consists of a variety of biopotential signals from human heartbeats. The electrodes are placed on the patient's epidermis to record these biopotential signals. It visibly displays the electrical activity of the heart's muscles. ECG facilitates the transmission of information about the heart's electrical activity to the central nervous system. It is a vital and fundamental part of the diagnostic process with heart problems. It is a valuable and effective tool for determining how serious a heart condition is. The electrical activity of the cardiac muscles is represented by the ECG signal, which is made up of distinctive electrical activation patterns[2]. The ECG signal



Principal

Pune District Education Association's

College of Engineering Manjari (Bk.),

Pune - 412307.

Video Streaming over Multimedia Network using TCP

AMAY BHIMRAO TAYDE¹, VYANKATESH GOPAL DESHMUKKH², RUSHIKESH R. SHINDE³,
ABHISHEK P. TAWARE⁴, PROF. ASHVINI A. BAMANIKAR⁵

^{1, 2, 3, 4} Student, PDEA's College of Engineering, Pune

⁵ Professor, PDEA's College of Engineering, Pune

Abstract- This paper aims to study about Video Streaming Services. Video streaming services have become increasingly popular, especially in the wake of the COVID-19 pandemic. These services have reached every corner of the world and have transformed the way we consume media. The business model of a video live streaming platform involves both a streamer and a platform provider, who simultaneously have an incentive alignment and a payoff conflict. The streaming platform relies on the efforts of streamers to strengthen its market share. Streamers can employ influencer marketing to construct their own additional revenue from commercials, which can affect the sales from the advertisements operated by the platform. In addition to advertising, major revenue sources of video live streaming services include subscriptions. To promote marketers' merchandise, video live streaming platform providers can utilize pre-roll ads or mid-roll ads, which appear before a live video starts or in the middle of a live video.

Indexed Terms- Streaming, On-Demand, Live Streaming, Buffering, Bandwidth, Data Packets, Content Management System (CMS), Library, Recommendations, Feedback, Parental Control.

I. INTRODUCTION

Video streaming services are online platforms that provide multimedia content such as TV shows, movies, music, or audiobooks¹. Here's a brief introduction:

What is Streaming?

Streaming is the continuous transmiss video files from a server to a client. In streaming is what happens when consu or listen to podcasts on Internet-com

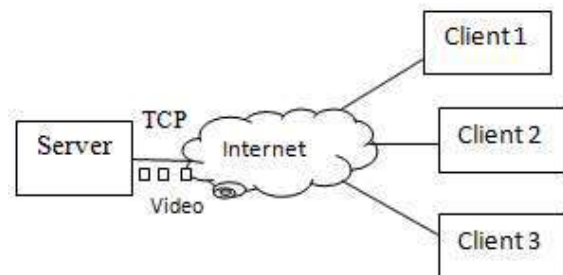
With streaming, the media file being played on the client device is stored remotely, and is transmitted a few seconds at a time over the Internet.

How Does Streaming Work?

Just like other data that's sent over the Internet, audio and video data is broken down into data packets. Each packet contains a small piece of the file, and an audio or video player in the browser on the client device takes the flow of data packets and interprets them as video or audio.

Streaming vs Downloading:

Streaming is real-time, and it's more efficient than downloading media files. If a video file is downloaded, a copy of the entire file is saved onto a device's hard drive, and the video cannot play until the entire file finishes downloading. If it's streamed instead, the browser plays the video without actually copying and saving it



II. FEATURES OF STREAMING SERVICES

Streaming services offer a variety of features to enhance the user experience. Here are some key users often look for in streaming

interface: A simple and intuitive ucial. Statistics show that 70% of

Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Unveiling Market Dynamics through Machine Learning: Strategic Insights and Analysis

¹Dr. Vilas S. Gaikwad, ²Dr. Shailesh Shivaji Deore, ³Govind M. Poddar, ⁴Rajendra V. Patil, ⁵Dr. Deepali Sandeep Hirolikar, ⁶Dr. Madhuri Pravin Borawake, ⁷Dr. Suman Kumar Swarnkar

Submitted: 06/12/2023 Revised: 17/01/2024 Accepted: 27/01/2024

Abstract: Due to their extensive knowledge and potential to change the game, artificial intelligence (ML) and strategic analysis have become significant players in more competitive and global markets. The article "Unveiling Market Dynamics through Machine Learning: Strategic Insights and Analysis" provides the first in-depth analysis of the strong connection between machine learning and market analysis, illustrating how these two fields can collaborate to understand the complex market dynamics. Thanks to this research, businesses may now analyse complex patterns, hidden trends, and untapped opportunities in complicated market economies. He accomplishes this with the help of AI's capabilities. Another essential element of this relationship is emotion analysis, which makes use of the deep learning and natural language processing to examine public sentiment and provide vital information for improving marketing and product development strategies. The ability of ML to recognise fresh opportunities and niche markets gives it a competitive advantage. Furthermore, it excels at proactively identifying anomalies, cracks, and risks. This study highlights the integration of various data sources and the growing significance of ethical considerations in addition to providing a broad overview of ML's applications in market analysis. This research expands our understanding of the potential for data-driven decision-making as we navigate the intersection of ML and strategic market analysis. It also provides a road map for organisations looking to harness ML's transformative power to make knowledgeable, quick, and strategic decisions in today's dynamic business environment.

Keywords: Machine Learning, Market Dynamics, Strategic Insights, Data-driven Decision-making, Predictive Modeling

1. Introduction

Businesses are going through a significant change in how they operate and strategy in the age of digital transformation. Organisations can now acquire unheard-of insights into market dynamics because to the increasing proliferation of data and developments in machine learning (ML). In order to provide readers with a thorough

grasp of how ML approaches can be used to reveal hidden patterns, trends, and opportunities in complicated markets, this paper examines the relationship between machine learning [1] (ML) and strategic analysis. Traditional market study methods frequently fall short of capturing the nuances of today's complex business environment. The amount, speed, and variety of data produced every day make static models and manual data processing inefficient. On the other side, machine learning thrives in this environment of abundant data. Massive datasets and computer capacity enable ML algorithms to sift through enormous volumes of data to find patterns and connections that escape human examination.

Fundamentally, ML enables businesses to forecast future market moves with a level of precision and detail that was previously unachievable. Businesses may predict market trends, consumer behaviour, and even economic indicators by using historical data and techniques like regression, decision trees, and neural networks. Strategic planning is transformed by this predictive power, which enables businesses to effectively allocate resources, respond quickly to shifting market situations, and decision-making procedures [2][3]. Sentiment research, a crucial aspect of is another area where ML thrives. ML assess public attitude towards certain and sectors of the economy by analysing

¹Associate Professor and HOD, Department of Information Technology Trinity College of Engineering and Research Pune vilasgaikwad11@gmail.com

²Associate Professor, Department of Computer Engineering SSVPS B S DEORE College of Engineering Dhule Maharashtra https://orcid.org/0009-0006-6930-5445 shaileshdeore@gmail.com

³Associate Professor, NES's Gangamai College of Engineering, Nagaon, Dhule (Maharashtra), India gmpoddar2811@gmail.com Orcid Id - 0009-00077185-0001

⁴Assistant Professor, SSVPS Bapusaheb Shivajirao Deore College of Engineering, Dhule (M.S.), India patilrajendra.v@gmail.com Orcid id - 0009-0000-1105-0423

⁵AP and HOD, Department of Information Technology, PDEA'S College of Engineering Manjari Bk, Pune hirolikar.ds@gmail.com

⁶AP and HOD, Department of Computer Engine Engineering Manjari Bk, Pune madhuri.borawake@gmail.com

⁷Dept of Computer Science and Engineering, Shri Shri of Professional Management and Technology Raipuu Sumanswarnkar17@gmail.com



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Carbon chain: Transparency in Carbon Credit by Automating Data-Management Using Block chain

Prof. Swati.P.Gade¹, Gayatri.S.Khot²,
Priyanka.B.Khuspe³, Sumit.V.Kolekar⁴,
Vaishnavi.V.Ugalmogale⁵

¹Professor, Department of Computer Engineering , P.D.E.A's College of Engineering, Pune, Maharashtra, India

^{2,3,4,5} Department of Computer Engineering , P.D.E.A's College of Engineering, Pune, Maharashtra, India

¹ swatiunique2006@gmail.com, ² gayatrikhot912@gmail.com, ³ priyankakhuspe09@gmail.com,
⁴ sumitkolekar002@gmail.com, ⁵ vaishnaviu2253@gmail.com

Abstract

A systematic literature review is presented to analyze the art in block chain-based solutions applied to the carbon credit and trading context. This review article is based on literature survey and information gathered from different resources. Carbon emissions have become global challenge, it requires innovative solutions. Carbon credit and trading based on block chain is one of the best solutions. We propose a review on block chain-based platform that makes carbon tokenization secure, transparent from their creation to retirement. Smart contracts are used to automate the verification and trading processes, ensures trust among stakeholders. This paper highlights the capability of block chain technology to evolve carbon credit management by enhancing transparency, traceability, and efficiency. In future, the integration of block chain technology into carbon credit markets can play important role in alleviate climate change.

Keywords – Distributed Ledger Technology (DLT), Smart Contract, Cap-And-Trade scheme (CAT), Carbon Credit Tokenization, Certified Emission Reductions (CERs), Decentralization, Transparency, Security.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Fitness Web Application for Personalized Workout Plans and Nutrition Guidance

Prof. A.A.Bamanikar,

Sagar Jagwal – jagwalsagar@gmail.com,

Dhanshri Jagtap - dhanashrijagtap2307@gmail.com,

Akshy Kalushe - akshaykalushe35@gmail.com,

Dnyaneshwari Gund - gunddnyaneshwari099@gmail.com

Department of Computer Engineering

PDEA'S College of Engineering, Manjari, Pune, India.

1. Abstract

The Fitness Website Project is a dynamic and interactive online platform designed to cater to fitness enthusiasts, offering a comprehensive range of resources, tools, and community engagement opportunities. This project aims to provide a user-centric digital space where individuals can access fitness guidance, track their progress, and connect with like-minded individuals to foster a healthy lifestyle.

Fitness experience through personalized user profiles, visitors can set fitness goals, track workouts, and monitor their progress over time. The platform also offers a diverse selection of workout routines, catering to various fitness levels and preferences, including strength training, cardio workouts, and flexibility exercises

One of the project's key highlights is its nutrition and diet component.

The website provides users with access to customizable meal plans, nutritional information, and dietary tips. This enables individuals to align their fitness goals with a balanced and tailored approach to their nutritional intake

Technical Keywords: Supportive community, Nutrition and diet, Dynamic and interactive online platform.

2. Introduction

In an era defined by technology and information, the pursuit of a healthier lifestyle and physical well-being has become an ever-present goal for individuals of all ages and backgrounds. The desire to lead a healthier life, stay fit, and manage one's wellness has created a significant demand for accessible and user-friendly fitness platforms. These platforms serve as invaluable resources, empowering users to track their progress, set and achieve fitness goals, and foster a sense of community and support.

The integration of modern w
of innovative and feature-rich



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

provided a gateway for the creation
c and engaging user experience.

AI BASED MOCK INTERVIEW EVALUATOR AND ANALYSIS: TO ANALYZE EMOTION,CONFIDENCE, AND KNOWLWDGE

Prof. A.A.Bamanikar ,

Pranjal Barse – pranjalbarse2003@gmail.com,

Dnyaneshwari Kulkarni – dkulkarni1602@gmail.com,

Shubhada Deshmukh – shubhadad.28@gmail.com,

Bhavesh Borse – bhaveshborse076@gmail.com

Department of Computer Engineering

PDEA'S College of Engineering, Manjari, Pune, India.

1. Abstract

Mock interviews are an excellent way to practice for a real job interview. When you conduct a practice interview, you put yourself in a situation that is similar to an actual job interview. It allows job seekers to practice, receive feedback, and improve their skills. A mock interview can also help you develop interview strategies, improve your communication skills, answer difficult questions, and alleviate the nerves that many people feel before a real job interview.

Mock interviews offer a safe environment in which to practice and develop important interview skills such as effective communication, problem-solving, and interpersonal skills. Mock interviews help people gain confidence and reduce anxiety, allowing them to be more comfortable and composed during actual interviews.

Mock interviews provide constructive feedback, allowing individuals to identify and work on areas of weakness. Mock interviews expose candidates to different interview formats and styles, ensuring that they are better prepared for various types of interviews, such as behavioral, technical, and panel

Individuals can improve their self-presentation skills, such as body language, attire, and overall demeanor, by participating in mock interviews.

Practicing with a variety of interview questions in mock interviews allows people to develop well-structured and compelling responses. Mock interviews teach candidates how to effectively manage their time during an interview, ensuring they address key points within the time allotted. Mock interviews help people clarify their career goals and objectives, which can result in more focused and successful interviews. Those who spend time practicing mock interviews outperform their peers in real interviews, giving them an edge in market interviews.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Stock prices predictors with the help of time series using machine learning.

Prof. S. P. Gade^{1}, Kshitija Gurav¹, Vikram Jadhav², Mohit Padole³.*

¹Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

²Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof. S. P. Gade, Email:

Kshitija Gurav, Email: kshitijagurav002@gmail.com

Vikram Jadhav, Email: jadhavvikram421@gmail.com

Mohit Padole, Email: mohit.padole17@gmail.com

ABSTRACT

The purpose of project title stock prices predictor with the help of time series has domain machine learning aims to develop model that can forecast future prices using time series analysis and machine learning techniques. This stock market is known for its volatility making it difficult accurately predict future stock prices however by leveraging historical data and applying time series analysis it is possible to identify patterns and trends then may help in predicting the price of the project will begin by collecting historical stock price data from various sources data will include information such as opening price, closing price, high and low prices, volume, etc. The collector that it will be free process and clean to remove outliers and inconsistent. After the data collection is the project will focus on feature engineering very important features will be selected to potentially include a set of features of the modern technique like moving averages, RSI, MACD, etc. and finally average convert again divergence maybe calculator to capture important market trends and patterns.

Forecasting the stock market movements is an important and challenging task. As the Web information grows, researchers begin to extract information (like news, comments and sentiments) from the Web to facilitate the prediction. However, studies are usually based on only one data source and thus may not capture the stock market movements. In



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Survey on Searchable Encryption against Keyword-Guessing Attack in Cloud computing

Prof. S.V. Phulari, Aniket Chavhan, Sana Patel, Pooja Gaikwad, Sourabh Patil.

Professor, Student, Department Computer Engineering.

Pune District Education Association COE, Manjari

Abstract— A type of encryption called searchable encryption (SE) allows cloud tenants to look for encrypted data while maintaining data security. Many search engine solutions still struggle with Insider Keyword-Guessing Attacks. This implies that the potential keywords can be discovered by internal hackers offline and used for search purposes. Additionally, in current SE systems, a cloud server that is somewhat honest but suspicious may provide inaccurate search results by carrying out a small percentage of retrieval activities in an honest manner. This system can accomplish verifiable search ability and survive internal KGA. We first introduce the basic version of VSEF and then demonstrate how the improved version can simultaneously make dynamic changes to data, encrypt multiple keys, and search for numerous keywords. This shows how important it is for SE to be practical and scalable in real-world applications using advanced encryption techniques.

Keywords—Advanced encryption, insider keyword- guessing attack, multi-keyword search, multi-key encryption.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Ola / Uber price prediction on mobile app or web

Prof. S. P. Gade, Gayatri Hampe, Sayuri Kamble, Amit Ekbote, Sarthak Gadge

Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof. S. P. Gade, Email: swatiunique2006@gmail.com

Gayatri Hampe, Email: gayatrihampe2703@gmail.com

Sayuri Kamble, Email: sayurikamble123@gmail.com

Amit Ekbote, Email: sumitekbote13@gmail.com

Sarthak Gadge, Email: sarthakgadge2002@gmail.com

ABSTRACT

In recent years, Ride-on-Demand (RoD) services such as Uber, Ola, and Rapido have emerged as popular alternatives to traditional taxi/cab services.

These services operate 24/7 and cater to tens of thousands of customers.

Unlike traditional cabs, RoD services do not offer a fixed price. Instead, they utilize Dynamic Pricing to balance supply and demand, taking into account factors such as location, time of booking, ride demand, and driver availability to improve their service.

However, the unpredictable and fluctuating nature of dynamic pricing has posed a significant challenge for customers, leading them to pay higher fares without their knowledge.

To address this issue, it is crucial to estimate dynamic prices accurately and provide the lowest possible fares to customers.

We also evaluate the contribution of different features to dynamic pricing, determining which factors play the most significant role in determining fare prices.

By analyzing the relationship between demand pricing and relevant features extracted from the datasets, we are able to carry out price prediction.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

DeepVision: Deepfakes Detection Using Human Eye Blinking Pattern

Dr.M.P Borawake^{1}, Ranjit lavate¹, Satyajeet Suryawanshi², Vaibhav Tribhuvan³, Ganesh Walunjkar⁴*

¹Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

²Savitribai Phule Pune University Pune, India

Madhuri.borawake@gmail.com

ranjitlavate0118@gmail.com

satyajeetsuryawanshi8600@gmail.com

vaibhavtribhuvan28@gmail.com

ganeshwalunjkar031@gmail.com

ABSTRACT

The ability to detect human emotions and cognitive states through non-invasive means has garnered significant interest in recent years. Human eye blinking patterns, a subtle yet expressive behavior, offer a potential avenue for such detection. This abstract presents a novel approach to utilize eye blinking patterns as a means of abstract detection, focusing on emotion recognition, cognitive workload assessment, and various applications in human-computer interaction and healthcare.

The human eye blinks involuntarily, but their frequency, duration, and regularity can vary in response to emotional states, mental work-load, and various stimuli. Recent advances in computer vision, machine learning, and wearable technology have enabled the capture and analysis of these patterns with high precision. By examining the dynamics of eye blinking patterns, we can gain insights into the individual's mental and emotional states.

KEYWORDS

Eye Blinking Pattern

Eye Blinking

Security

Deep Fake



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Block chain Based E-Voting System

Prof. M.P.Borawake, Sameer Bhor, Ravi Bade, Aniket Sahare, Shivraj Waman

Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof. M. P. Borawake, Email: madhuri.borawake@gmail.com

Sameer Bhor, Email: sameerbhor859@gmail.com

Ravi Bade, Email: ravibade2021@gmail.com

Aniket Sahare, Email: aniketsahare99@gmail.com

Waman Shivraj, Email: shivwaman5@gmail.com

ABSTRACT

Block chain technology has emerged as a disruptive force with the potential to reshape the landscape of electoral systems, offering secure, transparent, and efficient e-voting solutions. This research paper provides a comprehensive analysis of the latest advancements and key challenges associated with block chain-based e-voting systems, offering insights into their potential to revolutionize modern democracy. The paper begins by examining the evolution of block chain technology and its application to e-voting, highlighting recent developments and research findings. It explores the core principles of block chain that ensure tamper-resistant record-keeping, transparency, and trust in the electoral process. Challenges and considerations are also addressed, including identity verification, scalability, regulatory frameworks, and privacy concerns. Recent research on these topics is presented, shedding light on innovative solutions and ongoing debates in the field. The research emphasizes the importance of accessibility and inclusivity, discussing the potential of block chain-based e-voting to reduce barriers to participation for diverse populations. The paper also discusses real-world pilot projects and case studies, providing insights into their successes and challenges. The abstract concludes by underlining the significance of decentralized block chain-based e-voting to enhance the integrity and accessibility of electoral systems while acknowledging the ongoing research and development needed to fully realize their potential in shaping the future of democracy.

Keywords: Block chain, E-Voting System, Secure, Tamper-Resistant, decentralized, Democracy, etc.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Web Application For Innovate and Elevate Ideas

Prof. A. A. Bamanikar, Vaishnavi V Jagadale.

Sakshi P Mane, Shraddha D Walunje

Department of Computer Engineering

PDEA'S College of Engineering, Manjari, Pune, India.

ashwini.bamanikar@gmail.com, jagadalevaishnavi06@gmail.com
manesakshi2424@gmail.com, shraddhawalunje@gmail.com

ABSTRACT

The paper focuses on the usability of Web Application for Innovate and Elevate Ideas from a human-computer interaction (HCI) perspective. The Web Application for Innovate and Elevate Ideas is a platform for young innovators to solve real-world problems by developing innovative solutions. The website plays a crucial role in facilitating the registration, submission, and evaluation processes of the hackathon. The objective of this study is to evaluate the website's design and functionality based on established HCI principles and identify areas for improvement. The research methodology involved a heuristic evaluation of the website by a group of HCI experts, followed by user testing to validate the findings. The results revealed several usability issues that hindered the user experience and suggested improvements that could enhance the website's overall usability. The study concludes that adherence to HCI principles is crucial in designing effective and user-friendly websites, particularly for online events such as competition. The research provides insights and recommendations for website designers and developers to improve the overall user experience of the Innovate and Elevate Ideas website.

Keywords: Human Computer Interaction, Innovate and Elevate Ideas, HCI Principles, Usability, HCI Research.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Dynamic Health Care System -Web Application

Prof. Ashwini.A.Bamanikar, ashwinibamanikar@gmail.com

Swayam M Borude : swayamborude8695@gmail.com

Rutuja R Chavan : crutuja69@gmail.com

Rahil M Shaikh : rahilshaikh8399@gmail.com

Darshan D Walunje : walunjedarshan@gmail.com

Professor, Department of Computer Engineering , P.D.E.A's College of Engineering, Pune, India
Department of Computer Engineering , P.D.E.A's College of Engineering, Pune, India

ABSTRACT -

Web-based healthcare services face significant challenges in the years to come with regard to concepts, strategies, and implementation due to the demanding and delicate nature of the technology involved. Demographic changes including aging populations, labor shortages, and the proliferation of technological instruments are to blame for this. Therefore, Dynamic Health Care is regarded as an essential tactic to solve these problems. The use of information, communication, computer, and sensing technology throughout the full spectrum of tasks and processes that make up the practice and delivery of health care services is referred to as "dynamic health care." Dynamic Healthcare is provided via integrated applications in the healthcare setting, which incorporate a computer, communication, and sensor technology. When it comes to dynamic healthcare data, various definitions and objectives are used. As part of our effort, we created a dynamic healthcare application just for pneumonia, diabetes, and heart disease patients. We constructed a classification model that records a person's symptoms and predicts the likelihood of diseases that the person is suffering from by utilizing machine learning techniques like Random Forest (RF), Decision Tree, Support Vector Machine (SVM), Logistic Regression, K-Nearest Neighbor algorithm (KNN), and Convolutional Neural Network algorithm (CNN). The Django framework for Python is the foundation of this application. The database that will be utilized throughout the web application is MYSQL. Getting a health warning before it's too late is easier and saves time. The dynamic health care model enables users to communicate with healthcare professionals, access medical records, conduct health information research, and exchange messages with one another.

Keywords-

Python, Machine learning, Efficiency Treatment, Django, K- Nearest Neighbor Algorithm (KNN), Support Vector Machine (SVM), Decision Tree, Logistic Regression, Random Forest (RF) Convolutional Neural Network (CNN) Algorithm, MYSQL



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Machine Learning: Smart Health Care System: Leveraging Machine Learning for early detection.

Prof. S. P. Gade^{1}, Prasad Bhavsar¹, Aditya Jadhav², Rushikesh Jawalekar³, Pranav More⁴*

¹Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

²Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof. S. P. Gade, Email:

Prasad Bhavsar, Email: prasadbhavsar567@gmail.com

Aditya Jadhav Email: adityajadhav1811@gmail.com

Rushikesh Jawalekar, Email: rushikeshjawalekar8@gmail.com

Pranav More, Email: morepranav336@gmail.com

ABSTRACT

The purpose of this paper is to show concisely how we can promote chatbots in the medical sector and cure infectious diseases. We can create awareness through the users and the users can get proper medical solutions to prevent disease. We created a preliminary training model and a study report to improve human interaction in databases in. Through natural language processing, we describe the human behaviours and characteristics of the chatbot. In this paper, we propose an Chatbot interaction and prediction model using a deep feedforward multilayer perceptron. Our analysis discovered a gap in knowledge about theoretical guidelines and practical recommendations for creating chatbots for lifestyle improvement programs. Residents who live in rural area normally have limited access to Internet, poor living condition and limited access to healthcare services. Besides, medical specialists are not available every day. As such, quality of healthcare services in rural area is extremely low. In Saudi Arabia, there are approximately 5.69 million people living in rural area (resour

as a framework to develop mobile health application to aid the resour



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Interpreting Doctors Notes using Handwriting Recognition and Deep Learning Techniques

**Prof.Swati.P.Gade¹, Sakshi.B.Mangar²,
Siddhant.A.Takle³,Aditya.R.Kokate⁴**

¹*Professor, Computer Engineering Department, PDEA'S College of Engineering Manjari
(BK) Pune,
Savitribai Phule University Pune - 412307 (Maharashtra) India*

^{2,3,4,5}*Computer Engineering Department, PDEA'S College of Engineering Manjari (BK)
Pune, Savitribai Phule University Pune - 412307 (Maharashtra) India*

swatiunique2006@gmail.com
sakshimangar500@gmail.com
siddhantakle2792@gmail.com
adityakokate33@gmail.com

Abstract:

This Project introduces a Doctor's Prescription System incorporating handwriting recognition for medicine names through a Convolutional Neural Network (CNN) developed with TensorFlow and OpenCV. Comprising the Handwriting Recognition Pipeline and the Doctor's Prescription System App, the pipeline extracts handwritten words from prescription images, while the Android app offers a user-friendly interface for doctors and patients, seamlessly integrating the recognition model.

Keywords— Doctor's Prescription System, Handwriting Recognition, Convolutional Neural Network (CNN), TensorFlow, OpenCV, Android App, Healthcare Digitization, EMNIST Dataset, Flutter, Firebase, Medication Management, Image Processing.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Voice Of Innovation: i Voice Chatbot

Prof. S.V. Phulari^{#1}, Omkar Lomate^{*2}, Girish Kumbhar^{#3},

Tejal Waghmare^{#4}.

[#]Dept. of Computer Science (PDEA's COEM), Savitribai Phule Pune University
Pune, India

Abstract— In the sphere of sophisticated conversational agents, the i Voice Chatbot stands as a revolutionary stride, integrating Google AI's Bard API to bestow an unparalleled blend of intellect, accessibility, and efficacy. This pioneering feat not only elevates India's status in the AI-driven chatbot development but also heralds a new epoch in human-computer engagement.

The crux of innovation within the i Voice Chatbot resides in its seamless fusion with the Bard API, a robust AI tool birthed by Google. This distinctive amalgamation unlocks uncharted territories of chatbot capabilities, endowing the system with the acumen to fathom intricate queries, fashion imaginative textual structures, and furnish holistic responses finely tuned to the user's context and intent.

The i Voice Chatbot surpasses the confines of conventional chatbots through its extraordinary intelligence. The capacity to decipher and grasp an extensive spectrum of natural language inputs, encompassing intricate inquiries, nuanced appeals, and even imaginative cues, sets it leagues ahead of its forerunners. This extraordinary level of intelligence translates into a fluid user experience, empowering individuals to engage with the chatbot in an organic and instinctual manner, assured that their inquiries will be accurately discerned and attended to.

Designing with an emphasis on accessibility and inclusivity, the i Voice Chatbot's vocal interface obviates the necessity for typing, rendering it an optimal solution for those with visual impairments or mobility constraints. Moreover, its aptitude for comprehending an array of accents and dialects ensures accessibility for users from varied linguistic backgrounds.

Keywords: Artificial Intelligent, Chat-Bot , Machine Learning , LLM , NLP , Bard , API , Website User Interface

I. INTRODUCTION

The rapid advancement of artificial intelligence (AI) has permeated various aspects of human life, revolutionizing the way we interact with technology and the world around us. Among the transformative AI-driven innovations, voice-based chatbots have emerged as a powerful tool for enhancing human-computer interaction. These chatbots, equipped with natural language processing (NLP) and machine learning capabilities, enable users to engage in natural conversations, seek information, and complete tasks through voice commands.

The i Voice Chatbot distinguishes itself as a groundbreaking innovation in the realm of chatbots, pioneering the seamless integration of Google AI's Bard API. This unique combination unlocks a new level of intelligence, empowering the chatbot to comprehend complex queries, generate creative text formats, and provide comprehensive responses tailored to the user's context and intent. The i Voice Chatbot's remarkable capabilities are underpinned by its integration with the Bard API, a sophisticated AI tool developed by Google. This powerful API provides the chatbot with access to a vast storehouse of knowledge and the ability to process and understand complex natural language inputs. By leveraging the Bard API's capabilities, the i Voice Chatbot transcends the limitations of conventional chatbots, establishing itself as a truly intelligent and versatile conversational AI system.



In the ever-evolving landscape of technology, the realm of artificial intelligence (AI) has emerged as a transformative force, revolutionizing the way we interact with th
breaking innovations driven by AI, voice-


Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

An Automatic Car Accident Detection Method Based on Cooperative Vehicle Infrastructure Systems

Prof. S.V. Phulari, Vedant Chittyal, Prajwal Karvekar, Razik Mulani.

Professor, Student, Department of Computer Engineering.

Pune District Education Association COE, Manjari

Abstract— With population growth, the demand for vehicles has increased tremendously, which has created an alarming situation in terms of traffic hazards and road accidents. The road accidents percentage is growing exponentially and so are the fatalities caused due to accidents. However, the primary cause of the increased rate of fatalities is due to the delay in emergency services. Many lives could be saved with efficient rescue services. The delay happens due to traffic congestion or unstable communication to the medical units. The implementation of automatic road accident detection systems to provide timely aid is crucial. Many solutions have been proposed in the literature for automatic accident detection. The techniques include crash prediction using smartphones, vehicular ad-hoc networks, GPS/GSM based systems, and various machine learning techniques. With such high rates of deaths associated with road accidents, road safety is the most critical sector that demands significant exploration. In this paper, we present a critical analysis of various existing methodologies used for predicting and preventing road accidents, highlighting their strengths, limitations, and challenges that need to be addressed to ensure road safety and save valuable lives.

Keywords— Car accident detection, C



ing.

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Online Voting System

[A Literature Survey]

Prof A.A.Bamnikar
Project Guide
 Pune District Education
 Association COE Manjari Bk Pune
 India
 Mail Id: Ashvini.bamnikar@gmail.com

Sarthak Shirish Mahajan
Computer Department
 Pune District Education
 Association COE Manjari Bk Pune
 India
 ABC Id: 357744116820
 Mail Id: sarthakmahajan894@gmail.com

Vipul Prakash Raut
Computer Department
 Pune District Education
 Association COE Manjari Bk
 Pune India
 ABC Id: 714476119867
 Mail Id: rautvipul25@gmail.com

Chetan Gyandev Mane
Computer Department
 Pune District Education
 Association COE Manjari Bk
 Pune India
 ABC Id: 938392689934
 Mail Id: cgmane2003@gmail.com

Yogesh Sanjay Patil
Computer Department
 Pune District Education Association COE
 Manjari Bk Pune India
 ABC Id: 722318199223
 Mail Id: yogeshspatil@gmail.com

I. Abstract

An online voting system is a platform that aims to make the election process more efficient and up to date. It allows voters to conveniently cast their votes from using user friendly interfaces. This summary highlights features and considerations for a voting system emphasizing the incorporation of strong security measures, accessibility for different types of users and the use of advanced technologies to ensure that voting is both reliable and confidential. The system includes processes such as user authentication, encryption and multiple layers of verification to prevent fraud and unauthorized access. Additionally the summary explores how an online voting system can potentially increase voter participation by offering convenience and flexibility while addressing concerns regarding cybersecurity, privacy and overall trustworthiness, in voting platforms.

II. Introduction

Welcome to our state-of-the-art online voting system, a robust and secure platform designed to transform democratic processes. Our work is proven using advanced Java frameworks and SQL databases well mixed, providing a seamless and reliable voting experience. Powered by Java, our system boasts a scalable and versatile performance across environments. Using Java's object-oriented principles, we have developed a user interface that assures an intuitive and user-friendly experience. Regular updates and real-time updates enhance the system's reliability and security.



Principal
 Pune District Education Association's
 College of Engineering Manjari (Bk.),
 Pune - 412307.

Anemia Estimation Using a Machine Learning Model

**Prof. S. V. Phulari ,Aashay Patil, Kalpesh Margaj,
Prasad Shimpi and Pradnyesh Nikam**

*Department of Computer Engineering,
Savitribai Phule Pune University, India*

E-mail: theashaypatil@gmail.com

kalpesh2margaj@gmail.com

shimpiprasad013@gmail.com

nikampradnyesh@gmail.com

Abstract:

Anemia is a serious global public health problem that it mainly affects young children, menstruating teenage girls and women and pregnant and postpartum women. WHO estimates that 40% of children aged 6-59 months, 37% of pregnant women and 30% of women aged 15-49 worldwide suffer from anemia. That's how it will before the health of the patient, it is better to estimate it at an early stage and get it cured. We recommend a machine learning model for blood estimation based on circulatory criteria.

Patients with COVID-19 usually have a lower respiratory track disease, although it usually affects other organ systems rule. Hematological manifestations such as thrombocytopenia and a reduced number of lymphocytes and eosinophils is highly prevalent COVID-19 and have prognostic significance. A lot in the final generating as well as retrieving data rapid increase in creativity, so how to understand a large amount usually uncontrolled records that are the subject of information exploration, which is the processing process of finding trends in huge data collection including approach at the intersection of the machine learning, studies and facilities data sources the main cause of natural the development of InfoTech, Information exploration is used in numerous treatments such as health center, services, learning, scams discovery and bioinformatics. In the case of bioinformatics, it helps doctors remove valuable know-how coming from extensive data sets collected in the field of biology as well as individuals get a much better and much cheaper hospital. In hematology laboratory, which is a useful tool in care laboratory information of health status diagnostics, hematological data is a daunting and interesting obligation in a medical investigation region, therefore our company recommends a model that will help produce Comparison of different discriminant and regression approaches using Scikit-Learn.

In the past many decades, each of the generating and also collecting data quickly increases creativity, so how about it understand a large amount of usually unchecked records, i.e., the goal of information research, which is the processing process finding trends in large collections of data, including approaches to root device connection for machine learning, studies and data of the natural development of InfoTech, informa used in many treatments such as health center, fraud detection and bioinformatics. When bio doctors remove valuable know-how coming from collected in the field of biology as individuals ge much more budget friendly hospital. It is a useful hematology laborator information of health diagno.

Hematology data is a daunting and interesting duty area of medical investigation, so we recommend a model to help you create comparison of different discriminant and regression approaches using Scikit-Learn.

We are very pleased to present the preliminary project report on "Estimation of anemia in patients with COVID-19 using a .A Machine Learning Model". I would like to take advantage of this opportunity. I thank my internal guide Prof. S. V. Phulari sir for giving me everything the help and guidance I needed. I am really grateful to them for their kind support, support. Their valuable suggestions were very helpful.

Keywords:

Machine Learning, Hemoglobin, SVM

1. INTRODUCTION

For many decades, each generation and also collection of data is rapidly increasing creativity, so how to make sense of the large amount of usually unchecked records that are the target of information research. Which is the processing process of finding trends in huge collections of data including approaches at the intersection of machine learning, studies and data source facilities is the main reason for the natural development of InfoTech, information exploration is used in many treatments such as health center, services, learning, fraud detection and bioinformatics. In the case of bioinformatics, it helps doctors remove valuable know-how coming from vast datasets gathered in the field of biology and also individuals to get a far better and much cheaper hospital.

In the hematology laboratory, which is a useful tool in the care of laboratory information for the diagnosis of a medical condition, hematology data is a daunting and interesting duty in the field of medical investigation, so we find a model to help us make comparisons of different differences and also regression approaches using Scikit-Learn. In the available data set, ta is divided into four periods: Data selection, records, regression algorithm.

tion techniques used commonly create prototypes estimate the future evolution of the data. The basic ision tree induction is the greedy algorithm



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Security management for transaction and KYC using Blockchain Technology

Prof.Nayana.V.Gawali¹, Sakshi.S.Vacche², Anjali.S.Wakade³,
Pranjal.A.Shewale⁴, Nupur.V.Siddam⁵

¹Professor, Computer Engineering Department, PDEA'S College of Engineering Manjari
(BK) Pune,
Savitribai Phule University Pune - 412307 (Maharashtra) India

^{2,3,4,5}Computer Engineering Department, PDEA'S College of Engineering Manjari (BK) Pune,
Savitribai Phule University Pune - 412307 (Maharashtra) India

2nayana@gmail.com
vacchesakshi@gmail.com
anjaliwakade111@gmail.com
pranjalshewale202@gmail.com
nupurva1407@gmail.com

Abstract:

The electronic know your customer (e-KYC) system allows a banking or identity provider to set up a customer identification data verification process between reliant parties. Most banks deploy their e-KYC system on the cloud due to the efficient resource consumption and high degree of accessibility and availability. The KYC methods employed by banks are entirely reliant on encryption, which is slow and can result in the leakage of consumer information to third-party financial organizations. This system can be made more efficient by utilizing Blockchain technology, which has the potential to automate many human operations while also being resistant to attacks of any kind. The immutable blockchain block and its distributed ledger are an ideal complement to the KYC procedure. Fraud detection can be automated with the addition of smart contracts. We can use any type of KYC to store KYC identification details. As a result, banks can create a shared private blockchain within the bank's premises that can be used to validate documents. This gives the user control over their sensitive documents, while simultaneously making it easy for banks to access the records required for compliance.

Keywords—e-KYC, authentication, AES, key management, access control, block chain



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

IMPLEMENTATION REAL-TIME CHAT APPLICATION

Sairaj Yeshwante¹, Narendra Choudhary², Rushikesh Walke³, Sushant Mane⁴ and Prof. Nayana V Gawali⁵

¹Computer science, Savitribai Phule Pune University, India

E-mail:

sairajyeshwante7720@gmail.com

²Computer science, Savitribai Phule Pune University, India

E-mail:

E-choudharynarendra1361@gmail.com

³Computer science, Savitribai Phule Pune University, India

E-mail: rushiwalke001@gmail.com

⁴Computer science, Savitribai Phule Pune University, India

E-mail: sushantmane348@gmail.com

⁵Computer science (Prof), Savitribai Phule Pune University, India

E-mail: 2nayna@gmail.com

1. ABSTRACT

The rapid expansion of the Internet has prompted a growing number of individuals to favor online communication tools. Conventional real-time chat software generally takes the form of desktop applications that adhere to client-server (C/S) architecture, necessitating the installation of dedicated client programs. In web-based real-time chat solutions dispense with the need for additional client software, facilitating seamless visual communication directly within a web browser. This particular real-time chat application leverages HTML5. The system is composed of a fundamental information management module, a chat communication module, and a space management module. The findings of tests conducted on this system underscore its exceptional suitability for real-world online environments, as it delivers robust security, efficiency, and straightforward maintenance and scalability.

Keywords:

Internet, real-time chat software, security, client-server architecture, web-based real-time chat solutions

2. INTRODUCTION

Real-time messaging and communication applications, commonly referred to as real-time chat apps, serve as essential tools for instant interaction between users. These versatile applications are widely utilized in both personal and professional communication. Their popularity due to their convenience and effectiveness.

Real-time communication apps typically boast user-friendly interfaces, simplifying the process of signing up, logging in, and initiating conversations. They offer a wide range of features. In the realm of real-time chat applications, a diverse range of research has been conducted to enhance the functionality and performance of these tools.

3. LITERATURE REVIEW

SR. NO	YEAR	TITLE & AUTHORS	METHODOLOGY	ADVANTAGES	DISADVANTAGES
1	2022	Design and Implementation of Web-Based Real-Time Chat Interfacing Server	The paper focuses on developing a web-based real-time chat server to create flexible server-side applications in a network environment	This server offers faster performance when compared to applications built using MySQL and PHP.	One challenge with this application is the difficulty in maintenance when there is a significant increase in the user base
2	2019	A Lightweight and Efficient Secure Hybrid RSA Messaging Scheme With Four-Layered Authentication Stack	Four-layered authentication for user privacy. This paper introduces a messaging scheme with a four-layered authentication approach to enhance user privacy	The scheme is designed to provide users with a seamless and speedy experience in their interactions	However, it can be relatively slow due to the handshaking process required to establish connections.
3	2017	Real-Time Chat Application	The paper discusses the development of a real-time chat application using technologies such as React, Firebase, HTML, CSS, and JavaScript.	The application aims to provide users with a user-friendly interface and incorporates advanced features for enhanced user experience	A challenge associated with this application is the complexity of maintenance, especially when the user base experiences significant growth
4	2011	Development of a Real-Time Chat Application on an Intelligent Network	The paper focuses on the development of a real-time chat application on an intelligent network that utilizes fuzzy logic to determine the priority of each client.	This approach results in a more efficient utilization of server resources and time	However, it may experience reduced performance when dealing with heavy computing traffic



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

A MACHINE LEARNING APPROACH FOR EARLY DETECTION AND PREVENTION OF OBESITY AND OVERWEIGHT

Prof. M.P.Borawake

Kshitij Barapatre, Juee Shelke, Abhishek Tavhare, Shravani Wandhekar

Dept. of Computer Engineering, PDEA's College Of Engineering, Pune, India

Prof. M.P.Borawake, Email:

Kshitij Barapatre, Email: kshitijbarapatre59@gmail.com

Juee Shelke, Email: jueeshelke36@gmail.com

Abhishek Tavhare, Email: tavhareabhishek78@gmail.com

Shravani Wandhekar, Email: shravanibandhekar01@gmail.com

ABSTRACT

Obesity and overweight have become a global epidemic that poses significant health and economic challenges. Early detection and prevention are essential to mitigate the negative impact on individuals and society. Conventional methods for identifying at-risk individuals and implementing prevention measures are often insufficient due to their limited scalability and effectiveness. This research proposes a novel machine learning-based approach to address these issues and improve early detection and prevention of obesity and overweight.

The proposed machine learning system starts with data collection and pre-processing, where we collect information about individuals' demographics, medical history, physical activity, and dietary habits. Using a variety of features, we then apply advanced feature detection techniques to extract relevant information. We then employ predictive models, which include decision trees, support vector machines and deep learning neural networks, to develop accurate predictive models. These models aim to identify individuals at risk of obesity and overweight and provide a proactive and personalized approach for early :curacy.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Automated Document Verification System Using Digital Signature And OCR

Prof. N.V.Gawali^{1*}, Arati Jagdale¹, Swaranjali Mule², Navin Anand³, Chetan Badgujar⁴

¹Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof.N.V.Gawali, Email: 2nayna@gmail.com

Arati Jagdale, Email: artijagdale23@gmail.com

Swaranjali Mule, Email: swaranjalimule270@gmail.com

Navin Anand, Email: anandnavin261@gmail.com

Chetan Badgujar, Email: chetanbadgujar182@gmail.com

ABSTRACT:

The government of India routinely formulates diverse welfare and development initiatives through its ministries. These initiatives, commonly referred to as schemes, necessitate a broad array of identity documents for program enrollment. During the verification process, these documents undergo meticulous scrutiny by government authorities to ensure their legitimacy. However, this manual verification process is time-consuming and susceptible to inefficiencies. There is a pressing need to address challenges such as counterfeiting and tampering, which pose threats to the authenticity of submitted documents. In order to streamline and enhance this verification procedure, our proposed system leverages digital signature verification and Optical Character Recognition(OCR) technology for automated document authentication. This approach not only expedites the verification process but also addresses concerns related to user authentication, data integrity, and the confidentiality of data generation.

Keywords: OCR, Document Verification, Digital Signature

1.INTRODUCTION:

Various documents serve as crucial identifiers for individuals, confirming their citizenship within a given country. The government of India has instituted numerous citizen-centric schemes, tailored to factors such as financial status, caste, gender, and more. Access to these schemes hinges on possessing the requisite documentation. In a landscape where manual processes dominate, particularly in India, document authenticity verification is predominantly carried out through automated document verification using image processing. Image processing, a versatile field, is employed to extract pertinent information from images. Specifically, our system utilizes Image Processing Algorithms (IPAs) to identify symbols indicative of document authenticity. By comparing these symbols with their authentic counterparts, the system distinguishes between genuine and counterfeit documents.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Suspicious Activity Detection

Prof. Nayana.V.Gawali

Computer Engineering Department,
PDEA'S College of Engineering
Manjari (BK) Pune, Savitribai Phule
University Pune – 412307
(Maharashtra) India
2nayana@gmail.com

Sakshi.S.Mane

Computer Engineering Department,
PDEA'S College of Engineering
Manjari (BK) Pune, Savitribai Phule
University Pune – 412307
(Maharashtra) India
sakshi.mane4902@gmail.com

Aditi.K.Shinde

Computer Engineering Department,
PDEA'S College of Engineering
Manjari (BK) Pune, Savitribai Phule
University Pune – 412307
(Maharashtra) India
aditishinde290@gmail.com

Bhagyashri.S.Chame

Computer Engineering Department,
PDEA'S College of Engineering
Manjari (BK) Pune, Savitribai Phule
University Pune – 412307
(Maharashtra) India
bhagyashrischame02@gmail.com

Prasad.S.Bhumkar

Computer Engineering Department,
PDEA'S College of Engineering
Manjari (BK) Pune, Savitribai Phule
University Pune – 412307
(Maharashtra) India
prasadbhumkar23@gmail.com

Abstract—Suspicious Activity is predicting the body part or joint locations of a person from an image or a video. This project will entail detecting suspicious human Activity from real-time CCTV footage using neural networks. Human suspicious Activity is one of the key problems in computer vision that has been studied for more than 15 years. It is important because of the sheer number of applications which can benefit from Activity detection. For example, human pose estimation is used in applications including video surveillance, animal tracking and behavior understanding, sign language detection, advanced human-computer interaction, and marker less motion capturing. Low cost depth sensors have limitations like limited to indoor use, and their low resolution and noisy depth information make it difficult to estimate human poses from depth images. Hence, we plan to use neural networks to overcome these problems. Suspicious human activity recognition from surveillance video is an active research area of image processing and computer vision. Through the visual surveillance, human activities can be monitored in sensitive and public areas such as bus stations, railway stations, airports, banks, shopping malls, school and colleges, parking lots, roads, etc. to prevent terrorism, theft, accidents and illegal parking, vandalism, fighting, chain snatching, crime and other suspicious activities. It is very difficult to watch public places continuously, therefore an intelligent video surveillance is required that can monitor the human activities in real-time and categorize them as usual and unusual activities; and can generate an alert.

Keywords—Malware, Phishing, Suspicious wire transfers, Identity theft

I. INTRODUCTION

Detecting suspicious activity is crucial across various domains, from cybersecurity to financial transactions and public safety. It involves the use of advanced technologies, algorithms, and vigilant monitoring to identify behaviours or patterns that deviate from the norm and could potentially pose a threat or risk. In cybersecurity, suspicious activity detection revolves around monitoring network user behaviours to identify anomalies that pose a cyber threat. This includes unusual unauthorized access attempts, malware activity patterns.

In the financial sector, suspicious activity detection aims to prevent fraud and money laundering by monitoring transactions for irregularities such as unexpected large transfers, frequent small transactions to evade detection, or transactions involving blacklisted entities. General surveillance for public safety involves identifying behaviours or activities that could signal potential threats, like loitering in sensitive areas, unattended bags, or individuals displaying aggressive or suspicious behaviour.


Advanced technologies such as artificial intelligence, machine learning, and big data analytics play a pivotal role in enhancing the detection of suspicious activities. These technologies enable the creation of models that learn from vast amounts of data, allowing for the identification of complex patterns and anomalies that might evade traditional rule-based systems. The ultimate goal of suspicious activity detection is to enable proactive measures, such as alerting security teams or triggering automatic responses, to mitigate risks, prevent potential threats, and ensure the safety and security of systems, finances, and public spaces.

II. LITERATURE SURVEY

Paper Name: ESMD: Enhanced Suspicious Message Detection Framework in Instant Messaging Applications

Author: Mohd. Mahmood Ali, Mohammad S. Qaseem

Abstract : The excessive use of Instant Messaging Applications (IMA) and Social Networking Sites (SNS) has tremendously increased the suspicious information sharing activity which in turn is effectively used for evil purposes too. Many of terrorist and extremist organizations use these as a means of latent untraced communication for criminal activities. Surveillance of instant messages which usually include abbreviated or short-form words with malicious intent are difficult to detect. These words cannot be detected by an earlier OSMD surveillance tool, resulting in the concealment of suspicious messages. For detecting suspicious messages, the SFC program is proposed for renamed as Enhanced Suspicious Message Detection Framework that converts short form into full form and then categorizes the type of crime. Machine learning-based information extraction technique and predefined rules are used for the


Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Analyze and Forecast the Cyber Attack Detection Process using Machine Learning Techniques

Prof. N.V. Gawali^{1*}, Nahush Hirolikar¹, Harshvardhan Kadam², Ashutosh Joshi³, Akash Gore⁴

¹Dept. of Computer Engineering, PDEA's College of Engineering, Pune, India

Prof.N.V.Gawali , Email: 2nayna@gmail.com

Nahush Hirolikar, Email: nahush.hirolikar@gmail.com

Harshvardhan Kadam,

Email:kadamharshvardhan7@gmail.com

Ashutosh Joshi, Email: ashutoshj701@gmail.com

Akash Gore, Email: akashgore1509@gmail.com

ABSTRACT:

In the increasingly digitalized world, cybersecurity has become a paramount concern. With the rising sophistication of cyber threats, traditional rule-based intrusion detection systems have proven inadequate in identifying and mitigating modern cyber-attacks. Machine learning techniques have emerged as a promising solution to enhance cyber-attack detection and response. This abstract provides an overview of the process, challenges, and the potential for forecasting in the domain of cyber-attack detection using machine learning. The cyber-attack detection process involves data collection, preprocessing, feature engineering, model training, and real-time monitoring. Machine learning algorithms, particularly supervised and unsupervised learning methods, are employed to classify and detect anomalous patterns within network and system data. Anomalies may signify potential cyber-attacks, including but not limited to malware infections, unauthorized access, and data breaches.

Keywords: Cyber Attack Detection, Machine Learning, Data Preprocessing, Feature Engineering

1.INTRODUCTION:

In today's interconnected and digitized world, cybersecurity is an ever-growing concern. With cyber threats becoming more sophisticated and prevalent, organizations and individuals alike are facing an ongoing battle to protect their digital assets and sensitive information. Cyber-attack detection is a pivotal component of cybersecurity strategies, as it serves to identify and mitigate malicious activities before they cause substantial harm. While traditional rule-based intrusion detection systems have struggled to keep pace with the continuously evolving network threats, machine learning techniques have emerged as a crucial solution. In the norm, they often struggle to keep up with the rapidly changing threat landscape. Here the integration of machine learning techniques is crucial for effective cyber-attack detection and response.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



Sentiment Analysis of Customer Reviews using Pre-trained Language Models

Sohail Imran Khan¹, Shashikant V. Athawale², Madhuri Pravin Borawake³, Makarand Y Naniwadekar⁴

Submitted: 26/03/2023

Revised: 27/05/2023

Accepted: 12/06/2023

Abstract: Due to the increasing number of reviews, it has become more important for businesses to analyze their customer's sentiments. This paper presents a framework that uses pre-trained language models such as BERT, XLNet, and Electra to analyze these sentiments. The framework is based on the Sentiment140 dataset which contains over 1.6 million tweets with tags. This collection of sentiments allows us to perform an evaluation of the models' performance. The goal of this paper is to analyze the effectiveness of these models in categorizing and understanding the sentiments in customer reviews. BERT, for instance, has demonstrated exceptional performance in various tasks related to natural language processing. Another model that is transformer-based is XLNet, which adds more capabilities by utilizing permutation-based learning. On the other hand, the new generation of model, known as Electra, focuses on the generator-discriminator learning. Through the incorporation of these models, we can leverage the contextual understanding of the sentiments in the customer reviews. In this paper, we thoroughly examine the performance of the different models in the framework for sentiment analysis. We tested their precision, recall, F1-score, and accuracy in identifying and categorizing the sentiments in customer reviews. We also discuss the impact of adjusting the models on the task, as well as the tradeoffs between performance gains and computational resources. The findings of the study provided valuable information on the utilization of pre-trained models for analyzing customer reviews. We analyzed the performance of the different models BERT, XLNet, Electra, and BERT, revealing their weaknesses and strengths. This helps businesses identify the best model for their sentiment analysis needs. The study's findings have contributed to the advancement of sentiment analysis and natural language processing. It offers valuable recommendations that will aid in the future research efforts.

Keywords: Sentiment analysis, customer reviews, pre-trained language models, BERT, XLNet, Electra, Sentiment140 dataset, transformer models, fine-tuning.

1. Introduction

The field of sentiment analysis is rapidly expanding. It uses NLP to analyze and interpret the data that people share on social media and other platforms. With the increasing number of channels for feedback and comments, organizations can now benefit from this technology. Sentiment analysis is a process that can be used to analyze and interpret the data that people share on social media. It can help organizations improve their decision-making capabilities and develop marketing strategies[1]–[3]. Due to the emergence of deep learning models, such as those used in sentiment analysis, the field of this technology has been greatly expanded. These models have been able to perform various tasks such as detecting token replacements accurately[4], [5].

Due to their ability to analyze and interpret complex data, such as semantic relationships and linguistic patterns, deep learning models have been widely used in the field of sentiment analysis. The Twitter dataset known as Sentiment140 has gained widespread popularity as a standard reference for sentiment analysis queries. Its sizable collection of tweets, which includes a wide range of topics and sentiments, makes it a suitable training material and evaluation aid for models in the field. The goal of this study is to analyze the customer reviews generated by the Sentiment140 dataset using pre-trained models. These models are known to perform well in capturing semantic relationships and contextual information[6]–[10].

The models can learn about the various sentiment patterns in the Twitter dataset by taking advantage of the training they've received from large-scale simulations. The process is carried out in two phases: pre-processing the data and fine-tuning the models[11]. The first step involves cleaning the data before it is fed into the models. The methods used to do this include text cleaning, and vectorization. In order to perform sentiment analysis, it is important to consider the imbalanced classes in the data. This is because it comes to sentiment analysis. This issue

¹Assistant Professor, Department of Business Administration, Lebanese French University, Erbil-Iraq

²Assistant professor, Department of Computer Engineering, AISSMS COE, Pune, India

³Department of Computer Engineering, Pune District Education Association's College Of Engineering, Manjari Maharashtra, India

⁴Assistant Professor, Department of Chemical Engineering, Pune, India

sohailkhan@lfu.edu.krd¹, svathawale@gmail.com², madhuri.borawake@gmail.com³, makarand.chem@puneuniversity.edu.in⁴

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Intelligent Conversational Agents Based Custom Question Answering System

Nitin Sakhare

BRACT's Vishwakarma Institute of Information Technology, Pune

Jyoti Bangare

MKSSS's Cummins College of Engineering for Women, Pune

Deepika Ajalkar

G.H. Raisoni College of Engineering and Management, Pune

Gajanan Walunjkar

Army Institute of Technology, Pune

Madhuri Borawake

PDEA's College of Engineering, Pune

Anup Ingle

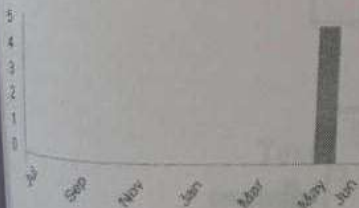
BRACT's Vishwakarma Institute of Information Technology, Pune

Keywords: Tortoise TTS, Custom Question Answering, VOCA, FLAME, GAN

ABSTRACT

Intelligent conversational agents have become increasingly popular in recent years, and they have numerous applications in education, customer service, and entertainment. In this paper, we present an intelligent conversational agent which will act like a historical personality. The goal of this research is to create a system that can provide accurate and engaging information about historical figures in a conversational manner. The digital characters respond to questions by providing audio responses and changing their facial expressions through lip-syncing. The model utilizes the Azure custom answering service to generate question-answer pairs, which are used to train the model to provide accurate answers to questions. The voice of the digital characters is cloned using the Tortoise TTS model of the TortoiseAI team. The audio responses generated by the voice cloning model are then utilized in conjunction with the VOCA and FLAME models and utilize an end-to-end speech-driven facial animation system based on a temporal GAN. The temporal GAN relies on a generator and three discriminators (frame, sequence, and synchronization discriminators) that drive the generation of an auto-lip-sync talking head using only a still 2D image of a person and a voice clip as input for lip-syncing and facial expressions of the digital characters. The model's subjective listening test evaluated the lip-syncing and facial expressions, demonstrating that the digital characters produced believable and accurate responses. The proposed system allows users to add new characters and is suitable for educational deployment. User study results demonstrate high accuracy and engaging user experience, suggesting our approach is a promising advancement in educational conversational agents.

DOWNLOADS



REFERENCES

M.Z. Jabeen, S., Khan, M., U., 2021. "A Realistic Image Generation Model". *Access*, vol. 9, pp. 1250-1260, 2021, doi: 10.1109/ACCESS.2021.3081111

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Fully Trained Generative Adversarial Networks, in



Intelligent Conversational Agents Based Custom Question Answering System

Nitin Sakhare^{1*}, Jyoti Bangare², Dr. Deepika Ajalkar³, Dr. Gajanan Walunjkar⁴, Dr. Madhuri Borawake⁵, Dr. Anup Ingle⁶

Submitted: 11/02/2023

Revised: 12/04/2023

Accepted: 09/05/2023

Abstract: Intelligent conversational agents have become increasingly popular in recent years, and they have numerous applications in education, customer service, and entertainment. In this paper, we present an intelligent conversational agent which will act like a historical personality. The goal of this research is to create a system that can provide accurate and engaging information about historical figures in a conversational manner. The digital characters respond to questions by providing audio responses and changing their facial expressions through lip-syncing. The model utilizes the Azure custom answering service to generate question-answer pairs, which are used to train the model to provide accurate answers to questions. The voice of the digital characters is cloned using the Tortoise TTS model of the TortoiseAI team. The audio responses generated by the voice cloning model are then utilized in conjunction with the VOCA and FLAME models and utilize an end-to-end speech-driven facial animation system based on a temporal GAN. The temporal GAN relies on a generator and three discriminators (frame, sequence, and synchronization discriminators) that drive the generation of an auto-lip-sync talking head using only a still 2D image of a person and a voice clip as input. For lip-syncing and facial expressions of the digital characters. The model's subjective listening test evaluated the lip-syncing and facial expressions, demonstrating that the digital characters produced believable and accurate responses. The proposed system allows users to add new characters and is suitable for educational deployment. User study results demonstrate high accuracy and engaging user experience, suggesting our approach is a promising advancement in educational conversational agents.

Keywords: Tortoise TTS, Custom Question Answering, VOCA, FLAME, GAN.

1. Introduction

In recent years, advances in artificial intelligence and machine learning have led to the creation of digital characters that can interact with humans in a more natural and engaging way. Digital characters can be used in various applications, such as virtual assistants, customer service chatbots, and video game characters. One important aspect of creating believable digital characters is ensuring that their facial expressions and lip-syncing are accurate and natural. Lip syncing involves synchronizing the movement of a character's mouth with the audio of their speech. In the past, lip-syncing was a time-consuming and difficult task that required a lot of manual work. However, recent advances in deep learning have led to the development of models that can generate accurate lip-syncing automatically [1]. In this research paper, we present a paper that involves the creation of digital characters of historical figures, including Shivaji Maharaj and Albert Einstein, to answer questions visually. The digital characters respond to questions by providing audio responses and changing their facial

expressions through lip-syncing. The model utilizes the Azure custom answering service to generate question-answer pairs, which are used to train the model to provide accurate answers to questions. The Azure custom answering service is a cloud-based natural language processing service that allows users to build custom question-answering models. It uses machine learning to extract relevant information from a knowledge base and provide accurate answers to user questions [2]. The voice of the digital characters is cloned using the Tortoise TTS model of the TortoiseAI team. The Tortoise TTS model is a neural text-to-speech model that can generate natural-sounding speech from text[3]. It uses deep learning to synthesize speech that sounds similar to a specific voice. We created a dataset by clipping audio files from movies and YouTube videos to train the Tortoise TTS model to clone the voices of Shivaji Maharaj and Albert Einstein. The audio responses generated by the voice cloning model are further processed using the VOCA and FLAME models for achieving lip-syncing and facial expressions synchronization. These models contribute to creating expressive audiovisual outputs. By using a voice cloning model with the VOCA and FLAME models, our system achieves synchronized audiovisual outputs, providing an immersive and engaging experience for users. The model's subjective

Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



ELEVATING QR CODE SECURITY THROUGH ENHANCED VISUAL SECRET SHARING

KIRTI T. KAMTHE, Department Of Computer Engineering , Trinity College Of Engineering And Research Savitribai Phule Pune University, India

PRASAD BHOSLE, Department Of Computer Engineering , Trinity College Of Engineering And Research Savitribai Phule Pune University, India

RUTIKA SHAH, Department Of Computer Engineering , Trinity College Of Engineering And Research Savitribai Phule Pune University, India

Abstract

Quick Response (QR) codes have been widely used in applications such as data storage and high-speed machine reading. Anyone can gain access to the information stored in QR codes; therefore, they are unsuitable for encoding secret information without the addition of cryptography or other protection. In this paper, we propose a visual secret sharing scheme to encode a secret QR code into several shares. In contrast with other techniques, the shares in our scheme are valid QR codes that can be decoded with some specific meaning by a standard QR code reader, thereby avoiding raising suspicion in potential attackers. Moreover, the secret message is recovered by XOR-ing the qualified shares, an operation that can easily be performed using smartphones or other QR scanning devices. Experimental results show that the proposed scheme is both feasible and reasonably secure. Our scheme's high sharing efficiency is also highlighted in this paper.

Keywords— QR (Quick Response) Code, healthcare, Health Monitoring, QR Code Technology, Medical Records

I. INTRODUCTION

Quick Response (QR) codes are two-dimensional barcodes that can be used to store a variety of information, such as text, URLs, and contact information. QR codes are widely used in a variety of applications, such as mobile payments, product tracking, and marketing. However, QR codes are also vulnerable to tampering and counterfeiting. To address this issue, researchers have proposed using blockchain technology to improve the security of QR codes. One way to improve the security of QR codes is to use visual secret sharing (VSS). VSS is a cryptographic technique that allows a secret image to be split into two or more shares, such that the secret image can only be reconstructed by combining the shares. Blockchain can be used to improve the security of VSS by providing a tamper-proof way to store the shares. This can help to prevent attackers from tampering with the shares or from forging new shares. The remainder of this paper is organized as follows. Section II introduces some preliminaries concerning our study. The proposed scheme is described in Section III, where contrastive and secure properties are theoretically proved. Experiments and Comparisons are presented in Section IV to illustrate the feasibility of this work and demonstrate how it improves on previous work. Finally, Section V provides conclusions. Modern commercial applications employ QR codes in brand promotion, enriching consumer usage experier promotional videos, web links, etc governments for the effective deli simplicity of QR code generation & extensive adaptation by commercia the consumer to connect to the IoT

UGC CARE Group-1,

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

ing product information, including tegrated with service platforms of trative services to the public. The phones and IoT has harnessed their]. For an example, QR codes allow let scan. Having all objects marked



MEDICAL DATA APPLIED QR CODE FOR PRIVACY PROTECTION USING AES ALGORITHM, ONE TIME PASSWORD PROTOCOL AND QR CODE GENERATOR ALGORITHM

Kirti T. Kamthe, Prasad Bhosle, Rutika Shah, Department of Computer Engineering , Trinity College of Engineering and Research, Savitribai Phule Pune University, India

ABSTRACT:

Medical data are an ever growing source of information generated from hospitals consisting of patient records in the form of hard copies which can be made easier and convenient by using QR Code of the patient details. Our aim is to build a Health-care Portal system which will provide the features like clinical management, patient records, disease prediction and generate QR Code for every patient as per there updated disease information.

There is a growing concern in the medical field, both on the side of physicians and other care providers as well as on the insurance and payer side about the impact medication non-adherence has on health care outcomes and costs. The widespread uses of smartphones at an unprecedented rate have revolutionized the way people access to information particularly in the health care sector. The use of mobile healthcare applications is a dynamic field and has received great attentions lately. This development provides mobile technology more attractive for mobile health (m-health) applications. The m-health is defined as a wireless telemedicine involving the use of mobile telecommunications and multimedia technologies and their integration with mobile healthcare delivery systems. Including human in authentication protocols, while guaranteeing, is not simple in light of their restricted capacity of calculation and remembrance. We exhibit how careful visualization outline can improve the security as well as the convenience of authentication. We propose health care service for generate QR Code through web/android application.

Keywords: QR (Quick Response) Code, healthcare, mobile health (m-health), Health Monitoring, QR Code Technology, Medical Records, etc.

INTRODUCTION

In medical management, more and more information technologies are applied to improve work efficiency. For example, the hospital information management system is used to carry out a patient's basic information and medical management, the wrist one-dimensional QR code is employed to quickly read or input a patient's identity (ID) and so on. Information technology brings convenience while at the same time there are certain secure drawbacks in several typical scenarios because of immature technology or management vulnerability, such as, the health record transparency leaks user privacy, access to view the medical privacy record is not strictly controlled, infusion confirmation is without technical authentication, patient wrist ID is easy to be forged, payment is not convenient and so on.[5]

The objective of this project is information. to develop a system where a person can enter his/her medical The system mainly focuses on the ability to quickly access information in case of any emergency. The users will be able to see the details of the person who needs any kind of medical attention. The system provides the information of the person, which includes his recent medical records and also personal details.

Most current e-/m-healthcare systems require doctors (or svstem administrators) to participate in medical information processing, operations and privacy violation system that can automatically and can address these two problems, p

effectiveness caused by manual rs' private data. A medical expert t but reduce doctors' participation general physical examinations. [8]

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Recognition and Evaluation of Heart Arrhythmias via a General Sparse Neural Network

Sanjay Sanamdikar^{1*}, Surendra Waghmare², Satis Patil³, Dipak Patil⁴, Madhuri Borawake⁵, Baban Suryatal⁶

^{1,4} Instrumentation Department, PDEAs College of Engineering Manjari Pune, India.

² ENTC Department, G.H.Raisoni, College of Engineering and Management, Pune, India.

^{3,6} Mechanical Department, PDEAs College of Engineering Manjari Pune, India

⁵ Computer Department, PDEAs College of Engineering Manjari Pune, India

sanamdikar123@gmail.com¹, surendra.waghmare358@gmail.com², sapcoeh@rediffmail.com³, dopatil25@gmail.com⁴,

madhuri.borawake@gmail.com⁵, bksuryatal@gmail.com⁶

Corresponding Author email: sanamdikar123@gmail.com

Abstract: In clinical use, an electrocardiogram (ECG) is an essential medical tool for assessing heart arrhythmias. Thousands of human beings worldwide are affected by different cardiac problems nowadays. As a consequence, studying the features of the ECG pattern is critical for detecting a wide range of cardiac diseases. The ECG is a test which assesses the intensity of the electrical impulses in the circulatory system. In the present investigation, detection and examination of arrhythmias in the heart on the system using GSNNs (General sparsed neural network classifier) can be carried out[1]. In this paper, the methodologies of support vector regression(SVR), neural mode decomposition(NMD), Artificial Neural Network (ANN), Support Vector Machine(SVM) and are examined. To assess the suggested structure, three distinct ECG waveform situations are chosen from the MIT-BIH arrhythmia collection. The main objective of this assignment is to create a simple, accurate, and simply adaptable approach for classifying the three distinct heart diseases chosen. The wavelet transform Db4 is used in the present paper to obtain several features from an ECG signal. The suggested setup was created using the MATLAB programme. The algorithms suggested are 98% accurate for forecasting cardiac arrhythmias, which is greater than prior techniques.

Keywords : Artificial neural networks, General Sparsed Neural Network, heart rhythm disorders, QRS complex average filter, Electrocardiograph, Db4 Wavelet Transform.

I. INTRODUCTION

Cardiovascular arrhythmias are abnormal heartbeats that may make it difficult for the heart to beat regularly. Electrocardiogram (ECG) signals offer important data for the investigation and categorization of various arrhythmia types. For this job, generalised sparse neural networks (GSNNs) may be helpful. To learn the patterns and characteristics that identify various types of arrhythmias, the GSNN model is trained using a dataset of ECG signals with known arrhythmia classifications. Here is a broad explanation of how cardiac arrhythmia analysis and classification using GSNNs can be carried out. The electrocardiogram (ECG) is a widely used procedure in cardiologist for examining patients' heart health. ECGs may be easily collected by placing surface electrodes on the patient's limbs or chest. In its simplest form, an ECG is an electromagnetic depiction of the muscular contractions of the heart. One of the most well-known and often utilised biological signals in the world of medicine is the ECG[3]. By measuring the peak values of R of the ECG signal throughout a single minute of monitoring (It is straightforward to calculate the heart's rhythm in beats per minute (bpm; see Fig. 1.1 ECG waveform). Understanding the ECG signal helps in diagnosing cardiac illness and for understanding how the heart works in various situations. According to the World Health Association, 70 million individuals worldwide suffer from cardiovascular disease. An electrode placed on

in the electrocardiogram (ECG), a testing technique, to gauge the electrical activity of the heart. The shape and pace of a human heartbeat reveal the condition of the heart. It is a less intrusive device that is used to assess cardiac issues and determines a waveform mostly on the skin's surface of a person [4]. Any alterations to the architectural pattern or any anomalies in heart rate or rhythm, which are indications of cardiac arrhythmia, can be seen in an ECG waveform analysis. The length and amplitude of the P-QRS-T wave provide crucial information on the type of cardiac disease. The existence of Na⁺ and K⁺ ions in the blood causes the electrical wave. One of the most important elements of the body is the heart. Through the blood, it gives the patient's body oxygen. The heart functions like a muscle pump. A complex network of arteries, veins, and capillaries links the heart to the rest of the body[5]. The electrocardiogram (ECG) consists of a variety of biopotential signals from human heartbeats. The electrodes are placed on the patient's epidermis to record these biopotential signals. It visibly displays the electrical activity of the heart's muscles. ECG facilitates the transmission of information about the electrical activity of the heart to the central nervous system. It is a vital and fundamental part of the diagnostic process with heart problems. It is a valuable and effective tool for determining how serious a heart condition is. The electrical activity of the cardiac muscles is represented by the ECG signal, which is made up of distinctive electrical activation patterns[2]. The ECG signal



Principal

Pune District Education Association's

College of Engineering Manjari (Bk.),

Pune - 412307.

Door lock system using Password and Arduino

Prof. R.K.Moje, C. H. Khadke, T. M. Lohare, V.S.Patil

Electronics & Telecommunication, PDEA's College of Engineering, Manjari(BK), Pune-412307

Abstract—Nowadays we required security from stranger. Hence we can design this type of door lock. In this Venture lets learn howto construct a Watchword based entryway bolt framework by meddle Arduino enter the password using the 4×4 keypad.We moreover interface an LCD show to form enter the password and change the password without encoding Arduino Once more. We are employing a Solenoid bolt which locks and opens the entryways by entering the secret word through the keypad and LCD show is utilized to Send events and messages.With this Extend ready to construct a security framework which works with secret word. In this Project we are building a security framework which works with watchword. But by increment in innovation, modern sort of locks such as electronic locks, savvy locks were concocted and individuals are utilizing them broadly to secure their resources. So, lets utilize the highlights Arduino micro control keyboard to function the Solenoid lock utilizing watchword. You'll coordinated this extend with indeed lockers

Keywords:- Arduino, Relay module, Solenoid lock, 4x4 Matrix Keypad Module

1.INTRODUCTION

Password based Solenoid Using the door lock system Keypad and The Arduino would interact with the Arduino with the 4×4 keypad to enter the combination, creating a combination based door lock system. We also added an LCD screen for easy access and change the password without having to re-code the Arduino. We are employing a Solenoid bolt which locks and opens the entryways by entering the watchword From keyboard and LCD show is utilized Send events and messages.With this Extend we are able construct a security framework which works with watchword. In day nowadays life everything is getting to be straightforward and progressed, already to bolt something we utilized to have a locks, combination locks. due to extend in burglaries and innovation, modern of locks such as electronic locks, sharp locks were planned and people are utilizing them broadly to ensure their resources.

From these couple of a long time Fingerprint as lock, RFID based locks, Keen phone app based locks, Confront acknowledgment locks are trending, Watchword based entryway locks are one of them. So,lets utilize the highlights of Arduino microcontroller and keypad to function the Solenoid lock using secret word. You'll be able coordinated this venture with indeed lockers.

2.COMPOENTS REQUIRED

2.1 Arduino Uno board

This microcontroller depends on the ATmega328P. There are all out of 20 pins (0-19) out of which 6 are simple information sources, 14 are computerized input yield pins(6 pins give PWM voltage) which can like be utilized as broadly useful pins, a ceramic resonator of recurrence 16 MHz, a USB association, a force jack and a reset button. It has a working voltage of 5V. It contains all that expected to help a microcontroller.



2.2 4x4 Matrix Keypad

The 4x4 Network Keypad interfaces is to require the input from the individual. Ready to enter the preset secret word to test the legitimacy of the watchword. On the off chance that the watchword is substantial at that point, the entryway bolt will be opened. In case invalid, the entryway bolt will proceed to be bolted. The 4x4 Matrix Keypad includes 4 rows and 4 columns. There is a transfer that connects every row and column. In our projec keys along with # to change the password.


Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



Enhanced Detection of Diabetic Retinopathy Using Ensemble Machine Learning: A Comparative Study

Sanjay Tanaji Sanamdikar^{1*}, Satish Akaram Patil², Deepak Onkar Patil¹, Madhuri Pravin Borawake³

¹ Instrumentation Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

² Mechanical Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

³ Computer Department, PDEA'S College of Engineering, Pune 412307, Maharashtra, India

Corresponding Author Email: sanamdikar123@gmail.com

Copyright: ©2023 IETA. This article is published by IETA and is licensed under the CC BY 4.0 license (<http://creativecommons.org/licenses/by/4.0/>).

<https://doi.org/10.18280/isi.280624>

ABSTRACT

Received: 5 June 2023

Revised: 2 September 2023

Accepted: 7 December 2023

Available online: 23 December 2023

Keywords:

machine learning, ensemble learning, deep learning and retinopathy in diabetics, deep convolutional neural networks (DCNNs), Messidor dataset

Diabetic Retinopathy (DR), a microvascular complication, stands as one of the leading causes of vision impairment among diabetic populations globally. This pathology is characterized by the occlusion of retinal vessels, thereby depriving the retinal tissue of essential nutrients. Given the progressive nature of DR and its potential to culminate in irreversible blindness, timely and accurate diagnosis is paramount for effective intervention. Conventionally, the detection of DR relies heavily on the expertise of ophthalmologists, a resource-intensive process that may be prohibitive in terms of cost and time. To address these limitations, automated detection systems have been developed, aiming to hasten diagnostic processes and democratize access to these crucial services. Nevertheless, the performance of such systems has been historically hampered by the scarcity of reliable data sources and medical records for this condition. In response to these challenges, this study explores an ensemble machine learning approach that synergizes multiple established classifiers into a cohesive diagnostic model. The proposed methodology demonstrates superior performance in accuracy compared to prevalent classification algorithms. Utilizing the Messidor dataset, the top-performing five and ten features were isolated into four sub-datasets through InfoGainEval and WrapperSubsetEval methods. The accuracy achieved for the top five features via InfoGainEval was 70.7%, while for the complete feature set, it reached 75.1%. The employment of ensemble machine learning techniques in diagnosing DR represents a significant application of artificial intelligence within the medical domain, conferring advantages such as enhanced accuracy, robustness, efficient feature selection, early detection, scalability, and a reduction in human error, all while ensuring cost-efficiency and enabling continuous monitoring for improved patient outcomes. However, the approach is not without limitations. These include the quantity and quality of data, clinical variability, ethical and privacy concerns, scalability challenges, potential overfitting, intricate feature selection and engineering, bias in data collection, and issues related to cost and accessibility. The findings underscore the efficacy of the sub-datasets, which facilitate a less cumbersome classification process as compared to the full Messidor dataset, thereby streamlining the diagnostic pathway.

1. INTRODUCTION

Diabetic Retinopathy (DR), a major microvascular complication of diabetes mellitus, manifests as damage to the retinal vasculature, resulting in characteristic macular changes such as exudates, aneurysms, and hemorrhages. The earliest recorded observation of macular anomalies in diabetic patients can be attributed to Eduard Jaeger in 1856. However, the definitive correlation between these anomalies was not established until 1872 when J. histopathological evidence of retinal destructive cystoid processes in diabetic individuals. Diabetic Retinopathy was first identified by V in 1876, marking a significant advancement in the treatment of DR [1].

Symptoms of DR, as described by the Mayo Clinic [2], often include vision spots, fluctuating visual acuity, chromatic aberrations, and in severe cases, complete vision loss in one or both eyes. These manifestations are the result of progressive occlusion of the retinal microvessels, which are essential for the nourishment of the retina. Consequently, automated diagnostic methods for detecting diabetic retinal damage are increasingly recognized as critical. While deep learning yielded high accuracy in binary classifications, its accuracy in multi-class categorizations, especially for disease diagnosis, remains suboptimal. The need for expedited clinical assessments and early intervention is underscored by factors such as high patient volume and the complexity of emergent care scenarios. Furthermore, the timely and effective treatment of DR is a fundamental healthcare



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

NOAA SATELLITE IMAGE RECEPTION USING QFH ANTENNA

Prof. S.B.KAMBLE¹, ANKITA M.KADAM², TEJASWI B. SONAWANE³, SRUSHTI B. WALHEKAR⁴

Department of Electronics & Telecommunication Engineering

PDEA's College of Engineering (Manjari Bk.)

Pune, India, 412307

ABSTRACT :-

Satellite imaging is widely used to monitor weather and interpret satellite images. Time limitation in accessing weather satellite image data is still a major problem for satellites. Automatically send images on 137.9125 MHz and 137.1000 MHz. NOAA 18 and NOAA 19 weather frequencies. In this study, data was collected with the help of a quadrangular helical antenna and RTL-SDR. Four-line H satellite imaging to obtain these two frequencies is widely used to monitor weather and interpret satellite images. Limiting immediate access to weather satellite imagery is still a major challenge for the 137.5 MHz design QFH antenna. Use WXtoImg software to collect, analyze, edit and display automated transmission images. Although the automatic transmission image of NOAA 18 received a frequency shift of 0.0685% and NOAA 19 had a frequency shift of 0.0686%, the results are clear enough and explainable. Use WXtoImg software to collect, analyze, edit and display automated transmission images. The results show that although there is a difference of 0.0685% and a frequency shift of 0.0686% in the automatic transmission images received by NOAA 18 and NOAA 19, the received weather satellite images are clear and descriptive enough.

INTRODUCTION

Real-time access to local weather satellite image data is still limited and the confidential information it contains is difficult to decipher. Publicly available APT (Automatic Picture Transmission) signals make NOAA weather satellites an alternative method of receiving weather satellite images. NOAA 18 and NOAA 19 satellite weather data are useful in GIS (Geographic Information System) for disaster mitigation, scientific research, economic management, construction planning, cartography, and road planning [1]. NOAA weather satellites carry five types of sensors, one of which is AVHRR (Advanced Very High Resolution Radiometer) [2]. The AVHRR sensor is responsible for detecting electromagnetic waves reflected from clouds and objects on the earth's surface, as well as currents emitted by air and water. The AVHRR sensor consists of 6 detectors that operate on radio waves of different wavelengths, from visible light to thermal infrared.

The APT signal transmitted by NOAA weather satellites is received by a QFH antenna. A QFH antenna is required [3] [4] [5]. This article discusses the reception of APT signals on the NOAA 18 and NOAA 19 frequencies. The QFH antenna (quadruple helical pipe). QFH antennas break the idea that a large area of copper pipes also promise ease of software applications that enable communication with NOAA weather satellite receivers [6]. RTL2832U as the controller and Raft

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

ular polarization), so a good RHCP antenna and software to acquire and identify the best antenna for APT reception at 137.5 MHz. QFH antenna using the same size copper pipes a large dish. QFH antennas made in a large area for enabling a wide range of applications [9]. Many SDR devices are used for APT reception. This SDR uses Realtek®



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

PLC-Based Automatic Stamping System

¹D. O. Patil, ²S. T. Sanamdikar, ³Satyajit Gorve, ⁴Nikhil Dinde

¹Associate Professor, ²Associate Professor, ³Student, ⁴Student

¹Department of Instrumentation & Control Engineering,

¹PDEA's College of Engineering (Manjari Bk.), Pune, India

Abstract: This paper represents the design project of the application of a stamping process. The stamping mechanism is controlled by PLC hence it can be implemented in small scale as well as big industries for faster operation and less labour requirement. Automatic stamping of object has received significant attention because automatic stamping is reliable and reproducible. This system uses Allen Bradley PLC, an integrated PLC with uploaded Ladder Logic Programming using Studio 5000 to control multiple machine operation for product sorting. Multiple machine operation of product includes Conveyor, start push button, stop push button, solenoid actuator, Inductive sensor. This current trend of stamping problems has made the small scale enterprises to lose large number of market share to the large scale manufacturing outfits. The need to make stamping process affordable, using easy to maintain machines and also complying to rood regulatory bodies necessitated the need for this work.

I. INTRODUCTION

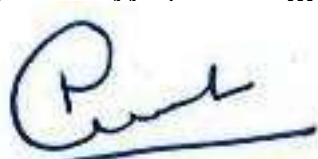
Conventional method for object stamping is manual, it is very time consuming and in non-automatic form. Continuous stamping or printing results in hand fatigue requires lots of efforts and also affects the accuracy to result so the manual method must be replaced by PLC Automation. Automatic stamping of object has received significant attention because automatic stamping is reliable and reproducible. This not only reduce manual effort but also gives more time for marketing also prevent danger which might occur when human being works in hazardous environment. Automation greatly improves the profit and productivity, it is very scalable.

By using automatic stamping machine, it is easy to print the logo, name, sticker on blank paper, metal and leather. Hence to attempt this needs fabrication of automatic stamping machine is needed. Although paper is the most common material, it is also frequently done on metals, plastics, cloth and composite materials. On paper it is usually carried out as a large-scale industrial process and is a needful part of stamping. Automation can be defined as the "technology concerned with application of mechanical, electronic and computer-based systems to operate and control production". There are many reasons for automating the process. The reason may be to reduce manufacturing lead time, to increase labour productivity or to improve the worker safety, etc.

II. RESEARCH METHODOLOGY

The main components of Automati connects the brain of the PLC, the usually be dedicated modules for it status of input signals such as push Product Stamping.

PLC I/O which is the part of the PLC that machines. In a PLC system there will outputs. An input module detects the sors, etc. to integrate the functioning



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



PLC-Based Tank Temperature Control Using PID Algorithm

¹D.O. Patil, ²S.T. Sanamdikar, ³ Vinayak Sagar, ⁴ Nagesh Shivane, ⁵ Rohit Jangale

¹Associate Professor, ²Associate Professor, ³Student, ⁴Student, ⁵Student

¹Department of Instrumentation & Control Engineering,

¹PDEA's College of Engineering (Manjari Bk.), Pune, India

Abstract: This research paper presents a comprehensive study on the implementation of a Programmable Logic Controller (PLC) based system for tank temperature control utilizing a Proportional Integral Derivative (PID) algorithm. The system incorporates an Allen Bradley Micro820 PLC, IO module, a 4-20mA control signal operated Solid-State Relay (SSR), a heater, and a Resistance Temperature Detector (RTD) PT100 for temperature measurement. The objective is to achieve precise and efficient temperature regulation within the tank while minimizing energy consumption.

The paper details the design, development, and testing phases of the system, focusing on the PLC programming for PID control, hardware integration, and calibration processes. Experimental results demonstrate the effectiveness and accuracy of the proposed system in maintaining desired temperature setpoints within the tank, showcasing its potential for industrial applications requiring reliable temperature control mechanisms. Additionally, insights into the system's performance under various operating conditions and potential areas for future enhancements are discussed.

I. INTRODUCTION

In contemporary industrial processes, precise temperature control within tanks is imperative for ensuring product quality, process efficiency, and equipment longevity. Programmable Logic Controllers (PLCs) have emerged as versatile and reliable tools for implementing sophisticated control strategies in such applications. This research paper delves into the development and implementation of a PLC-based system for tank temperature control using the Proportional Integral Derivative (PID) algorithm.

The system under study integrates an Allen Bradley Micro820 PLC, an IO module, a 4-20mA control signal operated Solid-State Relay (SSR), a heater, and a Resistance Temperature Detector (RTD) PT100 for temperature measurement. The utilization of these components forms the basis for constructing a robust and efficient temperature control system capable of maintaining desired temperature setpoints within the tank.

This introduction outlines the significance of precise temperature control in industrial processes, highlights the versatility of PLCs in control applications, and provides an overview of the components utilized in the proposed system. The subsequent sections of the paper will delve into the design, implementation, and performance evaluation of the PLC-based system, offering insights into its practical applicability and potential for optimization.



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



Pothole Hole Detection And Filling Robot

Dr. D.O. Patil

*Electronics & Telecommunication
PDEA's College of Engineering
Manjari(BK), Pune-412307*

R.M. Dhormare

*Electronics & Telecommunication
PDEA's College of Engineering
Manjari(BK), Pune-412307*

A.R. Patil

*Electronics & Telecommunication
PDEA's College of Engineering
Manjari(BK), Pune-412307*

R.M.Kamble.

*Electronics & Telecommunication
PDEA's College of Engineering
Manjari(BK), Pune-412307*

Abstract— Potholes can drastically impair driving and road performance. In 2018, 2019, and 2020, there were 2,015, 2,140, and 1,471 fatalities from road accidents caused by potholes, according to data from the Ministry of Road Transport and Highways (MoRTH). Potholes caused 4,775 incidents in 2019 and 3,564 accidents in 2020, respectively. Many researchers and transportation experts have directed their attention toward developing pothole maintenance techniques that work. Our requirement is for a pothole filling equipment that is long-lasting, economical, and requires minimal human labour. The objective of this project is to develop and construct a prototype for the Automatic Pothole Filling Robot, an automated road maintenance vehicle.

Without assistance from an operator, it is capable of automatically locating and fixing potholes on road surfaces. A straightforward mechanical technique was created to find potholes. It assists in reducing the expenses and complexity, which up to now have been the primary disadvantages of autonomous vehicles used for road maintenance. The breadth and depth of the pothole are measured and detected using ultrasonic sensors. The pothole will be automatically filled by the robot.

Introduction

Roads have a significant positive social impact and contribute significantly to economic growth. They are essential to the growth and development of a country. Roads promote social and economic development by opening up new spaces. Road infrastructure is the most significant of all public assets because of these factors. However, a pothole on a road would be extremely detrimental to human life. A pothole is a structural breakdown in the surface of a road. It is usually brought about by water seeping into the subgrade, which weakens the structure and traffic passing over the impact

Therefore, the goal of our project is to create a robot that can benefit society by increasing road safety. The difficulty of spotting potholes, and using a robot to fill them, which will save time. We created a semi-aut

can identify potholes in the road, release the necessary quantity of concrete to fill them, and then use a slider to level the released concrete. As a result, the pothole on the road (Fig. 1 Pothole) may be filled entirely, which would reduce the number of accidents caused by the pothole. Pancake pavement, a flexible base, or a hard composite base would all contain the pothole. The patches of pavement next to the pothole may be made of asphalt. The system had to be efficient in order to place the maximum amount of material each day for the least amount of money and manpower. Calculated operating and maintenance costs influence various technical decisions as well as the system's overall design. The cost of different patching processes can be found from a variety of sources.

1. LITRETURE REVIEW

[1] Identifying and Reporting of Potholes and Humps using IoT Smita Saitwadekar¹, Dr. Payel saha²)

One of the most vital problems in developing countries is conservation of roads. Well maintained roads contribute a significant portion to the country's economy. Spotting of pavement distress like potholes and humps helps drivers to avoid accidents or vehicle damages, conjointly helps authorities to take care of roads.

[2]POT-HOLE DETECTION AND CLEARANCE ROBOT Rupal Patel¹, Devayya², H. Lallawmawma³, Harsha KG⁴, Suraj P⁵

The preservation of roads is one of the most important issues in emerging nations. The economy of the nation is significantly impacted by well-maintained roadways. Finding potholes helps drivers prevent vehicle damage and also aids in road safety. Numerous ongoing efforts in the field of road networks aim to give drivers pertinent information about the roads and traffic patterns. Indian roads frequently have potholes, some of which may be dangerous. Therefore, it is crucial to spot potholes and fill them in both situations to ensure safe driving. In this paper, we create a sensor model based on the Raspberry

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.



Smart Hand Glows Using Flex Sensor

Dhanya Shetty , Pooja Motirave, , Prof. S.B.Kamble,
¹Student, ²Student, ³Professor,
Department of Electronics & Telecommunication
PDEA's College of Engineering (Manjari BK.)Pune, India, 412307

Abstract: Smart hand gloves equipped with flex sensors offer a promising solution for monitoring and assisting patients with hand-related conditions or injuries. These gloves incorporate flexible sensors that detect the degree of finger bending and transmit this data to a monitoring system. The flex sensor technology enables real-time tracking of hand movements and gestures, allowing healthcare professionals to assess the range of motion, dexterity, and muscle strength in patients. Additionally, these gloves can be integrated with smart devices or applications to provide personalized rehabilitation exercises, feedback, and reminders for patients to perform hand exercises regularly. By leveraging flex sensor technology, smart hand gloves have the potential to improve the rehabilitation process, enhance patient engagement, and facilitate remote monitoring of hand related conditions, ultimately contributing to better patient outcomes and quality of life.

INTRODUCTION

Injuries or conditions affecting hand mobility can significantly impact an individual's daily activities and quality of life. Rehabilitation and monitoring of hand movements are crucial aspects of treatment for such patients. Smart hand gloves equipped with flex sensors present an innovative solution to address these challenges. These gloves incorporate flexible sensors that can detect and measure the degree of finger bending and hand movements in real-time. This technology enables healthcare professionals to accurately monitor the range of motion, dexterity, and muscle strength of patients' hands during rehabilitation sessions. Additionally, smart hand gloves can be integrated with mobile applications or smart devices to provide personalized exercise programs, feedback, and reminders to patients. This integration facilitates remote monitoring and enhances patient engagement in their rehabilitation process. We explore the design, functionality, and potential applications of smart hand gloves utilizing flex sensor technology in the context of patient rehabilitation and monitoring. We discuss the benefits of these gloves in improving patient outcomes, enhancing rehabilitation effectiveness, and enabling remote monitoring of hand-related conditions. The motivation behind developing smart hand gloves for patients using flex sensors stems from the pressing need to address challenges faced by individuals with hand-related injuries or conditions. the motivation behind smart hand gloves for patients using flex sensors lies in their potential to revolutionize hand rehabilitation by providing accurate monitoring, enhancing patient engagement, enabling remote monitoring and telemedicine, offering customization, and leveraging technological advancements to improve patient outcomes and quality of life.

The development and implementation of smart hand gloves for patients using flex sensors aim to address challenges and problems associated with traditional rehabilitation methods. Traditional rehabilitation methods often lack precise monitoring, leading to inaccurate assessments and addressing these problem statements, smart hand gloves using flex sensors improve patient outcomes, enhance patient engagement, and ultimately transform the delivery of



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

for patients using flex sensors aim to address challenges and problems associated with traditional rehabilitation methods. Traditional rehabilitation methods often lack precise monitoring, leading to inaccurate assessments and addressing these problem statements, smart hand gloves using flex sensors improve patient outcomes, enhance patient engagement, and ultimately transform the delivery of



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Smart pyro Machine

Prof. S.M.Bankar¹

Department of E&TC
PDEA's College of Engg.
(manjariBk)Pune-412307)

T.M. Lohare²

Department of E&TC
PDEA's College of Engg.
(manjariBk)Pune-412307)

V.S. Patil³

Department of E&TC
PDEA's College of Engg.
(manjariBk)Pune-412307)

K.K. Todkari⁴.

Department of E&TC
PDEA's College of Engg.
(manjariBk)Pune-412307)

1. ABSTRACT

Nowday's people are searching for something creative and smart technologies for the various events and also for the entertainment purpose, so we are creating our project on the pyro machine or the automatic fireblast machine. The Smart Pyro Machine introduces an advanced system for controlled fire generation and management, leveraging cutting-edge technology to enhance both safety and spectacle in applications ranging from emergency training simulations to entertainment industry special effects. This paper discusses the design and implementation of the Smart Pyro Machine, which integrates real-time sensors, automated control systems to create precise and repeatable fire effects while ensuring user safety and regulatory compliance.

The core innovation lies in the machine's ability to analyze real-time data from environmental and internal sensors to adjust fuel mixtures, ignition timing, and blast intensity. This adaptive approach allows for high degrees of control and repeatability, essential for both training firefighters in realistic scenarios and for creating visually striking effects in films without endangering cast or crew.

2. INTRODUCTION

In recent years, the integration of advanced technologies such as automation in and entertainment applications has transformed operational efficiency protocols. Among the innovative emerging in this area, the Smart Pyro Machine stands out as a pivotal development in pyrotechnic and fire management. This machine is designed to enhance

precision, and spectacle of controlled fire blasts used in a variety of applications, from film special effects to fire-fighter training and safety demonstrations.

The motivation behind the development of the Smart Pyro Fire Blast Machine is twofold: to push the boundaries of what can be safely achieved in controlled fire displays and simulations, and to provide a tool that minimizes risk while maximizing control and repeatability. Traditional methods of handling pyrotechnics and fire blasts rely heavily on manual intervention, which carries inherent risks and variability in performance. The Smart Pyro Fire Blast Machine addresses these issues by employing a sophisticated suite of sensors, and automated systems that together ensure a high degree of accuracy and safety.

By enhancing control and safety, the Smart Pyro Fire Blast Machine not only improves the operational aspects of fire management but also broadens the creative possibilities for industries reliant on precise and spectacular fire effects.

Designing a "smart pyro machine," or a smart pyrotechnic device, would involve creating a system that can intelligently manage and control fireworks or pyrotechnic displays. This could involve elements of automation, remote control, safety enhancements, and integration with software for design and synchronization.

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Solar Energy Based Mobile Charger

Prof. R.K.Moje, S.N.Nightot, S.R.Babar, T.D.Wavadhane

Electronics & Telecommunication, PDEA's College of Engineering, Manjari(BK), Pune-412307

Abstract- we have use other methods to charge the mobile it is so costly. The solar energy is highly efficient and economical to use. Works on the principle that when light falls on the solar cell, electron-hole pairs are created in the n-type emitter and in the p-type base. The generated electrons (from the base) and holes (from the emitter) then diffuse to the junction and are swept away by the electric field, thus producing. Certain modules are selected and worked out to suitable specifications. Solar energy is generated by nuclear fusion reactions within the Sun. The energy that radiates from the Sun is a mixture of ultraviolet, visible, and infrared radiation. The intensity of this radiation when it reaches the Earth is 1361 W/m². Our project intension is to create a solar mobile charger. The project design solar energy and stores it in a rechargeable battery form. This system has ability to serve dual role, both as a protective case and act as power backup for the mobile phone in solar energy.

1.INTRODUCTION

A solar power system is an energy store device that obtains energy from the sun and uses it to charge/power various electronic gadgets, like phones, tablets, laptops, and torches, bulbs, and televisions etc. Solar cell phone chargers use solar panels to charge cell phone batteries. It has in-built solar panel which converts the solar energy to electrical energy. It is estimated that the world oil reserves will last for 30 to 40 years, whereas solar energy is forever. Solar energy has two big advantages over fossil fuels. The first is in the fact that it is renewable; it is never going to run out. The second is its effect on the environment. Flaming of fossil fuels is harmful pollutants into the atmosphere and contributes to global warming and acid rain. Solar cell directly converts solar energy into electricity. The solar cells that are connected together make up the solar panel. This can last up-to several decades without replacement.

2.PROBLEM STATEMENTS

Intermittency. One of the biggest problems that solar energy technology poses is that energy is only generated while the sun is shines. That means nighttime and overcast days can interrupt the supply. During disasters and power outages, it can be used with ease and with a long and forever durability of device and power. Even in the remote areas having scarcity of electricity, such models can be used. In rainy and foggy weather, there may be some rust and some maintenance may be required. We initiated this project because it is one of the few charging systems that uses renewable energy sources, which allows us to avoid power and charge weariness. It is both user-friendly and environmentally friendly. It has long-lasting equipment and high power endurance, making it especially helpful in distant places with limited energy. It may corrode on rainy or foggy days, necessitating extra attention.

2. LITERATURE SURVEY

As proposed by Shushi Sharma, Kamesh Kumar and Ash tosh Kumar in their report on Solar Cells .In this research, we explored the applications of solar cells and how they can be implemented. Battery management and capacity of solar cell and the price range is being covered in this paper. Current solar cell relevance and pertinence is analyzed as proposed by Ansari Mohammad, Bather, Marzari Mohamed, Abdi Valid, and Mirhabibi Mohsen in their report on types of solar cells and applications. The project laid emphasis upon types of cells that can be implemented for the project. The paper talks about the vast uses of solar cells and the categories in which they are available in market. Decision making on the basis of these categories and choosing the best solar cell /panel was covered. As proposed by N.Gupta, G.F ALAPATT, R. PODHILA, R.Singh, K.F Poole in their report on prospects of Nanostructures-based on solar cells for manufacturing photovoltaic modules. We inferred the scope of the project as well as the future implementation of it. The Paper describes new ways in which integration of Nano structures can make regular Solar cells impactful. The potential changes and novelty was understood. Published in IEEE Explore papers. Solar powered mobile phone: An innovative experiment. INSPEC Accession Number: 16980832.

3.1 BATTERY:

A parallel connection of two 2200 mAh : but not the amperage capacity. All batte parallel increases the total current capaci



Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

ie batteries in series increases the voltage
pere-hour rating. Connecting the cells in
verall amp-hour capacity

Translating Handwritten Document into Digital Text Using Deep Learning Approach

Prof.D.O.Patil

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune-412307
dopatil25@gmail.com

R.D.Fulari

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune-412307
ramfulari0@gmail.com

V.S Kumbhar

Department Of E&TC
PDEA' College of Engg.
Manjari(BK),Pune-412307
vidyakumbhar4245@gmail.com

S.S. Sable

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune_412307
s99sable@gmail.com

Abstract— Applications like document digitization, text analysis, and data entry all heavily rely on handwriting recognition. Using the Convolutional Recurrent Neural Network (CRNN) architecture and Connectionist Temporal Classification (CTC), the goal of this project is to create a handwriting extractor. The CRNN model combines the strength of recurrent layers for sequential information encoding and convolutional layers for visual feature extraction. Without the requirement for explicit character-level labelling, the CTC layer enables the model to accommodate variable-length input and output sequences. The technique under consideration seeks to precisely extract handwritten text regions from photos and offer a solid basis for subsequent text recognition tasks. Preparing the datasets, using pre-processing methods, training the models, and putting the CRNN-CTC architecture into practise are all included in the project. The performance of the system is evaluated based on metrics such as precision, recall, and F1 score. The results demonstrate the effectiveness of the CRNN-CTC approach in accurately extracting handwritten text and its potential for applications in document analysis and data processing tasks.

Keywords: CRNN, CTC.

I. INTRODUCTION

A cutting-edge platform called Handwriting Extractor is revolutionising the way handwritten documents are handled and converted to digital format. This cutting-edge technology uses machine learning and artificial intelligence to precisely extract text from handwritten documents. We save you time and effort by automating the procedure, which eliminates the need for manual transcription. Convolutional Recurrent Neural Network (CRNN) and Connectionist Temporal Classification (CTC), two of our highly developed algorithms, are trained on enormous datasets to assure remarkable accuracy and efficiency in reading and transcribing handwriting. No matter what form of handwriting you're working with, whether it's modern forms, or historical documents, this Ext manages it. We can maximise the value of handwritten documents in the digital age with Handwriting Extractor. We can organise, and retrieve information by converting text into editable and searchable formats. For individuals, corporations, researchers, and organisations, this platform is perfect. Handwriting Extractor offers a secure and dependable way to take advantage of the value of handwritten documents.

Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

II. RELATED WORK

There are many applications such as vehicle license-plate recognition, postal letter-sorting services, Cheque truncation system(CTS) scanning and historical document preservation in archaeology departments, old documents automation in libraries and banks, etc. The topic of deep learning is constantly developing; some of its subfields include autoencoders, CNNs, recurrent neural networks(RNNs), recursive neural networks, deep belief networks, and deep Boltzmann machines. Here, we introduce a convolutional recurrent neural network, a type of deep neural network that finds extensive use in face and object recognition, signal processing, recommendation systems, object recognition, image classification, signal processing, natural language processing, computer vision, and computer-aided design.

There are many applications such as vehicle license-plate recognition, postal letter-sorting services, Cheque truncation system(CTS) scanning and historical document preservation in archaeology departments, old documents automation in libraries and banks, etc. The topic of deep learning is constantly developing; some of its subfields include autoencoders, CNNs, recurrent neural networks(RNNs), recursive neural networks, deep belief networks, and deep Boltzmann machines. Here, we introduce a convolutional recurrent neural network, a type of deep neural network that finds extensive use in face and object recognition, signal processing, recommendation systems, object recognition, image classification, signal processing, natural language processing, computer vision, and computer-aided design.

In addition to sensor-based monitoring, some studies have investigated the use of building design and ventilation systems to improve indoor air quality. For example, a study by Shunichi Hattori (2022) [6] investigated the impact of ventilation systems on indoor air quality in residential buildings. The study found that well-designed ventilation systems can significantly reduce the concentration of indoor pollutants.

Indoor air pollution is a critical issue that has been addressed, with many studies investigating the sources, mitigation strategies of indoor air pollution. Further research is needed to develop effective strategies for mitigating indoor air pollution and to better understand the health impacts of indoor air

Translating Handwritten Document into Digital Text Using Deep Learning Approach

Dr.D.O.Patil

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune-412307
dopatil125@gmail.com

R.D.Fulari

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune-412307
ramfulari0@gmail.com

V.S Kumbhar

Department Of E&TC
PDEA' College of Engg.
Manjari(BK),Pune-412307
vidyakumbhar4245@gmail.com

S.S.Sable

Department Of E&TC
PDEA's College of Engg.
Manjari(BK),Pune_412307
s99sable@gmail.com

Abstract— Handwriting recognition underpins applications like document digitization, text analysis, and data entry. This project leverages Convolutional Recurrent Neural Networks (CRNNs) and Connectionist Temporal Classification (CTC) to create a handwriting extractor. CRNNs combine the strengths of recurrent layers for sequential information encoding and convolutional layers for visual feature extraction. The CTC layer enables the model to handle sequences of varying lengths without requiring explicit character-level labelling. Our approach aims to precisely extract handwritten text regions from images, laying the groundwork for subsequent text recognition tasks. The project encompasses dataset preparation, pre-processing methods, model training, and CRNN-CTC architecture implementation. We evaluate the system's performance using metrics like precision, recall, and F1 score. The results demonstrate the effectiveness of CRNN-CTC in accurate handwriting text extraction, highlighting its potential for document analysis and data processing tasks.

Keywords: CRNN, CTC.

I. INTRODUCTION

The ability to automatically extract and understand handwritten text from documents holds immense potential for various tasks, including document digitization, historical document preservation, and data entry automation. Traditionally, these processes relied heavily on manual transcription, which is time-consuming, prone to errors, and lacks scalability. Deep learning has emerged as a powerful tool for automating various aspects of document processing, and Convolutional Recurrent Neural Networks (CRNNs) have proven particularly effective in handwriting extraction.

CRNNs combine the strengths of two powerful deep learning architectures: Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs). CNNs excel at extracting visual features from images, making them adept at processing the spatial characteristics of handwritten characters. On the other hand, RNNs are adept at processing sequential data, allowing them to model the temporal relationships between characters within a word or sentence. By combining CNNs and RNNs, CRNNs can effectively analyze handwritten text and extract the embedded textual information.

This project leverages a CRNN-based approach to create a robust and accurate handwriting extractor. The goal is to automate the process of extracting handwritten text from images, paving the way for subsequent

recognition and analysis. The proposed system utilizes a CRNN architecture coupled with Connectionist Temporal Classification (CTC) to achieve this goal. CTC offers a robust solution for handling sequences of varying lengths, a common challenge in handwriting recognition.

II. RELATED WORK

The field of document image analysis has witnessed significant advancements with the rise of deep learning techniques. Convolutional Neural Networks (CNNs) have played a pivotal role in various tasks, including character recognition, text line detection, and document layout analysis. Early research explored techniques like LeNet and AlexNet architectures for character recognition, demonstrating promising results ([5], [6]). However, these approaches often faced limitations in handling complex handwriting styles and variations.

Recurrent Neural Networks (RNNs) emerged as a complementary approach to CNNs, particularly for tasks involving sequential data like handwriting recognition. Architectures like Long Short-Term Memory (LSTM) networks demonstrated improved capabilities in learning long-range dependencies within handwritten text sequences ([8]). However, RNNs alone struggled with the challenge of variable-length sequences, a common issue in handwriting where words and sentences can have different lengths.

The combination of CNNs and RNNs in CRNN architectures addressed these limitations by leveraging the strengths of both. Pioneering work by Graves et al. [1] established the foundation for CRNNs in handwriting recognition. This approach utilized CNNs for feature extraction followed by RNNs for sequence modeling, culminating in significant performance improvements. Subsequent research explored various CRNN architectures and training strategies, further enhancing the accuracy and robustness of handwriting recognition systems ([2], [3]).

This project builds upon these advancements by implementing a CRNN-CTC architecture specifically tailored for handwriting text extraction. The system is designed to handle the complexities of handwritten documents, paving the way for efficient and scalable automation in document processing tasks.

I. LITERATURE SURVEY

This survey explored various techniques for handwriting extraction. Traditional methods often relied on handcrafted features, which lacked robustness and struggled with diverse writing styles. Deep learning offered new approaches, with Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) showing promising results.

The Convolutional Recurrent Neural Network (CRNN) model gained particular interest due to its ability to extract both spatial and



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Onion Classification using Color and Convolutional Neural Network

Surendra Waghmare¹, Sanjay Sanamdikar², Deepali S. Hirolikar³, Madhav Vaidya⁴, Ganesh Pakle⁴,
Priya Waghmare (Ujawe)⁵, Dipali Choudhari⁶

Submitted: 14/09/2023

Revised: 28/10/2023

Accepted: 12/11/2023

Abstract: One of the most critical processes in producing fruits and vegetables is sorting, which is typically done manually in most countries. Onion production is large-scale in India, mainly in Maharashtra's West Region. As a result, it would be more useful in the industry for sorting and grading onions. Food quality detection and grading have benefited from the machine learning application then computer vision techniques. The task of distinguishing infected/uninfected onions from images of their exterior surface is investigated using various methods. One of the supreme important economic sectors in our nation is agriculture and it shows a critical part in our country's economic growth. Agriculture fruits are processed by cutting them from their natural forms, washing, sorting, grading, packaging, and shipping. Grading of onion is a significant step for protecting the quality of fresh-market items. The exterior appearance of the fruits is used to sort agricultural goods. Shape, size, and color are used to grade the items. In this study, HSV ranges are used to categorize onions into red and white colors. A convolutional neural network is also used to categorize the onion pictures into good and damaged quality.

Keywords: CNN, Color, deep learning, HSV, Onion sorting.

1. Introduction

One of our nation's best performing industries, farming is essential to the expansion of our economy. Fruits of excellent grade are in great demand due to our nation's expanding population. Agricultural produce is handled in many ways, including cutting fruits and vegetables from the farm, "washing, sorting, grading, packing, transporting, and eventually storing". Sorting and grading are significant processing which is responsible for protecting the quality of fresh-market items. The texture or exterior appearance of fruits is used to sort agricultural goods.

On the other hand, grading is done based on the overall qualitative aspects of a fruit by taking into account. A variety of qualities such as size, shape, color, and so on. The fruit industry is becoming increasingly discerning, with providers being required to provide superior quality and

appearance products. As a result of the growing demand to offer high-quality fruits in a short amount of time, there is a heavy demand of automated fruit grading systems.

India is a rapidly developing country, and cultivation is the strength of the country's early development. The ground is come across encounters as a result of urbanization and globalization principles. Also, knowledge of the need for cultivation must be fostered in the minds of the younger generation. The importance of innovation in the modern world is crucial in many disciplines, yet we still rely on outdated methods in agriculture. A mistaken diagnosis of plant disease results in a significant loss of output, time, money, and product quality. Segmentation approach utilized to be performed directly by trained personnel, but forecasting is becoming more challenging due to the various changes in the environment. As a consequence, vegetable grade can be determined using image processing methods. Due to a scarcity of resources, such as human resources, the quality of fruits then vegetables is now an essential factor, besides grading based on quality is a critical responsibility. The grading procedure will be automated using Computer vision-based technology. The main area of this approach is to use a deep learning algorithm to sort onions by color and quality.

A machine imaging system serves as a low-cost tool that offers dependable operation, quick processing, and precise

Because of the availability of computer vision-based sorting and grading it expansion in the agriculture industry in developing nations. The development of useful descriptions of physical things from as computer vision. For classification

¹Assistant Professor, Dept. of Electronics and Telecommunication Engineering

G H Raisoni College of Engineering and Management Wagholi, Pune, India

²Assistant Professor, Dept. of Instrumentation Engineering PDEAs College of Engineering Manjari Pune, Maharashtra, India

³Assistant Professor, Information Technology Department PDEAs College of Engineering Manjari Pune, Maharashtra, India

⁴Assistant Professor, Information Technology Department SGGGS Institute of Engineering and Technology, Nanded

⁵Assistant Professor, Information Technology Department G H Raisoni College of Engineering and Management Wagholi, Pune, India

⁶PG scholar, M.Tech (VLSI and Embedded Systems) Dept. of Electronics and Telecommunication G H Raisoni College of Engineering and Management Wagholi, Pune, India

¹surendra.waghmare@raisoni.net, ²sanamdik

³hirolikar.ds@gmail.com, ⁴mvvaidya@sggs.ac.in, ⁴gkp

⁵priva19.ujawe@gmail.com, ⁶dipalichaudhari93@gmail.com

International Journal of Intelligent Systems and Applications

Hybrid Algorithms based Software Development System using Artificial Intelligence for the Business Development

Dr. Deepali S Hirolikar
Information Technology
PDEA'S College of Engineering
Manjari Bk Pune
hirolikar.ds@gmail.com

Raman R. Tirpude
Department of Management
Maharashtra National Law University
Nagpur, India
ramantirpude100@gmail.com

Rithik.B
Electronics and communication
JSS Academy of Technical education
Bangalore
rithikbalaram77@gmail.com

Mr. Sony Varghese
Management
Xavier Institute of Management &
Entrepreneurship
Kochi, India
sony@xime.org

Shalu Saraswat
Information Technology
PDEA'S College of Engineering Manjari
BK Pune
SPPU, Pune, Maharashtra
shalusaraswat82@gmail.com

Anu Jayalwal
Computer Science
Sushant university
India
anujayalwal@gmail.com

Abstract— In this essay, we look at how to provide a product to a consumer as quickly as possible without compromising its quality. We'll show how putting six continuous architectural principles into practise will help us ensure the quality of the finished project while shortening the manufacturing cycle. Prior to reducing costs, it's important to provide the things as fast as feasible. We can do this by using a variety of strategies, such as availability plans, that enable us to maintain the greatest levels of quality, just as the software team was able to. He talks about these approaches, as well as a few more, for delivering top-notch printer software designs quickly. India has a big food-related industry. principal means of support. In this essay, I want to look at how to provide items to customers as quickly as possible without sacrificing product quality. Even while making enhancements, we will consider how the six comparable design components may ensure that the finished product has the highest possible quality in the shortest period of time possible. Giving excellent goods quickly and doing them effectively are both essential. To do this, we may use a range of strategies, such as unavailability techniques, which enable us to maintain the highest level of accuracy that our team of engineers is capable of. He discusses these methods and a few options for the goods' distribution. Using this stock market idea, growers can sell their goods at the highest bidder pricing. Farmers that fill out this form may register themselves and have access to a variety of facilities, such as market alerts, merchant engagement, assessments, and more. The creation of knowledge devices, automated weapon systems, [1] language comprehension, computer vision, legal analysis, and agricultural monitoring are just a few examples of the many uses for data modelling. The problem of the expanding global agricultural output will be addressed by the employment of AI in contemporary agriculture. Based on AI, it should be easy to recognise and quickly identify plants, and judgments on the appropriate chemical to apply and the necessary safe zone might be made quickly. The majority of residents in this area rely on agricultural products for the majority of their income, which is good for the whole neighbourhood. Farmers are in responsible of growing the food that is required for a healthy lifestyle. Choosing the right market value for the shares they are providing is a challenge for the sales reps. The costs of this corporation considerably outweigh its profits previously mentioned concept of share pri permitted to offer their goods at the highest l extra services available to farmers who joi assessments, supplier relationships, market up

other advantages and features of a similar kind. Data analytics has several applications, including as a tool of knowledge.

Keywords: AI, Business Development, Hybrid Algorithm, OOSE, Neural Network, CNN and XBLR.

I. INTRODUCTION

Prototypes are one of the life cycle pattern kinds for software development that are most often utilised. Many businesses that make software use the testing approach. The progressive model is often the order of steps utilised [2] when a customer submits a large-scale programme with the intention of completing it rapidly. The evolved life cycle approach is favoured over other life cycle methods because it enables us to continually develop the system given to the client while maintaining the basic minimums, or, to put it another way, the essential qualities of the product. For the application developers and the company, it is very problematic when the customer is unsure of his requirements and continuously altering them over time.

The life-cycle model is also employed well in modelling inside the software development business. Companies and organisations that create software often use prototyping. When a customer requests a speedy turnaround on a significant project, the up is often employed in connection with the life cycle idea. The transformational model [3] was chosen above other available models because it only includes the most basic elements, which we should really refer to as the item's essential components, and enables us to continue working on the building even after it has been delivered to the customer. When the consumer is unsure about their wants and often changes them, the programmers and the company face significant challenges. There will be a significant investment of resources, including time, energy, and labour. They should easily be able to introduce new items using OOSE since the new variables will absorb the key characteristics of the existing ones. Although the courses with either a solid item are restricted to carrying out their particular designated goal, to apply such elements in the construction of Device agile development (Central Board of tion) is useful in this situation. It enables us mputer system using the stock components. tive [4] is to build the system using preents and integrating them rather than



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Create an Innovative Intrusion Detection System for the Internet of Things by Improving Feature Weighting Through Heuristics

¹Amol B. Gadewar, ²Dr. Ritesh V. Patil, ³Dr. Surendra A. Mahajan

Submitted: 04/12/2023 Revised: 14/01/2024 Accepted: 25/01/2024

Abstract: Recently, the "Internet of Things (IoT)" industry has developed as a tool for developing intelligent models of operation. Real-world applications that rely on the IoT system view privacy and security as major issues. Security issues in IoT-enabled devices pose obstacles to progress in the smart economy. As a result, "Intrusion Detection Systems (IDSs)" tailored to the IoT industries are desperately needed to curb the escalating number of attacks based on the Internet of Things. Because of their limited processing power, memory size, and battery life, traditional IDSs cannot be used in broad IoT-aided networks. Several IDSs have been proposed in academic publications as potential solutions to these issues. However, many IDSs run into problems with false positives and false negatives when looking for anomalies. In order to detect intrusion in the IoT industry and fix the problems with traditional systems, a deep learning ensemble model is suggested. In the first stage, we obtain the raw data from established sources. Consequently, the model is verified using complementary metrics. The proposed approach, on the other hand, not only overcomes the greater detection rate, but also aids in avoiding intrusion from third parties.

Keyword: Ensemble Networks, IoT Intrusion Detection Systems, and the Internet of Things.

1. Introduction

The term "Internet of Things" (IoT) is used to describe the global network of electronic devices that can gather and share data through the use of built-in sensors, processors, and network connections. While there are many upsides to the Internet of Things, there are also some security concerns. Protecting Internet of Things (IoT) infrastructure from threats like hacking, data breaches, and other hostile actions relies heavily on intrusion detection systems. In order to identify security threats, intrusion detection systems (IDS) analyse data from all devices and traffic on a network. Due to resource limits, heterogeneity, and changing topologies in IoT networks, traditional IDS approaches generally fall short in IoT contexts. Due to its ability to automatically learn complicated patterns and features from massive volumes of data, deep learning has emerged as a potential solution for intrusion detection in IoT. In order to detect intrusions in the Internet of Things using deep learning, artificial neural networks are trained to examine data from sensors and other sources. Deep learning models can detect anomalous behavior, identify attempted intrusions, and categories threats by learning from past data. In conclusion, deep learning-based intrusion detection in

Things has considerable potential to strengthen IoT network and device security. As research and development in this area proceeds, it will likely play an increasingly important role in safeguarding the security, confidentiality, and privacy of Internet of Things (IoT) infrastructure.

There are a number of obstacles specific to intrusion detection in the IoT that must be overcome to assure adequate safety. The limited processing power, memory, and energy resources of many IoT devices is just one of the major obstacles. It can be difficult to implement resource-intensive intrusion detection algorithms on such devices. To get beyond these restrictions, effective methods like slimmer models or distributed computing need to be created. The devices that make up an IoT network can be made by a number of different companies and run a wide variety of software and communication protocols. Due to the wide variety of devices and communication protocols, it is challenging to create a unified intrusion detection system. For successful intrusion detection across various IoT devices, it is necessary to solve

compatibility and interoperability difficulties. Adversarial assaults, in which an attacker manipulates the detection model, can compromise based intrusion detection systems. False positives caused by malicious attacks reduce a network's ability to protect a network. It is a huge challenge to create deep learning models that are both

¹Research Scholar, SKNCOE

Vadgaon (Bk.), Pune amolgadewar22@gmail.com

²Principal, PDEA'S College of Engineering Manjari
rvpatil3475@yahoo.com

³Associate Professor, PVGCOET & GKPIOM, Pune
sa_mahajan@yahoo.com



Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/376202839>

Onion Classification using Color and Convolutional Neural Network

Article in *International Journal of Intelligent Systems and Applications in Engineering* · November 2023

CITATIONS
0

READS
28

7 authors, including:



Surendra Waghmare
Raisoni Group of Institutions

11 PUBLICATIONS 18 CITATIONS

SEE PROFILE



Sanjay Sanamdikar

14 PUBLICATIONS 63 CITATIONS

SEE PROFILE



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Onion Classification using Color and Convolutional Neural Network

Surendra Waghmare¹, Sanjay Sanamdikar², Deepali S. Hirolikar³, Madhav Vaidya⁴, Ganesh Pakle⁴,
Priya Waghmare (Ujawe)⁵, Dipali Choudhari⁶

Submitted: 14/09/2023

Revised: 28/10/2023

Accepted: 12/11/2023

Abstract: One of the most critical processes in producing fruits and vegetables is sorting, which is typically done manually in most countries. Onion production is large-scale in India, mainly in Maharashtra's West Region. As a result, it would be more useful in the industry for sorting and grading onions. Food quality detection and grading have benefited from the machine learning application then computer vision techniques. The task of distinguishing infected/uninfected onions from images of their exterior surface is investigated using various methods. One of the supreme important economic sectors in our nation is agriculture and it shows a critical part in our country's economic growth. Agriculture fruits are processed by cutting them from their natural forms, washing, sorting, grading, packaging, and shipping. Grading of onion is a significant step for protecting the quality of fresh-market items. The exterior appearance of the fruits is used to sort agricultural goods. Shape, size, and color are used to grade the items. In this study, HSV ranges are used to categorize onions into red and white colors. A convolutional neural network is also used to categorize the onion pictures into good and damaged quality.

Keywords: CNN, Color, deep learning, HSV, Onion sorting.

1. Introduction

One of our nation's best performing industries, farming is essential to the expansion of our economy. Fruits of excellent grade are in great demand due to our nation's expanding population. Agricultural produce is handled in many ways, including cutting fruits and vegetables from the farm, "washing, sorting, grading, packing, transporting, and eventually storing". Sorting and grading are significant processing which is responsible for protecting the quality of fresh-market items. The texture or exterior appearance of fruits is used to sort agricultural goods.

On the other hand, grading is done based on the overall qualitative aspects of a fruit by taking into account. A variety of qualities such as size, shape, color, and so on. The fruit industry is becoming increasingly discerning, with providers being required to provide superior quality and

appearance products. As a result of the growing demand to offer high-quality fruits in a short amount of time, there is a heavy demand of automated fruit grading systems.

India is a rapidly developing country, and cultivation is the strength of the country's early development. The ground is come across encounters as a result of urbanization and globalization principles. Also, knowledge of the need for cultivation must be fostered in the minds of the younger generation. The importance of innovation in the modern world is crucial in many disciplines, yet we still rely on outdated methods in agriculture. A mistaken diagnosis of plant disease results in a significant loss of output, time, money, and product quality. Segmentation approach utilized to be performed directly by trained personnel, but forecasting is becoming more challenging due to the various changes in the environment. As a consequence, vegetable grade can be determined using image processing methods. Due to a scarcity of resources, such as human resources, the quality of fruits then vegetables is now an essential factor, besides grading based on quality is a critical responsibility. The grading procedure will be automated using Computer vision-based technology. The main area of this approach is to use a deep learning algorithm to sort onions by color and quality.

A machine imaging system serves as a low-cost tool that offers dependable operation, quick processing, and precise

Because of the availability of computer vision-based sorting and grading it expansion in the agriculture industry in id developing nations. The development ngful descriptions of physical things from as computer vision. For classification

¹Assistant Professor, Dept. of Electronics and Telecommunication Engineering

G H Raisoni College of Engineering and Management Wagholi, Pune, India

²Assistant Professor, Dept. of Instrumentation Engineering PDEAs College of Engineering Manjari Pune, Maharashtra, India

³Assistant Professor, Information Technology Department PDEAs College of Engineering Manjari Pune, Maharashtra, India

⁴Assistant Professor, Information Technology Department SGGGS Institute of Engineering and Technology, Nanded

⁵Assistant Professor, Information Technology Department G H Raisoni College of Engineering and Management Wagholi Pune, India

⁶PG scholar, M.Tech (VLSI and Embedded Systems) Dept. of Electronics and Telecommunication G H Raisoni College of Engineering and Management Wagholi, Pune, India

¹surendra.waghmare@raisoni.net, ²sanamdik

³hirolikar.ds@gmail.com, ⁴mvvaidya@sggs.ac.in, ⁴gkp

⁵priva19.ujawe@gmail.com, ⁶dipalichaudhari93@gmail.com

International Journal of Intelligent Systems and Applications

Framework for Detecting Malicious Activity in Vehicular Ad hoc Network

Raghunath M. Kawale
Research Scholar, SKNCOE Vadgaon
(Bk.) Pune
raghunath.kawale@gmail.com

Dr. Ritesh V. Patil
Principal, PDEA'S College of
Engineering Manjari (Bk.) Pune
rvpatil3475@yahoo.com

Dr. Lalit V. Patil
Professor, SKNCOE Vadgaon (Bk.) Pune
lalitvpatil@gmail.com

Abstract: Vehicular Ad Hoc Networks (VANETs) have the capability of swapping every node of every individual while driving and traveling on the roadside. The VANET-connected vehicle can send and receive data such as requests for emergency assistance, current traffic conditions, etc. VANET assistance with a vehicle for communication purposes is desperately needed. The routing method has the characteristics of safe routing to repair the trust-based features on a specific node.

When malicious activity is uncovered, intrusion detection systems (IDS) are crucial tools for mitigating the damage. Collaborations between vehicles in a VANET enhance detection precision by spreading information about interactions across their nodes. This makes the machine learning distribution system feasible, scalable, and usable for creating VANET-based cooperative detection techniques. Privacy considerations are a major impediment to collaborative learning due to the data flow between nodes. A malicious node can get private details about other nodes by observing them. This study proposes a cooperative IDS for VANETs that safeguards the data generated by machine learning. In the intrusion detection phase, the selected optimal characteristics is used to detect network intrusion via a hybrid Deep Neural Network and Bidirectional Long Short-Term Memory approach. The Trust-based routing protocol then performs the intrusion prevention process, stopping the hostile node by having it select the most efficient routing path possible.

Keywords: Vehicular Ad Hoc Networks (VANET), Security Algorithm, Intrusion Detection Systems (IDS), Machine learning.

I. INTRODUCTION

Internet technology and cyberspace are currently penetrating all areas of life. New technology paradigms are being cha

and device automation is transitioning to devise automation. The transport communications area is

not an exception. A new type of machine-to-machine (M2M) telecommunications has been formed, a self-organizing wireless ad-hoc networks with dynamic topology, e.g. VANET, the intercar network; FANET, the network between aerial drones; and MARINET, the network between autonomous vessels. M2M network supports multiple sustainable links between the hosts and ensures the dynamic routing management at each host [1].

For instance, mobile ad hoc networks (MANETs) include the subset known as vehicular ad hoc networks (VANETs). Where it is created by moving or parked hives of mobile computers linked via wireless [2].

The European Transportation Policy identifies Intelligent Transport Systems as a critical technology for enhancing the transport sector's commitment to safety, efficiency, and environmental friendliness. Intelligent transportation systems rely on complex communication networks to gather information from the many parts of the transportation network. Users of the transit system and the transit authority benefit from the data processing and translation into relevant information and recommendations. The term "vehicular network" is widely used to refer to this type of complex communication system [3].

Equipping vehicles in the future will allow the deployment of extremely mobile networks. With the availability of historical data and utilization trends detected by



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Optimal Attack or Malicious Activity Detection in VANET Using Ensemble Machine Learning Approach

¹Raghunath M. Kawale, ²Dr. Ritesh V. Patil, ³Dr. Surendra A. Mahajan

Submitted: 03/12/2023 Revised: 15/01/2024 Accepted: 26/01/2024

Abstract: In a Vehicular Ad-Hoc Network (VANET), a large number of moving and stationary automobiles form a wireless network. It's a cheap and straightforward way to get data on traffic and cars to command centers. VANET employs a set of protocols to safely transmit data and connect vehicle nodes to the internet. It's not uncommon for VANETs to make use of the Ad-hoc-on-demand Distance Vector Protocol (AODV). It is a machine language paradigm that requires minimal processing time and memory. OBUs on vehicles carry out the necessary protocols and procedures for sending messages between vehicles, while RSUs are the fixed links that allow vehicles to communicate with one another. When multiple vehicles transmit data on a single vehicle at the same time, some of the data may be garbled or lost. However, the nodes' roles shift regularly, making routing difficult when a vehicle's software or hardware fails. New attack detection in VANET is developed to address the aforementioned problems. At first, we compiled the information from several online resources. Data cleansing is the process of scrubbing information of duplicates or irrelevant details. By contrasting the results of the developed machine learning-based attack detection in VANET with those of previously established methods and algorithms, we can verify the effectiveness of the latter.

Keywords: Malicious Activity Detection, Vehicular Ad-Hoc Network, Ensemble Machine Learning Model.

1. Introduction

In a Vehicular Ad-Hoc Network (VANET) [9], for example, automobiles connect to one another by Road Side Units (RSUs) and On-Board Units (OBUs), making it a type of Mobile Ad Hoc Network (MANET). The Onboard Bus Unit (OBU) implements communication protocols and techniques in cars, allowing them to communicate with one other through predetermined routes or other locations connected to roadways (RSU) [10]. Roadside units (RSUs) are secure infrastructure pieces that have communication tools installed so they can receive data from automobiles. More specifically, RSU can be installed at intersections, on roadside barriers, or at traffic lights [11]. The foundation of an Intelligent Transportation System (ITS) is any vehicle that can start and stop communicating depending on the information that has to be exchanged [12]. With the advancement of ITS communication technology, VANET is a concept in its early stages of development. An essential component of smart city infrastructure, VANET integration with mobile apps is delivering web apps over the internet while simultaneously increasing bandwidth and decreasing latency [13]. Vehicles participate in data analysis using cloud computing by acting as nodes and contributing computing power [14]. In addition

VANET provides a range of cloud services, including as computation and storage, from the vehicles' locations, which helps to minimize backbone network congestion and delay [15]. Hence, VANET opens doors to capitalizing on big data for a range of smart city uses, including infotainment, real-time traffic monitoring, and surveillance [16]. At the same time, since VANET connections necessitate engagement and cooperation between cars and other cloud entities, this makes them attractive targets for attackers.

1.1 VANET has a distributed

It is the responsibility of the infrastructure to ensure that all security parameters are properly managed while data is exchanged between the dispersed nodes in the vehicular network. VANET security characteristics such as authentication, integrity, and availability are susceptible to numerous attacks, such as Distributed Denial-of-Service (DDoS), Sybil Attack (SA), Man-In-The-Middle (MITM), and jellyfish attacks [17]. To make the ad hoc vehicular system more secure and efficient, it is necessary to provide a way to detect and block all of these harmful attacks in the network, taking into account all of the dangers in the VANET [18]. Every year, DDoS assaults take new forms and target different resources, such as system work bandwidth, and others. That being a very danger to system availability is a trial of service attack [19]. Developing a readable, and strong network intrusion system to effectively combat distributed

¹Research Scholar, SKNCOE Vadgaon (Bk.), Pune.
raghunathkawale22@gmail.com

²Principal, PDEA's College of Engineering Manjar
rvpatil3475@yahoo.com

³Associate Professor,
PVGCOET & GKPIOM, Pune.
sa_mahajan@yahoo.com



Principal

Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.

Swarm Optimization Framework for Energy-Efficient Allocation of Industrial IoT Resources

Shalu Saraswat

Department of Computer Engineering at
Smt.Kashibai Navale College of
Engineering, SPPU Pune
saraswatshalu23@gmail.com

Surendra Mahajan

Department of Information Technology
at PVG' College of Engg & Tech & GK
Pate (Wani) IOM, PUNE

Ritesh V. Patil

PDEA's College of Engineering
Manjari(Bk.), Pune

Abstract—The IIoT, or Industrial Internet of Things, has recently emerged as a major topic of discussion in the context of technological innovation in the manufacturing sector. The IIoT lends a hand in production by promoting and implementing smart sensors or devices for use in industrial systems. Although it demonstrates an astonishing process, it still raises difficult questions about how to make the nodes more energy efficient and how to fairly distribute the available resources among them. Earlier models were used, but they were hampered by issues like a single communication route and artificial constraints. But congested communications, scarce materials, and power outages are the biggest stumbling blocks. Because of this, there is a need for a more efficient IIoT model that can improve the gearbox. To address the difficulties of the traditional methods, this paper proposes a new energy-efficient resource allocation model for the IIoT. The difficulties of channel estimation will later be reduced by employing energy efficiency requirements. Finally, system energy efficiency will be improved, resulting in an effective resource allocation rate.

Keywords— Swarm optimization; power and channel resource allocation; energy efficiency in the industrial IIoT.

I. INTRODUCTION

The Industrial Internet of Things (IIoT) is a subset of IoT that emphasizes the use of IoT technologies in industrial settings. There is currently a widespread deployment of smart sensors [9] that can be networked together and share data over the IoT network. Meanwhile, the IIoT incorporates servers and other mechanical equipment to boost efficiency. Factory and other industrial facility health can be monitored with devices containing "Wireless Sensing Devices" (WSDs). Since data must be transmitted, processed, and stored simultaneously, these applications require more resources, particularly energy. With the help of modern technology, data is beneficial for completing a wide variety of tasks in a timely and effective manner [11]. Today, IIoT is being given a great deal of focus and importance in the urban sphere, the manufacturing and transportation sectors, the medical domain, and other industrial spheres. As a result, for the technology and its industrial applications to flourish, the function effectively [12]. The IIoT is stud

catering to high-quality results and organizing itself, despite its advanced knowledge of reliability and adaptability. Storage and hosting of data in the cloud is another challenging task. Using widespread infrastructure and local conditions boosts the efficiency of the system [13]. Network congestion slowed data transfer, and excessive energy consumption are only some of the issues that will occur [14]. In order to maximize power savings and resource utilization, professionals in this industry have implemented a number of different tactics for IIoT networks.

Since the IIoT business is experiencing rapid demands for extensive involvement and its services, energy consumption and communication overhead have become critical challenges to consider [15]. The IIoT network differs from the IoT in several ways, including delay, cost or benefit, efficiency, privacy, security, and so on [16]. Therefore, it is crucial that the system be constructed effectively, making the most of available energy and capacity while also addressing the problem of limited supplies. Energy consumption is challenging to control in a large network such as IIoT [17]. A key cause of system degradation [18] is the inefficient utilization of the network's abundant resources. The computerized model makes use of cloud-based information for its process, but it still suffers from issues including slowness, latency, and insufficient storage [19]. Edge computing tasks deployed across an industrial network can assist in solving some problems. Several academic disciplines contributed to the development of the many energy-saving methods currently in use. However, there are issues with the system that must be fixed, including latency, stability, and structural complexity [20].

The "Medium Access Control (MAC)" [21] is used by IEEE 802.15.4 to facilitate smoother communication between the coordinator and the devices. Of course, the superframe is referring to the time axis, which shows when exactly data transmission events occur [22]. Edge computing-based IIoT installations have benefited from the system's efficient on and computation offloading. The



Principal
Pune District Education Association's
College of Engineering Manjari (Bk.),
Pune - 412307.