Positioning of HAAR Cascade Algorithm and deep learning to predict Real Time Facial expressions

[1]Ganne Naga Sujini, Assistant professor, Dept of CSE, MAHATMA GANDHI INSTITUTE OF TECHNOLOGY, HYDERABAD, Telangana.
[2]Ayalapogu Ratna Raju, Assistant professor, Dept of CSE, Mahatma Gandhi Institute of Technology, Hyderabad, Telangana.

Abstract.:

The most difficult issue in the regions of picture preparation is human face identification. Crude Haar used for human face location along with three extra feeble classifiers is proposed in this paper. Classifiers identify human face using skin shade histogram coordinating, eyes location and mouth identification. Crude-Haar classifier is used to classify images of individuals. A frail classifier is used to extract dominant art of non-human faces based on face skin shade histogram. Eyes in the human face are identified using powerless classifier. Finally mouth is also identified using same classifier. OpenCV is used to produce results on images of individuals. Experimental results show that the proposed method is successful and extracts good number of features from human face and is effective.

Keywords: Classifiers, Haar-cascading, Opencv.

DOI Number: 10.14704/nq.2022.20.5.NQ22583 **NeuroQuantology 2022; 20(5):2037-2043**

2037 037

1. INTRODUCTION

Facial recognition is one of the major applications utilized in face acknowledgment innovation. Facebook, Amazon, Google and other tech organizations have various usage of it. Before they can perceive a face, their product must have the option to recognize it first[1][2]. Amazon has built up an arrangement of continuous face identification and acknowledgment utilizing cameras.[3][4] Facebook utilizes it generally on photographs that their clients transfer to recommend labeling companions [5]. Facelocation is a kind of utilization grouped under "PC vision" innovation Faces are found out from articles using calculations [6]. The proposed model can be implemented in airports. Initially, the camera recognizes and distinguishes the highlights of face and makes ID. In order to assign labels to individuals in photographs in facebook and snapchat this model can be used. It can also be used in identifying face in a mobile phone [7].

2. EXISTING SYSTEM

The quick increasing speed of arising perils, there is still a little examination of the foundations or techniques of the topic that could help the screen information structures inspectors and experts

overseeing network safety.[8][9] Wrongdoing as a Service (CaaS), the criminal strategy which encourages underground digital wrongdoing, is additionally a little reference [10][11]. This insightful vacuum and the handy digital wrongdoing issue that we face provoked us to investigate the underground digital wrongdoing industry by acquiring information examination come nearer from specialized fundamental methodology [12][13].

Existing System is on utilizing "The Local Binary Pattern" administrator (LBP) and HOG course classifiers to recognize the face rectangular district in explicit front face rectangular area [14][15]. Fundamentally in LBP, For LBP, a twofold example is removed inside a given rectangular area [16][17].In this paper, we rearrange the computational intricacy of both HOG and LBP highlights for quick element extraction time [18][19]. To accomplish this, we quantize the slope point into 2 orientations (horizontal and vertical axes).The LBP front face xml records have many getting ready information to find the rectangular bit of the face specifically. Given the quick ascent of computerized threats [20][21], little work is led on the causes or procedures of the point that could help direct network safety analysts and professionals in data frameworks [10]. We utilize a structure to analyze the digital wrongdoing underground economy by dismembering monstrous informational collection from the electronic hacking network. With embracing a system based structure study, this investigation adds relics, foundations, and ways to deal with the arrangement around it [30]. Likewise gives proficient important valuable encounters by suggesting rules on how governments and affiliations can get ready for attacks by underground cybercrime [22][23].

3. PROPOSED SYSTEM

The issue was tended to by the so-called Haar like highlights, which is prepared course. Because of its proficiency [24]. Haar-like square shape highlights have gotten a mainstream decision as picture highlights in the setting off detection [25]. We contrast our rectangular highlights and Haar-like highlights are ascribes separated from pictures utilized in example acknowledgment [25]. Their name comes from their comparability to Haar wavelets. The usage of these highlights as opposed to dealing with dim or shading level of the pixels legitimately was proposed in. In figure 1, algorithm features are showcased that it can detect the faces in any angle ofposition [26].

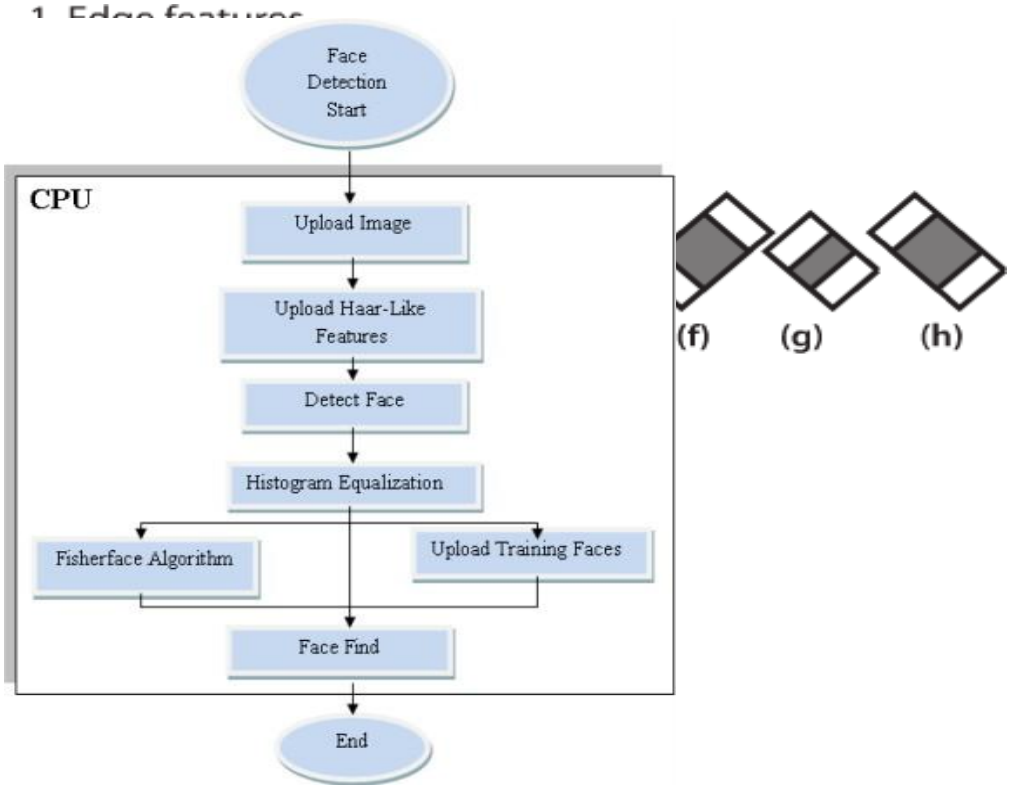

Figure 1: Haar Features

4. METHODOLOGY

The methodology we used in this paper consists of four phases. The first phase is to extract features from images, and the second phase is to train and test different machine learning models using these extracted features. [27] We also spent some time trying Convolutional Neural Network models which take images as direct input. Below, we will first explain some of the methods we test diverse AI models then we will explain the models that we tried. We use SVM technique for face detection our model authenticates both face detection as well as fingerprint verification then only ATM transaction has happened otherwise not possible to perform any transaction by the customer as shown in figure 2.

Figure 2: Block Diagram of Proposed Methodology

4.1. Navie Bayes Classifier

Innocent Bayes is a probabilistic computation that is ordinarily used for plan issues. Gullible Bayes is essential, common, however then performs incredibly well overall. For example, spam channels Email application uses depend on Naive Bayes [37]. They call it innocent because it's assumptions (it acknowledges that the amount of the amount of the the features in the dataset are comparatively huge and free) are incredibly hopeful and every so often substantial in most authentic applications[16] as shown in figure 3.

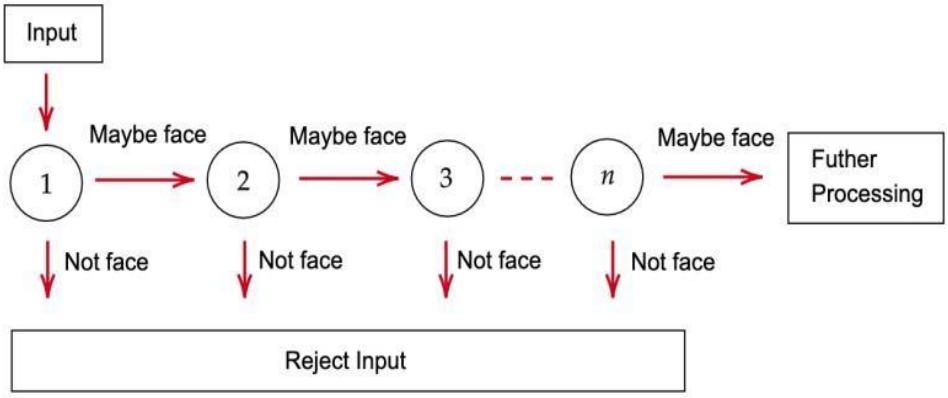

Figure 3: Algorithm Execution

4.2 Haar Feature Selection

Initially features are gathered using Haar. It extracts features by joining rectangular regions of a specific area in a window, summarize the pixel intensities in every locale and compute the difference between these pixels [18]. Consider the below picture two features are shown in top segment [19]. Than the head eyes region is vague even when compared with nose and cheeks [38]. Figure 4 demonstrates gathered features for further processing.

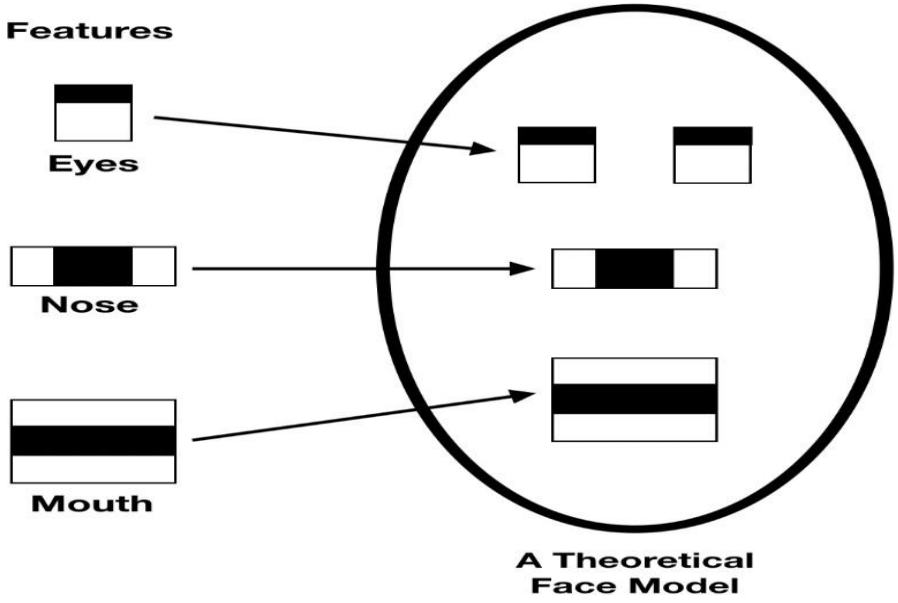

Figure 4: Feature Extraction

4.3 Creating Internal Images

The thought is changing an information picture into an added region table, where the incentive anytime (x, y) in that table is the amount of the relative multitude of pixels above and to one side of (x, y), inclusive. Where I(x,y) is the assessment of the vital picture pixel in the position (x,y), while i(x,y) is the looking at force in the first picture[20]. It is a recursive equation, if we start from one corner of the information picture, we will have a similar outcome in the essential picture. In figure 3.4as next step of process of the algorithm. The below figure 5 shows that the face is divided into several parts for accurate results.

Figure 5: Creating internal images

4.4 Adboost Training

Adboost uses 9 classifiers and picks best features that makes to be a strong classifier [21]. A window of fixed sized is moved over the image and Haar features are extracted by moving the window over each subsection of the image as shown in below figure 6.

Figure 6: Training The Dataset

4.5 Cascading Classifier

Each stage is prepared utilizing a strategy called boosting. Boostingenables to set up an essentially cautious classifier by taking weighted conventional of the choices made by the fragile understudies. Every time of the classifier indicates the locale depicted by the current district of the sliding window as either sure or negative. Positive shows that an article was found and negative shows no things were found [22,23]. A false positive is when a negative feature is wrongly labeled as positive. A false negative is when a positive feature is mistakenly assigned negative. Proposed model should have low false negative rate.

5. EXPERIMENTAL RESULTS

A dataset with chose Haar Cascade assets (for frontal face, eyes, profile face, grin, chest area) so youcan utilize simple Haar Cascade Classifiers to perform face[26] (and eye, grin, profile face, chest area)recognition from the video pictures in this opposition. The information is transferred from the first opencvGithub vault, and I incorporated the first permit data, as determined in each record [27].

2041 041

Haar classifier is otherwise called as face detector. It is used for detecting faces, body part. It is also used along with OpenCV. Haar classifier not only classifies features of humans but logos. The the object would have been more diverse if the number of training samples get increased. Cascade classification for Haar is even suitable for “blocky” features. In figure 7 we can see the multiple face detection at same point of time and recognizing the person with name by using the proposed system.

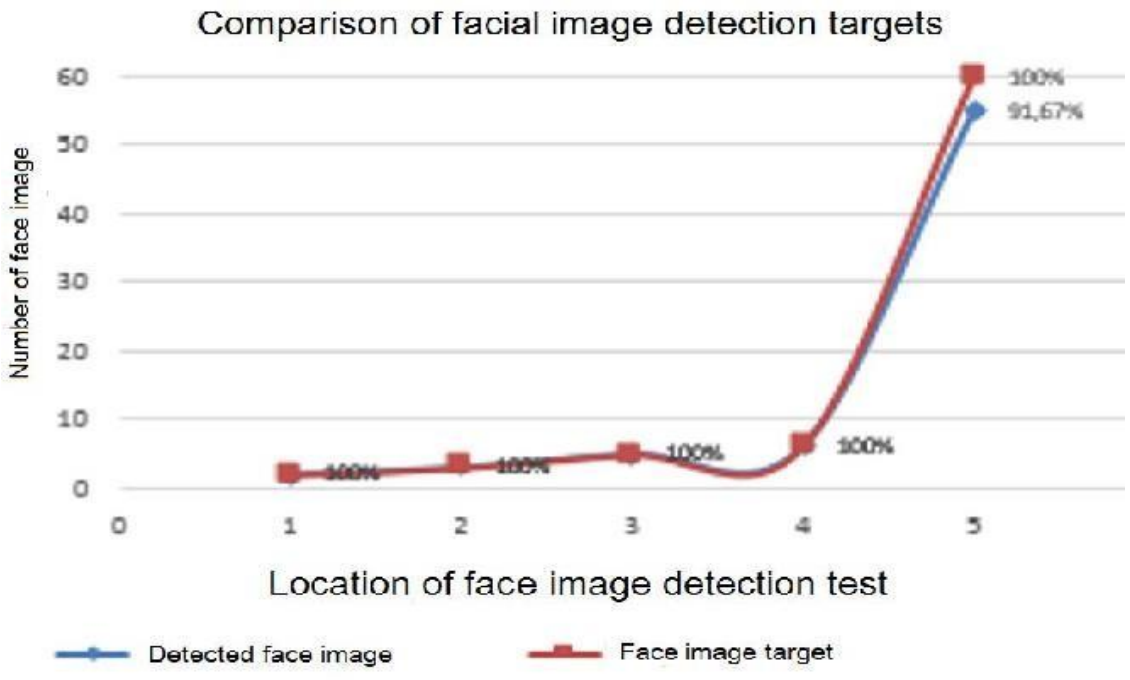

Figure 7: Comparing the Faces Detected and Targets

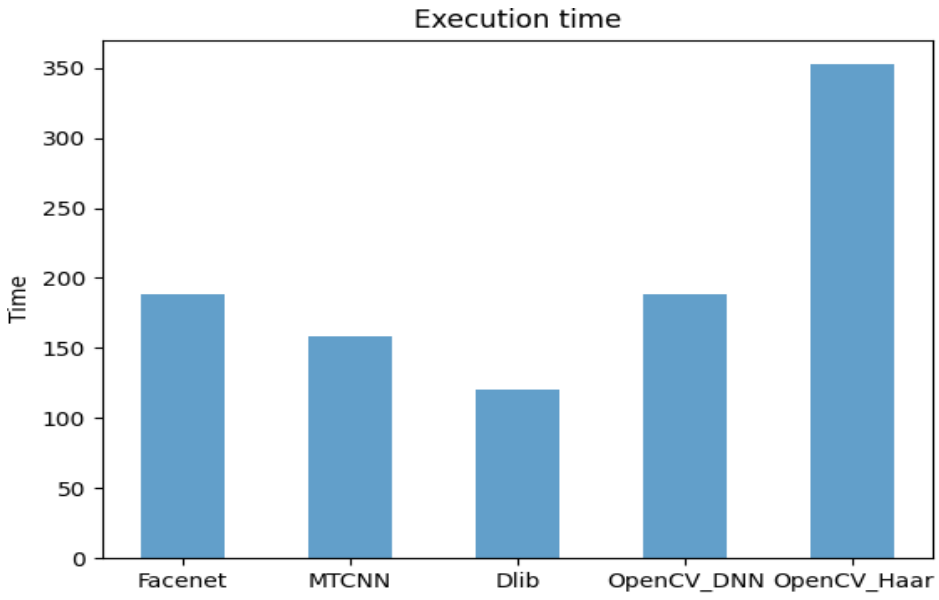

Figure 8: Comparative Analysis of Various Existing Algorithms

Figure 8 compares number of facial images considered and accuracy achieved in detecting the images. X-axis indicates facial detection tests. Y-axis indicates number of facial images. compares execution time of various existing algorithms. X-axis indicates name of the algorithm.Y-axis execution time of algorithms.

6.CONCLUSION

Haar classifier shows better performance in terms of processing speed but exhibits poor performance in terms of accuracy. Processing speed of various algorithms in identifying images is illustrated. Image of a tablet is given as input to Haar classifier which then exhibited performance speed of 1.8fps and an acceptable level of accuracy. It has become difficult for cascading as the input image given has more diverse features. Haar is also used to identify false positives accurately when compared with remaining classifiers.

REFERENCES

1. Ramaiah, V. S., Singh, B., Raju, A. R., Reddy, G. N., Saikumar, K., & Ratnayake, D. (2021, March). Teaching and Learning based 5G cognitive radio application for future application. In 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE) (pp. 31-36). IEEE.
2. Mohammad, M. N., Kumari, C. U., Murthy, A. S. D., Jagan, B. O. L., & Saikumar, K. (2021). Implementation of online and offline product selection system using FCNN deep learning: Product analysis. Materials Today: Proceedings, 45, 2171-2178.
3. Padmini, G. R., Rajesh, O., Raghu, K., Sree, N. M., & Apurva, C. (2021, March). Design and Analysis of 8-bit ripple Carry Adder using nine Transistor Full Adder. In 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 1982-1987). IEEE.
4. Dr. k. Raju, A. Sampath Dakshina Murthy, Dr. B. Chinna Rao, Sindhura Bhargavi, G. Jagga Rao, K. Madhu, K. Saikumar. A Robust And Accurate Video Watermarking System Based On SVD Hybridation For Performance Assessment *International Journal of Engineering Trends and Technology*, 68(7),19-24.
5. Saba, S. S., Sreelakshmi, D., Kumar, P. S., Kumar, K. S., & Saba, S. R. (2020). Logistic regression machine learning algorithm on MRI brain image for fast and accurate diagnosis. International Journal of Scientific and Technology Research, 9(3), 7076-7081.

6. Saikumar, K. (2020). RajeshV. Coronary blockage of artery for Heart diagnosis with DT Artificial Intelligence Algorithm. Int J Res Pharma Sci, 11(1), 471-479.
7. Saikumar, K., Rajesh, V. (2020). A novel implementation heart diagnosis system based on random forest machine learning technique International Journal of Pharmaceutical Research 12, pp. 3904-3916.
8. Raju K., Chinna Rao B., Saikumar K., Lakshman Pratap N. (2022) An Optimal Hybrid Solution to Local and Global Facial Recognition Through Machine Learning. In: Kumar P., Obaid A.J., Cengiz K., Khanna A., Balas V.E. (eds) A Fusion of Artificial Intelligence and Internet of Things for Emerging Cyber Systems. Intelligent Systems Reference Library, vol 210. Springer, Cham. https://doi.org/10.1007/978-3-030-76653-5_11
9. Sankara Babu B., Nalajala S., Sarada K., Muniraju Naidu V., Yamsani N., Saikumar K. (2022) Machine Learning Based Online Handwritten Telugu Letters Recognition for Different Domains. In: Kumar P., Obaid A.J., Cengiz K., Khanna A., Balas V.E. (eds) A Fusion of Artificial Intelligence and Internet of Things for Emerging Cyber Systems. Intelligent Systems Reference Library, vol 210. Springer, Cham. https://doi.org/10.1007/978-3-030-76653-5_12
10. Kiran Kumar M., Kranthi Kumar S., Kalpana E., Srikanth D., Saikumar K. (2022) A Novel Implementation of Linux Based Android Platform for Client and Server. In: Kumar P., Obaid A.J., Cengiz K., Khanna A., Balas V.E. (eds) A Fusion of Artificial Intelligence and Internet of Things for Emerging Cyber Systems. Intelligent Systems Reference Library, vol 210. Springer, Cham. https://doi.org/10.1007/978-3-030-76653-5_8
11. Shravani, C., Krishna, G. R., Bollam, H. L., Vatambeti, R., & Saikumar, K. (2022, January). A Novel Approach for Implementing Conventional LBIST by High Execution Microprocessors. In 2022 4th International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 804-809). IEEE.
12. Nagendram, S., Nag, M. S. R. K., Ahammad, S. H., Satish, K., & Saikumar, K. (2022, January). Analysis For The System Recommended Books That Are Fetched From The Available Dataset. In 2022 4th International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 1801-1804). IEEE.
13. Jothsna, V., Patel, I., Raghu, K., Jahnavi, P., Reddy, K. N., & Saikumar, K. (2021, March). A Fuzzy Expert System for The Drowsiness Detection from Blink Characteristics. In 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 1976-1981). IEEE.
14. Appalaraju, V., Rajesh, V., Saikumar, K., Sabitha, P., & Kiran, K. R. (2021, December). Design and Development of Intelligent Voice Personal Assistant using Python. In 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N) (pp. 1650-1654). IEEE.
15. Naidu, T. P., Gopal, K. A., Ahmed, S. R., Revathi, R., Ahammad, S. H., Rajesh, V., ... & Saikumar, K. (2021, December). A Hybridized Model for the Prediction of Heart Disease using ML Algorithms. In 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N) (pp. 256-261). IEEE.
16. Teju, V., Sowmya, K. V., Yuvanika, C., Saikumar, K., & Krishna, T. B. D. S. (2021, December). Detection of Diabetes Melittus, Kidney Disease with ML. In 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N) (pp. 217-222). IEEE.
17. Mannepalli, K., Raju, K. B., Sirisha, J., Saikumar, K., & Reddy, K. S. (2021, December). LOW complex OFDM channel design using underwater-acoustic-communication using machine learning techniques. In 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA) (pp. 1505-1513). IEEE.
18. Kumar, K. S., Vatambeti, R., Narender, M., & Saikumar, K. (2021, December). A real time fog computing applications their privacy issues and solutions. In 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA) (pp. 740-747). IEEE.
19. Ajay, T., Reddy, K. N., Reddy, D. A., Kumar, P. S., & Saikumar, K. (2021, December). Analysis on SAR Signal Processing for High-Performance Flexible System Design using Signal Processing. In 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA) (pp. 30-34). IEEE.
20. Raju, K. B., Lakineni, P. K., Indrani, K. S., Latha, G. M. S., & Saikumar, K. (2021, October). Optimized building of machine learning technique for thyroid monitoring and analysis. In 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC) (pp. 1-6). IEEE.
21. Kailasam, S., Achanta, S. D. M., Rao, P. R. K., Vatambeti, R., & Kayam, S. (2021). An IoT-based agriculture maintenance using pervasive computing with machine learning technique. International Journal of Intelligent Computing and Cybernetics.
22. Koppula, N., Sarada, K., Patel, I., Aamani, R., & Saikumar, K. (2021). Identification and Recognition of Speaker Voice Using a Neural Network-Based Algorithm: Deep Learning. In Handbook of Research on Innovations and Applications of AI, IoT, and Cognitive Technologies (pp. 278-289). IGI Global.
23. Rao, K. S., Reddy, B. V., Sarada, K., & Saikumar, K. (2021). A Sequential Data Mining Technique for Identification of Fault Zone Using FACTS-Based Transmission. In Handbook of Research on Innovations and Applications of AI, IoT, and Cognitive Technologies (pp. 408-419). IGI Global.
24. Raju, K., Pilli, S. K., Kumar, G. S. S., Saikumar, K., & Jagan, B. O. L. (2019). Implementation of natural random forest machine learning methods on multi spectral image compression. Journal of Critical Reviews, 6(5), 265-273.