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Research Article

Secure OTP Generated Hand Gesture Online Transaction Using CNN

Anirudh Pratap Shukla [1], Srinidhi Siva [2], M. Safa [3]*

Abstract

Online payment is a strategy where the transfer of asset or cash happens online over electronic asset move and it has acquired ubiquity in the new years as it made exchanges bother free. Be that as it may, alongside the expansion in its utilization, fraud cases likewise expanded. Fake exchanges cause colossal measure of misfortune for individuals and ending this is vital. To conquer this issue, we propose a face detection layer added to the exchange to get it. Face recognition and detection was perhaps in the main fields in the modern world applications. Face recognition is a framework that utilizes two sub-frameworks/system named as face detection and image database framework/system. Face recognition can be of feature based and image based. Feature based strategy utilizes the features like skin tone, eyes, nose and mouth etc., to identify and perceive human face while picture/image-based technique uses some pre-processed image collection for detection. This task executes the motion-based recognition for the transaction, which first discovers any face gesture the individual makes and afterward coordinates with it against the database to recognize the individual gesture which is pre-recorded in the bank database. Then, the detected human face from picture will be contrasted and the data set of training images to find a match. Hence, expanding security during on the online transaction.

[1] Department of Information Technology, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India, am8638@srmist.edu.in

[2] Department of Information Technology, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India, ss9133@srmist.edu.in

[3*] Assistant Professor, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India, safam@srmist.edu.in

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Introductıon

Utilizing facial recognition implies that the financial client has just one face which can permit them to admittance to all their bank accounts. In cybercrime, a programmer can penetrate an individual's online media profile and learn key data which can empower them to address security addresses, for example, 'what was the name of your first pet?' The biometric programming just validates a client dependent on what their identity is. A programmer can just figure out how to get to a ledger dependent on what they think about the client. So, this makes it simpler for a banking client to execute online on a cell phone by utilizing a gadget that has approved admittance and besides by utilizing a live facial picture of themselves through the phone's camera. Numerous works have been done in the logical writing in the field of biometric confirmation. The vast majority of time, it concerns the definition a calculation mostly dependent on picture preparing and design acknowledgment procedures. To be utilized in a genuine setting for exchanges, numerous issues must be settled like the security or material viewpoints. A few arrangements have been proposed utilizing keen cards for instance.

We all know that the world is moving in a fast pace. We have seen a huge transformation in marketing and technology. The mode of shopping has already been changed from offline to online mode. People are more into online shopping and they are finding it beneficial for them, they have easy return policy and time of delivery is also short. Due to which online transaction is also increasing at a great pace. It is increasing on various platforms like online shopping websites, grocery shops as well as clothing stores. We already have various examples to count upon like Amazon, Flipkart, Big Basket, Zomato etc. The rate of online fraud is also increasing therefore

We need an advanced online paying portal. This would increase the safety of our customers. Looking at the safety we are working on Facial gesture for online transaction. We were already using login passwords and OTP to verify our account but this methodology is also getting old therefore we need and alternative for this.

The facial recognition will make the online transaction more secure and easy to use. Our project is not finding anything new but we were solving a problem which are already exist. To develop

peoples, trust in online transaction and also provide them the assurity that their bank information is safe and could not be misused. However, people belonging from rural area still have trust issues while opting for online transactions. They still have a fear of losing their personal bank information. In order to solve all the above problems our project is looking into the safe and sustainable environment for online transactions.

Problem

There are different elements instances of getting one's pick taken for online exchange because of immediate or in-direct types of information burglary. This delivers the financial balance proprietor poor. Individuals burn through a great deal of fundamental time and mental harmony as well. A few issues identified with the equivalent can be closed as follows: -

Worldwide Issues

- Most criminal activities in the previous year were performed through infections, phishing and social designing techniques to acquire monetary resources and individual installment data, as indicated by top-20 Russian banks.
- Noticeably, since 2015 deceitful exchanges in portable applications have developed by 600%, partially on the grounds that more customers presently really like to utilize versatile applications for internet banking instead of the customary web channel.
- The middle sum buyers paid in these cases was $320. Inside the misrepresentation classification, faker tricks were the most announced and positioned first among the best 10 extortion classes recognized by the FTC. They represented $667 million in misfortunes.

Nearby Issues

Security is the significant impediment with computerized banking. Albeit all the security highlights and encryption programming put with your record, there will consistently be programmers who are sufficiently keen to get into your record and abuse it, take cash. Fraud is one of the primary disadvantages of web-based banking.

Passwords and OTPs secure the exchange yet the odds of the client not being the genuine client and penetrating the security of a specific individual's record is huge.

Thusly, a more elevated level of safety is to affirm the phony clients.

In 201718, an aggregate of 911 fakes were submitted utilizing charge and Visas got utilizing ungainful methods by scoundrels. The aggregate of cash that went into some unacceptable hands remain at Rs 65.26 crore.

- The banking area lost an aggregate of Rs 168.74 crore to coordinated wrongdoing coordinated at ATMs in the previous three years. This incorporates figures for the primary quarter of FY19.
- Financial establishments lost Rs 3.35 crore from a sum of 147 episodes. Security is likewise remiss in Delhi and Haryana, where 53 and 49 ATMs were focused on, bringing about the plunder of money adding up to Rs 2.25 crore and Rs 3.34 crore separately.
- Uttar Pradesh has reliably positioned among the most hazardous state for banks. In 2017-18, there were 80 heists at ATMs, hampering banks by taking Rs 2.90 crore.

West Bengal likewise saw more than 100 such episodes in past monetary year.

- The number of such wrongdoings at Indian bank offices and ATMs has remained generally stable in the course of recent years. A sum of 1,012 occurrences were accounted for the nation over in 2016-17, the most noteworthy in the previous three years. The count diminished insignificantly to in 2017-18.

Justification of Work

Justification behind coming up with this project is to bring out the secure online transaction in online mode. Avocation behind concocting this undertaking is to foresee if during the online bank exchange the individual engaged with the exchange is really the genuine proprietor of the record or not and how might we attempt to keep away from that from occurring. This will forestall the clients just as the individual banks to keep away from any misfortunes, regardless of whether in their time or business.

Some different focuses to note may include:

- Though we have a couple of face and motion remembering, we discovered that limit of these investigations was done on an exceptionally little dataset. Thus, they were not that precise, in actuality, applications.
- Once the strategy for face motion is anticipated precisely, these online cheats can be kept away from or limited bringing about a ton of time and cash being saved.

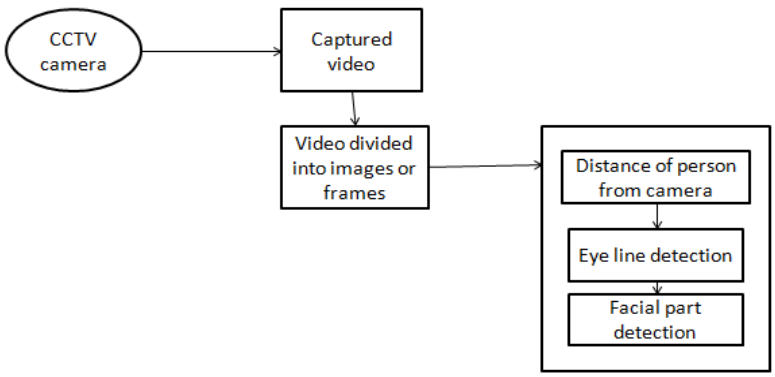
Literature Review

- Ram analysis the numerous techniques that are now proposed and have low acknowledgment ability, high bogus alert rate. Consequently, the significant undertaking of the examination is to create face acknowledgment frameworks with improved precision and improved acknowledgment season of a face acknowledgment framework.
- Ram and borker proposes a half and half face acknowledgment calculation by consolidating two face acknowledgment strategies by incorporating (PCA) head Component Analysis, (LDA) Linear Discriminant Analysis. The Jacobi technique is utilized to figure Eigenvectors that are essential for PCA and LDA calculations. Face Recognition framework will be carried out on Embedded framework based Raspberry pi 3 board
- Mekr Borker will test results are introduced to approve this structure utilizing contact elements, and the outcomes show that multimodal biometrics can be conveyed on touch-empowered telephones to altogether diminish the bogus paces of a solitary biometric framework. At last, they distinguish difficulties and open issues around here and propose that touch elements will turn into a standard angle in planning future client verification on cell phones.
- Dr. Chitra Kiran. N, Suchira Suresh build up a task "A Biometric based Payment System by utilizing Payee and Payer Module". They portray about the fundamental headway in installment instruments affects everybody's norm of life. The most recent installment components offer the two benefits and drawbacks for what's to come. To have quicker and effectively reasonable cycles, contactless installment has stood out enough to be noticed with throughput with dealers planned. These are the issues to the backers,

because of less strong client check instruments. Subsequently, different analysts advanced and supported a proficient, secure installment component. This paper gives a methodology and module by which one payee module can speak with the player module utilizing Bluetooth for cash move from the payers to the payee's bank. The meaning of this methodology is that it kills the actual need of case money and serves for a wide range of installment and character needs. The security of this module is increased utilizing biometric confirmation. At last, the outcomes close a protected installment instrument.

- Hemery build up a face confirmation technique for banking by recognizing the essence of the client. He depicts in that paper examines the advantage and the constraints of utilizing a specific biometric innovation "in particular face validation" for banking applications. They present first the overall ideas of banking.
- Hemry and jempropose a strategy to supplant the PIN code confirmation by utilizing biometrics information. Biometric verification is then point by point. A face acknowledgment strategy where they created is introduced uncovering itself as a biometric applicant arrangement. And furthermore, they demonstrate the advantage and cutoff points of this way to deal with be utilized in a genuine mechanical setting.

Proposed Methodology



The first step is Data Collection, the primary and the most crucial step towards building a model.

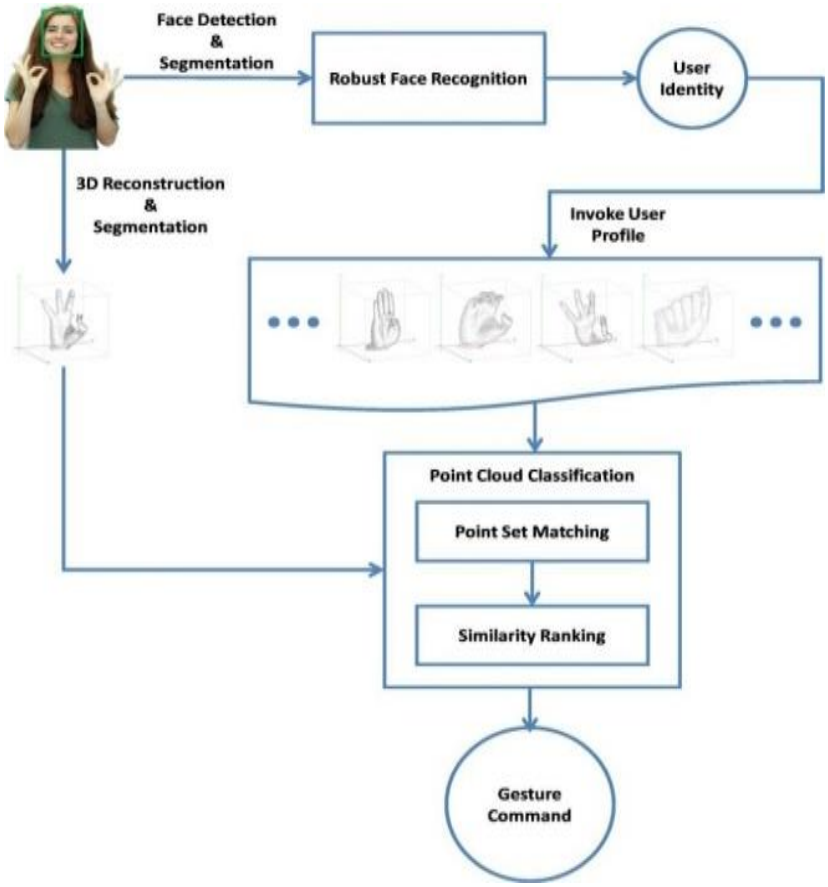
There are a few factors which are important while acquiring the dataset like the legitimacy, correctness and validity of the data. The data used here is acquired from the real-world images

as a dataset. Then comes the Data Pre-processing phase, here the data obtained is treated and changed into the desired format.

Cleaning of data i.e., to remove the tuples have null values, checking for redundancies, dropping irrelevant details, etc. is carried out in this phase. The processed data is then used for extracting features which are relevant and needed for training and testing phase. The training and testing phase is carried out in each of the four algorithms used. Then Voting takes place where the values like f-score, recall, precision and accuracy of all the four algorithms are compared.

- **Image and Gesture Recognition**

1. We will use the camera to sense the face of the transaction-er. It is done using Python.
2. Based on the face and gesture, firstly, we need to identify whether it is owner of the bank account or not and generate an instantaneous pattern.
3. The face gesture recognition is done by using the Google Gesture recognizer.



- **Image/video from Camera to Data**

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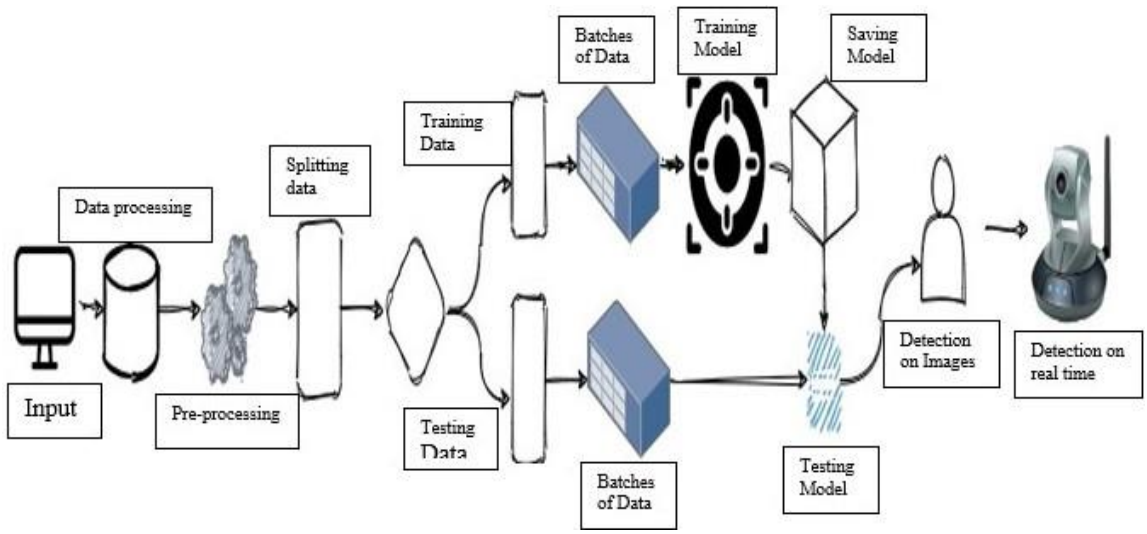
- **Data to Database for Correlation**

1. Gesture recognizer is used to convert the input gesture file in image format to code and stored in the database.
2. This received database is compared with the already saved data. If the data matches, the person and his gestures are authentic, symbolising that account the owner is using the transaction.
3. If the data on both side matches, transaction continues, else it fails.

System Architecture



A. Data Preprocessing

Data preprocessing is a pattern of setting up the crude data and making it suitable for a ML model. It is the first and critical development while making an AI model. While making a ML project, it isn't by and large a case that we come clean and coordinated data. What's more,

remembering that doing any movement with data, it is compulsory to clean it and put in a planned way. So we utilizing information preprocessing task. A genuine data all around contains disturbances, missing characteristics, and conceivably in an unusable setup which can't be directly used for ML models. Data preprocessing is required endeavors for cleaning the data and making it sensible for a ML model which moreover extends the exactness and efficiency of a ML model.

B. Data Extraction

Data extraction is the demonstration or cycle of recovering data out of data source for additional data processing or data storage. The import into the transitional extracting system is accordingly normally followed by data change and possibly the addition of metadata preceding fare to another stage in the data work process. Data extraction is a method of obtaining information from a data set or SaaS stage, so it is likely to be imitated as a goal (for example, an information warehouse) designed to help online scientific preparation (OLAP). Information extraction is the initial stage of information absorption measures (delete, change and burden) called ETL. It will be extracting the essential feature which we are giving as an input or the training data.

C. Face Recognition

The first step in identifying someone is to recognize his or her face. It means that the machine can recognize the picture as who's by comparing it to a previously trained dataset. Face detection from a live video is needed here. Detecting and identifying the right individual in real-time video is a major issue. Face recognition is an important aspect in the field of authenticity. We will be able to identify that it is not a different person who is doing the payment. Therefore, we can say that the owner of the account is handling the application and not someone else. We will only move further when the face recognition is completed. We can consider this as our first phase.

D. Feature Extraction

In ML, feature extraction, in any case called variable determination, attribute choice or variable subset choice, is the path toward picking a subset of appropriate features (factors, markers) for use in model turn of events. Highlight extraction strategies are used for a couple of reasons:

- Simplification of models to simplify them to decipher by investigators/customers.
- Shorter planning times.
- Enhanced hypothesis by diminishing overfitting (formally, decline of variance).

The focal reason while using an element choice technique is that the information contains a couple of features that are either overabundance or unessential, and would accordingly have the option to be taken out without achieving a lot of loss of information. Feature Extraction incorporates the coevolutionary layers that get picture highlights from the resize pictures. Feature Extraction is deeply done to extract the real video.

Methods

- **CNN**

A Convolutional Neural Network (CNN) is a deep learning algorithm which can take in an information about a picture, allot significance (learnable loads and inclinations) to different viewpoints/objects in the picture/image by separate each other. CNNs are utilized for image classification and recognition in light of its high exactness. The CNN follows a hierarchical model which works away at building an organization, similar to a pipe, lastly gives out a completely associated layer where every one of the neurons are associated with one another. Face recognition is accomplished utilizing Deep Learning's sub-field that is Convolutional Neural Network (CNN). It is a multi-layer network prepared to play out a particular undertaking utilizing order. Move learning of a prepared CNN model that is AlexNet is accomplished for face acknowledgment. CNN works by separating highlights from the pictures. Any CNN comprises of the accompanying:

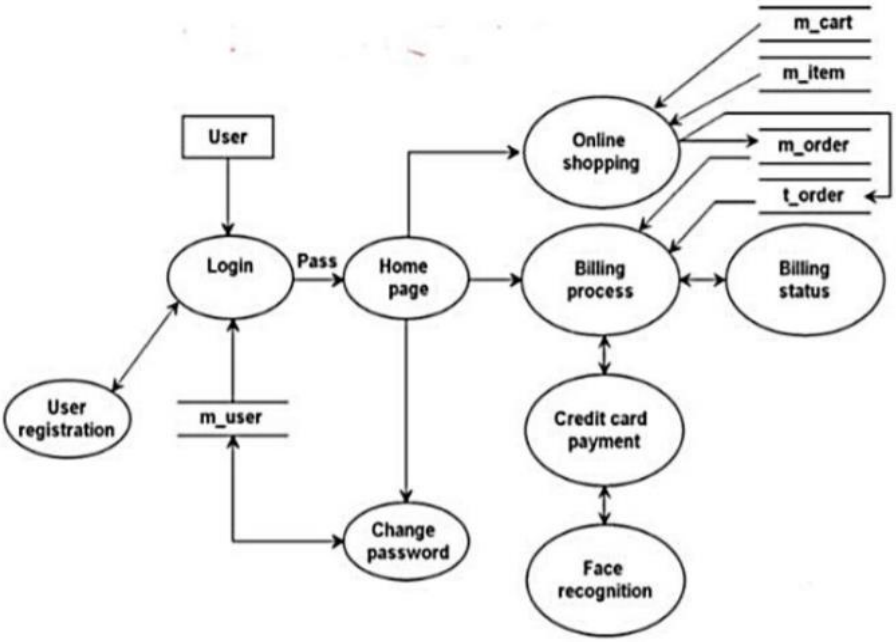
- The input layer which is a grayscale picture.
- The Output layer which is a twofold or multi-class names.

- Secret layers comprising of convolution layers, ReLU (redressed direct unit) layers, the pooling layers, and a completely associated Neural Network.

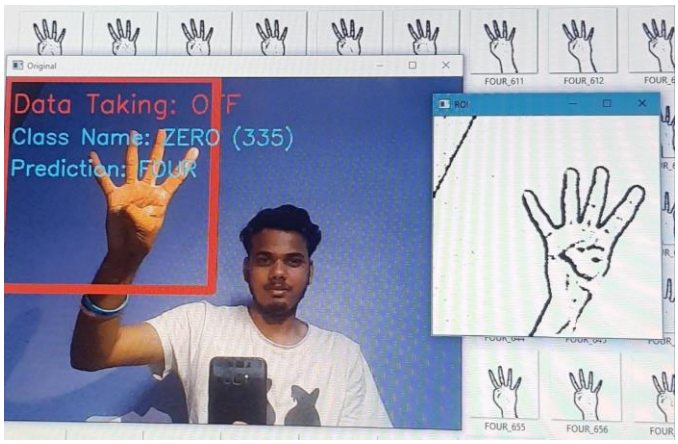
In the basic case, the size of the yield CNN layer is determined as "input_size-(filter_size-1)".

- To compute cushioning, input_size + 2 * padding_size-(filter_size-1).
- To compute the quantity of boundaries the organization learned (n*m*k+1)*f.

Flowchart



Results



Taking 4 as input

Table 1

Prediction Vs Actual Value of Confusion Matrix

Actual value	Predicted value						
		0	1	2	3	4	5
	0	1	0.0031	0	0	0	0
	1	0.001	1	0.0021	0.00034	0	0
	2	0.00068	0.0021	0.99	0.0034	0	0
	3	0	0	0.00034	1	0	0
	4	0	0	0.00034	0.022	0.97	0.0034
	5	0	0	0	0	0.0062	0.99

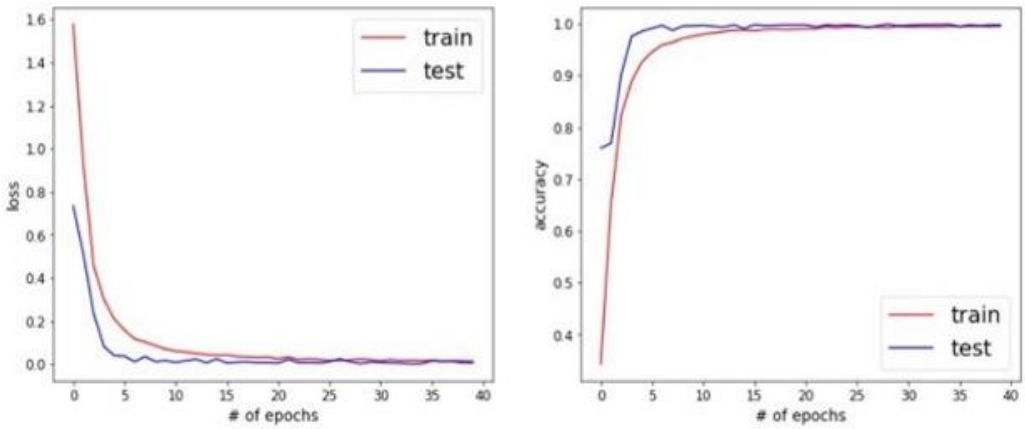


Figure 1. Loss and Accuracy of Train and Test Set

Conclusion

In this paper, we propose a secure online transaction by introducing a new hand-over-face gesture-based face recognition method to overcome the issues in online transaction process. Usually in current transaction OPT is generated to the user mobile number. Even if the One-time Pass is sent only to the owner of the bank account during transaction, it cannot be said for sure that it reaches the owner safely. Since the gestures are saved with the bank owner, only the owner and the bank are aware of the gesture. In this project, the face is authenticated successfully, it can be said for sure that it is actually the owner of the bank account that is accessing the payment option. Here, we using the real-time gesture recognition is involved, it can be said for sure that the fraudster is not using a picture to access the transaction.

References

Busso, C., Deng, Z., Yildirim, S., Bulut, M., Lee, C.M., Kazemzadeh, A., & Narayanan, S. (2004). Analysis of emotion recognition using facial expressions, speech and multimodal information. *In Proceedings of the 6th international conference on Multimodal interfaces*, 205-211.

Ioannou, S.V., Raouzaiou, A.T., Tzouvaras, V.A., Mailis, T.P., Karpouzis, K.C., & Kollias, S.D. (2005). Emotion recognition through facial expression analysis based on a neurofuzzy network. *Neural Networks, 18*(4), 423-435.

Mehrabian, A. (1968). Communication without Words, Psychology Today, *2*(4), 53-56.

Sumathi, C.P., Santhanam, T., & Mahadevi, M. (2012). Automatic facial expression analysis a survey. *International Journal of Computer Science and Engineering Survey*, *3*(6), 47.

Lee, I., Jung, H., Ahn, C.H., Seo, J., Kim, J., & Kwon, O. (2016). Real-time personalized facial expression recognition system based on deep learning. *In IEEE International Conference on Consumer Electronics (ICCE)*, 267-268.

Barros, P., Jirak, D., Weber, C., & Wermter, S. (2015). Multimodal emotional state recognition using sequence-dependent deep hierarchical features. *Neural Networks, 72*, 140-151.

Cotter, S.F. (2010). Sparse representation for accurate classification of corrupted and occluded facial expressions. *In IEEE International Conference on Acoustics, Speech and Signal Processing*, 838-841.

Miyakoshi, Y., & Kato, S. (2011). Facial emotion detection considering partial occlusion of face using Bayesian network. *In IEEE Symposium on Computers & Informatics*, 96-101.

Pease, A., & Pease, B. (2004). The Definitive Book of Body Language, Pease International: Austrelia.

Mahmoud, M., & Robinson, P. (2011). Interpreting hand-over-face gestures. *In International Conference on Affective Computing and Intelligent Interaction*, Springer, Berlin, Heidelberg, 248-255.

Mahmoud, M.M., Baltrušaitis, T., & Robinson, P. (2014). Automatic detection of naturalistic hand-over-face gesture descriptors. *In Proceedings of the 16th International Conference on Multimodal Interaction*, 319-326.

Prabhu, M.K., & Jayagopi, D.B. (2017). Real time multimodal emotion recognition system using facial landmarks and hand over face gestures. *International Journal of Machine Learning and Computing, 7*(2), 30-34.

Whitehill, J., Serpell, Z., Lin, Y.C., Foster, A., & Movellan, J.R. (2014). The faces of engagement: Automatic recognition of student engagement from facial expressions. *IEEE Transactions on Affective Computing*, *5*(1), 86-98.

Mahmoud, M., El-Kaliouby, R., & Goneid, A. (2009). Towards communicative face occlusions: machine detection of hand-over-face gestures. *In International Conference Image Analysis and Recognition, Springer, Berlin, Heidelberg*, 481-490.

Viola, P., & Jones, M.J. (2004). Robust real-time face detection. *International journal of computer vision, 57*(2), 137-154.

Kim, H.C., Kim, D., & Bang, S.Y. (2002). Face recognition using the mixture-of-eigenfaces method. *Pattern Recognition Letters*, *23*(13), 1549-1558.

Belhumeur, P.N., Hespanha, J.P., & Kriegman, D.J. (1997). Eigenfaces vs. fisher faces: Recognition using class specific linear projection. *IEEE Transactions on pattern analysis and machine intelligence, 19*(7), 711-720.

Rowley, H.A., Baluja, S., & Kanade, T. (1998). Rotation invariant neural network-based face detection. *In Proceedings. 1998 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (Cat. No. 98CB36231)*, 38-44.

Seow, M.J., Valaparla, D., & Asari, V.K. (2003). Neural network based skin color model for face detection. *In 32nd Applied Imagery Pattern Recognition Workshop, 2003. Proceedings*, 141-145.

Felzenszwalb, P.F., Girshick, R.B., Mc Allester, D., & Ramanan, D. (2009). Object detection with discriminatively trained part-based models. *IEEE transactions on pattern analysis and machine intelligence, 32*(9), 1627-1645.

Safa, M., & Pandian, A. (2021). A Review on Big IoT Data Analytics for Improving QoS-based Performance in System: Design, Opportunities, and Challenges. *In Artificial Intelligence Techniques for Advanced Computing Applications*, *Springer, Singapore*, 433-443.

Piyush R., Safa, M., Nitish, K., Sahrudh, P.J., & Shivaditya, S. (2020). Enhanced Smart Music Controller by Applying CNN in IoT. *International Journal of Advanced Science and*

Technology, 29(6), 2739-2749.

Saranya, G., Geetha, G., Safa, M., & Meenakshi, K. (2020). Multi-Label and Multi-Class Retinal Classification and Comparative Model of Retinal Diseases. *International Journal of Advanced Science and Technology, 29*(6), 2319-2329.

Aditya, V., Safa, M., Sanjit, S.S., Bhaawan, M., & Bhagavatula, A. (2020). Enhancing Smart Precision Agriculture in IoT Using Agro ecologicali Analysis. *International Journal of Advanced Science and Technology, 29*(6), 2750-2760.

Abhirup, B., Safa, M., Sanjay, B.S., Manas, R.A., & Vivek, K. (2020). Implementation of Dynamic Lighting & Augmented Reality (DLAR) Smart Home System for Deaf and Hard-of-Hearing (DHH) Residents. *International Journal of Advanced Science and Technology, 29*(6), 2724-2738.

Uma Maheswari, K.M., & Govindarajan S. (2019). Hybridization of Oppositional Center based Genetic Algorithms for Resource Allocation in Cloud. *Journal of Networking and Virtual Organization (Inder Science), 21*(3), 307-325.

Umamaheswari, K.M., Taaran, C., Kyle, F. (2020). Meme Chat: An Innovative Social Media Platform for Content Monetization & Corporate Outreach Using OCR & NLP. *Journal of Critical Reviews, 7*(4), 206-208.

Uma Maheswari, K.M., Sujatha, R., Govindarajan, S. (2017). Hybrid Green Scheduling Algorithm Using Genetic algorithm and Particle Swarm Optimization Algorithm in IAAS Cloud. *ARPN Journal of Engineering and Applied Sciences*, *12*(12), 3762-3766.