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FR-PAY-A secure approach for payment

Kamlesh Mali[1], Karan Kumar[2], Balaji Mhetre[3], Janhavi Sangoi[4]
[1](Computer, Viva Institute of Technology/Mumbai, India)
[2](Computer, Viva Institute of Technology/Mumbai, India)
[3](Computer, Viva Institute of Technology/Mumbai, India)
4(Computer, Viva Institute of Technology/Mumbai, India)

Abstract: *The form of digital payments continues increasing, this is because according to WHO the surface of objects can be a medium in the spread of the covid-19 virus. The trend of digitalization is becoming a new business trend to develop and survive in the midst of a crisis due to this pandemic. Face recognition has got rapid growth in recent year. Face recognition is the ability to detect and recognize person face by facial- characteristics. We know that face is multidimensional so it requires lots of mathematical computation. Face recognition system is very essential and important for providing security, mug shot matching, law enforcement applications, user verification, user access control, etc. and is mostly used for recognition for various applications. These all applications require an efficient Face recognition system. In payment system the facial recognition has brought new challenges. We know that credit card payment was easy and quick but sometimes we forget the password or lose the card. There are lots of other method for payment like UPI, QR code etc. Researchers said that there were many studies emphasizes that working principles of facial recognition payment system have reliability and the further development trend. Researcher said determinant of end-user acceptance of biometrics.*

Keywords – *Biometrics, Computation, Digitalization, Face recognition System, Security*

I. INTRODUCTION

Digital payments play an important role in this pandemic. In view of the current situation in which individuals are forced to maintain a physical distance, digital payment modes are actually being adopted. The conventional methods of payment cannot be relied on as they can be forged, manipulated and even stolen. In addition, traditional security methods like keys and cards can be lost or misplaced.

Thus, a simple and efficient payment system has to be developed to overcome these drawbacks. Biometric methods can be implemented as they present a higher degree of security when compared to traditional methods. As the human face is unique, it offers much higher security and efficiency than other techniques. Systems that are capable of detecting and recognizing faces can be applied to a wide range of applications including payments, criminal identification and surveillance systems.

Face recognition is one of the few biometric methods that possess the merits of both high accuracy and low intrusiveness. It has the accuracy of a physiological approach without being intrusive. For this reason, face recognition has drawn the attention of researchers in fields from security, psychology, and image processing, to computer vision. Numerous algorithms have been proposed for face recognition. Among the various biometric ID methods, the physiological methods (fingerprint, face, DNA) are more stable than methods in behavioral category.

II. LITERATURE SURVEY

Anurag Achanta et.al [1], modern culture has always been trying to achieve a cashless and digital society. The evolution of payment methods like cards, net banking, and digital wallets has enabled the possibility of cashless and cardless payments. But, these payment methods are at the risk of crime or Fraud and sometimes may require users to memorize different passwords. Mobile and biometric payment systems as they do not require a device to take out the transaction, That's Why Face recognition payments are easier

than the present card. It is also reliable, secure and efficient. Therefore, It saves time for both the retailer and customer. The earlier system used Eigen faces and Euclidean Distance for face recognition payment. the proposed system uses Haar Cascades for face detection and Local Binary Patterns Histogram (LBPH) for face recognition. the proposed approach is more efficient for parameters such as noise reduction, training time, confidence and accuracy as it Provides a higher noise reduction and accuracy with a lower threshold, training time and confidence. Zhang Li et.al [2], the Purpose of this paper is to put forward the mode of identification and secure payment based on face recognition. With the help of this paper, using face recognition technology, the general framework of mobile commerce and the management processes are designed and constructed. The proposed management solution of unknown payment, based on face identity, is an important method for m-commerce privacy protection. Users only need a payment expression to replace traditional payment, random verification code input, and another cumbersome process, which not only frees mobile users from remembering different passwords but also avoids potential hazards, such as password disclosure, forgotten, lost and illegal access. In this paper, the author presents an innovative digital solution to secure payments in mobile commerce, which considerably enhances the safety and efficiency of mobile payment systems and boosts the rapid and humanistic development of mobile commerce by technological means. Ankit Rohra et.al [3], now the era is technological era, here technology has developed rapidly and in this the payment method has enhance day by day. we all know that transaction has been on online via One Time Password or pin or password in a second. For online transaction the security is the most important part in online transaction. due to advance technology, it is easy for hacker to get personal detail of users due to this most people are hesitating to use online payment method. now the most common method for payment is OTP verification for payment. for more security, they use Facial payment method with MTCNN algorithm in this technique usually user have capture the face on device and on the time payment the device recognizes the face and then the payment is done. Ha-kyun Kim et.al [4], from fourth industrial revolution the rapid development of big data, Artificial intelligence, Internet of things, cloud computing, block-chain and other technologies has increases. we all know that how face recognition technique is implemented in various field e.g. attendance system using face recognition, security system as facial lock part in mobiles, financial industries for settlement. in this paper they show how payment system will be implemented on facial recognitions method and how people will be used it. first they have to capture their face on device and then they go for they just need to verify their face for payment. the characteristic of face recognition payment system is convenience, reliability, security, and contactless transaction. The paper basically focuses Chinese customer review on payment system. Wen Kun Zhang et.al [5], this paper is shows that use facial recognition payment via Chinese consumer and how they affected from them. at present we all know various simple and easy payment method are such as credit cards, QR code payment and other modes. But it is easy to lose the cards, forget the password or pin. due to this thing people uses easy password or save them in their device and also they use same password for different account also. from all this Way it is easy for hacker to steal their details and use them for their use.in this era everyone uses online stores or e- commerce website for purchasing and for that they have given there details to the website for payment process so they purchase something. the main aim of the paper is to study and explore the factors security, visibility, and Expected effort and social image as feature variable all the factor affect the consumer intent use the system. The openness characteristics has moderating effect on the relationship between security, expected effort and usage intention. Shreya Jain et.al [6], in this paper mention that digital wallet is quickly becoming mainstream mode of online payment and mobile users use their smartphones for money transaction through payment gateway from specified application. Also the e-commerce sector ha bummed with the ease of purchase and selling of their product easily on internet. the people are now trusting on their product and the payment gateway for payment. form this we get the consumer uses different payment mode COD and Online mode and most of the people prefer COD because they don't trust on Online payment. so it is important for online business specifically to understand the payment usage of ever changing consumers for better sustainable growth. Veena R. Humbe et.al [7], Now this paper mentioned how digital currency and online payment has grown rapidly after demonetization happen in India. after demonetization people are aware about how digital currency used by people. more number of people are involving in digital payment using. then in India an initiative has started that is called digital transparency initiative where volunteer of government gives information about digital payment... The use of digital payments gives more transparency in money transactions this improves the economy of India. In last few years due to the digital payment platform by NPCI called UPI and BHIM app there is positive changes in digital payments. The objective of this research paper is to study

the positive impact of UPI and BHIM app on digital payment system. Rahul Gochhwal et.al [8], India is the seventh largest economical growing country in the world. and the paper is basically on UPI which is most used payment gateway in India. every user trust on the UPI for digital payment. the UPI is tied up with reserve bank of India for digital currency. the UPI is the third party gateway for transaction in one to another account. in this they mentioned UPI is module and its needs a application for further process. The UPI gets rapid growth in 2016 in terms of no. of users. it's a modular API based architecture which enable development of innovative solution for consumers and business. now the merchant centric UPI is increased rapidly. it can help to bring large population in digital economy and can be great tool for financial inclusion in India. Arun Mishra et.al [9],We all know that how biometric technology has popular day by day. The main reason for popularity of biometric is that, each individual has their own biological footprint that is unique and hence cannot be duplicated. Systems are created regularly to make biometric enabled system robust. Loopholes in this system are recognized and work in done to remove those short coming. This paper describe how they develop the secure payment using face recognition technique. for developing this module they uses Eigen faces for face detection which has less accuracy then LBPH algorithm which label each pixel of the image base on labelling of neighbor pixel if similarity found in the pixel then face match for the payment. Shubham Dhere et.al [10], human face contains huge number of facial features. face detection is computer technology that determine the location and size of the face in image. basically face detect facial features and ignore everything. Human face localization and detection is often the first step in applications such as video surveillance, human computer interface, face recognition and image database management in this paper they mentioned how they track human face through OPENCV i.e. open source computer vision. the OPENCV is a library of programming function on Computer Vision. the library focuses on the real-time image processing. Feifei Liu et.al [11], this is a article on face recognition payment system in china and how they uses it. in this article they mentioned facial recognition payment is convenient but users in china were concerned and confused after using it for first time. the face recognition payment gained more popularity in china because china is the biggest user of facial feature recognizer country in the world. in this model user don't have to carry any kind of device or wallet for payment just it need to carry face along with him. basically a screen will be fixed at merchant place. when consumer buy something from there store they just need to scan there face on screen and the money or amount will be debited consumers account, but the consumer is concerned about the data because the data has been store in merchant database. Zlatko Bezhovski et.al [12], the internet and mobile technology has growing rapidly. due to this digitization process grow rapidly. the normal mobile phones have become a smartphones were people can do anything in it. in this paper they mentioned usually people don't carry lots of hard cash. nowadays on behalf of that they use credit card, debit card or e-wallet. but coming credit and debit card people don't want to carry them instead of this they used e-wallet were they put their digital money, which is third party application recognize by trusted banks. Nowadays people do a small transaction through online payment that they think this method is convenient and easy to use rather than caring cards. Now most people trusting on online transaction and e-wallet. Haritha et.al [13], The threat of transaction timed-out or malicious software (malware)-based attacks or illegal use of technology is critical and growing; at an equivalent time online banking gets more and more popular. Earlier, during making any online payment or making any online banking related transactions, the tactic wont to complete a transaction was with One-Time-Passwords also as passwords, which were sent on the top users registered mobile number or email address which were linked together with his checking account. Financial loss could also be one among the results if credentials or credentials linked devices get stolen. In many protocols, the transaction information isn't secured properly. The proposed "Authentication of E-Payment using Face Recognition" is predicated on the face recognition technique on payment gateway. This system eliminates the One-Time-Password & password based transactions with Face recognition system. When face recognition authentication is employed, spoofing or faking of face comes into picture. As in face recognition, faking is often done by displaying photograph (hardcopy) or video ahead of the authenticating device. Considering these faking or spoofing techniques, the system also uses Face spoofing algorithms to beat these issues. Using this we will complete successful transaction by verified natural person during a way that it's proven to the executing party, that the transaction was actually initiated and confirmed by an identified natural person. The proposed Payment gateway is formed secure by the implementation of secure e-transaction using face recognition. Because of this only authentic customers can do transactions. This payment gateway is made secure enough that any authorized customer can easily trust thereon and fearlessly or confidently make payments over the online. At first it's checked if the customer is permitted one or not then the entire

transaction takes place. E Payment gateways fulfil all requirements and provide security, privacy etc. On the basis of these requirements and the local infrastructure, we implemented an electronic payment using face recognition for local environment. Zhaomiao Xu et.al [14],with the increasing market share of the smartphone, more and more people use m-payment (mobile payment) to buy something in their lifestyle. during this paper, a fresh m-payment framework which supported face authentication is proposed after studying existing m-payment security frameworks. On the idea of traditional password authentication technology, this new face authentication based framework applies biological characteristics to make sure users' privacy. In technical level, it uses semi-3D vertical recovery technology and face feature extraction method which deal with 2D-PCA (two-dimension principal component analysis) to verify users' face image. Besides, this framework applies a third-party to ensure the legitimacy of the transaction process This m-payment framework has high-level security and efficiency. However, due to the complication within the technology and therefore the disturbance from circumstance, the accuracy and efficiency are going to be influenced to the extent when users take photos at different direction or under different lights. Thus, after the development of the framework, our group will further explore the face authentication algorithm so as to extend the framework's stability and accuracy Baback Moghaddam et.al [15], From a computer perspective, facial recognition may vary genealogy goes back a lot in the 1960s with the work of Bledsoe. This program (and many others like it it) relies on the geometry of (hand-drawn) "facial points such as eye / nose / mouth spaces and their location relationships (angles, length measurements, etc.). Canada was present "rst to upgrade to the default version of this version system. This `feature-based paradigm continued (or set asleep) for about 30 years, researchers remain frustrated with low recognition rates obtained even before small data sets. It was not until the 1980s that researchers he started trying visual presentations, he did the use of appearance or texture of facial images, often as 2D green inputs to their systems. To test our awareness strategy, we use a collection of photos from the ARPA FERET face database. This collection of photography contains cases of hard recognition it has been found that there are many dates for gaining facial recognition previously tested in the FERET database. The The di $ culty asked by this data set appears to be from that the photos were taken at different times, e different areas, and under conditions of rental paintings. Image collection contains preview views (FA / FB) divided into two subsets: the `galleria (training set) and `probesa (test set). Gallery photos had 74 pairs of photos (2 each) and the investigation set contained 38 pairs of photographs, matching at the bottom set of gallery members. Investigation and gallery data captured for the week split again show variation in clothing, hair and lighting (see Figure 2).the front of our system contains default face recognition module image insert and is usually translated, rated as and minimal rotation (both on and off the plane).This plan is explained in detail to the Chiefs. also uses a high proportion of local object possibilities (in this case the position and scale of the face and individual facial area) depending geometrically align the face to the standard default form All faces on our tests were geometric aligned with the general practice in this way before proceeding analysis.

III. METHODOLOGY

To train the model with face it extracts various values and parameters which depicts and are associated different aspects such features like eyes length, Contrast, image grey scaling, Chroma and image preprocessing are extracted from the image captured from user.

Using deep learning models processing using Python package OpenCV for extraction of feature from the image. The output generated models will decide if the face is matching or not.

If it is matched the further process will be carried out or if it is does not match the process will be discarded.

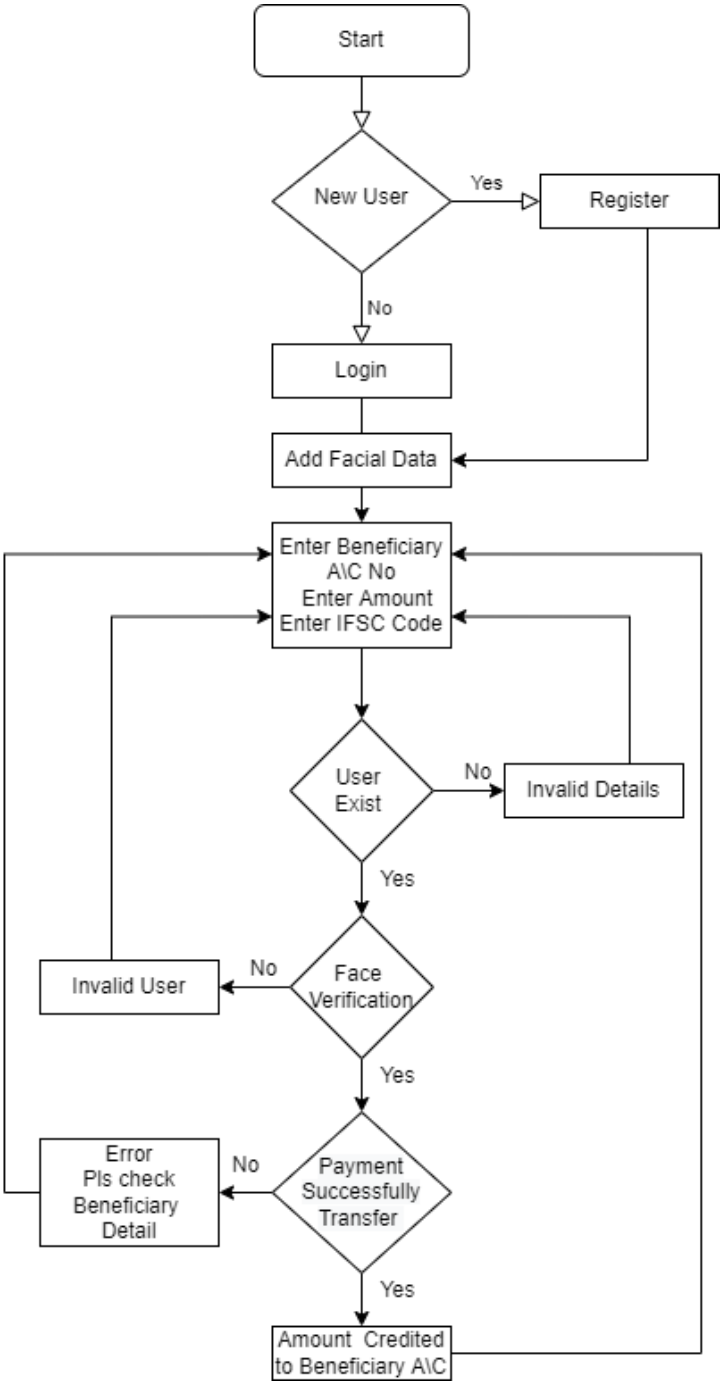

Figure 1: System flow diagram

Fig.1 shows the system flow diagram of the proposed system. The flow starts from the new user. If user is new, it will add data on the database, if not it will procced for the further process. It will check if a payee is new or exist, then the facial verification done. For the security purpose, if a amount to be exceed RS.2000 or equal to that it will ask for the pin.

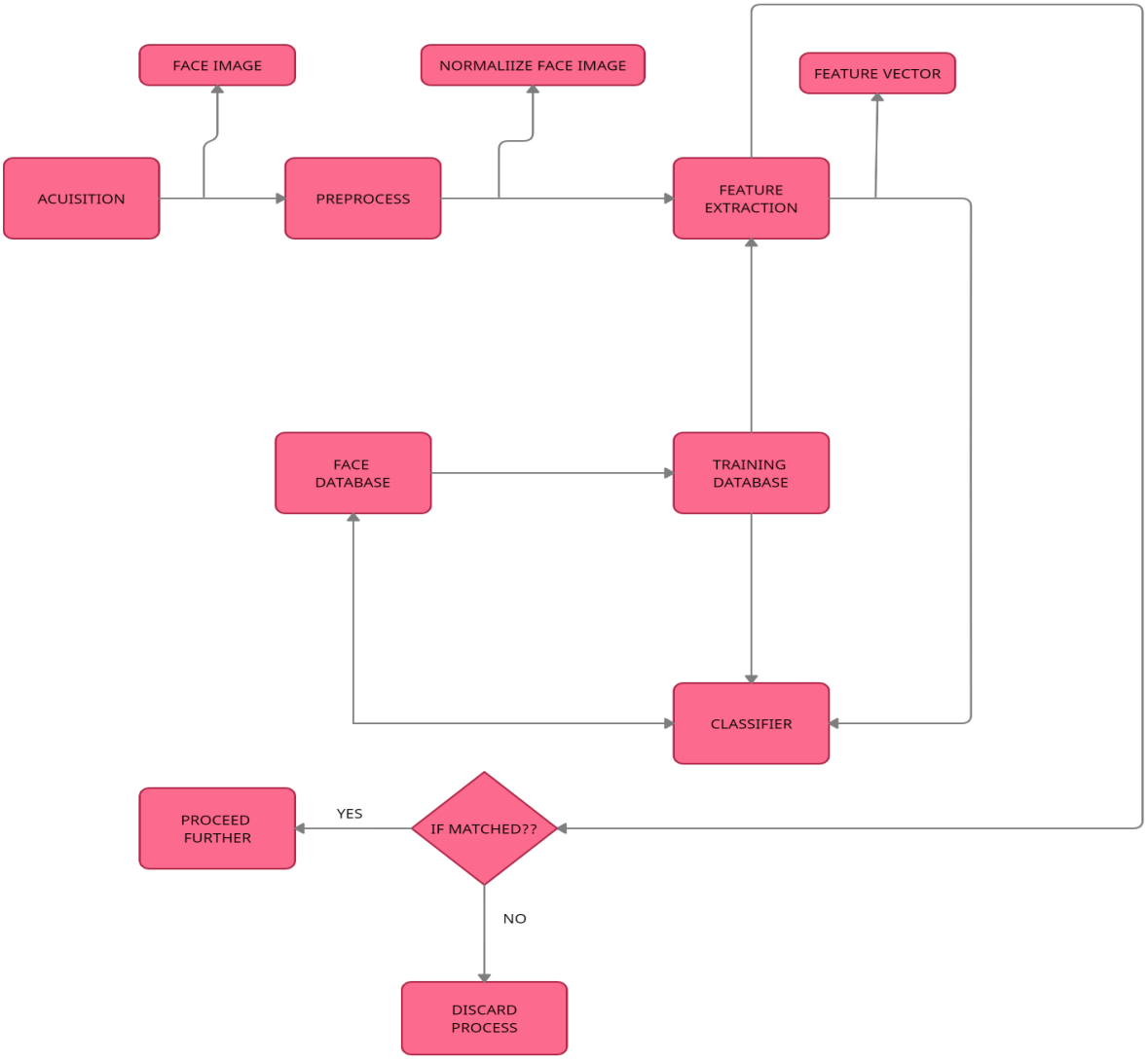

Figure 2: Block diagram.

Fig 2 shows the block diagram of the proposed system. The block diagram show that face image is pre - processing then it will classify and put into the database, these databases used for training the module then the feature extraction is done to get output if the output matches, then process proceed further otherwise the process will be discard

IV. CONCLUSION

Face recognition is a both challenging and important recognition technique. Among all the biometric techniques, face recognition approach possesses one great advantage, which is its user-friendliness. Majorly, Cards and mobile phones are being used for payment but there still exist lots of security issues. There has been a lot of frauds and it is still happening. The proposed system will help in controlling the frauds happening and also helps in securing the personal details. Also, the proposed Payment gateway is made secure by the implementation of secure e-transaction using face recognition. Because of these only authentic customers can do transactions. This payment gateway is made secure enough that any authorized customer can easily trust on it and fearlessly or confidently make payments over the Internet.

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