

Secure Online Payment using Proxy and Facial Recognition

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ABSTRACT:

In the recent days the advancements in technology have led to a surge in online transactions via internet banking, online shopping, payment gateways, movie tickets, booking hotels, etc. During these online transactions Security is the most prevailing issue. People are hesitant to use online transactions because of such issues. so that we have developed our system which secures online transactions using two-step verification. The first step is OTP verification then followed by Facial recognition. In order to interact with a user, the system uses an online interface. The interface is used to gather card details from the user. Once the OTP verification done, the user is authenticated using facial recognition. The system uses a Convolutional Neural Network (CNN) with one shot learning algorithm in order to verify the user by comparing the real time captured image of the user against the image associated with the user's account.

I. INTRODUCTION:

Today's advanced technology allows hackers to get personal details of users and so many people are reluctant to use online transactions [2]. The security becomes a key factor during online payments. We developed a system to enhance the security of online transactions by providing a two-step verification process first one is OTP verification then followed by Facial Recognition [1]. The face is a primary focus in our day-to-day and social life that plays an important role in communicating identity and even emotions [6]. System that recognizes and detects face can be applied to any kind of applications that include online payments, criminal identification and security systems [2].

The system we propose will focus on reducing attacks, which makes the transactions vulnerable, like account takeover, fraudulent application. Face recognition and detection becomes a difficult task because these algorithms are rigid and complex. The main difference between face recognition and detection is that, in face recognition we need to input face from the already existing database, whereas in face detection we need to determine whether the face is present in the image [7]. For that we use a Convolutional Neural Network (CNN) with one shot learning algorithm in order to verify the user by comparing the real time captured image of the user against the image associated with the user's account. Related work is illustrated in Section II, Methodology is proposed in section III, Section IV Conclusion, Section V is the Future scope

II. RELATED WORKS

2.1 Secure Online Transaction Approach

In our current trend, online transaction is being in a multi-device, omnichannel world where our password, card verification value (CVV) and one-time password (OTP) are said to be fail-safe credence, but it is vulnerable to Bluejacking, Impersonation and Reply Attacks as well. In past there are limited source for cashless & card less payment methods but now there are dozens of online virtual payment platforms. [1]

Online payment applications like GPay, Paytm & PhonePe etc where we can quickly send or receive money and also by using Quick Response bar code scanner money can be transferred, well now security is the concern of all personnel [1]. The current Online payment applications faces a dearth of security, so it can be easily spoofed. Therefore, we have designed a face recognition technique which cannot be falsified.

2.2 Biometrics

Biometrics are biological measurements used to authenticate the personnel. The required biometrics of a personnel will be taken and stored in the database [3]. The Biometric identifiers are of many types such as Iris & Retina Recognition (Eyes), Finger Recognition, Finger Geometry Recognition, Gait, Voice & Face recognition etc[6]. Uniqueness, fixity, reliance on the ability, performance and circumvention are been used in grading different types of biometrics. Facial recognition is been used common these days, because camera is been available in every smartphone so availability doesn't matter here [1].

2.3 Facial Recognition approach

There are different types of approach used in facial recognition such as Principal component analysis (PCA), Linear Discriminant Analysis (LDA), Support Vector Machine (SVM) and Convolutional Neural Networks (CNN) [5]. Here we are going to follow the CNNs technique with one-shot learning algorithm where CNNs can be used as classifiers or simply feature extraction [2]. CNNs have shown better accuracy with facial recognition as compared to the other techniques, where by using this 97% accuracy in Facial security can be obtained [4].

III. Proposed Work:

Overview:

The proposed application uses a deep learning algorithm known as one-shot learning for facial recognition [7]. The network used in this method is Siamese network and the reason is because of its low loss function when compared to the other existing networks [2]. The reason for using one-shot learning algorithm is that it increases the accuracy of the work to its maximum and only a small amount of time and input is required to train the model [6]. A mobile app is developed to work as an interface between the front end and back end of the application [8]. The complete flow of the application is represented in figure-1.

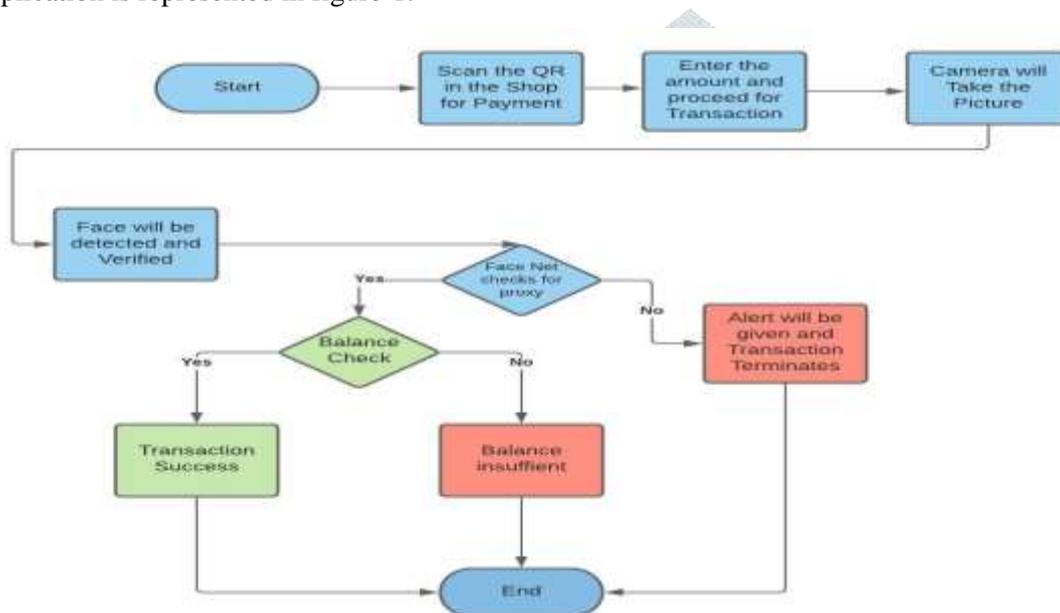


Figure-1: Flow Work of the System

The QR code is scanned for payment and front camera of mobile captures the image of the user and the image is being with database [8]. If the user is authenticated has sufficient balance the transaction is being processed or else the transaction is being terminated as shown in the above diagram.

Training Process:

The learning process of the system is explained as follows. At first, a sample of 20 images is taken to train the model [2]. These images are given as input to the input layer which in turn consists of three different hidden layers. In each separate hidden layer, a particular part of the image is taken and new images of the user are formed based on different possibilities [4]. A clear understanding of the way of separation is represented visually in figure-2.

FACE NET ALGORITHM TRAINING PROCESS

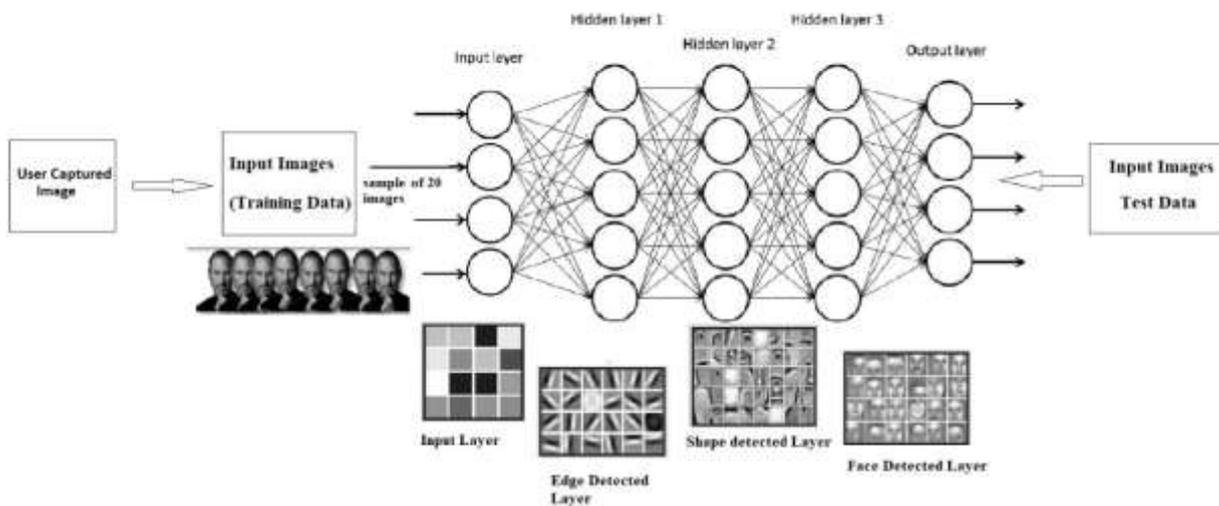


Figure-2: Face Net Training Process

Face Detection and Authentication Process:

The complete work of the proposed application is explained in this section. As explained earlier, after the transaction has been initiated the input image of the user is matched with the system images that are derived as a result of face net training module [6]. If the user image matches any of the images in the database, another wall of proxy testing is initiated that checks for any external factors in the image such as a second person or an image of a person is being used as an input [7]. Once all the process is successful the transaction is completed or else the transaction is terminated [1]. All these details are represented visually in figure-3. The algorithm for the proposed application is given below.

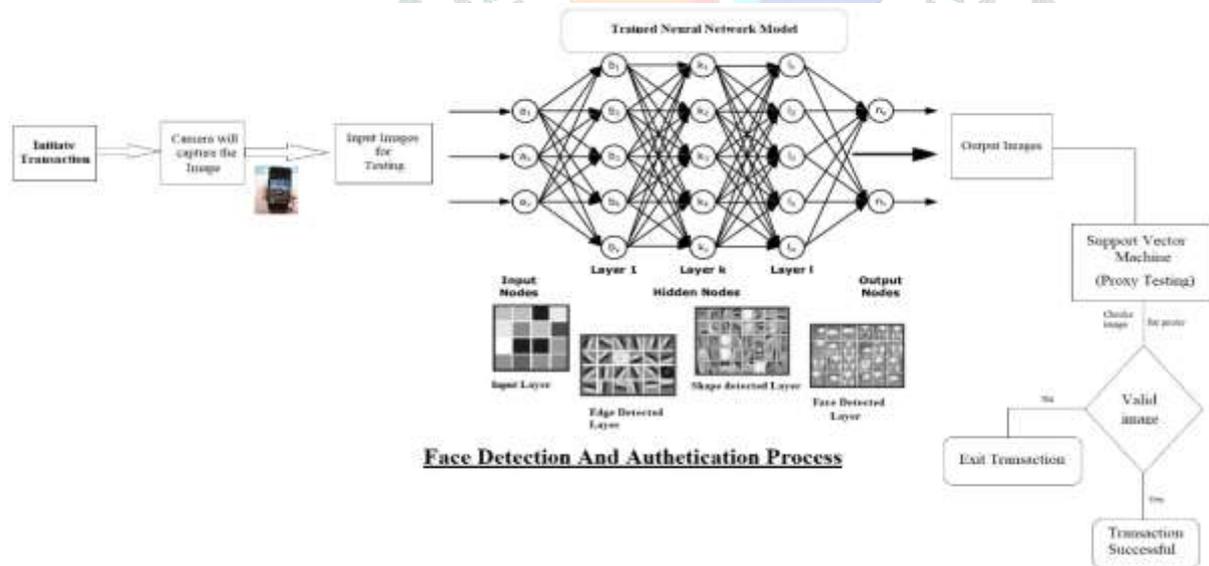


Figure-3: Face Detection and Authentication Process

Algorithm: Online Secure Pay

Step 1: Start

Step 2: Input1 ← Scan the QR for Payment (I/O)

Step 3: Input2 ← Amount proceed for transaction (I/O)

Step 4: Input 3 ← Camera will Take picture (I/O)

Step 5: Face will be detected and verified (Process)

Step 6: Face Checks for Proxy (Decision)

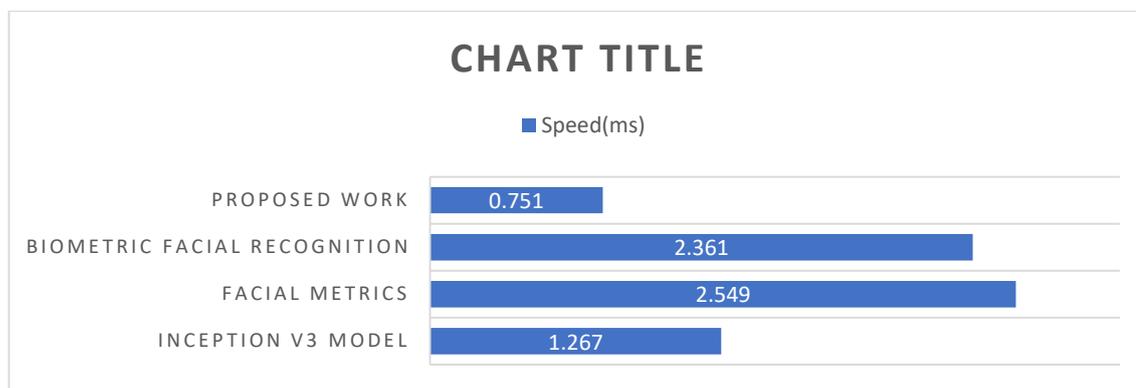
Step 7: If the user has sufficient balance the application goes to step-8 or else to step 9.

Step 8: Transaction Successful

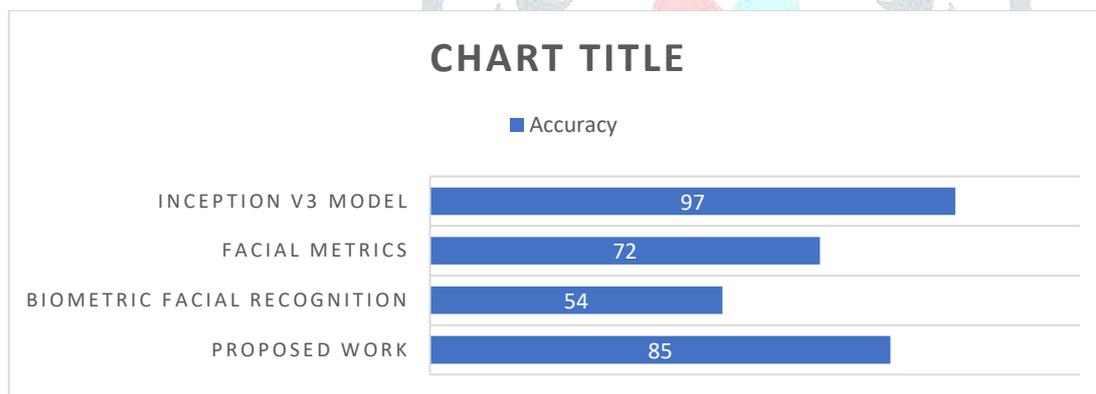
Step 9: Transaction terminated.

IV. RESULTS AND DISCUSSION:

An application is developed based on the proposed algorithm and used its accuracy has been calculated. The accuracy and speed of the application has been calculated and compared with the existing application. At first, the accuracy of the application has been compared with the existing application and recorded in table-1 and represented graphically in figure-4.



After this the speed of the application is being compared with the existing works and the data has been recorded in table-2 and represented graphically in figure-5.



V. CONCLUSION:

The proposed system will help us increase the safety of online transaction through proxy and facial recognition. One shot learning algorithm is used for facial recognition which increases the accuracy of the proposed work to its maximum for successful recognition and authenticating users. This system can be accessed through any mobile operating system. It acts as a payment gateway to all the online payment apps gpay, paypal etc. For further work, fingerprint and iris recognition can be added to the work for further enhancement of the work done in this system.

VI. REFERENCES

1. Surekha. R. Gondkar, Dr. C. S. Mala, Saurab. B “**Biometric Face Recognition Payment System**” 2018 International Journal of Engineering Research & Technology (IJERT)
2. Ritika Patil, Shubhada Patil, Shruti Sagar, Shruti Sancheti , Prof. Sheetal More “ **Secure Online Payment with Facial Recognition using CNN**” 2019 International Research Journal of Engineering and Technology (IRJET).
3. Falaye Adeyinka Adesuyi, Osho Oluwafemi, Alabi Isiaq Oludare , Adama Ndako Victor and Amanambu Victor Rick “ **Secure Authentication for Mobile Banking Using Facial Recognition**” 2013 *IOSR Journal of Computer Engineering (IOSR-JCE)*.

4. Namita Jain, Vikrant Mukkavar, Mahesh Jadhav, Prof. Shruti Sekra **“Survey on Online Transaction using Face Recognition”** 2017 International Journal of Advanced Research in Computer and Communication Engineering.
5. Rafael C. Gonzalez, Richard E. Woods, **“Digital Image Processing”**, 4th Edition, Pearson Education Inc, 2018, Google Scholar
6. Surekha.R.Gondkar, Dr.C. S. Mala, Saurab. B **“Biometric Face Recognition Payment System”** 2018 International Journal of Engineering Research & Technology (IJERT)
7. Faizan Ahmad, Aaima Najam and Zeeshan Ahmed **“Image-based Face Detection and Recognition: “State of the Art””**, Google Scholar.
8. Surekha. R. Gondkar, **“Biometric Face Recognition Payment System”**, Google Scholar.

