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Credit Card Authentication for Fraud Detection

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***Abstract* - Human face detection is the most promising field of image processing that has a vast area of research oriented real life applications. In the real world the concept is widely used for the content annotation, access control, profiling and potential discrimination in the web world. There is always constructive scope of new inventions in the field of technology which is as vast as galaxy on its own. This leads to the better future. There has been a supportive development in the field of technology by the humans since the beginning of mankind. The motive was in rapid development and also in the advancement of technology to ensure the minimization of risk that is prone along with the new inventions which would make life easier, better and much faster. The main intention of face detection is to find out the human face in the given input using Convolutional Neural Network. The Psychological process of locating the human face in the visual frame is also possible. Credit cards are widely used all over the world. People mostly use credit cards for huge transactions, as it provides great benefits, hence attract more people. But with these pros, there exists some cons as well, one of them is frauds. The purpose of frauds is to obtain the goods without paying for it.**

Keywords: Human Face Detection, Image Processing, Convolutional Neural Network, Credit Card.

I. INTRODUCTION

In the current scenario, credit card and debit card are becoming the most common type of payment mode. All the credit card related task is managed by credit card processor. Companies using credit card processing makes sure that transactions are processed correctly and on time. Many companies prefer online transaction because it benefits their business. Funds are transferred into account on time without putting much effort.

Since people are comfortable with cashless transactions, the demand of credit card is increasing rapidly. The main problem faced by the credit card users is to have a secure online transaction. Credit card fraud is a big challenge. The proposed solution will make use of face detection and face recognition technology for making credit card transaction system secured and much better. One of the existing systems deals with securing payment process between the card issuer and the card reader terminal and it is thus ensuring that card number is not known to any other entity, other than the two end points. There is another system that suggests, a detection model must be available to capture the possible anomalous transaction. There is a number of challenges like concept drift, class imbalance and verification latency in credit card fraud detection. Machine learning can also be used for detecting credit card fraudulent transaction using a real world dataset. Deep learning presents a programming resolution to the matter of MasterCard fraud detection that produces use of historic client knowledge in addition as real time group action details that area unit recorded at a similar time of group action. There is another system that makes use of two random forests to train the behavior features of normal and abnormal transactions. With the increasing theft in banks, the security has become an important aspect in banking region. Most of the Credit Cards are currently protected by key locking, some password-based locks or using some digital locks which is insecure and unreliable. So, in this system we are implementing credit card fraud detection system. Face recognition is an effective and successful security technique whose accuracy can be improved by combining other technologies. For facial recognition, this project uses the CNN algorithm.

In this project, only authenticated user can access the credit card as faces are stored for the individual identity of a person. Facial recognition alone cannot determine whether the person is real or not. Therefore, liveness detection is implemented. In liveness detection, the system detects if it interacts with a real person or a spoof arte fact used by other person such as a face photo. To detect whether the person is live or not the project uses eye blink detection. The project identifies whether the user is authentic or not. If not then, the card will not open instead it will raise an alert and it will send a text SMS to the admin that somebody is trying to open their credit card and immediately the system will capture photograph of that person and that photograph will be emailed to the user. In this way, the system provides high security, theft protection and alert for fraud detection.

II. LITERATURE SURVEY

Credit Card Transaction Based on Face Recognition Technology (TDhikhi, Ajay Rana,Anurag Thakur and Karan

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Kapoor). This paper proposes a method for credit card transaction system which will make use of face recognition and face detection technology, using Haar Cascade and GLCM algorithm. The main problem faced by credit card users is attack to lot of privacy issues such as credit card. This generally happens when users give their credit card number to unknown people or when the card is lost. So, we are proposing a system that will reduce the risk of credit card frauds. The system we are proposing will match the image of user's face with dataset of respective user. A database will be maintained for authentication purpose. If the image matches, that means user is genuine and he will be allowed to proceed otherwise, the user will be denied to do the transaction.

Credit Card Fraud Detection Techniques: A Review (Sonal Mehndiratta, Mr. Kamal Gupta). The prediction analysis is the approach which can predict future possibilities on the current data. When the physical-card based purchasing technique is applied, the card is given by the cardholder to the merchant so that a successful payment method can be performed. The fraudulent transactions are conducted by the attacker by stealing the credit card. When the loss of the card is not noticed by the cardholder, a huge loss can be faced by the credit card company. A very little amount of information is required by the attacker for conducting any fraudulent transaction in online transactions. In this research work, various credit card fraud detection techniques are reviewed in terms of certain parameters.

A Comprehensive Survey on Machine Learning Techniques and User Authentication Approaches for Credit Card Fraud Detection. In this work, we provide a survey of current techniques most relevant to the problem of credit card fraud detection. We carry out our survey in two main parts. In the first part, we focus on studies utilizing classical machine learning models, which mostly employ traditional transnational features to make fraud predictions. These models typically rely on some static physical characteristics, such as what the user knows (knowledge-based method), or what he/she has access to (object-based method). In the second part of our survey, we review more advanced techniques of user authentication, which use behavioral biometrics to identify an individual based on his/her unique behavior while he/she is interacting with his/her electronic devices.

CCFD-Net: A novel deep learning model for credit card fraud detection(Xiao Liu,Kuan Yan,Levent Burak Kara). In this paper, we propose a novel Credit Card Fraud Detection model called CCFD-Net that employs a modified residual network architecture. Based on a real world dataset from Vesta's e-commerce transactions, we conduct comparative analysis on predictive models to evaluate and verify the effectiveness of the proposed method. The paper explores hybrid architecture of 1D-Conv and the residual neural network (Res-net), evaluates the performance of different machine learning models based on K-fold cross-validation. The results prove the effectiveness and robustness of the model in credit card fraud detection. In practice, our proposed model can identify more fraudulent transactions than other compared models, and performs best on the evaluation metrics.

III. METHODOLOGY

Credit cards are widely used all over the world. People mostly use credit cards for huge transactions, as it provides great benefits, hence attract more people. But with these pros, there exists some cons as well, one of them is frauds. The purpose of frauds is to obtain the goods without paying for it. As per the survey, India was ranked among the top 5 companies in credit card frauds. In last 2 years, more than 2000 credit frauds have been filed. The traditional method of credit card transaction uses email for verification. The security of this system can be enhanced using face recognition. Various algorithms have been proposed for face recognition like CNN.

In the proposed model, we have used Local binary patterns for face recognition. The user had to enter credit card details, the webcam will turn on and capture images of each person will be clicked automatically and a folder will be created on his name and images will be stored on local server. If the valid person identifies then transaction will be done otherwise system send the email to authorized user.

IV. SYSTEM IMPLEMENTATION

The proposed system for credit card fraud detection using face recognition and two-way authentication was implemented using Python programming language. The system implementation consisted of several phases, including face detection, image preprocessing, face recognition, credit card verification, and database management.

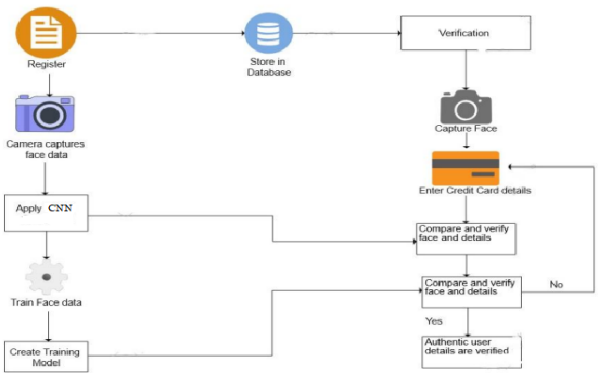

Figure 1: System Architecture

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First, the CNN was used to detect faces in the input images or videos. The algorithm was trained using a large number of positive and negative images to improve the accuracy of the face detection process. Once a face was detected, the face image was cropped and passed through several image preprocessing steps such as normalization and resizing. Next, the face recognition process was implemented using the OpenCV library. The face image was compared against a database of pre-registered user faces using an algorithm that calculates the similarity between two images.

If the face image matched with the pre-registered face, the system moved to the next step. Otherwise, an error message was displayed.

The credit card verification step was implemented using a database management system. The user's credit card details were stored in the database, and the system checked if the details entered by the user matched with the details stored in the database. If the details matched, the transaction was completed. Otherwise, an error message was displayed.

Finally, a graphical user interface was created using the Tkinter library to provide a user-friendly experience. The system was tested using various input images and videos, and the results were evaluated for accuracy and efficiency.

V. ALGORITHM USED

A) Convolutional Neural Network (CNN)

CNN is one of the main categories to do image recognition, image classification. Object detection, face recognition, emotion recognition etc., are some of the areas where CNN are widely used. CNN image classification takes an input image, process it and classify it under certain categories (happy, sad, angry, fear, neutral, disgust). CNN is a neural network that has one or more convolutional layers.

- Step 1: Dataset containing images along with reference emotions is fed into the System. The name of dataset is Face Emotion Recognition (FER) which is an open – source data set that was made publicly available on a Kaggle.
- Step 2: Now import the required libraries and build the model.
- Step 3: The convolutional neural network is used which extracts image features f pixel by pixel.
- Step 4: Matrix factorization is performed on the extracted pixels. The matrix is of m x n.
- Step 5: Max pooling is performed on this matrix where maximum value is selected and again fixed into matrix.
- Step 6: Normalization is performed where every negative value is converted to zero.
- Step 7: To convert values to zero rectified linear units are used where each value is filtered and negative value is set to zero.
- Step 8: The hidden layers take the input values from the visible layers and assign the weights after calculating maximum probability.

VI. RESULTS AND DISCUSSIONS

The output of the implemented model is shown here. The image captured by webcam in real time is compared with the image stored in the database.

The given screenshots show us the face captured using webcam. The given screenshots show us the face of the user is captured in real time and it is compared with the training set in the database. If the face matches, the transaction will be successful. Our proposed project has been designed for the purpose of reducing the credit card frauds that may occur during online payment transaction. There is no need of specialized hardware for installing this system. It just needs a computer and a camera for construction. The system is reliable and efficient mode of transaction process.

The camera plays a crucial role in the working of our project, therefore the image quality and also the performance of the camera must be tested time to time.

A) Main Home Page

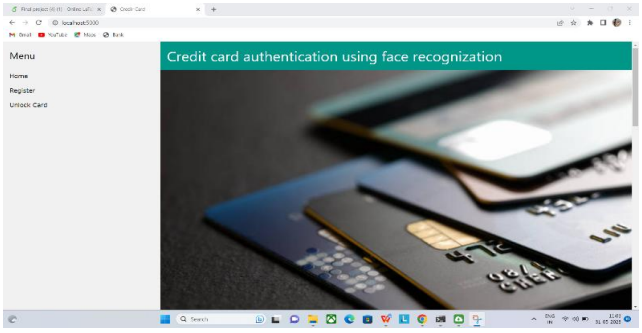

Figure 2: Home Page

B) Login Page

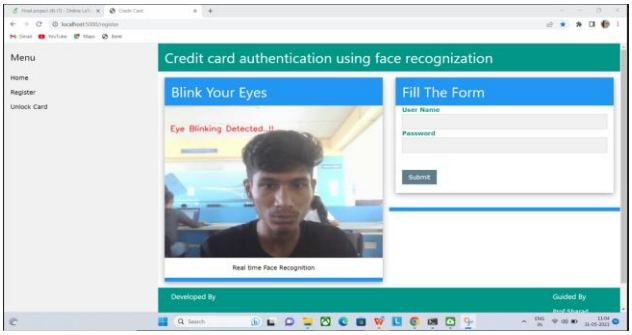

Figure 3: Login Page

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C) Result

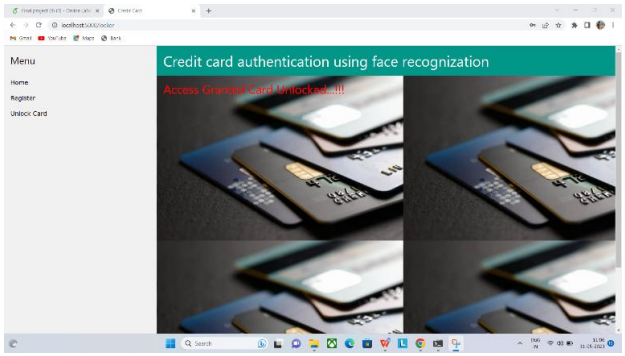

Figure 4: Result

VII. CONCLUSION

In conclusion, the use of face recognition technology and machine learning algorithms for credit card fraud detection provides a powerful tool for improving the security of credit card transactions. The proposed system offers a two-factor authentication process that combines credit card verification with user face recognition, making it more difficult for fraudulent transactions to take place. By incorporating real time transaction authorization and fraud detection, the system ensures fast and accurate detection and prevention of fraudulent activities.

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