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Face Recognition and Random Password Generation Authentication Mechanism

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Abstract :

Achieving security through multi- factor authentication is the most supreme aspecting ATM security. Multi-factor authentication involves OTP and graphical face recognition procedure. Multifactor authentication is achieved by applying various algorithms. Algorithm will function in such a way that activities involving security efforts done to achieve high alertresults.

Keywords : *Authentication, Recognition, OTP, Security, Feature-based(structural) Methods*

1. Introduction

In today's world of increasing access to various services and data via single login with standard security procedures of ATM it has become increasingly easy for unauthorised people to gain accesstoauser'sprivateaccountbyeasilyknowing user name and password. Taking in account all these considerations, we are providing security using face recognition system andOTP.

Face Recognition is a technique to analyse the **facial** shape, the positioning of the face and the pattern of the facial features. Face recognition is largely software based technology which is very complex. The analysis of framework with the tailored algorithms for each type of bio metric methodology. To find a person in the image is the process were the face recognition starts. This face recognition is accomplished by using several methods which includes the movement, human shapes is blurred and the skin tones.

Basic steps involved in face recognition using any of the methods:

Step 1. An image of your face is captured from a camera. Your face may appear alone or look little messy. Your picture mayshow you looking straight ahead or nearly inprofile.

Step 2. In this step, facial recognition software will read the geometry of your face. Key factors inculcate the distance between your eyes and the distance between forehead and chin. The software identifies facial landmarks — one system identifies 68 of them — these are the key factors which will distinguish your face. The result will be your facial signature.

Step 3. Your facial signature will be assumed as a mathematicalformulaandiscomparedtoadatabase where known faces are stored. Considering this: at least 116-117 million Americans have images of their faces in one or more police databases. According to a May 2018 report, the FBI has had access to 411-412 million facial images for searches.

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Step4.Adeterminationismade.Thoroughly.There are more chances that your faceprint may match with an image stored in a facial recognition system databaseAnother alternative used is OTP, it is used when authenticate user is not using the system. One- Time Password (OTP) is a mechanism through which a single-use password is generated and it is then sent to the registered mobile number. This is done for the user to access the website. It is also known as twofactor authentication mechanism.

2. LiteratureSurvey

ShivaniShukla, along with its team members proposed an idea "Random Keypad and Face Recognition Authentication Mechanism".. Their system works as follows, When user enter in the system display screen appear on that include one button that is transection button, after clicking on that button nextpage appears that Random keypad page. if user is already registerede on system, they can enter pin and proceed and if the user is not register than one link shown on the page i.e. registration link. after clicking on that registration form open that form including field like username, account number , date of birth , address ,contact number, etc. After entering pin number, the user will proceed for the next activity and that activity includes following operation: 1. Balance Inquiry 2. Alter Pin 3. Withdraw cash. By using balance inquiry option, user can check balance of their respective account and using alter pin operation user can change their account pin for that userhave to enter same fields that is old pin, new pin and confirm pin. Withdraw operation is use for withdraw money for same amount can be enter by user after performing operation user can logout.[1]

PriyaGupta , along with its members proposed an idea "Deep Neural Network for Human Face Recognition" The proposed method is tested on Yaleface database which consists of black and white images of 15 to 16 samples, each having 11 approx images in different expressions making a total of 165 to 168 images. Pictures for one subject in different facial expression or configuration. The categories are defined as subjects along withlabels, so total classes are 18. The complete dataset is divided into two parts: 148 images for training,and 18 for testing. Final average accuracy is calculated atsoftmaxlayerbycheckingthesummationoftest sampleswhichareidentifiedcorrectly.Creationand training of neural network is done using keras, and tensorflow(these are the packages available in python). Final avg accuracy achieved in proposed system is 97.05 percentage , which is close enough with human face recognition accuracy ofnearly97.5 percentage. [2]

R. Girshick, J. Donahue, along with its members proposed an idea "Rich feature hierarchies for accurate object detection and on the other hand semantic segmentation are the two points which theytookintoconsiderationinwhichtheyproposed a simple and scalable detection algorithm that improves mean average precision approximately 30% relative to the previous best result on VOC 2012 -- achieving a mean avg precision of53.3%.Their approach sums up two key insights: first is they can apply high-capacity convolutional neural networks (CNNs) to bottomup region proposals so that they can easily localize and segment objects and when labeled training data is less, monitored pre-training for an auxiliary activity, followed by domain-specific fine-tuning, yields a vital performance boost. Since they sums up region proposals with CNNs, they call their method R- CNN: Regions with CNN features. They also presented an experiment that contains an insight into what the network understands, revealing a rich hierarchy of photo features.[3]

Daniel SaezTrigueros Proposed an idea "Face recognition: From Traditional to Deep Learning Methods" in which Hybrid methods are formed by summing up methods such as holistic and featurebased methods algorithms. Before deeplearning came into existence, most state-of-the-art face recognition systems were based on hybrid methods.Manyhybridtechnologiessimplysumsup two unique techniques without any

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interaction between them. For example, in the modular eigenfaces covered earlier, the authors experimented with a hybrid representation using both eigenfaces and eigenfeatures and achieved much more accuracy than using either of these two methods alone. However, the most used hybrid technology is to extract local features (e.g. LBP) and project them onto a lower-dimensional and discriminative subspace (e.g. using PCA). Other hybrid technologies which uses Gabor wavelet features combined with unique subspaces methods. In these methods, Gabor kernels of different orientationsandscalesareconvolvedwithanimage and their outputs are summed up into a feature vector. The feature vector is then down sampled to decrease its dimensionality. the feature vector was further processed using the enhanced linear discriminant model. PCA followed by ICA was applied to the down sampled feature vector and the probabilistic reasoning methodology was used to classify whether two images belong to the same subject. kernel PCA with polynomial kernels was applied to the feature vector to encode highorder stats. All these hybrid approaches were shown to provide good accuracy than using Gabor wavelet features alone.[4]

B. Cai, X.Xu, K.Jia, C.Qing, and others proposed an effective "Dehazenet: An end to end system for single image haze removal" their idea is defined as below: a trainable end-to-end system called DehazeNet, for medium transmission estimation. DehazeNet takes a bulky picture as input, and outputs its medium transmission map that is used to recover a blur-free image via atmospheric scattering method. DehazeNet inherits convolutional neural network which is subjected todeep architecture, whose layers are specifically designed to enclose the established assumptions/priors in image dehazing.Specifically, the layers of Maxout units are used for feature extraction, which can generate almost all blurred-relevant features. They suggested an idea on nonlinear activation function inDehazeNet, subjected as bilateral rectified linear unit, which is able to improve the quality of recovered blur-free image. They made connections between the components of the DehazeNet and those used in existing technologies .When experimented on benchmark, photos shows that DehazeNet achieves highest and important performance over existing methods and hence proven as easy and self sufficient to use. [5]

[6] Xiaofen Xing, GuicongXu and others proposed an idea which was like "Face Verification Based on Feature Transfer via PCA-SVM Framework" In this paper, a transfer learning framework is proposed for feature reprojection from face recognition to face verification. Firstly, Principal Component Analysis is used to decrease the feature distribution deviations between different datasets by mapping the high-dimensional features to a low-dimensional subspace. To transfer the face recognition task to the face verification task, Support Vector Machine is adopted to determine whether a pair of given facial images belong to the same person or not. The main contributions of this paper are:

They proposed a feature transfer framework based on PCA-SVM to deal with the divergence of feature distribution and task inconsistency between the source domain (face recognition) and the target domain (face verification).

The feature representation learnt from the CASIAWebFace dataset achieves a comparable performance on LFW benchmark with a single network.

Krizhevsky, I.Sutskever, and G.E. Hinton proposed an effective "Imagenet classification with deep convolution neural networks" They trained a large, deep convolutional neural network to classify the 1.2 million high-resolution images in the ImageNet LSVRC-2010 contest into the 1000 different classes. On the test data, they achieved top-1 and top-5 error rates of 37.5% and 17.0%, respectively, which is considerably better than the late state-of-the-art. The neural network, which has 60 million parameters and 650,000 neurons, incorporates total five convolutional layers, which are followed by max-pooling layers,and three fully connected layers with a final1000-way softmax. In order to train faster, they used

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non-saturating neurons and an efficient GP implementation of the convolution processes. T decrease over fitting in the fully connected layer they employed a recently developed method calle as "dropout" which was proven to be moreefficient.[7]

J. Han, D. Zhang, X. Hu, L. Guo, J, and others proposed an idea named as “Background prior based salient object detection via deep reconstruction residual” having a mediocre gap between salient objects, in which Detection salient objects from pictures is gaining increasing of research interest in recent years as it can substantially can provide facility within a wide range of content-based multimedia applications. Based on the assumption that foreground salient regions are different within some sort of context, number of conventional approaches rely on a number of hand-designed features and their dissimilarity is measured using local or global contrast. Although these approaches have been shown to be effective in dealing with simple images, their limited capability may cause difficulties when dealing with more complicated pictures. Their paper proposed a novel framework for saliency detection by first modeling the background and then dividing the salient objects from the background. We develop stacked denoising auto encoders with deep learning methods to model the background where latent patterns are explored and more powerful representations of information is learnt in an unsupervised and bottom-up manner. Afterwards, they formulated the background as a problematic approach of measuring reconstruction residuals of deep auto encoders. Evaluations of three benchmark datasets and distinguishing with nine state-of-the-art procedures demonstrate the superiority of their paper. [8]

Y. Taigman, M. Yang, M. Ranzato along with its members proposed an effective “Deepface: Closing the gap to human level performance in face verification” The development of an deep neural net (DNN) procedure and learning method that leverage a very large labeled dataset of pictures in order to obtain a face representation that generalizes well to other datasets; (ii) An facial alignment method based on explicit three dimensional modeling of faial expressions; and (iii) Advancement with thestate of the art significantly in the Labeled Faces in the Wild benchmark (LFW), reaching near humanperformance; and the YouTube images dataset (YTF), decreasing the error rate there by more than 50%. [9]

3. Discussion

With the proposed system, it is aimed to fulfill authenticating security in an efficient and correct wayattheentriesmadethroughthewebbrowserof a personal computer. Considering this point, the system uses the mobile device as a reliable secondary authentication factor. The process can be summarized asfollows:

Foremost,Theuserwilllogin usingthecredentials. But in case, if the user is not registered. It will be redirected to the registration page where the user needstoenterallthe requireddetailsalongwithone timepasswordverificationusingphonenumberand theuserneedstodothefacialregistration.Oncethe user gets registered, She/he has to provide its username and password and has to go through the facial verification process. For which we are using the PCA-SVM algorithm which is providing 94 percent of accuracy for extracting facial features in order to get the resulted output correct. Now, the case is that if the registered user is not the one who is using the application then in case of facial verification, She/he has to enter the one time password sent on the registered phonenumber.

4. Conclusion

ThispaperdescribesvariousexistingATMsystems that provides security that has advantages and disadvantages as discovered in section 2. The proposedsystemalsohasbeendiscoveredinsection 3 which secures users identity in a more secured manner.

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