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Face Recognition System with HOG in ATMs

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Abstract - *Face is of great significance part through which we can recognize who we are and how people recognize us. Face is person's most precious part and distinctive physical characteristics through which we can recognize someone without difficulty. A face recognition system is computer application and it is also use in webcam that is capable of verifying or identifying the human from digital image from video source or image source. Humans are having good quality to identifying faces. Facial recognition is mostly used for security used, though there is increasing curiosity in other areas of use to identify the face.*

***Key Words*: Existing Technique-: ATM, Problem Statement, Proposed System-: HOG, Steps to perform algorithm.**

1. INTRODUCTION

Face recognition is usually used in many fields and it can be note the similarity to other biometrics through fingerprint or retina of eye. Recently face recognition has also become most famous in an organization and also with marketing tool. Face recognition is user friendly biometrics authentication method which is currently available to everywhere. To use face recognition system it has to know that what a primary face must looks like. Different faces has distinguish facial landmark, different peaks that make facial characteristics. Human face have 83 nodal points and distance between human eyes, nose, shape of cheekbones are measured by software's. Complex structure of face it requires huge computation so fast face recognition is required.

2. EXISTING SYSTEM

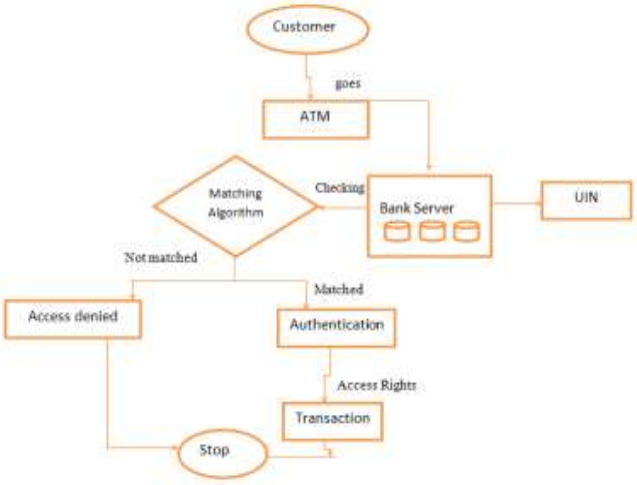
2.1 Automatic Teller Machine

Atms (Automatic teller machine) communicate with bank through host processor. Host processor is similar to an Internet service provider (ISP) and that's the gateway through which all the various ATM network become available to cardholder.

Host processors support leased-line machines. Leased-line machines connect directly to the host processor through point-to-point, dedicated telephone line.

Fig -1: Automatic Teller Machine

1.2 Flowchart of Existing System



Flowchart -1: Flowchart of ATM process

Let's try to understand above flow chart, customer goes to ATM and insert card into card reader and it link to bank server through the host processor, bank have UIN (Unique Identification Number) which has stored unique id of customer so bank server checking the matching algorithm to authenticate the customer's ID and after the authentication of customer, transaction should be done. If it is not matched to customer's information the process is immediately stop.

3. PROBLEM STATEMENT

ATM has always been a big target for hackers. Hacker hack the pin code of the victim's account number, details of customer's may be taken and withdraw the cash so,

security is important in ATM. The hacker simply enters a couple of codes into the ATM and withdraws the money. Attackers were able to steal hundreds of thousands of cash from ATMS, all without attracting any attention. Facial recognition is already used in CCTV camera at ATMs, but the next step is to do the same while we are using ATM.

4. PROPOSED SYSTEM

Customer can use facial recognition to withdraw cash in ATMs by using HOG algorithm technology and users will need to register for the service before using it for the first time. The bank provides this service for joint account customer's also as they can register their photo as an alternative basis on same card holder.

The registration process will be completed in web portal of bank. ATM is just an extension of the bank, it requests the bank's computers to verify the balance and the authenticity and withdraw the cash and then transmits a completed transaction notice. But first we insert photo of customers in training database so face will recognize easily. The aim of implementing facial recognition technology in ATMs is to offer better user experience and more security in transaction, it make it possible to withdraw cash from ATM easily.

Customers insert card into the card reader, it responds to the prompts on the screen for face detection, when customer's face recognize in ATM, cash will be withdraw and within a minute customer get a receipt.

4.1 Histogram of Gradients

A Histogram of Gradients is feature descriptor which is used to detect the object. Gradients are calculated within image per block. A block is considered as pixel grid in gradients is constituted from the magnitude and direction of change in the intensities of the pixel within the block.

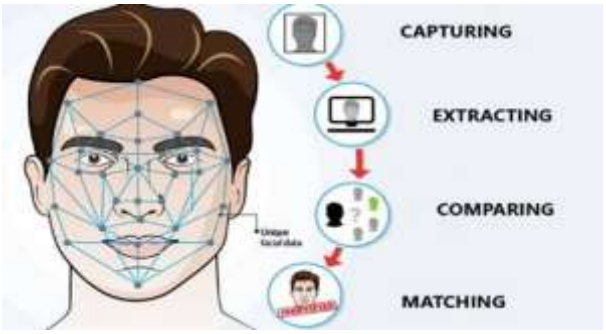


Fig -2: Face recognition process

To recognize the face obtained, a vector of HOG features of the face is extracted. This vector is then used in the SVM model to determine a matching score for the input vector with each of the labels. SVM model returns the label with maximum score, label represents the confidence to closet match within trained face data. The task of calculating matching score is usually heavy to compute. Hence once detected and identified face in an image needs to be tracked for reduce the computation in future use.

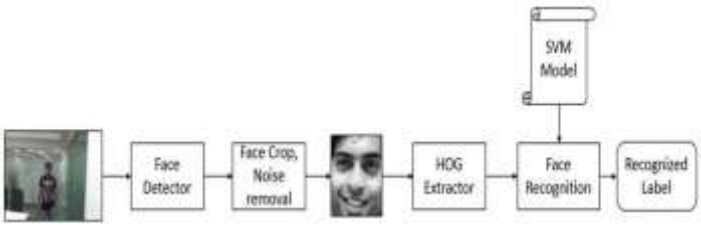


Fig -3: HOG Process

5. STEPS TO PERFORM ALGORITHM

1. Take image and convert it into black and white format.
2. Neighboring pixel are analyzed with each and every pixel in image.
3. Break down the image into squares. Move gradients to higher level.
4. Compare image to other previously extracted faces.
5. Detect Facial landmarks.
6. Perform affine transformation on image so, underlying facial landmarks would always line up with the landmark template.
7. These transformation faces are then fed into a Histogram of Gradients that outputs recognize. Now we can recognize the face by using this technique.

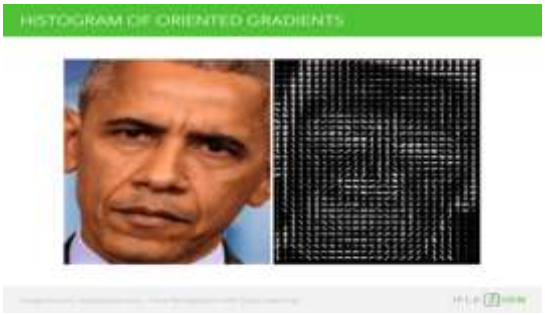
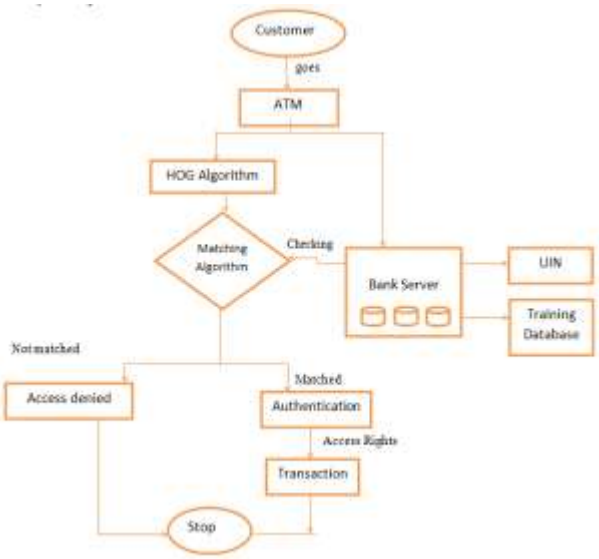


Fig -4: Original Vs. HOG Representation

Fig -5: Face recognition in ATMs

1.2 Flowchart of Proposed System



Flowchart -2: Face Recognition in ATMs

Let's try to understand above flow chart, customer goes to ATM and insert card into card reader and it link to bank server through the host processor, face captured by the camera, bank have UIN (Unique Identification Number) which has saved unique id of customer so bank server checking the matching algorithm to authenticate the customers ID and Training database which include the photo of customer to recognize the face of customer.

After the authentication of customer, transaction should be done. If it is not matched to customers information the process is immediately stop.

6. CONCLUSIONS

- **More than 16,000 security points**
  The ATM has the hardware and software which validate up to 16,000 points on the image of the customer's face, which guarantees a totally secure recognition.

- **High level of interest among customers**
  Bank need to conduct a study with customers to determine the mark of acceptance of identification by facial recognition ,the sense of security that comes with facial recognition ,it convenience to use ,time consuming and work it fast so no more need to wait in queue to withdraw cash.

- **Banking digitalisation**
  Now a days online banking are there for transaction but we need to more secure and update the technology to safe bank account so, face recognition is most important factor to digitize bank system.

- **An innovative experience to improve service.**
  Define a different customer experience, as part of banks strategy to constantly upgrade towards new needs and ideas.
  The facial recognition strengthens Bank position among the other banks with the most advanced ATMs around the world.

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