

Real-time Face Tracking for Password Authentication

Mr. Kaustubh S. Sawant¹, Mr. Pange P.D²

¹Student, E&TC Dept. of AMGOI Engineering, Maharashtra, India

²Associate Professor, E&TC Dept. of AMGOI Engineering, Maharashtra, India

Abstract - Real-time face tracking is important for improvement of security level. This project explains algorithm for face recognition using image processing and manipulation of ARM controller by tracking the face of a human. The face recognition algorithm has been developed on MATLAB platform by the combination of several image processing algorithms. Using the theory of Image Acquisition and Fundamentals of Digital Image Processing, the face of a user has been detected in real time. MATLAB programming develops a computer vision system in the real time for face detection and tracking using camera as image acquisition hardware. Security has become the prime concern for everyone in present scenario. In this work an attempt has been made to develop a security system which is accessible, affordable and yet effective. Face recognition is important for many applications, including security check-up, judicial administration, visual monitoring and intelligent interaction. ARM controller programming provides an interfacing of a hardware prototype with control signals generated by real time face detection and tracking. The revolutionized computers open up the chances of using images and video frames as input signals of the signal processing. Such signal processing is named as image processing. Image processing transforms various sets of characteristics of image parameters into output as control signals. The constant revolution in the field of digital image processing opens up a multitude of application in various areas, in which innovative technologies could have been developed. The best platform on which many image processing algorithms have been developed so far is MATLAB. Major advantage of using MATLAB as an image processing algorithm development environment is it's built in image processing functions and its compatibility with hardware such as cameras, ARM Controller and many more. The aim of this project is to propose a prototype model which both detects and matches a face with distinct features and generates and sends a control signal to the hardware according to the face recognized. This proposed prototype system contains both software and hardware tools. Software includes MATLAB whereas hardware includes PC Camera, ARM board.

Keywords:- MATLAB, ARM Board, Serial Data, PC Camera, Digital Image Processing.

1. INTRODUCTION

Object detection and tracking are important in many computer vision applications including activity recognition, automotive safety, and surveillance. A simple face tracking

system is developed by dividing the tracking problem into three separate problems: Face detection in the frame, Initial facial features used for tracking, Face Tracking. Face detection in MATLAB can be done using many different existing algorithms [1]. These algorithms use different mechanisms to identify the facial features. Some use edge detection methods while some use contrast separation. The reason behind using MATLAB for image processing is due to its features with inbuilt tools and support for good range of hardware like ARM Board, Arduino and Raspberry Pi[2]. In this project, I present an implementation of a ATM security system based on Face Recognition. Verification algorithm is developed using the information age is quickly revolutionizing the way transactions are completed. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use PIN's for identification and security clearances. Using the proper PIN gains access, the successful transactions can occur, but the user of the PIN is not verified. When ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes. This paper describes how face recognition technology can help to the real world ATM machines.

1.1 PURPOSE

The purpose of this work is to improve security level of ATM's. Security has become the prime concern for everyone in present scenario. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. Access codes for buildings, banks accounts and computer systems often use PIN's for identification and security clearances. Using the proper PIN gains access, the successful transactions can occur, but the user of the PIN is not verified. When ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes.

2. SYSTEM DESIGN

System consists of Camera, Keyboard, PC with MATLAB software, ARM microcontroller, LCD display, Buzzer.

Microcontroller [ARM LPC 2138]: This is the CPU (central processing unit) of our project. I am going to use a microcontroller of ARM7 family. It requires 3.3V power

supply for operation. 32 KB of on-chip static RAM and 512 KB of on-chip Flash program Memory.

LCD Display: I have used 16x2 alphanumeric Liquid Crystal Display (LCD) which means it can display alphabets along with numbers on 2 lines each containing 16 characters. It requires 5v power supply.

Matrix Keyboard: Keyboard is used to enter the pin of the ATM, The 4x3 matrix keyboard is used.

MATLAB: I have used MATLAB software for face recognition.

PC Camera: I have used the PC Camera to capture the real-time image.

Buzzer: I have used the buzzer for generating alert for wrong password input.

3. WORKING

Firstly the LCD shows the initializing at that time all the components are in initializing condition.

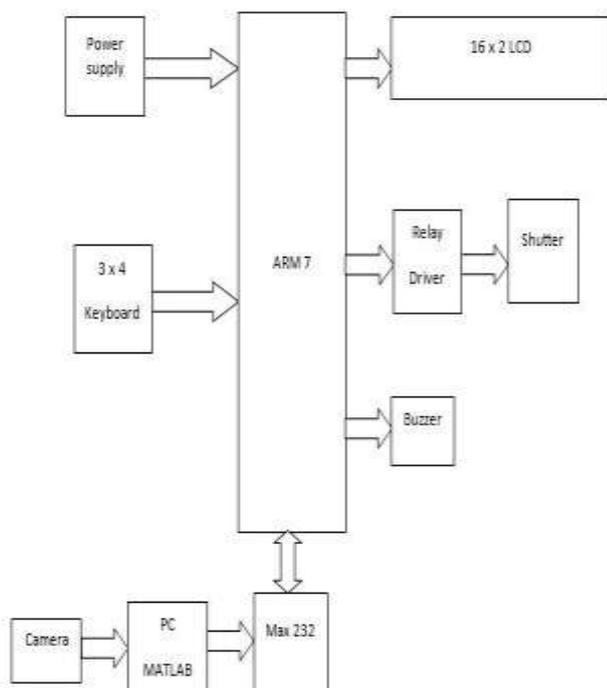


Fig-1. Block Diagram of the Real-time Face Tracking System

After initializing the LCD displays match face first. At that time we have to stay in front of camera. The camera will detect the face by using the face recognition algorithm in The MATLAB software after detecting the face the comparison of the registered image and the live image are takes place under the MATLAB software with the help of face recognition code. If the face is not matched then shows user

not registered. And if the face is matched then LCD shows face matched. After that shows enter the password, If the entered password is wrong then the Buzzer will ON. If the password is correct then the Relay will be ON and shutter will open and LCD shows withdraw cash. After that the system is ready for new transaction. Figure 1 shows the block diagram of the system. Figure 2 shows the overall flow of the system.

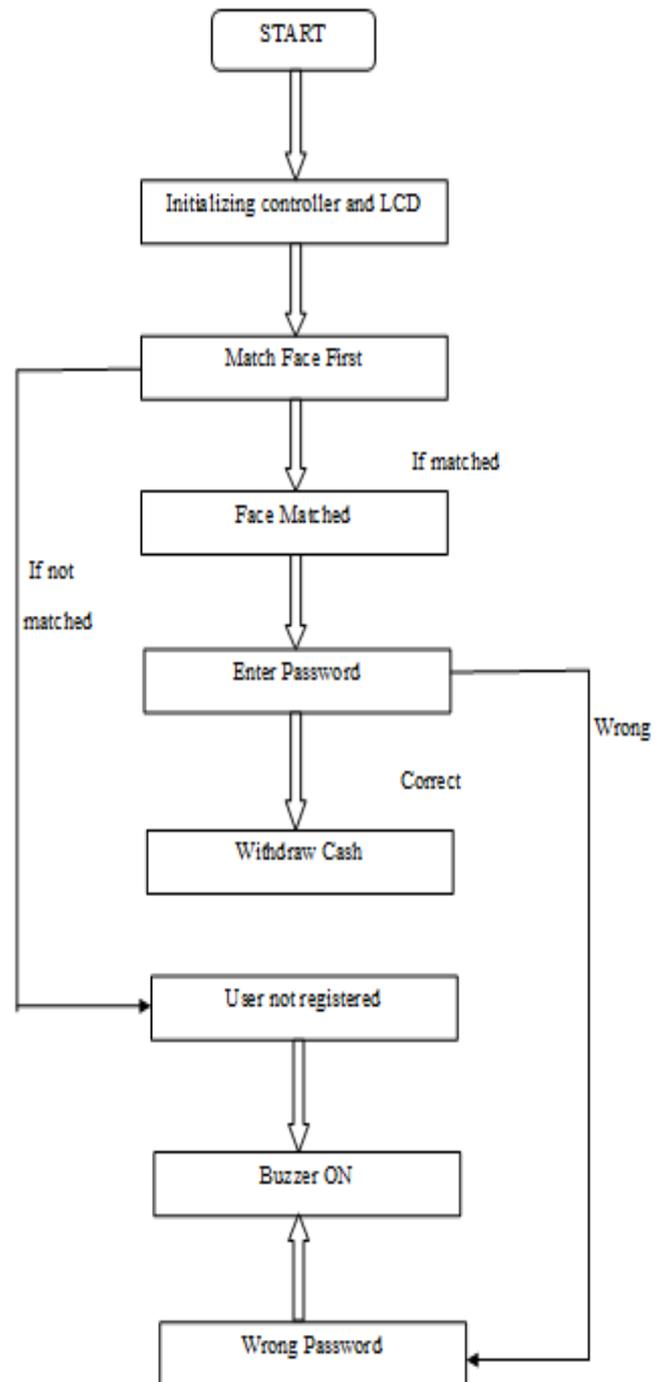


Fig-2. Flow Chart of the Real-time Face Tracking System

4. RESULT AND OUTCOME

Face Matching Stage:



Face Matched and Enter Password:



Enter Password:



Last Stage (Withdraw Cash):



Over All System of Project:



5. CONCLUSION

Finally, the proposed system for tracking faces using PCA algorithm in MATLAB is better than the existing methods. Usage of adaptive boosting for the algorithm helps in increasing the precision and efficiency of the proposed method. This kind of tracking can be used effectively in the surveillance field. Also, Computer Vision is the major field which holds a vast scope for robotics.

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