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DESIGN OF ELECTRONIC VOTING MACHINE BASED ON IMAGE PROCESSING USING RASPBERRY PI

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Abstract —*Electronic voting machine (EVM) has been developedand widely used in many developed nationsfor further improve the election process and to avoid rigging, but most of them use Radio Frequency ID. In developing countries RFID identity for each person does not exist. And using RFID is still a costly solution. Some of the developing countries use image processing technique to detect citizens. But only image processing is not enough for security criteria.*
Keeping these problems in mind in this paper a raspberry pi will be used as host. The Raspberry Pi is a credit card sized single computer or SoC uses ARM1176JZF-S core. SoC, or System on a Chip, is a method of placing all required electronics for running a computer ona single chip. It needs an Operating system to start up. SD/MMC card will acts as a bootable hard disk. A camera will be employed to take picture of citizen's frontal image and identify that this user is valid voter for that region. If the citizen is valid and also didn't vote then the person will be allowed to submit his/her vote. Each voting machine is locked by finger print access module. As the voterfingerprint ismatched with the database, he/she will be sent to a specific machine for voting. Each voting machine is linked with the central raspberry pi voting identification system.

Keywords-- *Raspberry pi, electronic voting machine, pattern recognition, communication, sensor.*

I. INTRODUCTION

E-Voting has been a very controversial topic ever since The Presidential Elections in the U.S. in 2000. Many Security flaws were found. The Standards for the implementation of E-Voting systems were shown to be too weak and many (Scientific) Experts expressed their negative opinions on E-Voting. Nevertheless, efforts are still made to introduce e-voting in Countries that use traditional paper ballots. E-Voting is an Election Method in which the Votes are Cast or Collected electronically. A Computer System whose main element is a Software Component that maps the voting procedure electronically is called an E-Voting System. A Direct Recording Electronic (DRE) Machine is a special case of system which implements all steps in the process of voting, from registration and ballot polling to counting. There are two different forms of voting: Distance and Presence Voting. In present voting system, a voter can cast his/her vote in a polling station under the supervision of the electionadministrator. Examples for presence voting are conventional elections in polling stations or voting with E-Voting Machines. In Distance Voting, the voter acts without the supervision of the electoral and casts his or her vote from a place.

II. LITERATURE SURVEY

The first ever vote in record took place in Rome in 139BC and used simple hand written paper ballots. This system was further modernized and the existing system was first used in Australia in 1858. The system incorporated the use of a set of ballots that were provided by the government. The ballots contained the list of candidates and voters showed their preference by placing a mark on the provided area using pens, stamps and other specified markers.The voter received privacy to place their votes after which the paper ballot was returned and kept in safeguard until the time of tally. The tally is obtained from an accurate count, or so it is supposed to be. This system is still widely used today around the world; however the threats posed by the paper ballot system have been quite evident in many accounts.

The most evident of the issue was the controlling of the count of votes. On many occasions ballot papers are found to have unclear markings that make it hard to distinguish the choice of the voter. These give a wide range chance of the rigging of votes. The party in power may deliberately chose counting teams so as to modify the outcome through the use of such circumstances. The 1910 Encyclopedia Britannica states in its information of voting machines that; up to forty percent of votes were commonly nullified in the process of tallying.Perhaps with the statistics in hand most electronic voting machines suggested have completely eradicated the use of paper ballots. However, as an age old method, it is one that voters can physically see and feel assured that they have actually indeed cast their vote. Therefore, we would like to propose the idea of keeping this traditional system as a sort of back up and feel well system to the electronic parts by the use of a POS printer to print out ballots.

The major issue of traditional voting systems oscillates around the system of tallying. The main problem of this system is dependable on manual procedure and for this reason has raised many questions. Following the US presidential elections in 2000, questions rose on the ballot counting procedure. During the counting of tally, ballots may be displaced and often marks on ballots are hard to identify and distinguish. Therefore we would like to simplify the tedious job of tally counting with the help of modern technology. Keeping count of the tallies should be digitalized, to save time and of course increase reliability. To eliminate the confusion of distinguishing between improperly marked ballots we plan on using digital buttons systems. The advantage being that pressing on the button means a vote has been casted and no chance is left to human error.

As suggested by research, an election system should be able to withstand fraudulent behaviours. This includes the familiar issue of multiple votes cast by a single voter. When a voter is admitted into the system to cast their vote, it is essential that they are properly identified and allowed to vote only once. Keeping this in mind, the paper suggests the use of Near Field 14.

To overcome these complications and to reinforce the checking procedure, the paper suggests the use of fingerprint identification using reliable biometric technologies. Use of biometrics in voting systems has been an acclaimed one as fingerprints are unique to individuals.

The system suggested uses the fingerprint of the voter to compare to a predetermined database where the information on the voters NFC ID card must match to their corresponding fingerprint. After the verification and matching of the two data, the voter is allowed to proceed to voting. With the automation and use of two layers of identification systems, the procedure removes the chance of any fraudulent entrants.

Many electronic voting systems that have been proposed before contain the use of online networking, and the risk of tampering of information through hacking posed a great threat. The machine presented eliminates the use of a live network altogether, thus causing the vote casted to be safe from any tampering. Through the integration of these features and the multiple checking mechanism of using NFC cards and biometric fingerprint identifier, a more secure and prompt method of the traditional voting system can be developed which complies with the expectations mentioned.

III. BLOCK DIAGRAM

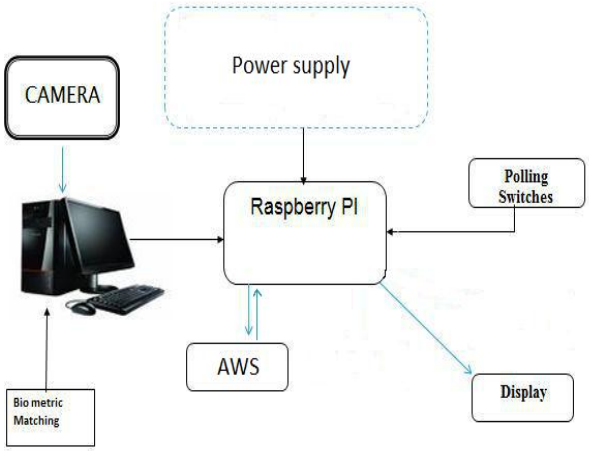
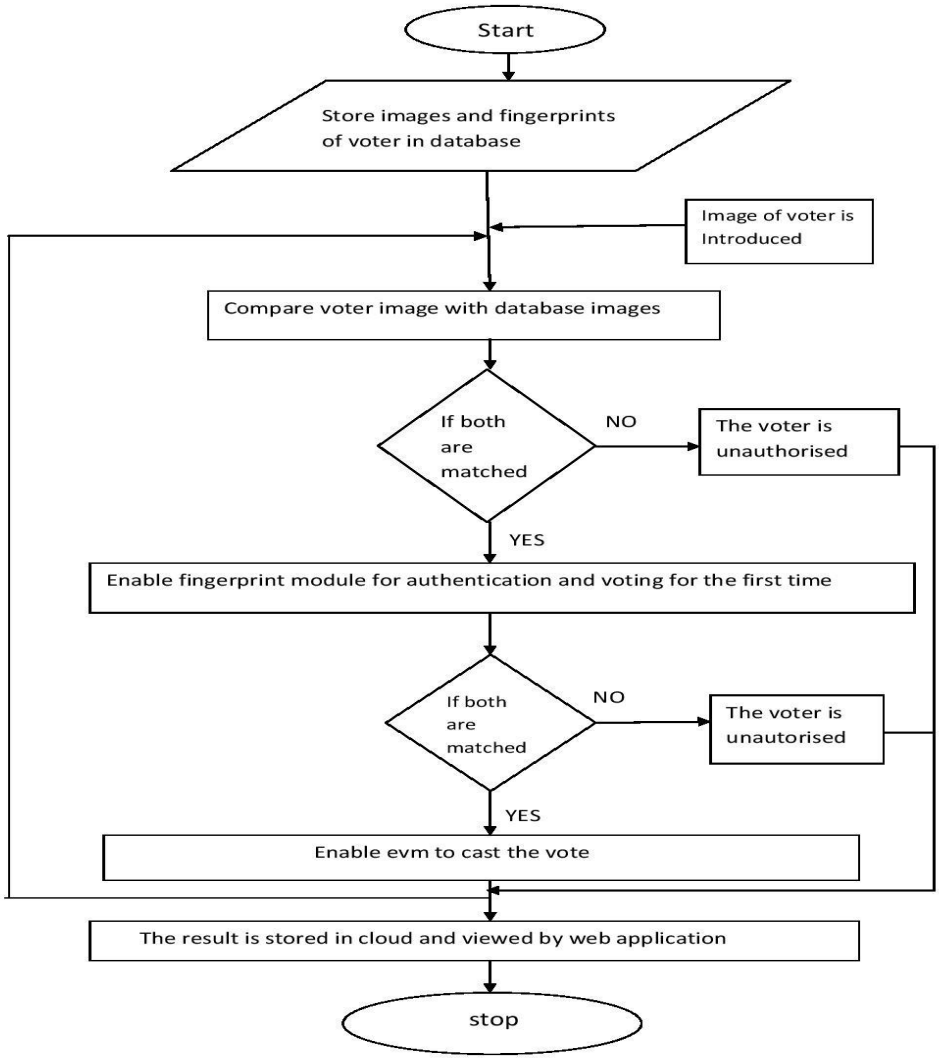


Fig : Block diagram of the project

The finger vein and face recognition gets MATLAB which is compared with existing Images. If the image is matched, the computer sends the command the person is valid to the micro controller and displayed. If anyone try to poll their vote beyond the time limit is the GSM modem send the message alert to authorized person. This processor is implemented on Raspberry Pi Board. So this board is connected with monitor, camera, and SD card. Those all components are connected by USB adaptors. Once the base station confirms the voter as valid member it transmits finger print of the voter in a specific voting machine. Finger print sensor takes the finger print of the voter. When the finger print matches the voting machine gets unlocked and ready to accept the vote otherwise it will be remained lock.

IV. FLOW CHART



V. SOFTWARE ANALYSIS

TOOLS REQUIRED:

Python:

Python is a widely used high-level, general-purpose, interpreted, dynamic programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. The language provides constructs intended to enable clear programs on both a small and large scale.

RASPBIAN OS:

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages; pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

The initial build of over 35,000 Raspbian packages, optimized for best performance on the Raspberry Pi, was completed in June of 2012. However, Raspbian is still under active development with an emphasis on improving the stability and performance of as many Debian packages as possible.

VI. RESULTS

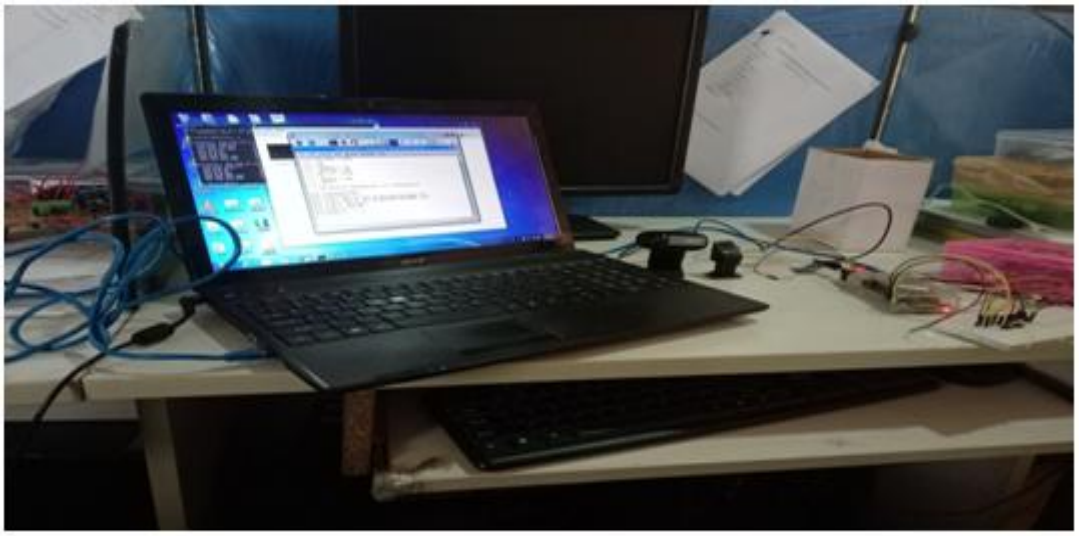


fig.a Working model of EVM

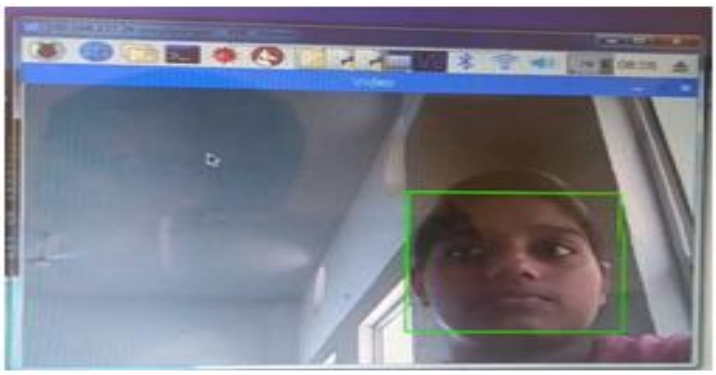


fig.b Face Detection

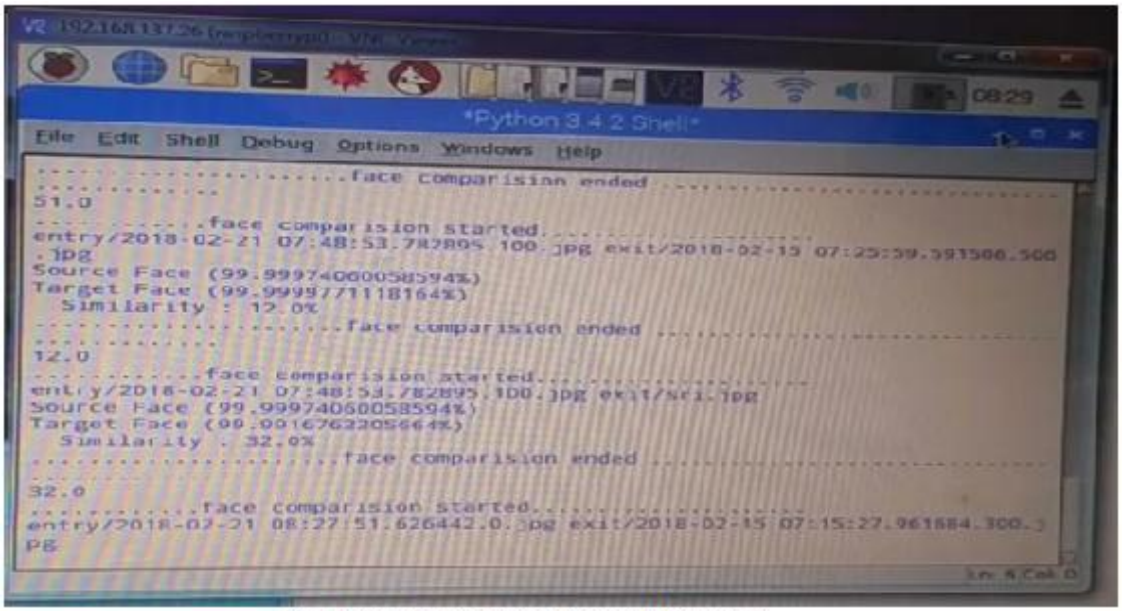


fig.c Image Comparision from AWS bucket

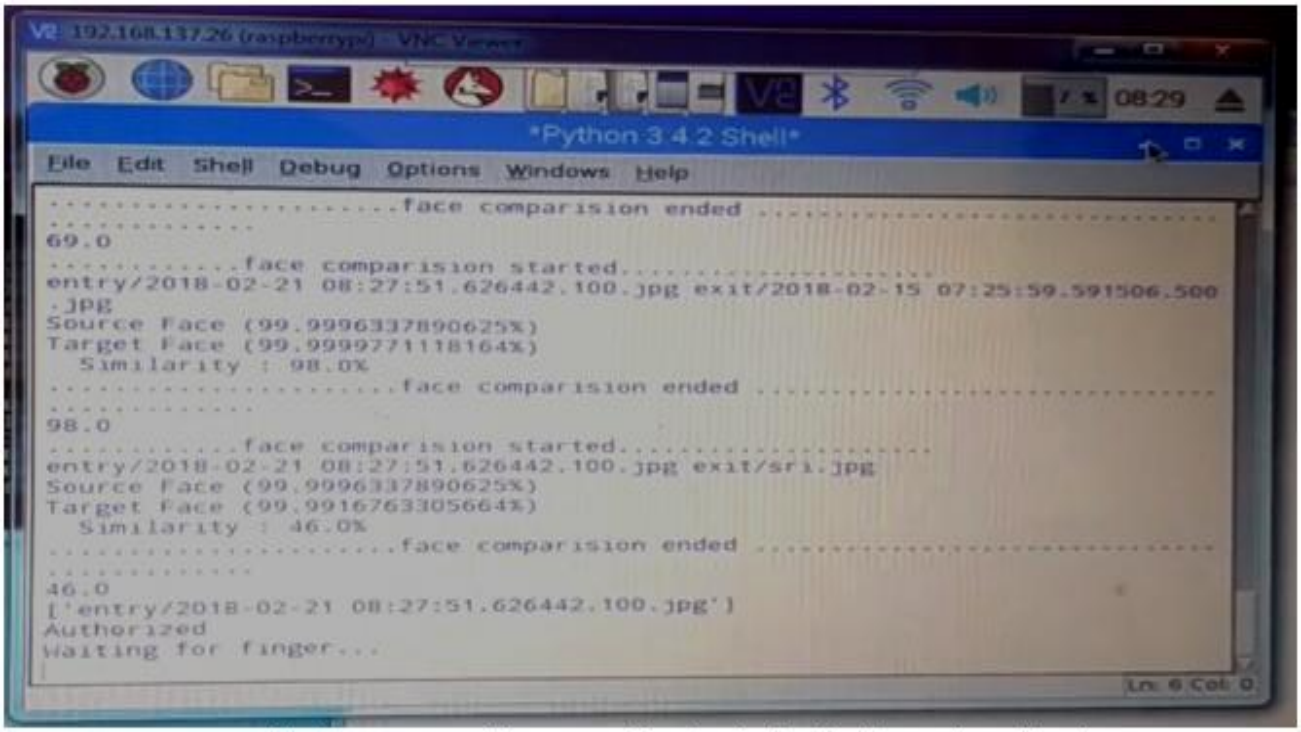


fig.d Image comparision successful and authorized for finger print verification

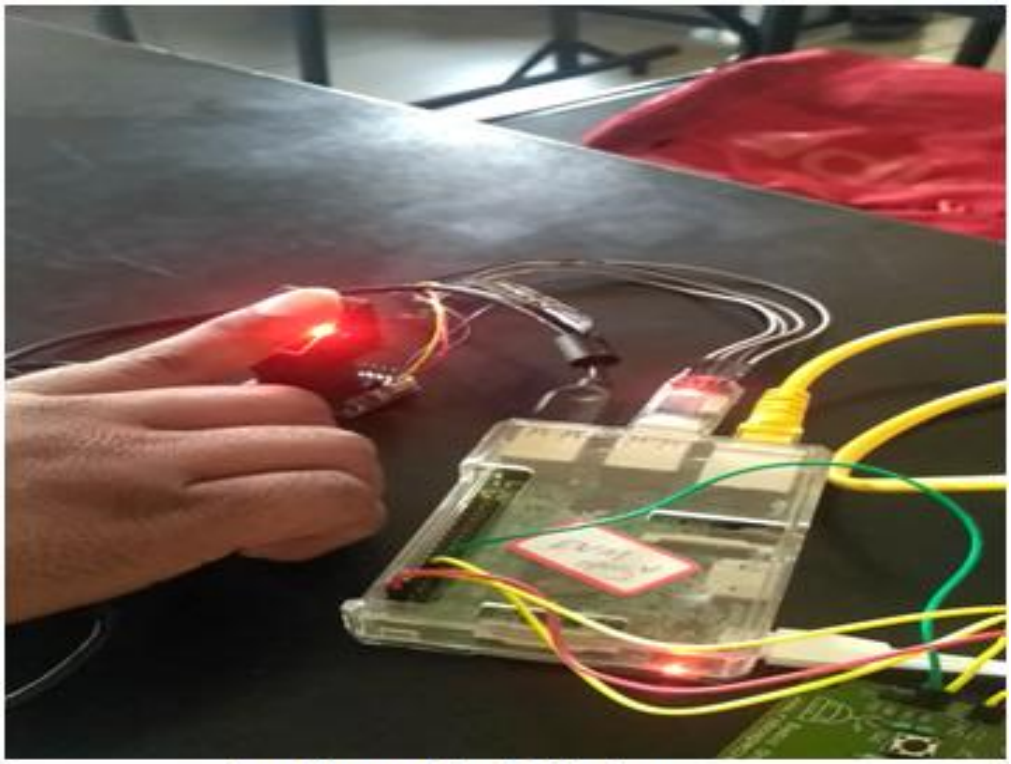


fig.e Finger print Verifcation

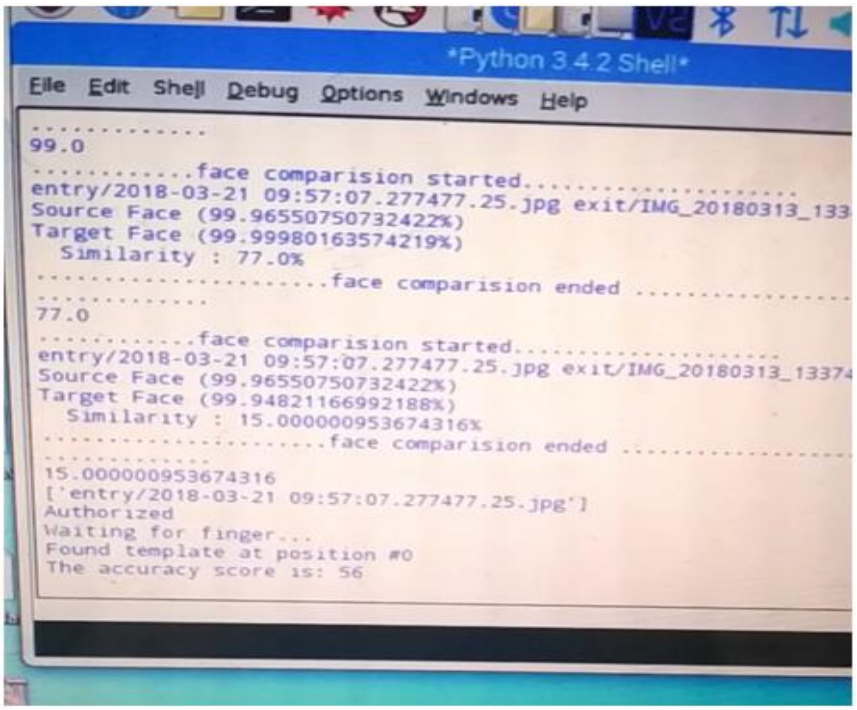


fig.f Finger print verified

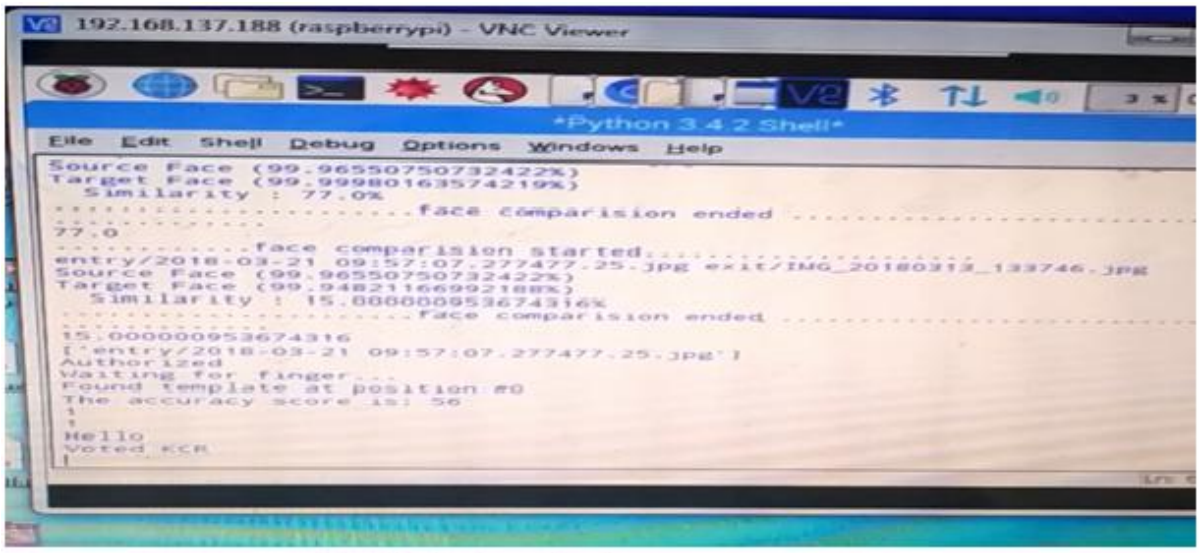


fig. g Vote has been placed

VI. CONCLUSION AND FUTURE SCOPE

The project work titled **"Design of electronic voting machine based on image processing usingraspberry pi"** is successfully designed & developed, and a demo unit is fabricated and the results are found to be satisfactory. The paper includes the initial works done for the development of a system that aims to dictate a much larger scale of the voting frontier. Thus the machine still has many limitations that need to be overcome to allow it to reach the level it is aimed for. Starting with the devices integrated in the machine, for large scale production and use the devices need to be upgraded to better or alternate versions. The fingerprint sensor that was previously used had a low threshold for the output confidence level and overall low efficiency, and so the Adafruit fingerprint sensor is an improvement on those levels. This electronic voting machine will save time and efforts of human. Thus, the proposed EVM system is more fast and reliable as compared to existing electronic voting system.

With the advancement in technology, various models depending upon the requirement of an individual or a certain group of people can be implemented. Not only a time saving but also a proper organized technique can be implemented.In future we can use this application in automated train ticket system, real time tracking can be used by returning officer, parking lot automation, automated attendance system.

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