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A SMART VOTING SYSTEM COMBINING FINGERPRINT AND FACIAL RECOGNITION FOR ENHANCED SECURITY

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ABSTRACT

Bogus (fake) voting is still a major drawback in elections. In Aadhaar card, the government has all our data base including finger print and retina. Biometric finger print devices and web cameras are used in electronic voting machines for voter verification. We have designed a smart voting machine where the user does not need to carry his ID which contains his necessary details. The person present at the polling station need only place his/her finger in the finger print scanner and capture the facial recognition on the web camera at the polling station counter, thus allowing to obtain on-spot fingerprint and facial recognition from the voter who Works. an identity. This data is sent to the control unit for verification. The controller receives data from the reader and compares this data with already existing data stored during voter registration. If the data matches the pre-stored information of the registered fingerprint and face, the person is allowed to cast his/her vote. If not, a warning message is displayed on the LCD and a warning is given through voice, thus stopping the person from casting his/her vote. The mechanism of casting votes is done manually using a keyboard. The LCD is used to display relevant messages, warnings and upcoming results.

Keywords: Voter ID Card, Finger Print Module, LCD, Web Camera, Microcontroller

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1. INTRODUCTION

Biometrics is the science and technology of measuring and analyzing biological data. Biometrics refers to technologies that measure and analyze human body characteristics, such as DNA, fingerprints, eye retina and iris, voice patterns, facial recognition, and hand measurements, for authentication purposes. The field of biometrics emerged and has since expanded to include many types of physical identification. Among many human fingerprints and facial recognition remain a very common identifier and the biometric method of choice among law enforcement. These concepts of human identification have given rise to the development of fingerprint scanner webcam which serves to quickly identify individuals and grant access privileges. The basic point of these instruments is the Election Commission. According

According to Election Commission data, 1,378,352 EVMs were in use in July 2009. Of these, 448,000 were third generation machines, manufactured from 2006 to 2009, of which 253,400 were from BEL and 194,600 from ECIL. The

remaining 930,352 were second generation models manufactured from 2000 to 2005, including 440,146 from BEL and 490,206 from ECIL. (The first generation machines were considered too risky to be used in national elections because of their

The 15-year service life has ended, although they are apparently still used in some state and local contests.) In the 2009 parliamentary election, 417,156,494 votes were cast, for an average of 302 votes per machine.

2. BLOCK DIAGRAM

The system aims to develop fingerprint based advanced Electronic Voting Machine (EVM) which helps in conducting elections in a free and fair manner which is the foundation of a democratic country like India. This project consists of the following units: voting system, fingerprint module, webcam and ARM controller unit. The voter first places his/her finger on the fingerprint module which checks the authentication of the user. If the voter is authenticated then he shows his face towards the web camera, this will capture the image of his face, which will check the authentication in the stored memory. If the voter is authenticated, he will now cast his vote in the voting system by pressing the button against his favorite leader through a button. The control unit consists of an ARM controller, push buttons for various operations of the EVM. The votes cast for a particular candidate in that particular section of the constituency are shown through an LCD display. To perform this intelligent function, the ARM controller is loaded with an intelligent program written in embedded "C" Language

1) ATMEGA 162

The ATMEGA 162 is the brain of this project. It features AVR® 8-bit microcontroller, fully static operation up to 16 MIPS throughput at 16 MHz, on-chip 2-cycle multiplier, non-volatile program and data memory, 16K bytes of in-system self-programmable flash endurance 10,000 write/erase cycles, extensive on-chip debug support, programming of flash, EEPROM via JTAG, fuses and lock bits. Dual Programmable Serial USART, this microcontroller is suitable for industrial control and medical systems. Although your entire fingerprint is recorded, the computer takes only parts of the print to compare with other records.

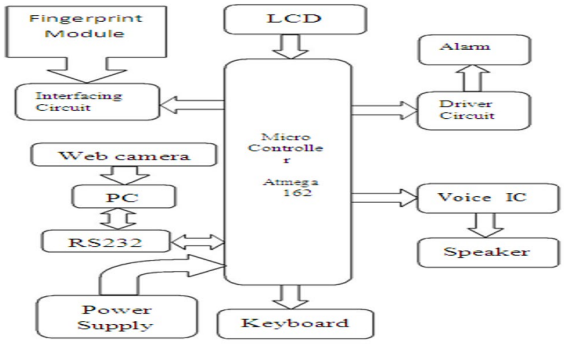

Figure 1 ISVM Flow of Work

2) RS232

In telecommunications, RS-232 is a standard for serial binary data interconnection between a DTE (data terminal equipment) and a D.C.E (Data circuit-terminating device). It is commonly used in computer serial ports.

3) Power Source Module

Major blocks of power supply transformer, rectifier, filter, 7805 voltage regulators are given below

This will provide regulated power supply to the unit which is first converted to 12V AC. 12V AC is converted to DC using a rectifier circuit. Finally, the 7805-voltage regulator provides constant 5V DC supply which will be given to the circuit.

4) Keypad

Push buttons are used in keypad. A push-button or bus button is a simple switch mechanism for controlling some aspect of a machine or process. Buttons are usually made of hard material, usually plastic or metal.

5) Voice IC

MP3 mode, one to one key mode, 7 kinds of operating modes: parallel mode, one record one play key mode, audio-book mode, two-wire serial mode and three-wire serial mode, support MIC and Line-in Recording, support plug-in 64M bit SPI-FLASH, recording time up to 1600 seconds, support voice upload and download via USB.

3. SPEAKER AND FINGERPRINT MODULE

This tool is the most popular of all identification tools because of how easy it is to obtain, and also because of the number of sources available for its data collection. It has found wide use in law enforcement and immigration purposes. The module used here is R252. The basics of this identification process come from "Galton points" – a fixed feature defined by Sir Francis Galton, through which fingerprints can be identified. In this module the scanned image is compared with your existing fingerprint to get the correct identification. The comparison is done by the processor and the comparison is made between valleys and ridges. A loudspeaker (or "speaker") is an electroacoustic transducer that converts electrical signals into sound. The speaker moves according to the variations of the electrical signal and transmits the sound waves through a medium such as air or water.

1) Driver Circuit

A driver is an electrical circuit or other electronic component that is used to control another circuit or other component, such as a high-power transistor.

2) Alarm

A buzzer or beeper is a signaling device, usually electronic, commonly used in automobiles, home appliances such as microwave ovens, or game shows. An alarm provides an audible or visual warning of a problem or condition.

3) Web camera

A webcam is a video camera that feeds or streams its image to a computer or over a computer network in real time. When "captured" by a computer, the video stream can be saved, viewed, or sent to other networks through systems such as the Interne

4) Flow chart

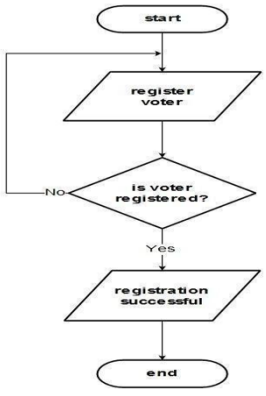

Figure 2 Flow Chart

4. METHODOLOGY

It is implemented with both software and hardware using various devices

1) Software

- Keil Tools by Arm version 4
- MATLAB

2) Hardware

- Finger print module
- ARM processor
- Web camera

5. ADVANTAGES AND DISADVANTAGES:

Benefit

- Effective cost
- This system allows only authenticated voting compared to existing devices as the person is identified based on his/her fingerprint and facial recognition which is unique to each person.
- Low power consumption
- It is affordable
- Requires less manpower
- Time conscious, requiring less time for voting and counting
- Avoid illegal voting as it prevents unregistered voters from voting.

6. RESULT ANALYSIS

As you can see in this picture the finger print scanner and webcam are connected with AVR microcontroller and LCD. We have used LCD for display purpose. We used five templates for experimental purpose.

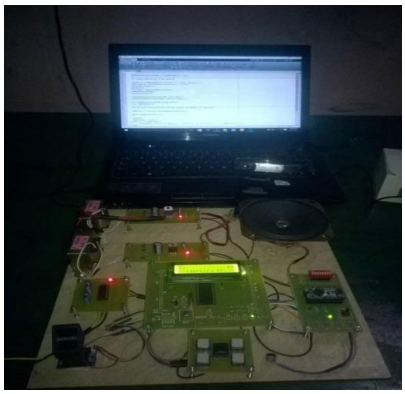

Figure 3 Model of the proposed system

The final experimental result in which the person is casting his/her vote using the biometric system and the template matches the already stored template and the person can vote. And second time the person is trying to vote with wrong fingerprint and facial recognition which leads to fraudulent voting and siren sounds. So in this way we can completely overcome the problem of fake voting.

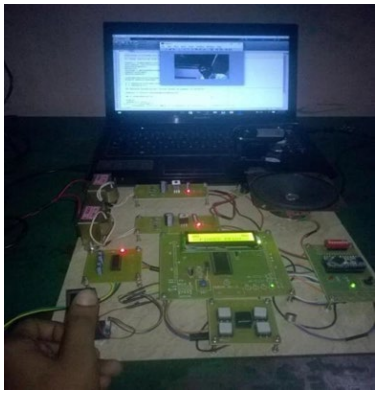

Figure 4 Function of the proposed system

Drawbacks:

- Before voting the user must first enroll.
- The sensitivity of the finger print module sometimes causes a combine character error.

- **Applications:**

This project can be used as a voting machine to prevent rigging during elections at polling stations.

- Fast Track Voting which can be used in small scale elections, such as Resident Welfare Association, "Panchayat" level elections and other society level elections, where results can be immediate.
- It can also be used to conduct opinion polls during the annual shareholders' meeting.
- It can also be used to hold general assembly elections on a smaller scale, where the number of candidates is less than or equal to eight as in the current situation.

7. CONCLUSION

The main objective of the project “Smart Voting Machine based on Fingerprint and Facial Recognition” was to develop advanced Electronic Voting Machine (EVM) based on fingerprint and facial recognition which helps in conducting elections in a free and fair manner which is essential in a democratic country like India.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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