

# Smart Voting System Based on Finger Prints and Face Recognition

Nitin Bachani<sup>1</sup> Nishant Panchal<sup>2</sup> Divyani Jigyasu<sup>3</sup>

<sup>1,2</sup>Student <sup>3</sup>Associate Professor

<sup>1,2,3</sup>Department of Computer Science & Engineering

<sup>1,2,3</sup>Arya Institute of Engineering & Technology, Jaipur, Rajasthan, India

**Abstract**— Bogus (fake) voting is still a major drawback in the Voting system. In Aadhar Card, the Government has all the information of us including Finger-print and Retina. Biometric Finger-print devices and Web Cameras are used in the Electronic Voting Machine (EVM) system for voter verification. We have proposed a Smart Voting Machine (EVM) system in which, for the user, there is no need to carry the ID which contains his required details. The voter at the polling booth needs only to place his Finger on the Finger-print sensor and capture the face identity in web camera at the counter of the polling booth. Thus, allowing the acquisition of an on-spot Finger-print and Face identity is enough from the voter which serves as identification. Further, this data of voter is passed onto the controlling unit for the verification process. The controller of the system fetches the data from the reader and compares this data with the existing data which was stored during the registration process of the voters. If the data matches the pre-stored information of the registered voter, that is Finger-print and Face, then only the voter is allowed to cast his vote. If the data does not match, a warning message is displayed on the display component (LCD) and warns through the voice message by this way, the person is barred from casting his vote. The vote casting mechanism is achieved manually using the keyboard. Display component (LCD) is used to display the related messages, warning messages and ensuing results.

**Keywords:** Smart Voting System, Voter ID, LCD, Web Camera, Micro-controller

## I. INTRODUCTION

Biometrics system is a group of interdependent components for measuring and analysing biological data. Biometric system refers to the technology that measures and analyses human body characteristics such as Finger-prints, Eye retinas and irises, voice patterns, face recognition and hand measurements for the authentication purposes. The field of the biometric system was formed and has expanded in many types of physical identification processes. Among the several, human Finger-prints and face recognition remains a very common identifier and a biometric method among law enforcement. These concepts of human identification have to lead the development of Finger-print sensors and web cameras that serves very quickly to identify individuals and assign access privileges accordingly. The basic application of these devices is also in the Election Commission of India. According to Election Commission of India, 378,352 Electronic Voting Machines were in use in July 2009. Out of these, 448,000 were the third-generation machines manufactured between the year 2006 and 2009 with 253,400 from BHEL (Bharat Heavy Electricals Limited) and 194,600 from ECIL (Electronics Corporation of India Limited). The remaining 930,352 were the second-generation machines manufactured between the year 2000 and 2005 with 440,146

from BHEL (Bharat Heavy Electricals Limited) and 490,206 from ECIL (Electronics Corporation of India Limited). The first-generation Electronic Voting machines might be too risky to use in the Election System because their service life pf 15 years has expired. Although they are still used in certain states or local areas.

## II. BLOCK DIAGRAM

The proposed system aims at developing an advanced Electronic Voting Machine (EVM) based on Finger-print and face recognition which helps in a free and fair way of conducting elections which are the basis for a democratic country like India. This project consists of following units such as a Voting system, Finger-print sensor, web camera and ARM controller Unit. The voter first places his finger on the Fingerprint sensor which checks for the authentication of the user. If the voter is the authenticated one then he has to show his face in front of the web camera. The web camera will capture the picture of his face which checks for the authentication in the stored memory. If the voter is the authenticated one, he will now cast his vote in the voting system by simply pressing the button in front of his favourite leader through a button. The control unit consists of an ARM controller, push-button for different operations of EVM (Electronic Voting Machine). The votes cast for a particular candidate in a particular section of the constituency is displayed through an LCD. To perform this intelligent task, the ARM controller is loaded with an intelligent program written in Embedded C programming language.

### A. ATMEGA 162:

ATMEGA 162 is the Brain of this project. ATMEGA 162 has the following 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 Memories
- 16K Bytes of In-System Self-programmable
- Flash Endurance:10,000 Write/Erase Cycles
- Extensive On-chip Debug Support

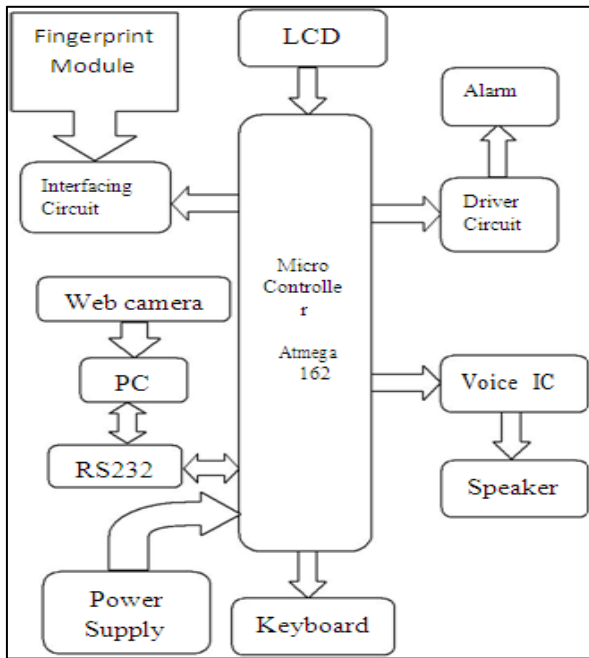


Fig. 1: Block Diagram

**B. RS232:**

In telecommunications, RS-232 is a standard protocol which is used for serial communication between the computer and its peripheral devices. RS232 was originally introduced in 1960 for the purpose of serial communication transmission of data.

**C. Power Source Module:**

The major blocks of power supply are the Transformer, Rectifier, Filter, 7805 voltage-regulator. These blocks will provide the regulated power supply to the unit which is first converted into 12V AC, then 12V AC is converted into DC using the Rectifier circuit. In the end, the 7805 voltage-regulator provides constant 5V DC supply which will further be given to circuit.

**D. Keypad:**

A set of push-buttons is used in the keypad. A push-button is just a mechanism of switching that is used in controlling some aspects of a machine or a system. In general, buttons are made of hard material like plastic or metal.

**E. Speaker:**

A loudspeaker or simply a speaker is a transducer that converts electromagnetic waves into sound waves. The speaker moves according to the variations of an electrical signal and causes sound waves to propagate through a medium such as air or water.

**F. Fingerprint Sensor:**

The fingerprint sensor is the most popular device among all the identification devices reason being of its ease in the acquisition of the data. The fingerprint sensor has a vast use in law enforcement and immigration purposes. The sensor used here is R252. After sensing fingerprints using this sensor, the scanned image of fingerprints is compared with an earlier existing fingerprint of voters to get the correct identity.

**G. Driver Circuit:**

In electronics, A driver circuit is an electrical circuit or an electronic component which is used to control another circuit or another component such as an LCD (Liquid Crystal Display), a high-power Transistor etc.

**H. Buzzer:**

A Buzzer is an electronic signalling device that makes a buzzing noise. A Buzzer is used for signalling. A buzzer has a vast area of implementation in automobiles, household appliances such as a microwave oven or game shows. A buzzer gives an audible warning about a problem or condition.

**I. Webcam:**

A Webcam is a video camera that connects to a laptop, computer or any system. A Webcam is capable enough to capture still pictures or motion video. With the help of software, A webcam can transmit its video to the internet in real-time as well.

**III. METHODOLOGY**

"Smart Voting System Based on Finger Prints and Face Recognition" is implemented with the help of both software and hardware. These software and hardware implementation tools are mentioned below:

**A. Software Implementation Tools**

- Keil Tools by arm version 4
- MATLAB

**B. Hardware Implementation Tools**

- Fingerprint Sensor
- ARM processor
- Web camera
- LCD (Liquid Crystal Display)
- Buzzer

**IV. FLOW CHART**

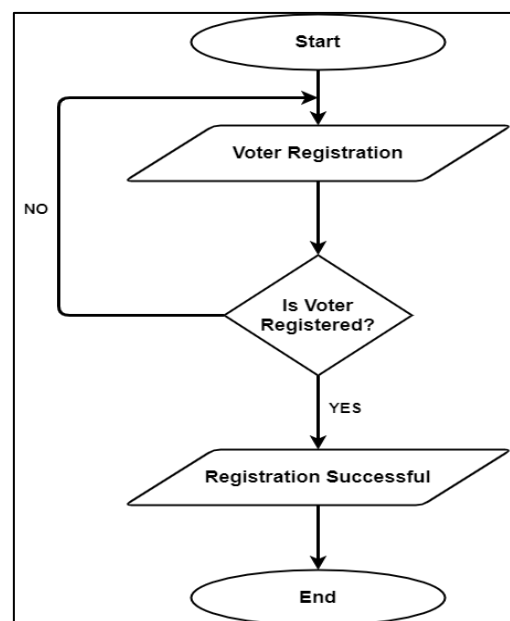


Fig. 2: Flow Chart

#### V. ADVANTAGES OF THE PROPOSED SYSTEM

- The proposed system is cost-efficient.
- The proposed system allows casting to vote only to the authenticated voters with the help of some modules such as Fingerprint module and Face Recognition module which is unique to each individual.
- The proposed system consumes less power.
- The proposed system is economical.
- The proposed system requires less manpower.
- The proposed system required less time for voting & counting.
- The proposed system avoids invalid voting as it prevents unregistered or unauthenticated voters from voting.

#### VI. DISADVANTAGES OF THE PROPOSED SYSTEM

- In the proposed system, before voting, the voter needs to enrol first.
- In the proposed system, Sensitivity of fingerprint sensor sometimes causes combine character error.

#### VII. RESULT ANALYSIS

In the following figures, you can see that the fingerprint sensor and the Webcam are connected to the AVR microcontroller and LCD (Liquid Crystal Display). Here, we have used LCD for the display purpose. In this project, we have used some templates for the experimental purpose.



Fig. 3: Model of Proposed System

The final experimental result in which a voter casts the vote using the biometric system and that template matches with one of the previously stored templates, only then the voter can cast the vote. And if the second time the voter tries to cast the vote with the wrong fingerprints and wrong facial identification which indicates fake voting, then

the siren starts blowing. So, in this way, we can completely overcome the problem of bogus or fake voting.

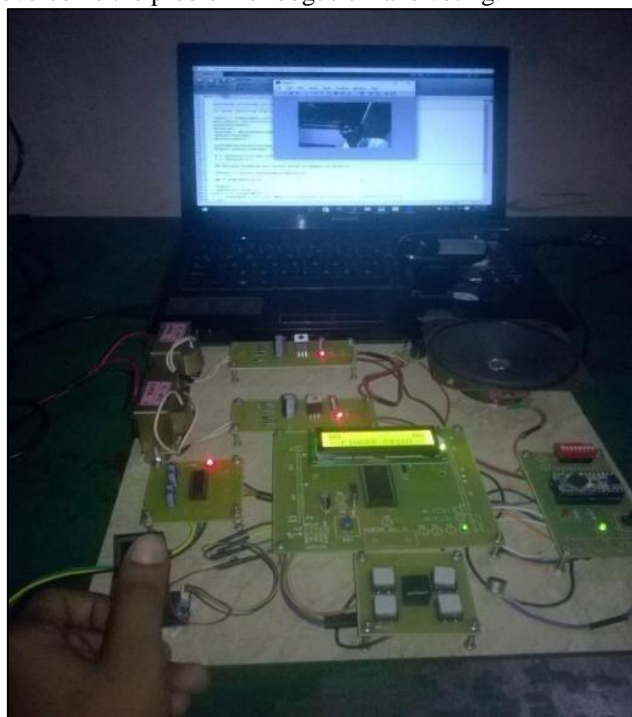


Fig. 4: Working Model of Proposed System

#### VIII. APPLICATIONS

The proposed system can be used as a voting machine to prevent bogus or fake voting during the elections at the polling booths. There is a large number of applications of the proposed system. Following are a few applications of the proposed system mentioned below:

- The proposed system can be used to conduct the elections at a small scale like Resident Welfare Association, Panchayat level elections and other society-level elections where results can be instantaneous.
- The proposed system can be used to conduct opinion polls during an annual meeting of shareholders.
- The proposed system can be used to conduct general assembly elections where the number of candidates is on a small-scale basis, in the current situation.

#### IX. CONCLUSION

The project "Smart Voting System Based on Finger Prints and Face Recognition" is mainly intended to develop a highly secure fingerprint and face recognition based advanced Electronic Voting Machine (EVM) which helps in conducting bogus-free or genuine elections which are the basis for a democratic country like India.

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