“The Use of Biometrics in Election Voting Systems”

A MINOR PROJECT REPORT

Submitted by

SAURABH PANDEY(RA2011003010207)

AAKASH CHAUDHARY(RA2011003010159)

RUDRANSH SINGH(RA2011003010196)

DEVANSH PAREEK(RA2011003010184)

Under the guidance of

Ms. M. Hema

(Assistant Professor, Department of Computing Technologies)

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE & ENGINEERING

of

FACULTY OF ENGINEERING AND TECHNOLOGY

S.R.M.Nagar, Kattankulathur, Chengalpattu District

NOVEMBER 2022

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Under Section3 of UGC Act,1956)

BONAFIDE CERTIFICATE

Certified that minor project report titled “The Use of Biometrics in Election Voting Systems” is the bonafide work of **Saurabh Pandey[RA2011030010207], Aakash Chaudhary[RA2011003010159], Rudransh Singh[RA2011030010196], Devansh Pareek[RA2011030010184]** who carried out the minor project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Ms. M. Hema
Assistant Professor
Dept. of Computing Technologies

Dr. M. Pushpalatha
Head of Department/Professor
Dept. of Computing Technologies

Table of Contents:

The use of Biometrics in Election:

- Biometrics involves the measurement and analysis of unique physical or behavioural characteristics, especially as a means of verifying and identifying an individual. The broad range of biometric characteristics that can be measured includes fingerprints, palm prints, retina and iris scans, voice patterns and DNA profiles (Bolle and Pankanti 2004).
- In a biometric verification system, an individual claims an identity, for example,
  by providing a name and date of birth. The individual's biometric features are captured and compared to previously captured and confirmed biometric features of that individual. Such a one-to-one comparison determines whether the individual is indeed who they claim to be.
- In a biometric *identification* system, the individual does not need to claim an identity.
- His or her biometric features are captured and compared to the features of all previously captured biometric features stored in a biometric database. This one-to-many comparison seeks to determine who the individual is.

The use of Biometrics Worldwide:

- According to International IDEA's ICTs in Elections Database, as of 2016, 35 per cent of over 130 surveyed EMBs were capturing biometric data as part of their voter registration process. Biometric technology is widely used in the registration process, especially in Africa and Latin America. In 32 percent of surveyed countries, voter registers are based on civil registers. In many cases, civic registration systems contain biometric data that can be used for electoral purposes.

- Twenty-five per cent of the surveyed EMBs use biometric information to identify voters at polling stations. However, in many cases this does not involve electronic biometric identification, but rather a manual check of each voter's photograph on the voter list. Only 9 per cent of the surveyed countries utilize an electronic biometric voter identification system. In some of these cases, fingerprint scans are only conducted in selected precincts and not the entire country.

Is there a real need for Biometrics?

- The following questions may help assess the value of biometric technologies. The more of these questions that are answered in the affirmative, the stronger the case for using biometric technologies becomes. However, only the most complex biometric systems will be able to cover all these functionalities.
- Is a new registration system the only reliable option for creating a credible voter list? Could such a list be derived from other registers?
- Is there a need for better de-duplication of local or national voter lists?
- Is there a need for more reliable identification of voters through printed photos or signatures on paper voting lists at polling stations?
- Is there a need for more advanced electronic and/or biometric identity checks at polling stations on election day, for example to verify voter eligibility and to prevent impersonation and multiple voting?
- Should voter ID cards include biometric features, such as a photo, signature or fingerprints?
- Is there a need to issue new, more reliable voter ID cards?

Which biometric data should be captured?

- Automatic fingerprint identification systems can be based on scanning a single fingerprint for each registrant. This is the fastest and simplest procedure. However, only capturing one fingerprint increases the possibility of fraud, as the same person may register multiple times by using different fingers.
- Capturing more than one fingerprint for each voter reduces the potential for
- Fraud, and increases the amount and quality of available fingerprint data. In this way, false match rates can be greatly reduced.
- In recent years, 10-fingerprint scanners have become more common. They scan
- All 10 fingers in three steps (four fingers on the left hand, four fingers on the right hand and both thumbs)
- While electronic signature pads are able to capture signatures, this is not very common in voter registration. A person's signature may intentionally or unintentionally vary significantly, which makes reliable electronic matching difficult. Images of voter signatures can still be useful to print on voter ID cards, for example for visual comparison against the signature on the voter list.

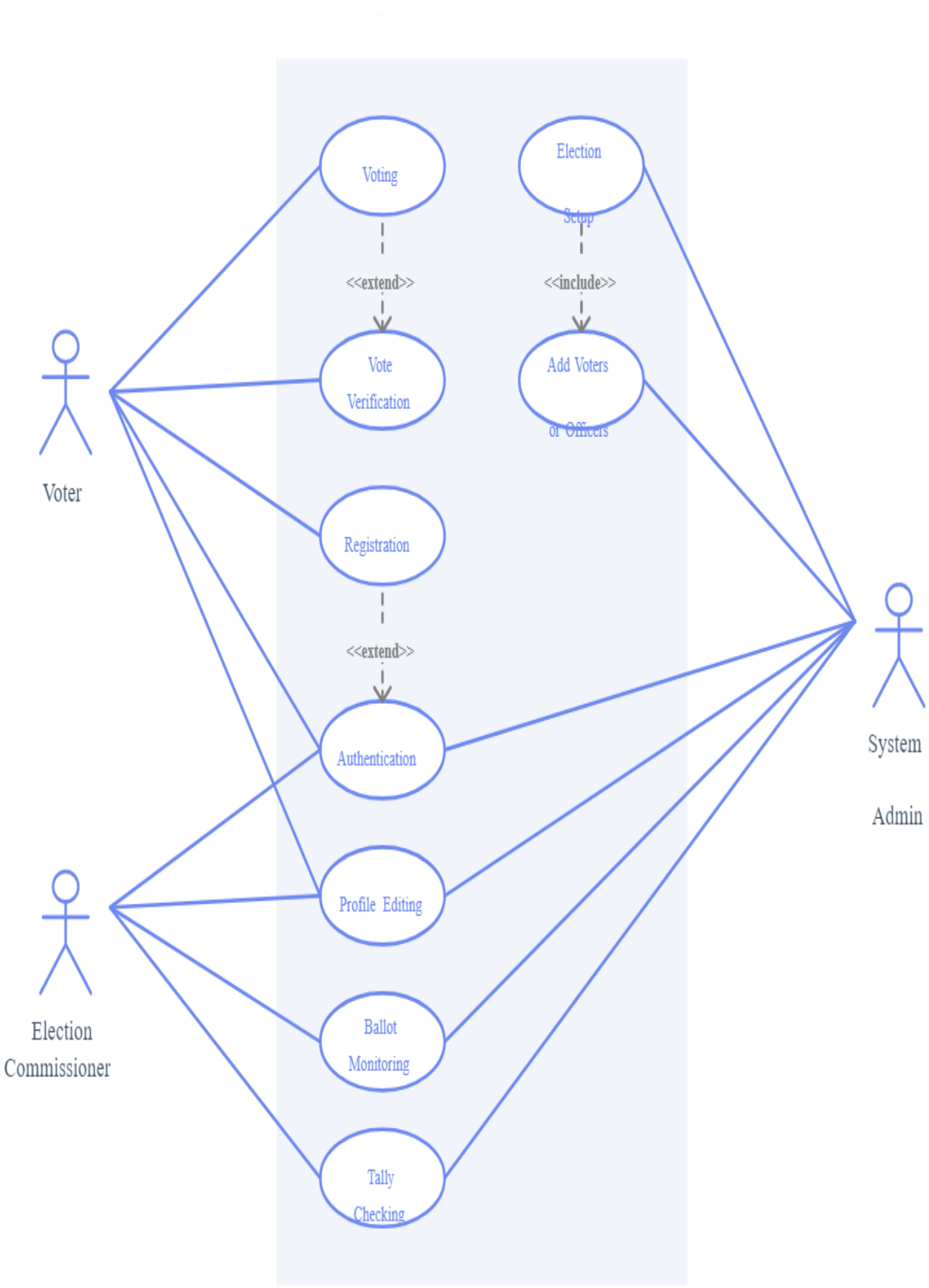
Literature Review:

- Hanady Hussien, Hussien Aboelnaga, IEEE 2013. "Design of secured E-voting systems." is able to desire with the widespread use of computers and embedded systems. Security is the essential problem should be considered in such systems. This paper proposes a new e-voting system that fulfils the security requirements of e-voting. It is based on homomorphic property and blind signature plan. The suggest system is executed on an embedded system which serves as a voting machine. The system employees RFID to store all conditions that comply with the rule of the government to check voter eligibility.
- Urmila Shrawankar Dr. Vilas Thakare, "techniques for feature extraction in speech recognition system" The time domain waveform of a speech signal carries all of the auditory information. From the phonological point of view, very little can be said on the basis of the waveform itself. However, past research in mathematics, acoustics, and speech technology have provided many methods for converting data that can be considered as information if interpreted correctly. In order to find some statistically relevant information from incoming

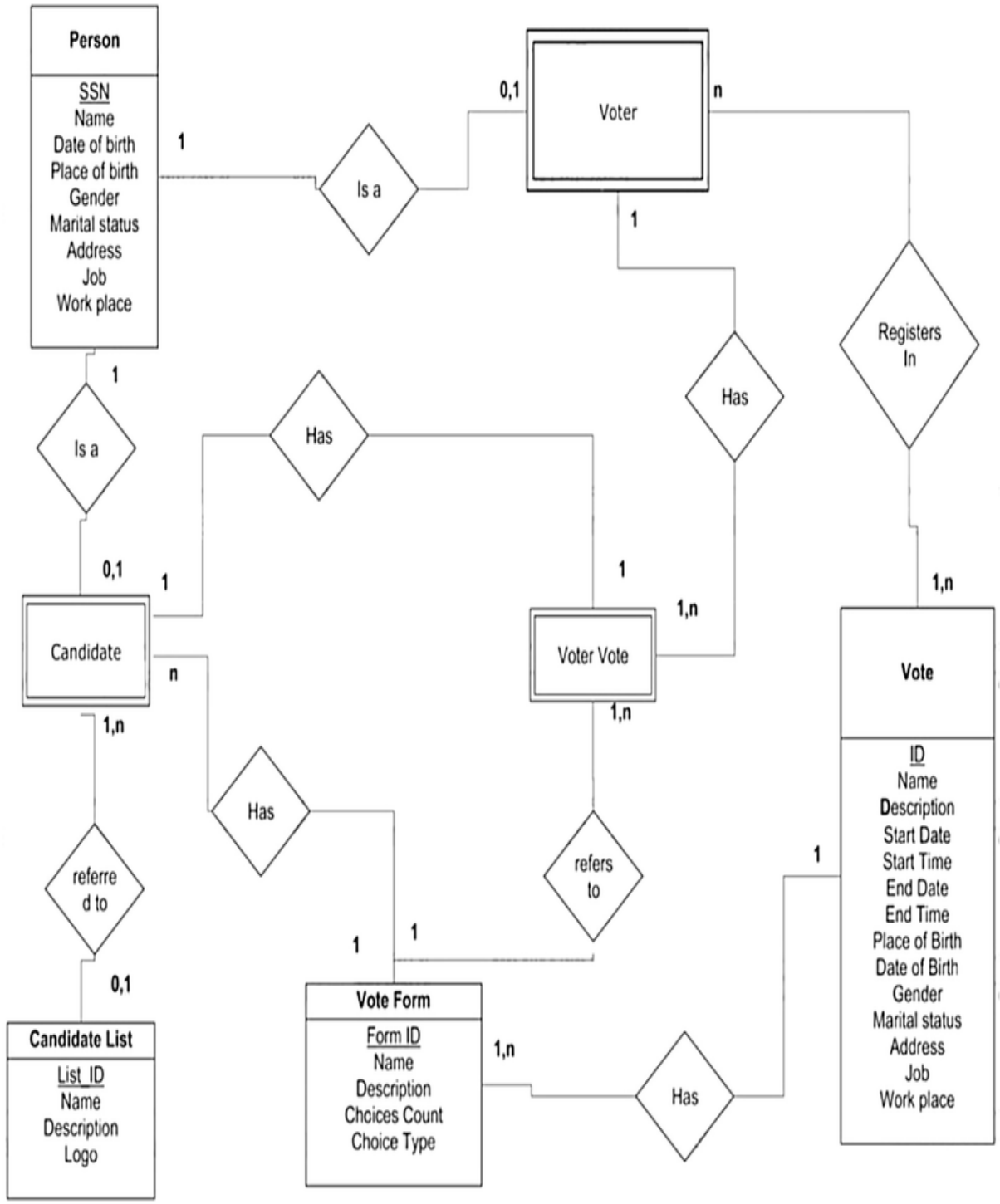
data, it is important to have mechanisms for reducing the information of each segment in the audio signal into a relatively small number of parameters, or features. These features should describe each segment in such a characteristic way that other similar segments can be grouped together by comparing their features.

- Steven J.Anderson, A.C.M Fong, senior member, IEEE, Jie Tang, member, IEEE, “Robust Tri-Model Automatic Speech Recognition for consumer Applications.” IEEE Transactions on Consumer Electronics, Vol. 59, No. 2, May 2013. Commercial automatic speech recognition (ASR) started to appear in the late 1980‟s and can proposal a more natural means of receiving user inputs than methods such as typing on keyboards or touch screens.
- Firas I. Hazzaa, Seifedine Kadr, This paper deals with the design and development of a “Web-Based Voting System Using Fingerprint Design and Implementation”, in order to provide a high performance with high security to the voting system also we use web technology to make the voting system more practical.

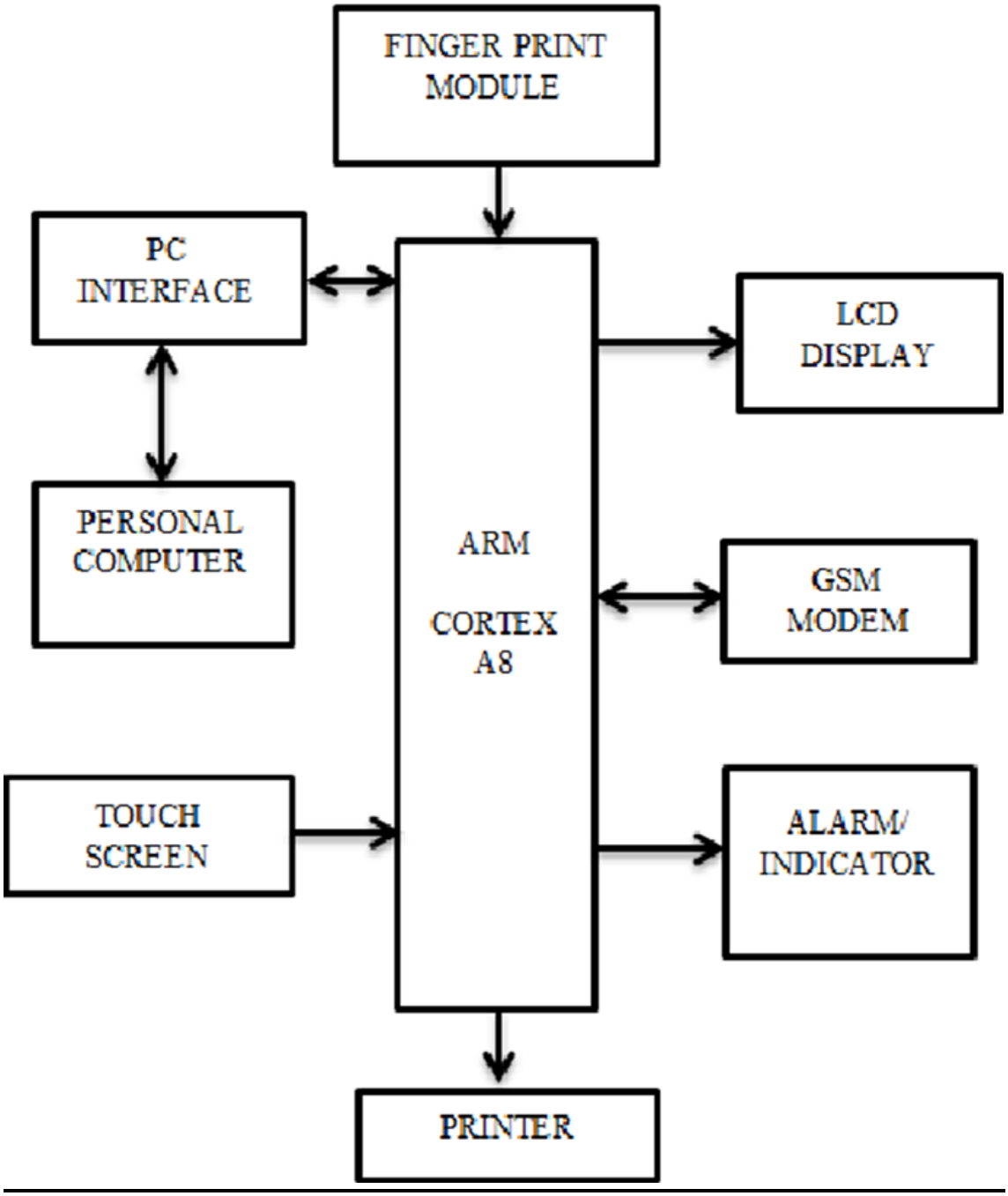
USE-CASE Diagram:



ER Diagram:


Person
SSN
Name
Date of birth
Place of birth
Gender
Marital status
Address
Job
Work place
Is a
Voter
Registers In
Has
Has
Is a
Candidate
Voter Vote
Vote
ID
Name
Description
Start Date
Start Time
End Date
End Time
Place of Birth
Date of Birth
Gender
Marital status
Address
Job
Work place
referre d to
Has
refers to
Candidate List
List_ID
Name
Description
Logo
Vote Form
Form ID
Name
Description
Choices Count
Choice Type
Has
0,1
n
1
1
1
1
0,1
1
1,n
1,n
n
1,n
1
1
1
1,n
0,1
1,n
1

Block Diagram:



Advantage of this System:

- The actual democratic process is transparent from start to end with a biometric voting process. Moreover, the framework's design allows an authority to verify that votes accurately reflect a voter's aim when casting a ballot.
- Many voters bailout of the voting process due to worries about identity theft, as votes could be cast using fake identities. Since the voters are registered with unique biological traits, it is impossible to tamper with them. As voters know that only they can cast their own vote, it will increase participation.
- Compared to the old approach to voters registration, the biometric voting system is easily scalable. With the old method, the number of voters grows as the population grows. Adding new voters to the system can be troublesome. On the other hand, adding new voters is user-easy with a biometric voting system, and there is no chance of duplication.
- The biometric system allows the right voters to cast votes and eliminate any chance of scams. This allows a fair result and a fair election.

Conclusion:

This project can be used for voting since it overcame all the drawbacks of ordinary voting machine and also provided additional security. Its main advantage is that since fingerprint of every person is unique and hence this system completely reduces the chances of invalid votes. This concludes that Biometric based Electronic Voting Machine will be useful: (a) In avoiding rigging (b) In reducing time consumption (c)To keep the voter's information more secured (d) Iris or retina scanning can be included to make the security of the system much higher. (e) Face detection technology can be added for further security and to also help in the verification of person with disabilities. (f) GSM module can be used for casting votes through mobile so that voters far away from their constituency on the day of election can also cast their votes. (g) Audio output can be introduced to make it user friendly for unlettered voters.

References:

http://www.bioelectronix.com/what_is_biometrics.html https://components101.com/buzzer-pinout-working-datasheet
https://en.wikipedia.org/wiki/Liquid-crystal_display
https://en.wikipedia.org/wiki/Thin-film-transistor_liquid-crystal_display
https://www.tutorialspoint.com/arduino/arduino_board_description.htm
https://www.androidauthority.com/how-fingerprint-scanners-work-670934/
http://wilsonhurd.com/images/pdfs/MembraneSwitchesDesignGuidelines.pdf