

# Smart Voting System

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**Abstract** - The electoral system in India has undergone several changes in recent years. The current system involves either Secret Ballot Voting (SBV) or Electronic Voting Machines (EVM), both of which are costly, labor-intensive and inefficient. The current system only verifies identification proof, which increases the likelihood of fraudulent voting. This study proposes the use of an electronic voting system that incorporates fingerprint and face recognition technology. The online system enables voters to cast their votes from anywhere, minimizing the chances of voting fraud. The proposed system has three levels of security: verification of unique id number, election id number, and face recognition. The use of voter identity number and fingerprint can prevent fake and duplicate registrations, leading to a higher success rate during voting. This method significantly enhances the security level of the voting process.

**Key Words:** *identification proof, face recognition, protect, security level, success.*

## 1.INTRODUCTION

In the 1960s, a small academic network of four mainframe computers located at different universities and research centres laid the foundation for what we now know as the internet, with over 2.8 billion users worldwide today. High-speed internet access is now considered essential and is an important economic indicator in both urban and rural markets globally. Cloud computing, electronic voting, and online voting systems are presented as important components for increasing citizen participation in decision-making. Electronic voting provides various benefits such as accuracy, flexibility, privacy, verifiability, and mobility, but it also has several drawbacks, including being time-consuming and labour-intensive, lacking direct involvement of higher authorities, damaging computers due to neglect, and limiting users' ability to edit multiple items at once during mass updates. Online Voting Method eliminates these limitations by using the cloud, leading to a new integrated approach that can improve accuracy and reduce the vulnerability of votes during an election.

## 1.1 AIM AND OBJECTIVES

Our goal is to create an application that improves the election process for political party elections by using a multi-level security authentication system, using a real case study. Cloud computing is an ideal solution for voting, as it can minimize human error and handle multiple modalities, while providing scalability for large elections. Our research aims to develop a secure and trusted electronic voting system using cloud computing for election voting. We are designing a Smart Voting Machine that eliminates the need for voters to carry ID cards to the polling booth. Instead, the voter can verify their identity by placing their finger on the fingerprint module and taking a picture of their face with the polling station's web camera. This process instantly captures the voter's face and fingerprints for identification purposes.

## 1.2 MOTIVATION OF THE WORK

Election fraud refers to the unethical practice of repeatedly voting for a preferred party to increase their vote share. Eliminating election fraud is crucial for fair elections. To tackle this issue, automated voting based on CNN has been proposed, but it may not be affordable for ordinary citizens due to the high cost of elections in India. Moreover, only wealthy people can run for elections and they often engage in unlawful practices. Election laws should address the misuse of government resources during elections, as the ruling party may use them to their advantage. Therefore, an online voting system has been suggested as a possible solution to address these challenges.

## 1.3 SCOPE OF THE PROJECT

The research aims to utilize the election id for casting votes on the cloud, where it will be encrypted in a barcode format and only scanned by a barcode scanner. The internet-based voting system is highly secure, employing face recognition and comparison technology to prevent fraudulent votes. Results can be obtained more quickly compared to traditional systems, which can take longer to count ballots. Online voting has the potential to increase voter participation in India. Our

proposed method allows for convenient voting from home.

## 2. LITERATURE SURVEY

Although there are many researches works on voting systems, here we have critically analyzed and summarized Eight research works and projects which are more relevant and recent. It is observed that most the recent works address the issue of voting and use of various information technologies.

In the year 2012, Kumar DA & Ummal Sariha [1] , The author has proposed in this paper that biometric EVM It was an automated system. This will ensure that the vote is precise, democratic, private, and verifiable. A fingerprint LCD, microprocessor, and sensors are used in an innovative electronic voting system design. The LCD displays votes in a clear and precise manner.

In the year 2013, Agarwal H, Pandey [2] , The author has proposed in this paper that The information on the voters is determined by the online voting system for India that is based on the AADHAAR ID. It was simple and precise to verify the voters and candidates.

In the year 2014, Hasan SM, Anis AM, Rahman H, Alam JS, Nabil SI, Khalilur Rhaman M [3], The development of electronic voting machines with nearfield communication ID cards and biometric fingerprint identifiers ensured that each voter's identification was accurate and prevented multiple votes from being cast by the same individual. Voting will be done securely.

In the year 2020, Vivek S K, et.al., [4] Developed a secure, transparent and decentralized e-voting system is proposed using the Hyper ledger Saw tooth block chain framework.

In the year 2016, Mrs.Nilam Kate, Mrs. J.V.Katti [5], Developed the technique where a web-based voting system that permits voter to vote independent of location. Without using biometric function authentication of the voter is done.

In the year 2020, Roopak T M, Dr. R Sumathi [6] A secure electronic voting system has been created through the use of biometric data and Virtual IDs (VIDs) from the Aadhar database to enable voters to cast their votes.

In the year 2021, Ganesh Prabhu S,[7] , The paper's main focus is on a voting system that allows users to cast their votes remotely from any location using a mobile phone or computer. This system eliminates the need for voters to physically visit polling stations, and instead uses a two-step authentication process that includes face recognition and an OTP (One Time Password) system.

In the year 2020, Ramya Govindaraj, Kumaresan P, K.Sree harshitha[8], Developed an online voting system with features like the schemes that the specific party has implemented, based on the features we are going to vote. The main reason we need to shift from normal voting system to online voting system is that we can consume our time and can vote from anywhere online.

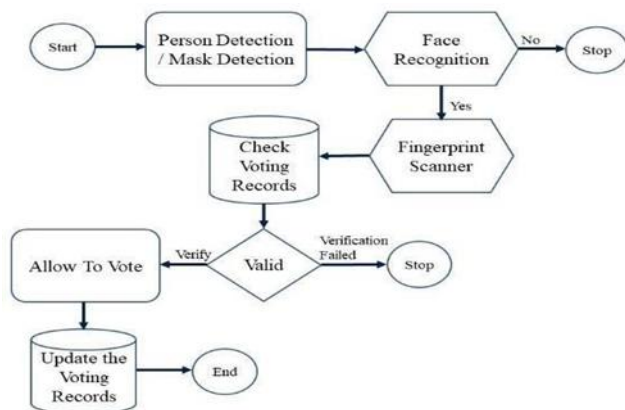
## 2.1 PROBLEM DEFINITION

Typically, electronic voting systems allow users to cast their votes on a text platform without much regard for its security or reliability. Users can access the security mechanism of the electronic voting system and cast multiple votes using another user's ID number, as well as vote on the same text multiple times. The fact that users can see the results of the vote during the voting process makes the system unreliable, and users can manipulate the outcome of the vote by accessing the results before the end of Election Day. Although India has made strides in digitalization, the voting system still has shortcomings. The current system only allows for voter registration at polling stations, and voters can only cast their ballots within their registered area. To address these issues, we propose a smart voting system that uses image processing and face and fingerprint identification.

## 3. PROPOSED SYSTEMS

This system aims to improve the security and authenticity of the voting process by ensuring that the election officers do not have control over the system. Instead, the cloud voting system will be managed by the primary server of the voting system. The project uses component-based face detectors for facial feature extraction. Once all the features are obtained, they are compressed into a single feature vector and sent to the recognizer. The voter will be authenticated using both face recognition and fingerprint recognition. Once the system verifies the voter's unique credentials in the server database, the voter will be allowed to vote only once. The voting link will be encrypted using algorithms LBPH. The voter will cast their vote only once, after which the system will automatically close the voting link for that voter.

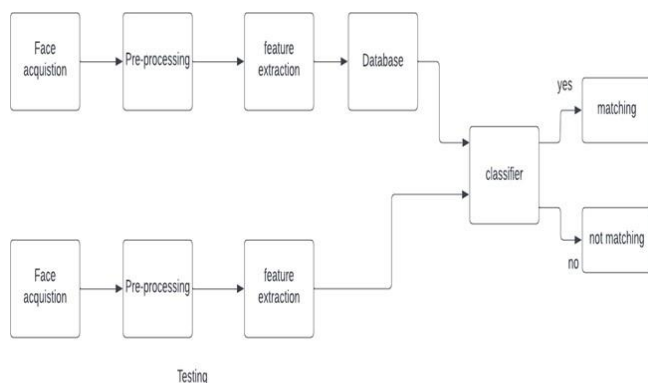
The concept of "cloud computing" allows for the creation and deployment of a shared pool of computing resources, including networks, servers, storage, applications, and services, via a network with minimal administration labor or contact with service providers. The cloud symbol, often used to represent the internet in diagrams, inspired the name "cloud computing." Over the years, there has been a significant migration towards the cloud, with end-users storing increasing amounts of personal data such as bookmarks, photographs, music files, etc., on remote servers accessible via a network.



3(a). Block diagram

### 3.1 LBPH (Local Binary Pattern Histogram)

The LBPH (Local Binary Pattern Histogram) is a face recognition technique that is used to identify individuals based on their facial features. It is highly effective in recognizing people from both front and side views. The algorithm was first introduced in 2006 and is based on a local binary operator. Its strong discriminatory capabilities and easy-to-implement computational framework make it a popular choice for facial recognition applications.



#### 3.1.1: Working of LBPH Algorithm

To perform this task, follow these procedures: build a dataset; capture faces; extract characteristics; and categorize. Each region utilizes a nearby binary operator. For instance, if an image has dimensions of  $N \times M$ , it will be separated into sections with the same height and width, with each section having a size of  $m \times m$ .



Fig 3.1.1. (a)



Fig 3.1.1.(b)

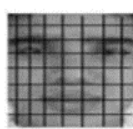
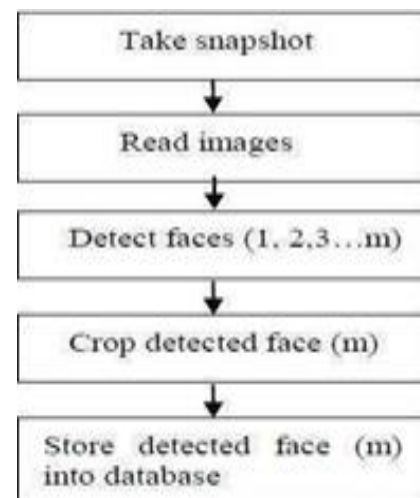


Fig3.1.1.(c)

Local binary operator is used for every region. A  $3 \times 3$  window serves as the definition of the LBP operator.



The process of face recognition involves the following steps:

1. Obtaining a new image for identification purposes.
2. Identifying faces in the new image.
3. Eliminating any background data from the new image.
4. Employing the principal component analysis method to match the new image with the image database.
5. Comparing the new image with each image in the database, calculating the matching percentage for each image. The image with the highest matching percentage will be considered the recognized face.

### 3.2 Requirements Specifications

#### 3.2.1. Software Requirements

- 1) Operating System: Windows 7/8/10
- 2) Libraries Used: Pandas, NumPy.
- 3) Firebase

#### 3.2.2. Hardware Requirements

- 1) Processor: I3/Intel Processor(Min)
- 2) RAM: 4GB (Min)
- 3) Hard Disk: 128 GB

#### 4. CONCLUSION

As the world becomes increasingly digitized, voting is also being digitized. One of the advantages of this project is that it speeds up the announcement of results. The system's security is enhanced by incorporating face recognition, fingerprint scanning, and cloud computing. The proposed system has several robust features, including accuracy, verifiability, simplicity, and more. With this approach, voting can be conducted securely from anywhere, without the need for an election official, paper ballots, or electronic voting equipment.

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