

Smart Voting System with Face Recognition

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Abstract:- India is the world's largest democratic country. As a result, it is critical to ensure that the governing body is elected in a fair election. India has only an offline voting system, which is ineffective and inefficient because it requires a large number of people and takes longer to process and publish the results. As a result, for the system to be effective, a change that overcomes these disadvantages is required. The new method does not require a person's physical appearance to vote, which simplifies matters. It focuses on a system that allows users to vote remotely from anywhere using a computer or mobile phone without having to travel to a polling station. Voters must register with their voter id, name, and Aadhar number. The face scanning system is used to record voters' faces prior to the election and is useful during the voting process. At the time of voting, facial recognition will be used to compare the voters' facial data to existing data; if both match, the vote will be counted; otherwise, the vote will be marked as invalid.

I. INTRODUCTION

Elections are crucial in a large democratic country like India, where the leader is elected by the people. Elections protect the integrity of the state by giving citizens the opportunity to choose their own government. As a result, the election should be a free and honest process. Every citizen of a democratic country has the right to vote for the candidate of their choice. One of the fundamental problems with the traditional democratic framework is that it requires a large amount of labor and resources. Some people may also be concerned about illegal movement publications at some point during this election or its preparation. There are some drawbacks to the traditional election voting process used in our country, such as machine failure, the possibility of brutality, time consumption, resource consumption, spot arrangements, and so on. Many people were unable to vote because they had to travel to polling places to vote, or because they live far away from their original birthplace, where they are allowed to vote. To address these shortcomings, a new system, the Online Voting System, is introduced, which provides accuracy, security, flexibility, mobility, and other benefits. An online voting system in the form of a web-based application that will be used in the election process. The ballot paper technique was initially used in the election process. Then there are the Electronic Voting Machines, which are easy to store data on and manage. These are more secure than ballot paper and take less time to complete. A system with biometric authentication is now available to make voting

more secure and to shorten the voting process. The electorate can use this to solidify their vote for their preferred candidate by using their system. It employs face detection and recognition technology to determine whether or not a citizen is the proper consumer. When the voter uses the system, the system will capture an image with a web camera and compare it to the image in the database. If both images are identical, the voter may vote.

II. EXISTING SYSTEM

The current system is inefficient. There are currently two types of voting methods:

A. *Voting by Ballot*

B. *Electronic Voting Machines*

A. *Voting by Ballot*

A ballot is a device used to cast votes in an election, and it can also be a piece of paper used for secret voting. The voter is given a piece of paper with all of the party symbols and representative names on it. People come to the polling station, take the ballot paper, and vote by stamping the desired party symbol. The ballot paper is then folded and placed in the ballot box. Finally, the Election Commission officers count the votes.

B. *EVM (Electronic Voting Machine)*

Voting An electronic voting machine (EVM) is a voting device. This machine is made up of party symbols, the representative's name, and a button at the end for each party name. Voters approach the EVM machine after completing their verification at the early level voting. After verification, the voter approaches the EVM and votes by pressing the button. The procedures outlined above are not entirely accurate, as there is the possibility of false/false voting. The ballot papers may be lost during the counting process, affecting the results of the specific area, or people may miscount the number of votes, putting authority in the wrong hands.

III. PROPOSED SYSTEM

This project revolves around the creation of an online voting system that uses facial recognition registration for each voter per election, allowing voters to vote regardless of their physical location. The system's design is primarily divided into two functionalities: voter registration using facial data and voting. The voter will enrol in the system using their voter id, name, and Aadhar number, and then facial data images of

the user will be collected and mapped to their enrollment details. Following the completion of the collection of facial data, the images are trained. OpenCV is the library used for face recognition.

➤ *Local Binary Pattern Histogram (LBPH)*

The face recognizer algorithm will look for facial data that matches. The LBPH algorithm is used for facial recognition. The Local Binary Pattern Histogram (LBPH) algorithm is a face recognition algorithm that uses a local binary operator to recognize both a human's side and front face. However, the LBPH algorithm's recognition rate is limited if conditions such as expression diversification, disorientation, and a change in lighting performance manifest. Only authorized users are permitted to vote. Image processing can be used to recognize faces in a variety of ways.

IV. EXPERIMENTAL TOOLS

A. PyCharm

PyCharm is a Python integrated development environment (IDE) that provides a wide range of essential tools for Python developers. These tools are tightly knit together to create a working environment for productive Python, web, and data science development.

B. OpenCV

OpenCV is a massive open-source computer vision, machine learning, and image processing library. OpenCV is compatible with a wide range of programming languages, including Python, C++, and Java. It can analyze images and videos to recognize objects, faces, and even human handwriting. When it is combined with other libraries, such as NumPy, a highly optimized library for numerical operations, the number of weapons in your arsenal grows, as any operation that can be done in NumPy can be combined with OpenCV.

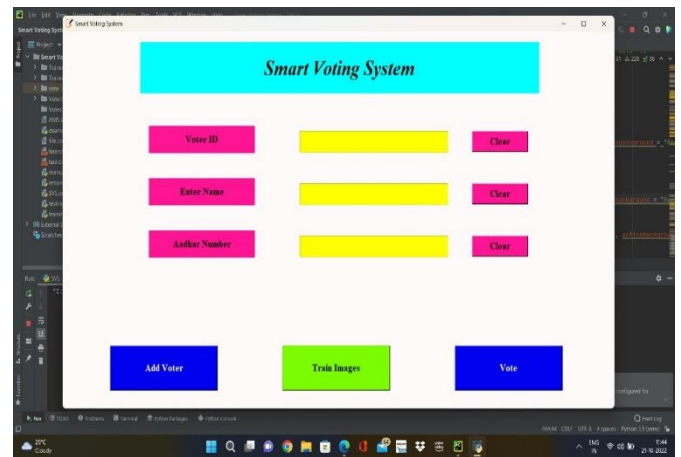
C. Tkinter

Tkinter is a Python module for creating graphical user interfaces. Because it is simple and easy to use, it is one of the most commonly used modules for creating GUI applications in Python. You do not need to install the Tkinter module separately because it is included with Python. It provides the Tk GUI toolkit with an object-oriented interface.

D. Pillow

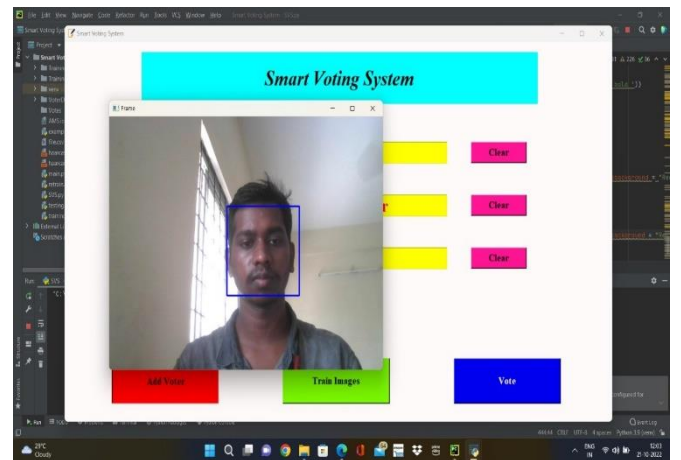
Digital image processing is the digital processing of an image using a computer. Image processing allows us to perform operations such as image enhancement, blurring, text extraction from images, and many others. Digital image processing can be done in a variety of ways. The Python Pillow module will be discussed in this section. Python Pillow is based on PIL (Python Image Library) and is considered a fork of the latter, as PIL was decommissioned in 2011. Pillow accepts a variety of image file formats, including BMP, PNG, JPEG, and TIFF. By creating new file decoders, the library encourages the addition of support for newer formats.

V. OUTPUT



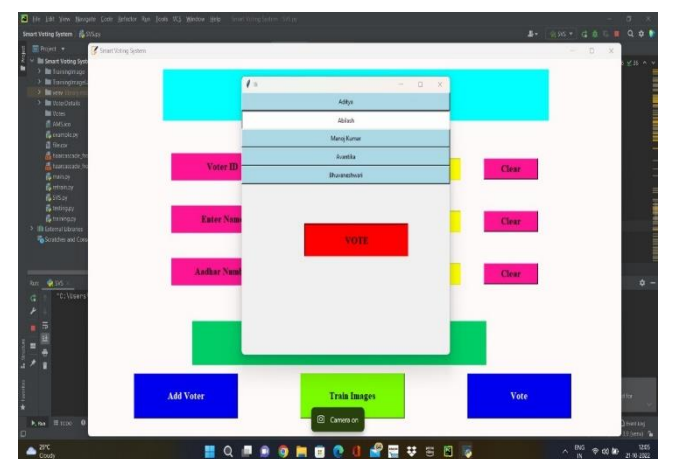
(Fig.1 User Interface)

Enrollment of voter details into the database by collecting Voter Id, Name and Aadhar Number. If voter is already registered directly voting can be done.



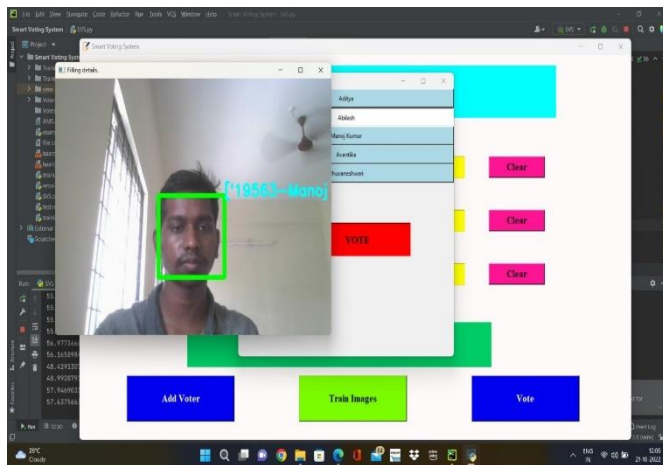
(Fig.2 Capturing Facial data)

Device camera will open to collect facial data and the collected images are labeled with enrollment details and stored in database.



(Fig.3 Selecting candidate)

List of candidates nominated will be shown one person can be selected from it and button VOTE should be clicked for next step that is facial recognition.



(Fig.4 Facial recognition)

Facial data existing in database will be checked for identifying the voter, If data exists then the Voter Id and Name are displayed on the screen.

VI. CONCLUSION

As we can see, the existing voting system has many flaws such as a lengthy process, time consuming, insecure, bogus voting, and no security level, but we can now say that this approach is more useful and secure than the existing system. False voters can be easily identified in this proposed system due to the use of security. The facial authentication technique is extremely useful in identifying fraudulent voters, allowing us to avoid bogus votes during election commission. Voters can vote from anywhere in the world by logging into our smart voting system. The location of the voter is unimportant, but their vote is. Because data is stored in a centralized repository, it is accessible at any time and backups are possible. Every minute, the smart voting system updates the results. It also necessitates less manpower and resources. Every year or before an election, the database must be updated so that new eligible citizens can be enrolled and those who have died are removed from the voter list. If this system is used in a real-life election process, its usability is very high. It will undoubtedly be beneficial to users who wish to vote, and the voting process will be made much easier by using this application.

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