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Implementation of Smart Online Voting System

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ABSTRACT: This system's primary objective is to provide an online voting platform that will help cut down on fraud in manual voting systems and prior iterations of online voting that relied on a webcam for face recognition and OTP generation. We are also adopting a location-free voting option (hometown) for voters who are unable to travel to the polling place. Here, we present a system with many layers of verification, such as face verification and OTP verification with validation information, to ensure the reliability of the device. Each voter must first identify themselves and have their registration status checked against the given database in order to access the system. The voter will be able to proceed and choose their chosen candidate from the panel after the pertinent face and the data have matched.

KEYWORDS: OTP verification, face recognition, Smart online voting system, Verification, Voter, Candidate, Admin

I. INTRODUCTION

In India, casting a ballot is a fundamental right and duty of every adult citizen. All citizens in India are guaranteed the right to vote by the constitution, and the administration has taken substantial steps to ensure free and fair elections. India operates under a representative democracy, where citizens choose their representatives for the national, state, and local levels of government. These representatives are in charge of formulating rules and regulations that have an impact on residents' lives.

The Election Commission of India, a separate constitutional body, oversees the voting process in India. The commission is in charge of holding elections at all levels of government and making sure that they are honest, open, and free from fraud or other irregularities. Voters in India are given voter ID cards, which act as both a form of identification and documentation of their voter registration. Voters can cast their ballots on paper or an Electronic Voting Machine (EVM) at their allocated polling place on election day.

There are two different voting systems used in India: direct voting and indirect voting. Since 2003, the first method—secret ballot paper—which needed a significant amount of paper—has been in use. The current mechanism for conducting internet voting is insufficiently secure, thus we must create a more secure method. The concept of face detection and recognition is used in this project proposal to identify the person. The voters are scrutinised three times in our suggested method. By the time you reach the third level of security, the technology has located your face in a database of images provided by the electoral commission. The first two stages of security are the verification of a unique identity number and the verification of an electoral commission identification number or voter card number. If you certify that the number on your voter card is correct, you will be promoted to level three, the highest level of protection. Voters are only allowed to take part in an election if the photo they took matches the image on their database record. Otherwise, they won't be allowed to cast a ballot. Anyone can vote on someone else's behalf using a voter card because the current method restricts security to a voter card. However, our team has created a voting process that is a lot safer.w

II. PROBLEM STATEMENT

Long lines, manual counting mistakes, voter fraud, and a lack of transparency are all problems with the traditional voting system used in many nations today. This poses a serious threat to the electoral process' integrity, which is crucial to a functioning democracy. Therefore, the creation of a clever online voting system that is secure, effective, and user-friendly is urgently needed.

In an online voting system, ballots must be addressed, obtained, marked, delivered, and counted using computers. Election data is generally recorded, saved, and processed as digital information. As a result, voter

identification and authentication methods are crucial for more secure platform mechanisms to get around the client vulnerabilities of the voter's voting device.

The key issues that need to be addressed in developing a smart online voting system include:

Security: Maintaining the voting system's integrity and security is essential to preventing voter fraud and ensuring that only eligible voters can cast ballots. The voting database should not be subject to hacking, tampering, or unauthorised access

User-friendliness: All eligible voters, including those with impairments, should be able to easily use and access the online voting system. The voting process should be set up so that there are as few mistakes as possible and that there are no technological issues.

Efficiency: A significant volume of votes should be handled by the online voting system accurately and efficiently. The system must be able to process votes swiftly, deliver real-time updates on the vote total, and avoid any hiccups or errors that can influence the election's outcome.

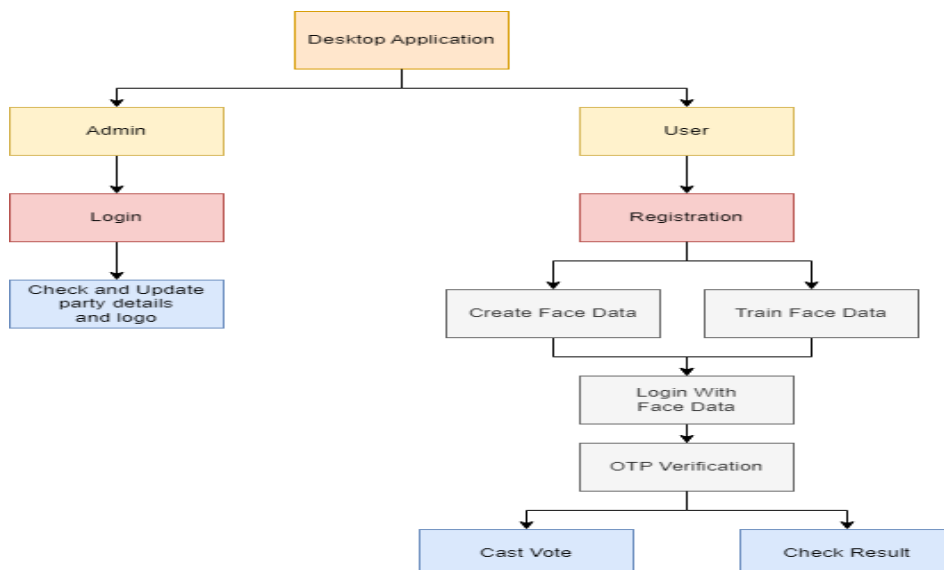
User-friendliness: The online voting system should be simple to use and accessible to all eligible voters, including those who have disabilities. The voting procedure should be set up to ensure that there are as few errors and technical problems as possible.

Legal and regulatory compliance: The online voting system should comply with all legal and regulatory requirements, including those related to data protection, privacy, and election laws.

To ensure fair and transparent elections and safeguard the integrity of the democratic process, it is crucial to build a smart online voting system that tackles these crucial challenges.

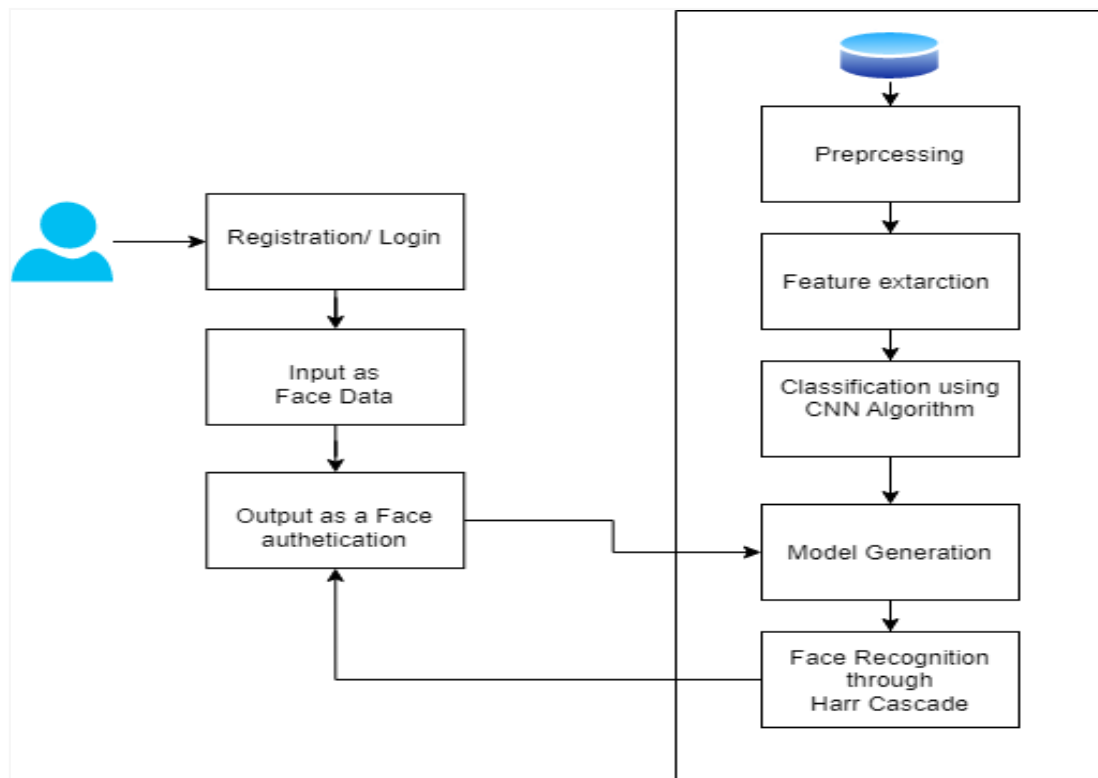
III. RELATED WORK

Smart online system is a desktop-based application. The voters are scrutinised three times in our suggested method. By the time you reach the third level of security, the technology has located your face in a database of images provided by the electoral commission. The first two stages of security are the verification of a unique identity number and the verification of an electoral commission identification number or voter card number. You will be moved to level three, the highest level of safety, if you confirm that the voter card number is correct. Voters are only allowed to take part in an election if the photo they took matches the image on their database record. They won't be able to vote if that happens. Anyone can vote on someone else's behalf using a voter card because the current method restricts security to a voter card. Finding a way to increase voting in local, state, and federal elections is the project's major goal. In order to enable remote voting, we create a voting system that uses a previously taken photo of a voter's face and an OTP to confirm the voter's identity. The opt will be sent to the registered mobile number and it will be verified when the user will appear to vote.



(Figure 1: System Architecture)

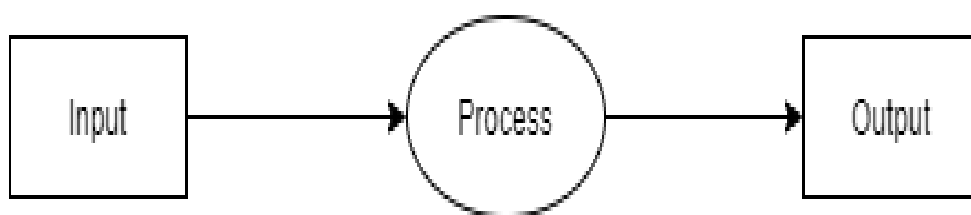
This is our Activity Diagram this will show the actual sequence of the program. As you can see there are two sides first is admin and the second is user side. In the ADMIN side the admin has to log in using their username and password. After successful login the admin will be redirected to the ADD PARTIES PAGE where admin can add parties. In the second side USER SIDE First user has to register themselves by providing the credentials like Aadhaar Card, Voter ID, Name, Age, Registered Number, and etc. Once a user is registered them it will start the camera and click about 40 to 50 images for more accuracy and correct matching. Once the face data is taken successfully then he/she can login using their face data.



(Figure 2: Architecture diagram for Face Verification)

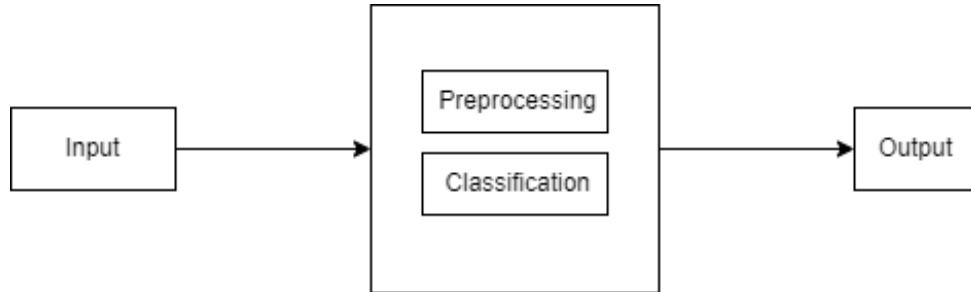
Here's a digram which will show you that How the face will be verified or registered. As shown earlier diagram that user will register itself and then the face data will be taken. After that the face data will be taken as input where it will go through CNN and Harr cascade algorithm which is used for Image Classification, Image Verification, Feature Extraction and etc. CNN algorithm will classify the image and then it will create a template of the given image(data) and then it will go to the Harr Cascade algorithm where the image will be converted into the grayscale and then features like birth marks marks eyes position will be extracted. Sn in this way it will work.

DFD Level 0

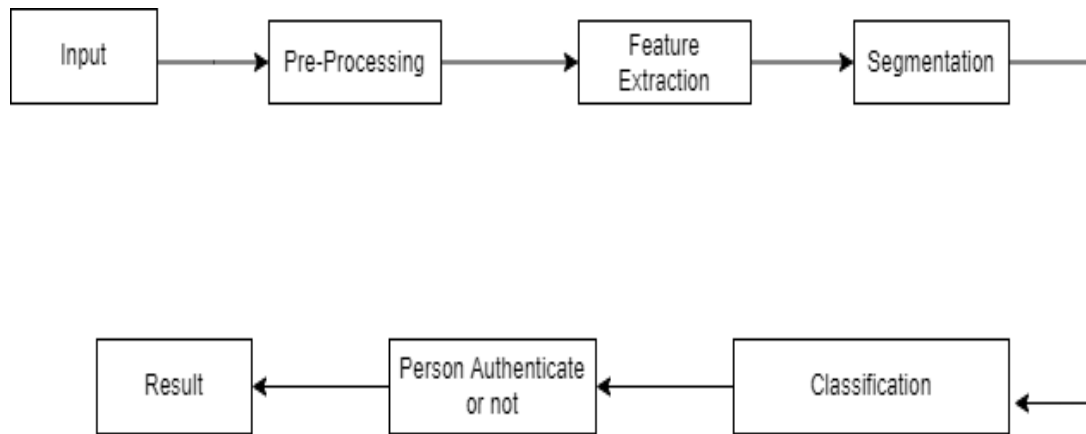




DFD Level 1

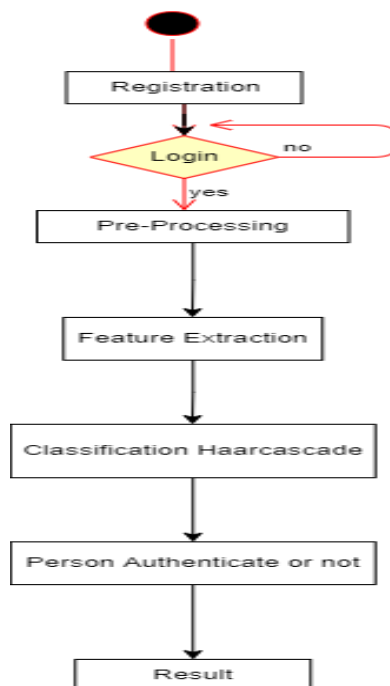


DFD Level 3



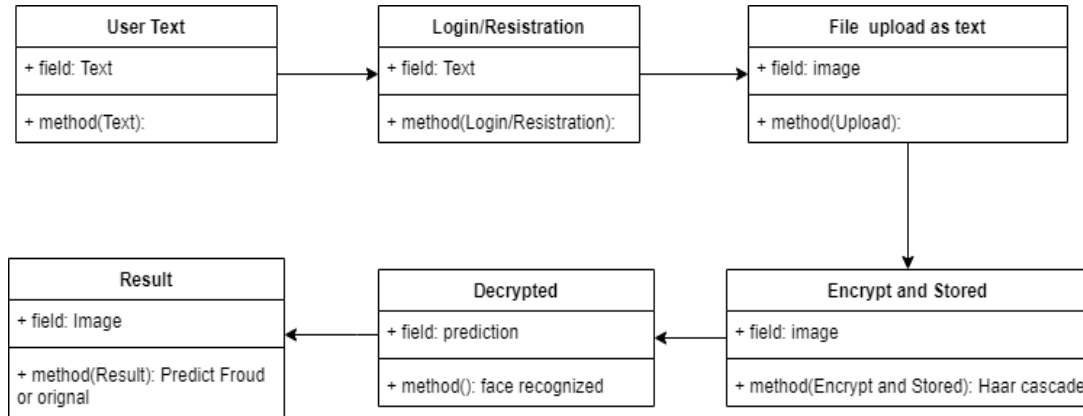
(Figure 3: DFD diagram)

Activity Diagram



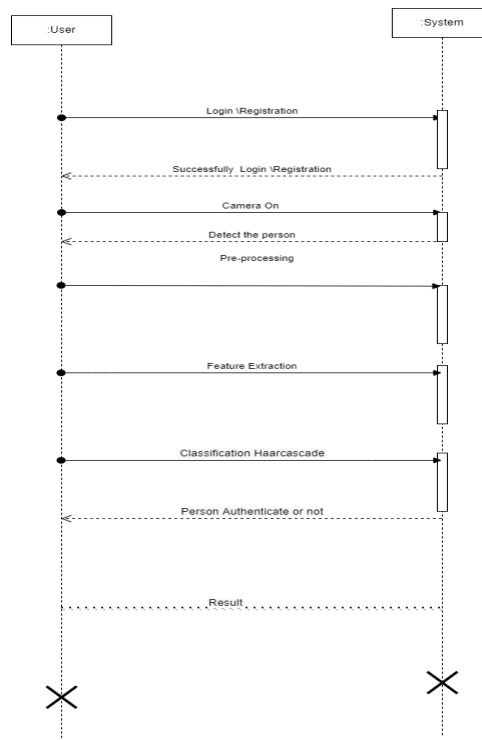
(Figure 4: Activity diagram)

Class Diagram



(Figure 5: Class Diagram)

Sequence Diagram



(Figure 6: Sequence Diagram)

Libraries and packages that are used

- **Tkinter:** Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit. Creating a GUI application using Tkinter is an easy task.
- **SQLite:** Python SQLite3 module is used to integrate the SQLite database with Python. It is a standardized Python DBI API 2.0 and provides a straightforward and simple-to-use interface for interacting with SQLite databases. There is no need to install this module separately as it comes along with Python after the 2.5x version.
- **NumPy:** NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

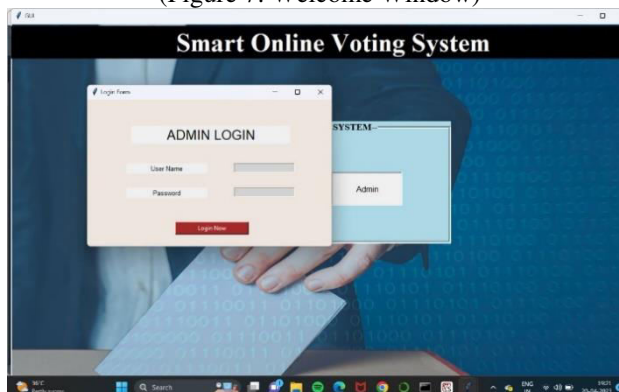
- **Pillow:** Pillow is built on top of PIL (Python Image Library). PIL is one of the important modules for image processing in Python. However, the PIL module is not supported since 2011 and doesn't support python 3. Pillow module gives more functionalities, runs on all major operating system and support for python 3. It supports wide variety of images such as "jpeg", "png", "bmp", "gif", "ppm", "tiff". You can do almost anything on digital images using pillow module. Apart from basic image processing functionality, including point operations, filtering images using built-in convolution kernels, and color space conversions.

Hardware and Software Requirements

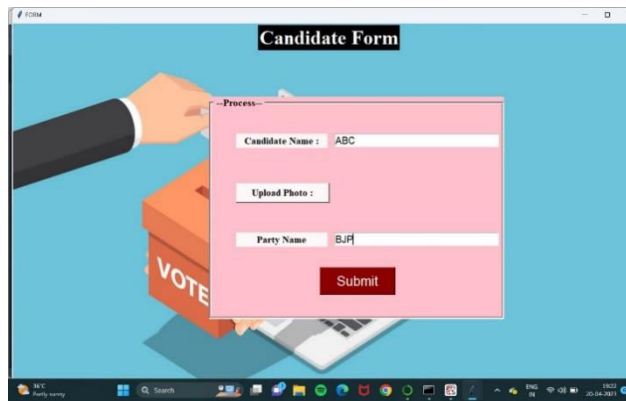
- RAM: 8 GB
- Hard Disk: 40 GB
- Processor: Intel i5 Processor
- IDE: Spyder
- Coding Language: Python Version 3.8
- Operating System: Windows 10
- Processor: Intel i5 Processor
- Speed: 1.1 GHz
- RAM :8 GB
- Hard Disk: 40 G
- **Outputs of the Project**



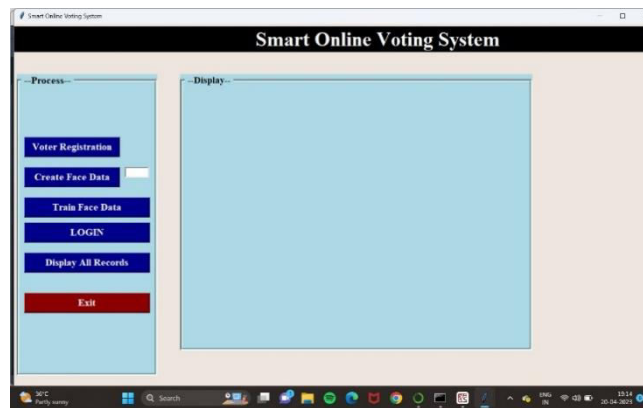
(Figure 7: Welcome Window)



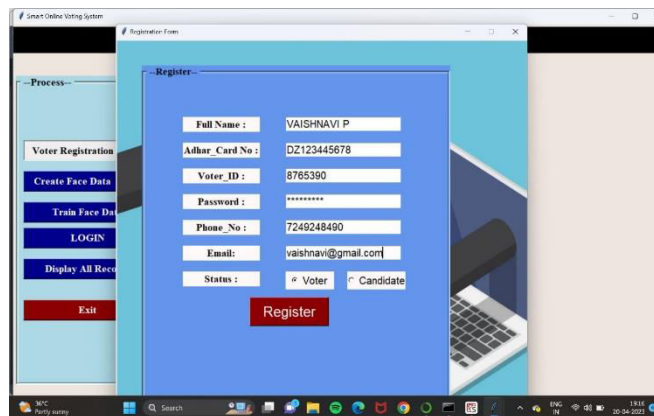
(Figure 8: User Login)



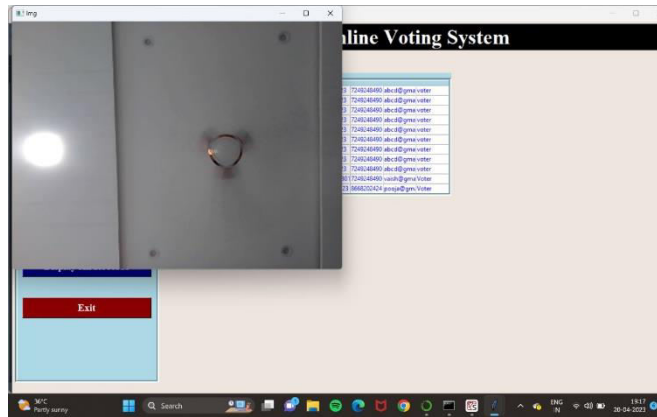
(Figure 9: Add Parties)



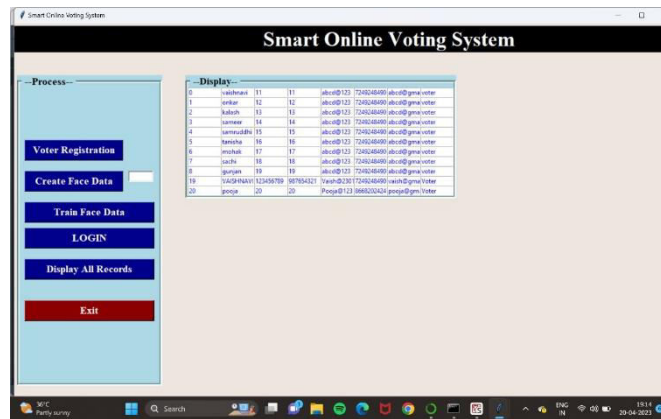
(Figure 10: User Screen)



(Figure 11: User Registration Page)



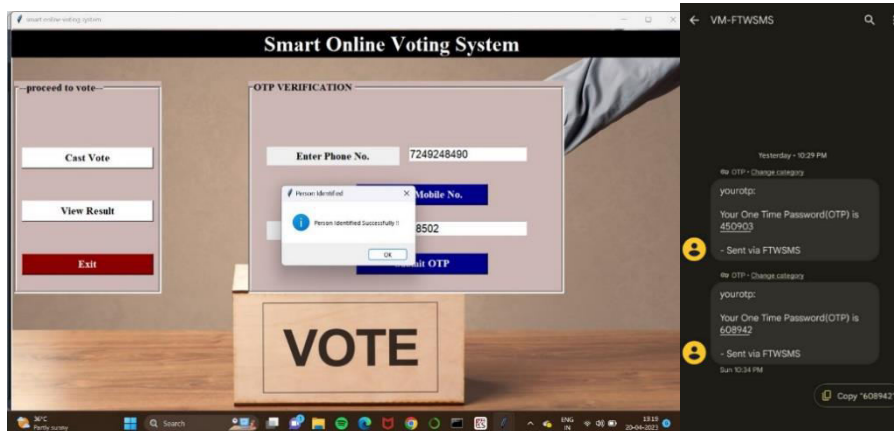
(Figure 12: Camera to get face data)



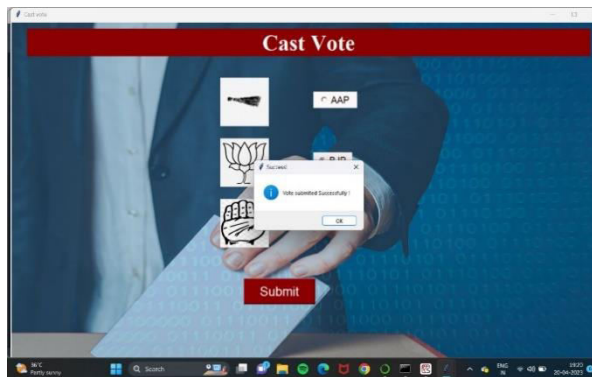
(Figure 13: Records Page)



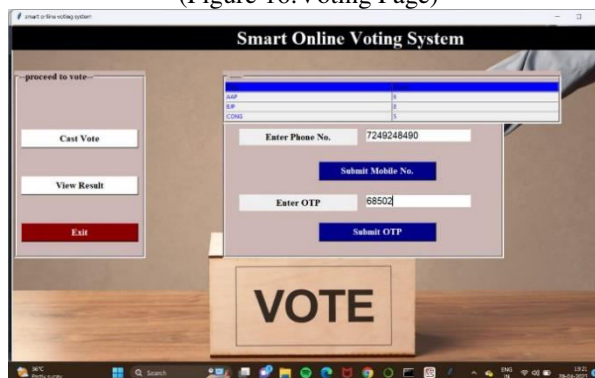
(Figure 14: Voter Side)



(Figure 15: OTP Verification)



(Figure 16: Voting Page)



(Figure 17: Records of Voted voters)

IV. CONCLUSIONS

Our proposed solution is machine learning based with face detection which allows the voter to register and he/she can vote from anywhere irrespective of the location. This system provides security and also avoid casting of the multiple votes by same person. This system is more reliable in which we can vote from multiple locations. It also minimizes work, human requirements and time resources.

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