

ONLINE VOTING SYSTEM USING FACE RECOGNITION AND OTP(ONE-TIME PASSWORD)

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Abstract - The basic idea of this system is to create an Online Voting System that will help to suppress deceive of the manual voting system and also the prior versions of online voting by camera for Face Recognition and OTP generation. We are also implementing location free voting system to the voters for whom it is not possible to come at the voting location (hometown). Here we propose a system that includes multiple layers of verification to ensure the reliability of the device which includes face verification and then OTP verification with validation data. Each voter can access to the system only when being recognized and checked with the given database of enlist voters. Once the corresponding face is matched with the information provided, the voter will be allowed to proceed for choosing their preferred candidate from the panel.

Key Words: Image Processing, Python, Voting System, Face Recognition, MySQL, OTP

1. INTRODUCTION

As per the records of TOI 24 Jan, 2009 11 lakhs fake votes were observed in Delhi. Then according to India News June 2013 : 30000 illegal voters were found in election commission under Sheila Dikshit constituency. Another news which was alleged by LJP(LokJanshakti Party) Chief, Ram Vilas Paswan saying that Bihar election were having 30% fake voter- cards. Election involves both public or private vote which depends on the position. Local, state, and federal governments are some of the most important positions. In paper based on election, Voters cast their votes by simply depositing their ballots in sealed boxes distributed across the electoral circuits around a given country. After ending of election period the boxes which contains of ballot control unit are opened and votes are counted manually in presence of the certified officials appointed by election commission. So it is a time consuming process and also requires a lot of resources to conduct voting process. In this paper we have proposed online voting system to cast the vote using face recognition and OTP. The information about the OTP and Face is passed to the server unit for the further verification. Then the server checks for the data from the database and compares that data which is already existing in database. If the data matches with the already stored information, the person is allowed to poll the vote. If not, a message is displayed on the screen and therefore the person

is not allowed to poll the vote. For voting representatives are appointed by electorates. In current scenario voter needs to show his/her voter ID card to cast the vote on the booth. So this process is time consuming as the voter ID card needs to be get verified by the officials. Thus to speed up the voting process and avoid such type of problems, we have proposed the new system.

1.1 Problem Statement

Even though our Country has taken steps towards Digitalization of India, considering the progress of Voting System it still has some flaws. Registration of Votes is being possible only if people go to polling booths for the current system. During the time of voting, voter's name is listed in the list of his/her respective area. They cannot vote outside the vicinity of the address mentioned in the voting card. So people who are migrated to other places cannot cast the vote physically. The recent pandemic situation of Corona Virus shows us the risk of this system. This can lead to failure of social distancing during voting process, as the voter needs to be physically present for casting the vote.

1.2 Literature Survey

1) Decentralized E-Voting Portal Using Blockchain

This paper represents frameworks of blockchain for the E-voting system. This implementation can be used for small scale elections such as board rooms or inside corporate houses elections. Smart contract from Ethereum is used for this implementation. The idea behind this implementation is to combine the technology of blockchain with the homomorphic encryption and secret sharing schemes for the decentralized voting applications safe from trusted third party. It gives the public and transparency voting process which protects the anonymity of voter's identity and the privacy of data transmission and verification of ballots during billing phase.

Advantages:

- It increases transparency of the voting and protects the uncertainty of identity of voter.

- Protection to the data privacy, transmission and ballots verification during the phase of billing is provided.

Disadvantages: Internet- and blockchain-based voting systems can have security risks.

Limitations: User should have knowledge about application.

2) Electronic Voting Machine with Enhanced Security

This paper describes the construction and design of voting machine using ATMEGA 32 microcontroller which has security of three extra layers. EVM takes a lot of time for the process of voting using ballot papers. So considering to the amount of time, manpower to be saved for extremely fast and reliable. So here implementation of the system is in such a way that voting secrecy is maintained without using ballot paper. VVPAT is currently used for voting machine which is expensive than EVM. EVM gives 100% proof of tamper, where results are just a click away. But this EVMs can be tampered easily by changing the hardware connections. So this paper proposes a three layered extra security.

Advantages:

- Speed of counting of ballots is increased using this application .
- Saves the cost of paying staff as there is no need to count votes manually.

Disadvantages: Security risk present.

Limitations: Issue of Compatibility can occur.

3) Biometrically Secured Electronic Voting Machine

In this paper, Arduino and Finger print scanner is used to implement the system which identifies each voter, also count votes and avoids fake votes. In this system voter is identified using FPS which detects if a person is a registered or not and also it denies for the voter to cast the second vote.

Advantages:

Biometric description of voter is used.

Disadvantages:

Advanced security system can be required for significance of investments and costs to implement.

Limitations: Application should be known to users.

4) Multipurpose platform independent online voting system

In this system the voter just needs to have a Aadhar card number and a smart phone which can scan the barcode implemented on the system. The user can vote on any location as it is totally online based application. This system

creates its own voting ballot. The encryption of vote data is at the user’s end and decryption is at the local administrator end. This makes the system more authenticated and secure for voting.

Advantages:

User just needs to have Aadhaar card number.

Disadvantages:

Risk of fraud can happen.

Limitations:

Smartphone is required for this system

2. Proposed System

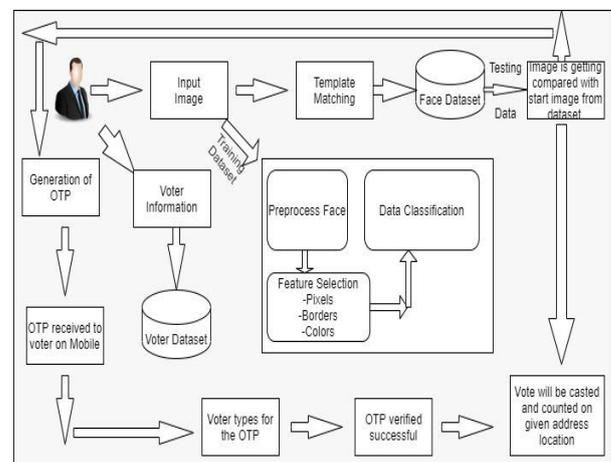


Fig -1: System Architecture

Description

Initially, user needs to register in the system by providing information such as Aadhar number, Mobile number, City, Age, Password etc. This information is stored in voter dataset. The system takes input image from the user at the time of registration through webcam. This image is stored in face dataset for template matching. Then for casting the vote, user needs to login to the system by entering Aadhar number and Password. After this user needs to answer security question. If it gets verified successfully the user moves on to the next page where he/she can select the candidate to cast the vote. After clicking the vote button the webcam gets on and verify face of the user from the prepared dataset . After successful verification of face it will send OTP on user’s registered mobile number. The OTP gets verified and casting of vote is successful.

At the end Admin releases the result of voting process.

2.1 Modules

Voter(User): Here Voter is the important person to vote the particular candidate. The voter is verified user authorised by admin on registration process.

ML Process: Machine learning process is for training the voter faces to recognition voting time to vote the candidate.

Face and OTP Verification: The proposed architecture explains that here 2 ways authentication process on voting time; one is face recognition and second is OTP verification.

2.2 Algorithm used

1. Local Binary Pattern Histogram

Local Binary Patterns (LBP) is a detectable descriptor style which is used for the classification of Computer Vision. Texture Spectrum model which was proposed in 1990 from which LBP became a specific case. LBP was represented in the year 1994 for the first time. So it has been used as a classifying texture for solid elements. Improvement of the execution of identification on some datasets is done when LBP gets combined with the descriptor histogram of oriented gradients(HOG). Figure 1 shows the LBPH algorithm flowchart diagram.

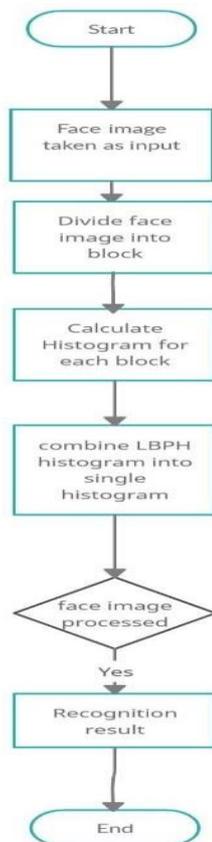


Fig -2: LBPH Flowchart

The input image gets divided into cells(4 x 4) pixels which is used for encoding features. The contrasting is done by using a clockwise or anticlockwise bearing the surrounding pixel values. The value of every neighbour's intensity is being compared to the central pixel. The location has been assign as a 1 or 0 which depends on the difference whether it is low or high than 0. 8-bit value as a single cell is generated in the results.

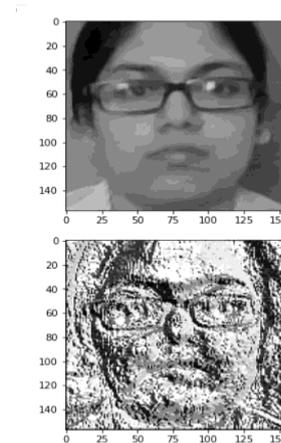


Fig -3: LBPH for Face Recognition

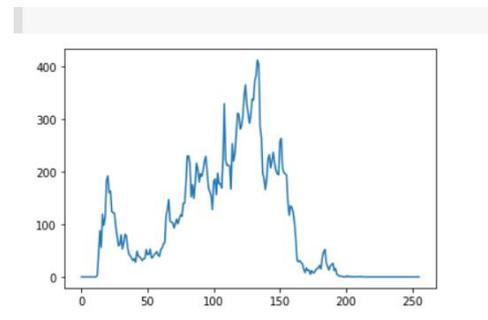


Fig -4: Histogram of Face By LBPH

2. Haar Classifier Algorithm:

Haar-like features is the core basis for Haar classifier object detection. Instead of using the intensity values of the pixel, it changes the contrast values between adjacent rectangular groups of pixels. The relative light and dark areas are being determined using contrast variances between the pixel groups. Haar-like feature is formed by two or three adjacent groups with relative contrast variance. Scaling of Haar features can be done easily by increasing or decreasing the size of pixel group, which allows features to be used for various sizes by detecting the objects. Haar-features which distinguishes an object are analysed with the highest probability with sub images which allows the cascading of classifier. It allows accuracy of a classifier to vary only once. Increasing of false alarm rate and positive rate and decreasing of number of stages can be done. This algorithm has achieved 95% accuracy rate for human face detection by using 200 simple features which was experimented by Viola

and Jones. Haar classifier cascades are to be trained first for detection of facial features of human such as mouth, eyes, nose. As for the training of classifier Haar feature algorithm needs a gentle AdaBoost algorithm along with it. But as Intel has developed an open source library which makes it easy for the implementation of computer vision related programs known as Open Computer Vision library(OpenCV).

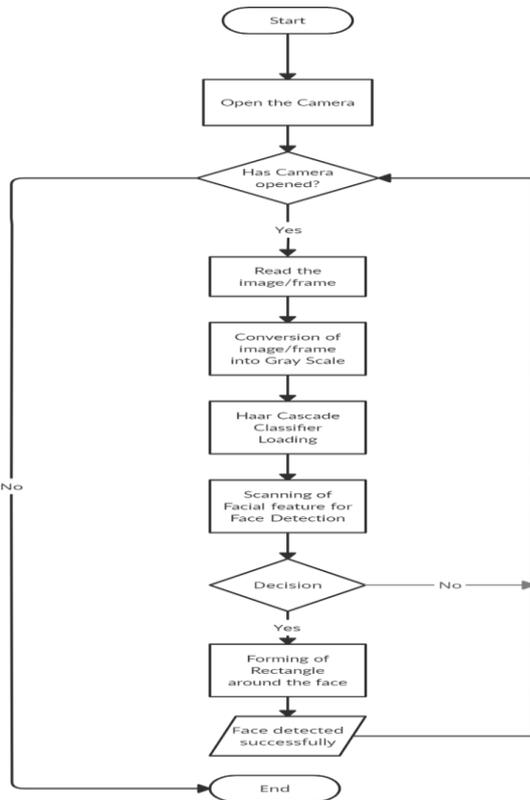


Fig -5: Haar Classifier Flowchart

3. 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 vote by same person. This system is more reliable in which we can vote from multiple locations. It also minimize work, human requirements and time resources.

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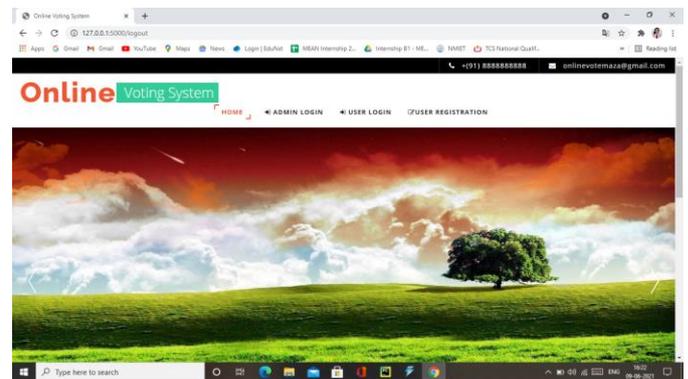
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RESULTS

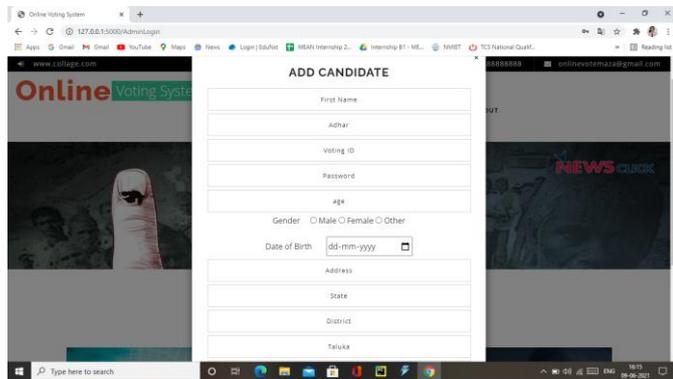
Home page:



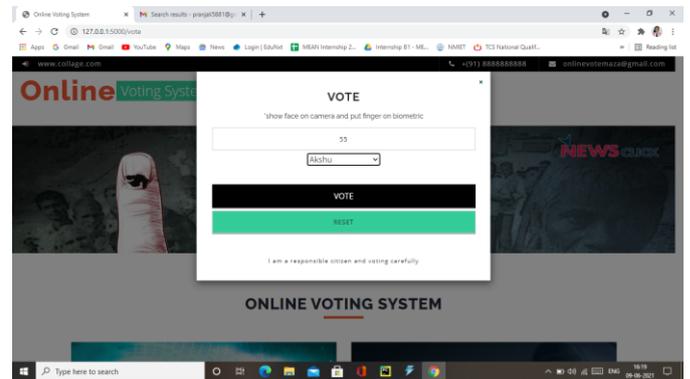
Admin page:



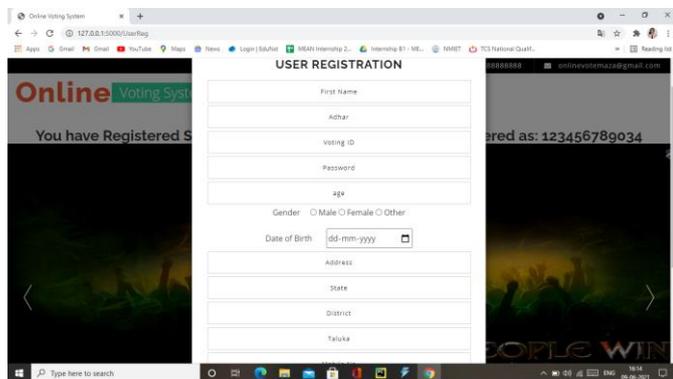
Candidate Registration:



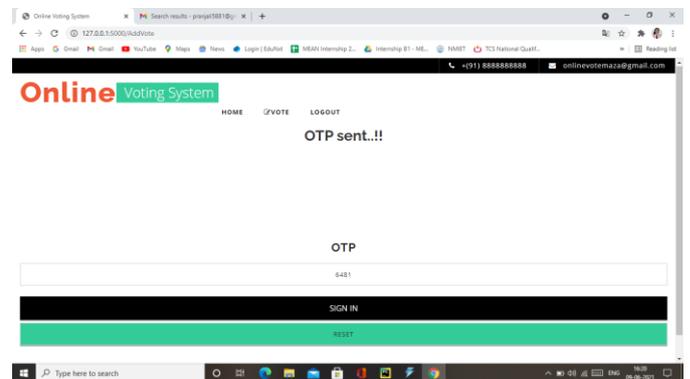
Adding Vote:



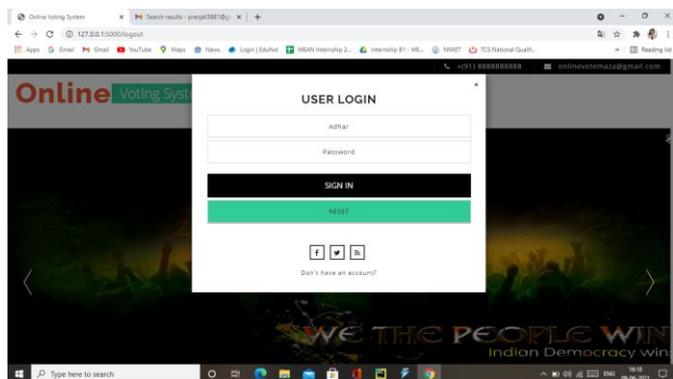
User Registration:



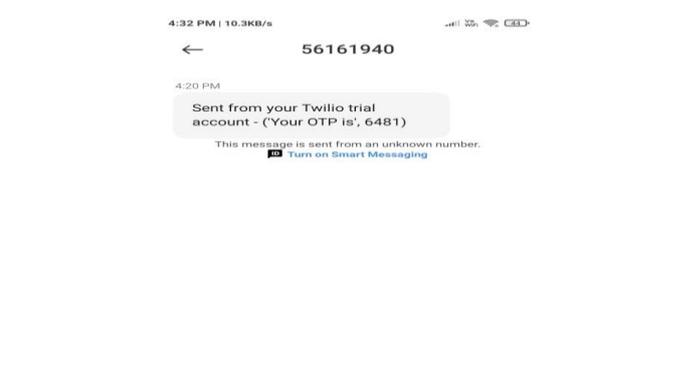
OTP Verification Page:



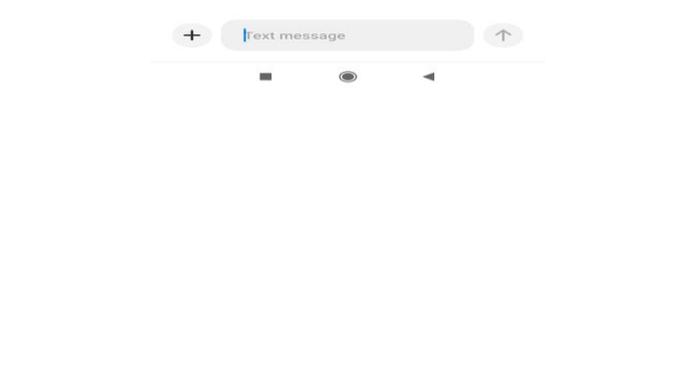
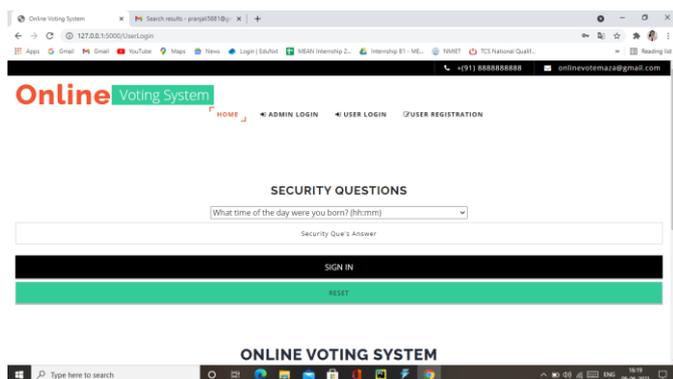
User Login:



OTP Message On Mobile:



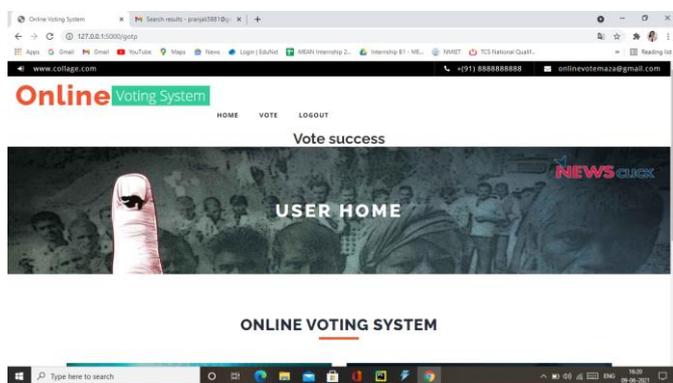
Check Security Question:



Face Verification through webcam:



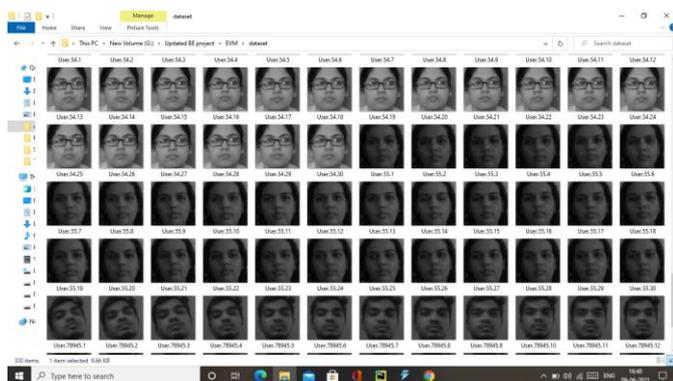
Vote Successful Page:



View Voting Result:



Dataset Prepared:



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