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Online Voting System Using Face Recognition and OTP(One-Time Password)

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Abstract: ***The fundamental idea behind this system is to provide an online voting system that will aid in reducing fraud in manual voting systems and earlier iterations of online voting that used a webcam for face recognition and OTP generating. Also, we are introducing a location-free voting mechanism for voters who are unable to visit the polling location (hometown). Here, we suggest a method that uses various layers of authentication, starting with face recognition and continuing with OTP verification using validation data, to guarantee the device's dependability. Only after being identified and verified against the provided database of registered voters may each voter access the system. When the information provided and the corresponding face match, the voter will be permitted to move through with selecting their top candidate from the panel.***
Keywords: Image Processing, Python, Voting System, Face Recognition, MySQL, OTP

I. INTRODUCTION

According to TOI records, 11 lakhs of fraudulent votes were discovered in Delhi on January 24, 2009. Later, in June 2013, 30000 illegal voters were discovered in the Sheila Dikshit constituency by the electoral commission, according to India News. Ram Vilas Paswan, the leader of the Lok Janshakti Party, also claimed that 30% of the voter cards used in the Bihar elections were false. Depending on the post, elections may involve both public and private voting. Some of the most crucial positions are held by local, state, and federal governments. Voters cast their ballots in paper-based elections by placing them in sealed boxes placed throughout the electoral circuits of a certain nation. After the election time is over, the boxes containing the ballot control unit are opened, and the votes are counted. manually in front of the qualified electoral commission officers. Voting is therefore a time-consuming operation that also uses a lot of resources. Using face recognition and OTP, we have suggested an online voting system in this study. The server unit receives the information on the OTP and Face for further verification. The server then checks the database for data and compares it to data that already exists there. The person is permitted to poll the vote if the data matches the information that has previously been stored. If not, a message is shown on the screen, thus the user must do so. is forbidden from counting the votes. Representatives for voting are chosen by electorates. In the current situation, a voter must present his or her voter ID card in order to cast a ballot. Because the voter ID card needs to be authenticated by the authorities, this process takes time. Thus to speed up the voting process and avoid such type of problems, we have proposed the new system.

II. BACKGROUND

Road networks are crucial for connecting communities and supporting economic growth, but regular usage and other factors can lead to potholes and other road defects that pose safety risks and cause inconvenience for commuters. Traditional methods of pothole detection can be time-consuming and inaccurate, but leveraging technology such as sensors and machine learning algorithms can provide real-time and accurate data on pothole locations and severity. The development of an android pothole detection system that can leverage smartphone sensors and machine learning algorithms has the potential to revolutionize road maintenance and safety. The proposed system will use the smartphone's GPS sensors to detect potholes and distinguish between potholes and other road irregularities. The system will also be integrated with a backend database that can store and analyze data on road conditions, allowing authorities to prioritize maintenance and repairs. The android pothole detection system can provide several benefits, such as reducing road accidents, lowering repair costs, and minimizing traffic congestion. The development of such a system has the potential to revolutionize the transportation industry, providing safer and more efficient means of travel for all.

III. LITERATURE SURVEY

A. Decentralized E-Voting Portal Using Blockchain

This study proposes blockchain frameworks for the electronic voting system. Small-scale elections, such as those held inside corporate buildings or in boardrooms, can be held using this technology.

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For this implementation, an Ethereum smart contract is utilised. The concept behind this solution is to use homomorphic encryption, blockchain technology, and private sharing protocols to keep trustworthy third parties out of the decentralised voting applications. It provides the general public with a transparent voting procedure that safeguards voter anonymity, data transfer privacy, and ballot verification during the billing phase.

1) Advantages
a) It improves voting transparency and guards against voter identity ambiguity**.**
b) During the paying phase, privacy protection for data transmission and ballot verification is offered.

2) Disadvantages
a) Security risk present.

3) Limitations
a) Issue of Compatibility can occur.

B. Electronic Voting Machine with Enhanced Security

This paper presents the development and design of a voting system using the ATMEGA 32 microcontroller, which includes three additional layers of protection. For the process of voting with paper ballots, EVM takes a lot of time. So, in order to be exceptionally quick and trustworthy, manpower must be spared. Hence, without the use of ballot paper, voting confidentiality is preserved in this instance of system implementation. Voting machines that use VVPAT are currently more expensive than EVMs. EVM provides complete proof of tampering, and outcomes are easily accessible. Nonetheless, this EVMs are easily modifiable by altering the hardware connections. As a result, this article suggests adding three layers of security.

1) Advantages
a) Speed of counting of ballots is increased using this application.
b) Saves the cost of paying staff as there is no need tocount votes manually

2) Disadvantages: Security risk present.
*3) Limitations***:** Issue of Compatibility can occur.

C. Biometrically Secured Electronic Voting Machine

The system that authenticates each voter, counts the votes, and prevents false votes is implemented in this paper using an Arduino board and a fingerprint reader. In this method, a voter is recognised via FPS, which determines whether or not a person is registered and also forbids the voter from casting a second ballot.

*1) Advantages***:** Biometric description of voter is used.
*2) Disadvantages***:** Advanced security system can be required for significance ofinvestments and costs to implement.
*3) Limitations***:** Application should be known to users.

D. Multipurpose platform independent online votingsystem

The voter only requires an Aadhar card number and a smartphone that can scan the system's barcode in order to use this system. Since that the programme is entirely online-based, the user can vote on any location. This system generates its own ballot for voting. Vote data is encrypted at the user end, and it is decrypted at the local administrator end. As a result, the voting mechanism is more authenticated and secure.

1) Advantages: User just needs to have Aadhaar card number.
2) Disadvantages: Risk of fraud can happen.
3) Limitations: Smartphone is required for this system

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IV. PROPOSED SYSTEM

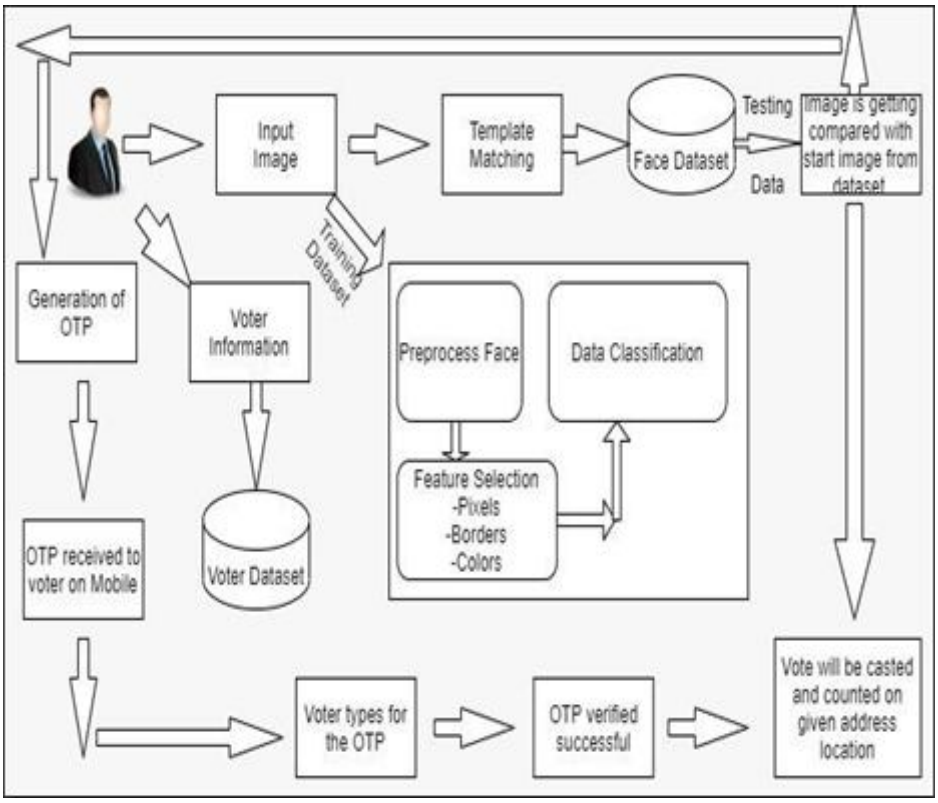


Fig -1: System Architecture

V. DESCRIPTION

The user must first register in the system by entering information such their Aadhar number, mobile number, city, age, and password. The voter dataset contains this data. When a user registers, the system uses a webcam to capture an input image of them. In order to match templates, this image is kept in the face dataset. After logging into the system with their Aadhar number and password, they may then vote. The user must then respond to a security question. Once the verification process is successful, the user advances to the following page, where they may choose which candidate to vote for. After pressing the vote button, the camera turns on and checks the user's face against the provided dataset. Upon satisfactory validation of when the face has been successfully verified, an OTP will be sent to the user's registered cellphone number. Voting is successful if the OTP is validated.

A. Modules

1) *Voter (User):* Voters are crucial in this case because they choose which candidate to support. The voter is a confirmed user who has been given admin permission to vote.
2) *ML Process:* The purpose of machine learning is to teach voter faces to recognise voting times for candidates.
3) *Face and OTP Verification:* The suggested architecture states that there are two methods of voting-time authentication: facial recognition and OTP verification.

B. Algorithm used

1) *Local Binary Pattern Histogram*

A discernible descriptor style used for computer vision classification is called local binary patterns (LBP). LBP was made into a special case from the 1990 Texture Spectrum model. The first time LBP was represented was in the year 1994. As a result, it has been utilised as a texture for identifying solid components. Combining LBP with the descriptor histogram of directed gradients improves the execution of identification on specific datasets (HOG). The flowchart for the LBPH algorithm is shown in Figure 1.

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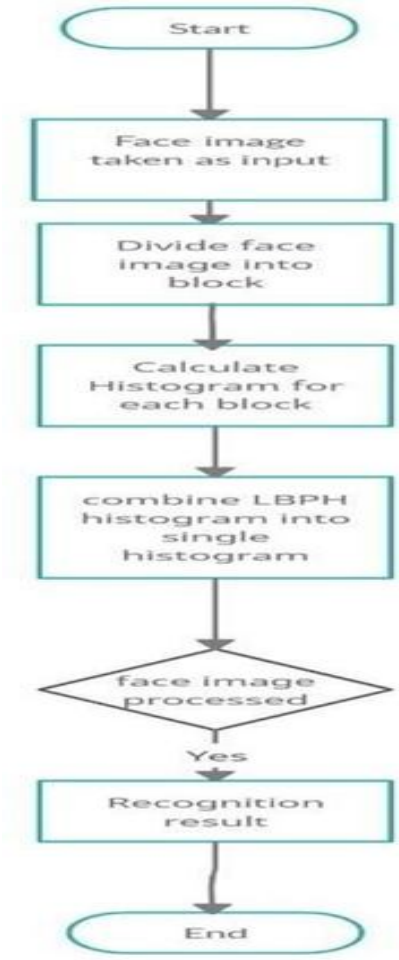


Fig -2: LBPH Flowchart

To encode features, the input picture is partitioned into cells (4 × 4) of pixels. By carrying the surrounding pixel values either clockwise or anticlockwise, the contrast is achieved. Every neighbor's intensity value is compared to the value of the focal pixel. The location has been given a 1 or a 0 depending on whether the difference is higher or lower than 0. The results are an 8-bit value in a single cell.

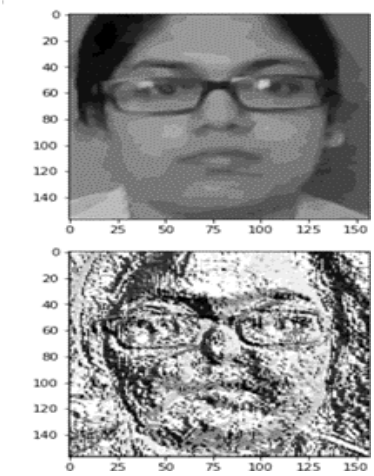


Fig -3: LBPH for Face Recognition

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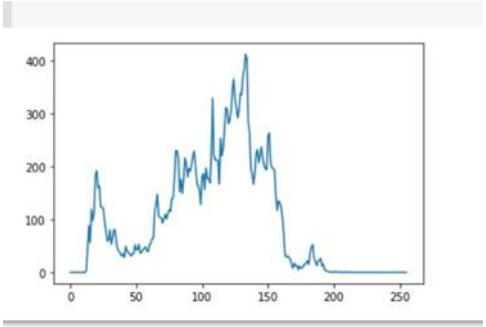


Fig -4: Histogram of Face By LBPH

C. Haar Classifier Algorithm

The main building block for Haar classifier object recognition is a set of Haar-like characteristics. It modifies the contrast values between adjacent rectangular groupings of pixels rather than the pixel's intensity values. The contrast variances between the pixel groupings are used to estimate the relative bright and dark regions. Two or three neighbouring groups with relative contrast variance combine to generate a Haar-like feature. By simply raising or lowering the size of the pixel group, it is simple to scale the Haar characteristics, allowing them to be applied to objects of different sizes. Using subimage analysis, which enables the cascade of classifiers, the maximum likelihood of analysing the Haar-features that differentiate an item is achieved. Our proposed solution aims to address ongoing road problems by crowdsourcing information from people facing these issues and forwarding it to relevant authorities using an Android application. To achieve this, we will utilize a Deep Learning model capable of detecting potholes, collecting information It permits a classifier's accuracy to change just once. It is possible to reduce the number of phases while increasing the false alarm and positive rate. By employing 200 basic traits, the system developed by Viola and Jones has a 95% accuracy rate for identifying human faces. The first step is to train the Haar classifier cascades to recognise human face characteristics such the lips, eyes, and nose. As for the training of the classifier, the AdaBoost method must be used in conjunction with the Haar feature technique. But, Intel has created an open source toolkit known as the Open Computer Vision Library that makes it simple to design computer vision-related apps (OpenCV).from users, and sending it to authorities. The steps involved in implementing this solution are depicted in the figure above.

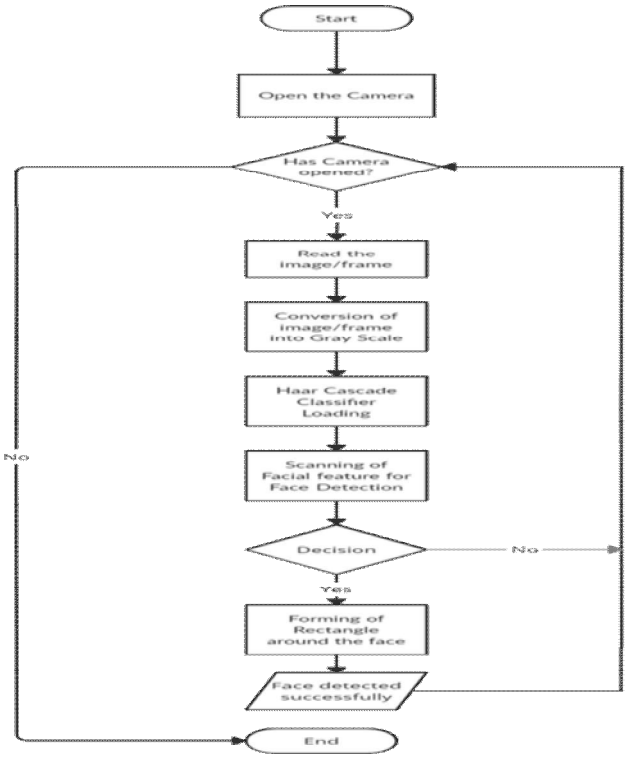


Fig -5: Haar Classifier Flowchart

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VI. CONCLUSION

Our suggested approach combines facial identification with machine learning to enable voters to register and cast ballots from any location, regardless of where they are. This technique offers security and prevents one individual from casting numerous votes. This approach, in which we may cast our votes from many locations, is more dependable. Also, it reduces work, human needs, and time resources.

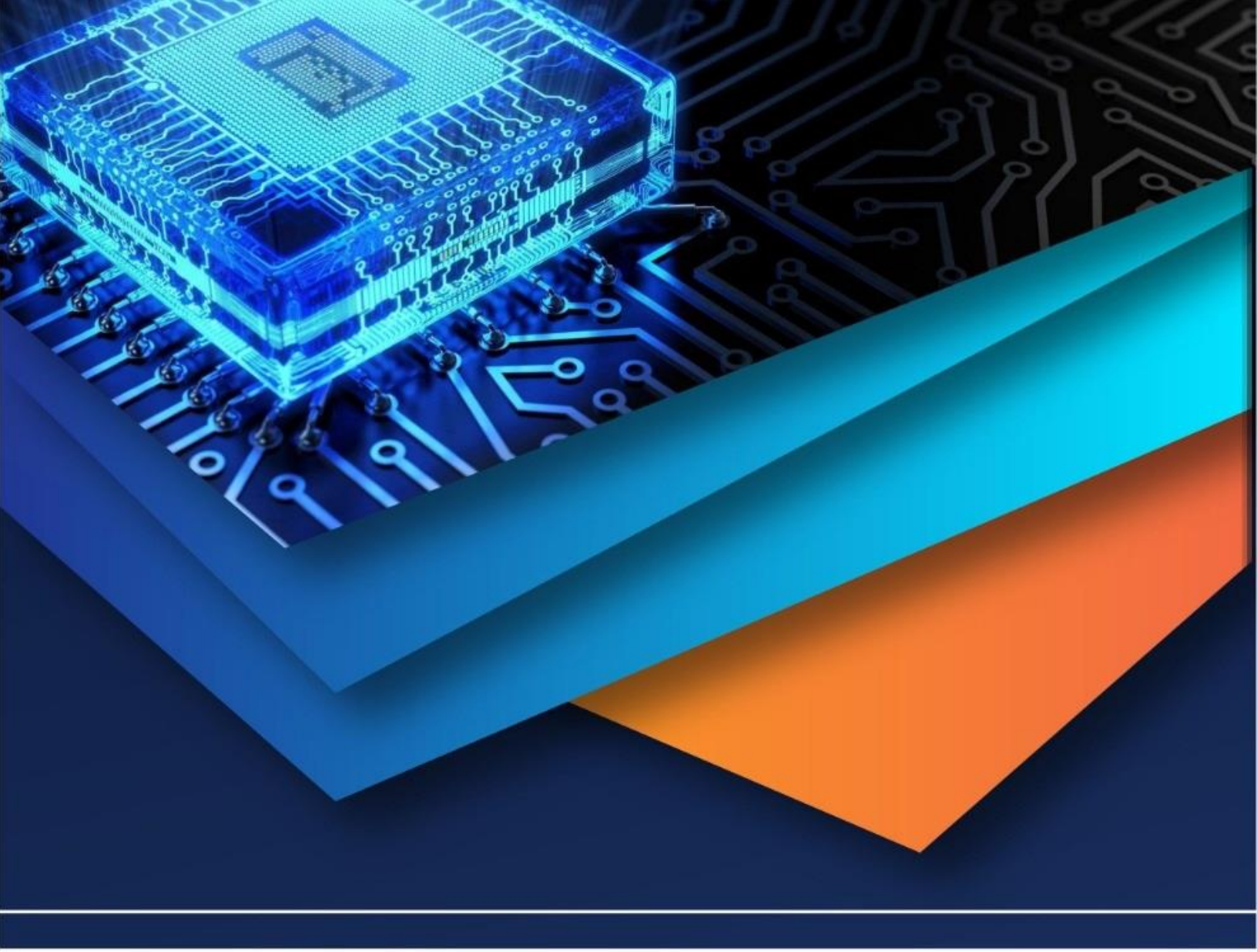
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