SMART VOTING SYSTEM USING COMPUTER VISION AND DEEP LEARNING

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Abstract— Our country, India is the largest democratic country in the world. So, it is essential to make sure that the governing body is elected through a fair election. Although there is online method of voting, India is following offline voting system which is not effective and up to the mark as it requires large man force and it also requires more time to process and publish the results. Therefore, to be made effective, the system needs a change, which overcomes these disadvantages. In this model a person can also vote from outside of his/her allotted constituency or from his/her preferred location remotely from anywhere using his/her computer or mobile phone and doesn't require the voter to go to the polling station through two step authentication of face recognition and mail system. The face is scanned while user registration prior to the election and is useful at the time of voting. The additional feature of the model is that the voter can confirm if his/her vote has gone to correct candidate party In the proposed system the tallying of the votes will be done automatically, thus saving a huge time and enabling Election Commissioner of India to announce the result within a very short period.

Keywords: Smart online voting system , Face scanning ,Machine Learning Algorithms, Deep Learning Techniques.

I. INTRODUCTION

Online voting system is a way that helps public to select their representatives and express their preferences for how they will be governed. The belief of the election process is utmost important. Election process is secure if anything goes wrong in Elections the system will increase the security levels. But there is a chance for Maoist attacks and rigging problems in some areas, there is a chance to lost their vote and life. So public needs a more secure way of casting their vote. Online voting systems offer advantages compared to other voting processes. An Online voting system may be involved in any one of a number of steps in the setup, voting, collecting, distributing and counting of ballots. The question of who gets to count your vote was addressed in while in the voting security has been analyzed. The same problem has also been addressed in more abstractly to ponder over its perception and reality. It is hard to make the voting system trustworthy only because it has high security requirements: confidentiality and integrity. Confidentiality means all voters get assured about the privacy of votes and prevent selling of votes.

Integrity means the assurance of election results and the votes are counted correctly. The proposed system provides peoples to vote in a secure manner without any fear. The online voting system also provides the security to the voter's by storing the vote in a secure digital form, if the voter votes against malevolent candidate.

In this proposed system, at first user's faces are captured during registration process using CNN algorithm.As a second step, users while casting their vote, registered faces are checked with the corresponding Aadhar details.

II. RELATED WORK

In the existing Online Voting System, voters are verified with the AADHAR details and a secure OTP while casting their votes. Even though AADHAR is unique ID for Indian citizens, there may be chances of gambling. People can misuse with the AADHAR details of some other persons.

III. METHODOLOGY

Online Voting system is an interesting topic in a democratic country particularly in security way. Online Voting system has two basic steps.

- Election Commission of India.
- Voters.

a) Election Commission of India

Election Commission plays a major role in India. It conducts election in a procedural way. Here, in this project Admin acts as Election Commission of India. It checks the nominated candidate participating in the election, finalizing the party symbols, Announcing the election dates, finding out the polling booths, monitoring the security issues for any malpractices, preparing the voters list, conducting elections in a smooth way.

b) Voters:

In Online Voting system, Voters has to register themselves with their voter Id details, Aadhar number and register their face. Voters registered face is checked with the face of respective Aadhar's number using CNN techniques.

c) Method of Voting:

Once Voters are registered with their details, they are ready for voting through online voting. During voting, Voters have to enter their registered AADHAR number and face. Once their details are matched, they are ready to cast their vote.

- CNN
- Modules Involved

3.1 Convolution Neural Network (CNN)

convolutional neural network is a special type of feed-forward neural network originally employed in areas such as computer vision, recommender systems, and natural language processing. It is a deep neural network architecture, typically composed of convolutional and pooling or subsampling layers to provide inputs to a fully-connected classification layer. Convolution layers filter their inputs to extract features; the outputs of multiple filters can be combined. Pooling or subsampling layers reduce the resolution of features, which can increase the CNN's robustness

to noise and distortion. Fully connected layers perform classification tasks.

The input data was preprocessed to reshape it for the embedding matrix. The figure shows an input embedding matrix processed by four convolution layers and two max pooling layers. The first two convolution layers have 64 and 32 filters, which are used to train different features; these are followed by a max pooling layer, which is used to reduce the complexity of the output and to prevent the overfitting of the data. The third and fourth convolution layers have 16 and 8 filters, respectively, which are also followed by a max pooling layer. The final layer is a fully connected layer that will reduce the vector of height 8 to an output vector of one, given that there are two classes to be predicted (Positive and Negative).
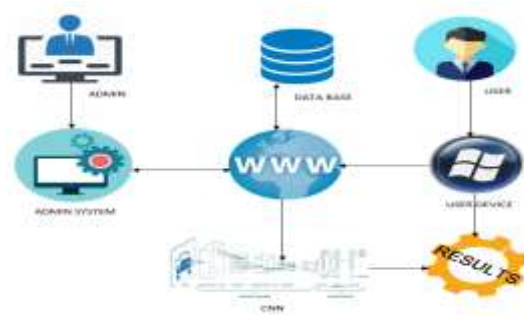

Figure – 1: Architecture

In the proposed system, we have tried to build a secure online voting system that is free from unauthorized access while casting votes by the voters. In addition to AADHAR details, voters' faces are captured during registration. The same voters' have to capture their faces while utilizing their votes. The proposed system verifies whether both the faces are matched. It uses computer vision techniques for person identification. The servers of the proposed system have such distribution of authority that server does not enable to manipulate the votes. Thus, the proposed online voting system will increase the transparency and reliability of the existing electoral system.
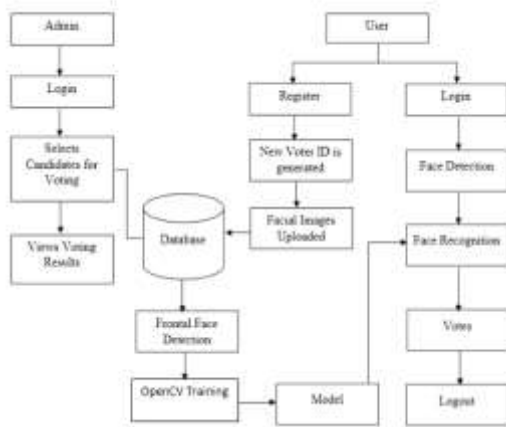
Figure – 2: Project Flow

3.2 Modules

Admin: Admin is the person in charge and maintaining the system entirely.

The main functions of the admin are:

- **Login:** Logs into the system.

- **Select Candidates:** Selects the candidates for voting.

- **View:** View voting results.

- **Logout:** after completing the process he log's out from the system.

User: User is the person who is interested to vote we can call him as a voter.

- **User Register:** Register into the system if he is new otherwise, he log's in directly.

- **User Login:** Login into the system using facial images or Video Stream.

- **User vote:** They vote to their desired party/candidate.

- **Logout:** After voting they logout from the application.

IV. RESULTS

Figure – 3: Home Screen

Figure – 4: Admin Login

Figure – 5: Administrator Controls

Figure – 6: New Nominee Page

Figure – 7: Voter Registration

Figure – 8: Voting Results

Figure – 9: Update Page

Figure – 10: Voter Detection

CONCLUSION

We have successfully developed an online voting system. The system has a new registration feature which takes in frontal facial images of the person registering. The user needs to verify their emails using OTP as well for a successful registration. Once someone is registered, the models has to be trained again by the admin in order to detect and recognize the new person. A registered user is identified by their face and then allowed to vote unless they have already voted as no one can vote more than once. Frontal Face Harcascading is used for facial embedding generation. Computer Vision is employed for image preprocessing and video streaming. Flask is used for the User Interface via Python.

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