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FRAUD VOTE DETECTION USING FACIAL RECOGNITION

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Abstract*:* To uphold democratic integrity, this project introduces a facial recognition-based system designed to prevent electoral fraud, specifically duplicate voting and impersonation. The system integrates high-precision facial recognition technology with existing voter databases to verify voter identities in real-time as they present themselves to vote. This ensures that each individual votes only once per election, significantly reducing the potential for fraud. Facial recognition technology combined with Firebase offers a formidable solution to the problems with voter verification that have long existed.

Keywords: Facial Recognition, Voter Verification, Electoral Fraud, Firebase.

I. INTRODUCTION

In modern era with accurate, safe, and effective voter verification—especially through real-time facial recognition—modern technology is revolutionizing elections. Through the integration of Firebase and facial recognition, this study improves data security, scalability, and system robustness. The system matches and captures voter facial traits using the face recognition library, reducing the likelihood of fraud. Verification processes that are adaptable to various voting phases guarantee user experience and security. Voter data is discretely protected by strong encryption and specialized security protocols. In order to maintain the integrity and transparency of the voting process and real-time.

II. LITERATURE VIEW

Noha E. El-Sayad and Rabab Farouk Abdel-Kader created "Face Recognition as an Authentication Technique in Electronic Voting ". It describes identity authentication for online voting, verifiability of votes, Use real-time alerts and monitoring systems to spot any unusual or suspicious activity during the voting process. Make certain that every user can access the voting site. [1].

Roopa Shankar, Reju R Nath, Sneha T B, Sreejith K, SreeSabari N, Kala L, Prasad R Menon invented "VOTERS FACE RECOGNITION AND FAKE REJECTION USING DIGITAL IMAGE PROCESSING" describing Threshold Value, Number of Eigenfaces, Eigenfaces Algorithm, and Haar-like Features for Face Recognition are all covered. [2].

Balamurali, Potru Sarada Sravanthi, B. Rupa invented "Smart and Secure Voting Machine using Biometrics" explaining cloud database storage, GPS tracking, SMS and GSM module integration, and biometric identification. [3].

E. Vetrimani, J.Akash, C.Rishi, P.Raveena invented “Real Time Face Recognition in Electronic Voting System using RFID and OpenCV" that explains Facial Authentication for Voting, Face Recognition with Election Commission ID, RFID Number Verification, Face Detection using Haar Cascades, Improve Face Recognition and User Interface. [4].

Citra Devi Nair Appunair, Nazirah Abd Hamid, Ahmad Faisal Amri Abidin, Mohamad Afendee Mohamed, Mohd Fadzil Abdul Kadir, Siti Dhalila Mohd Satar "A SECURE ONLINE VOTING SYSTEM USING FACE RECOGNITION TECHNOLOGY" explain The system makes use of convolutional neural networks (CNNs) and Haar Cascade classifiers, two computer vision approaches. [5].

III. IMPLEMENTATION MODULES

Modules:

1. Firebase admin.
2. cv2(OpenCV).
3. Face recognition.
4. Pickle.
5. Datetime.
6. Pygame.

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Module Description:

Firebase admin: Firebase Admin is a Python SDK that allows interaction with Firebase services such as Realtime Database, Cloud Firestore, and Cloud Storage. It provides APIs for initializing Firebase apps, managing database references, and performing operations like reading, writing, and querying data in Firebase.

cv2 (OpenCV): OpenCV (Opensource Computer Vision Library) is a popular open-source library used for various computer vision tasks. It provides a wide range of functions for image and video processing, including reading and writing images, resizing, colour conversion, filtering, feature detection, and more. OpenCV is widely used in applications involving object detection, facial recognition, and image analysis.

Face recognition: The face_recognition library is built on top of dlib and provides easy-to-use APIs for face detection, facial landmark identification, and face encoding (extracting facial features as numerical vectors). It allows for efficient face recognition by comparing face encodings to identify known faces within images or video frames. This library simplifies the implementation of facial recognition systems.

Pickle: Pickle is a module in Python used for object serialization and deserialization. It allows Python objects to be converted into a stream of bytes and saved to a file (serialization), and later reconstructed from the file to the original object (deserialization). In the context of the project, Pickle is used to save and load face encodings or other data structures efficiently.

Datetime: The datetime module in Python provides classes for manipulating dates and times. It allows for the creation, formatting, and manipulation of date and time objects. In the project, the datetime module is likely used to manage timestamps for various purposes such as recording when a voter last voted or calculating time differences.

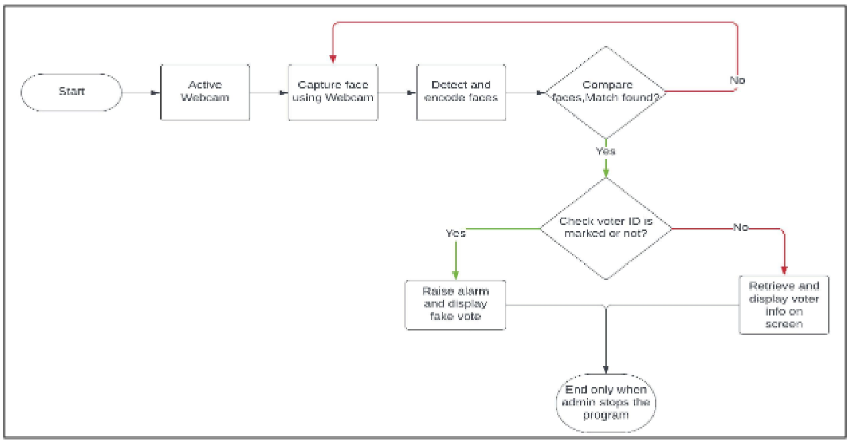
Pygame: Pygame is a cross-platform set of Python modules designed for writing video games and multimedia applications. It provides functions for handling graphics, sound, input devices, and events. In the context of the project, Pygame is used for playing audio files (e.g., alarm sounds) to provide feedback or alerts based on certain conditions (e.g., detecting fraudulent voting attempts).

IV. COMMON COMPONENTS

1. Actors: The users that interact with a system. An actor can be a person, an organization, or an outside system that interacts with your application or system. They must be external objects that produce or consume data.
2. System: A specific sequence of actions and interactions between actors and the system. A system may also be referred to as a scenario.
3. Goals: The end result of most use cases. A successful diagram should describe the activities and variants used to reach the goal.

V. DIAGRAMS

Flowchart:


Start
Active Webcam
Capture face using Webcam
Detect and encode faces
Compare faces,Match found?
No
Yes
Check voter ID is marked or not?
Yes
No
Raise alarm and display fake vote
Retrieve and display voter info on screen
End only when admin stops the program

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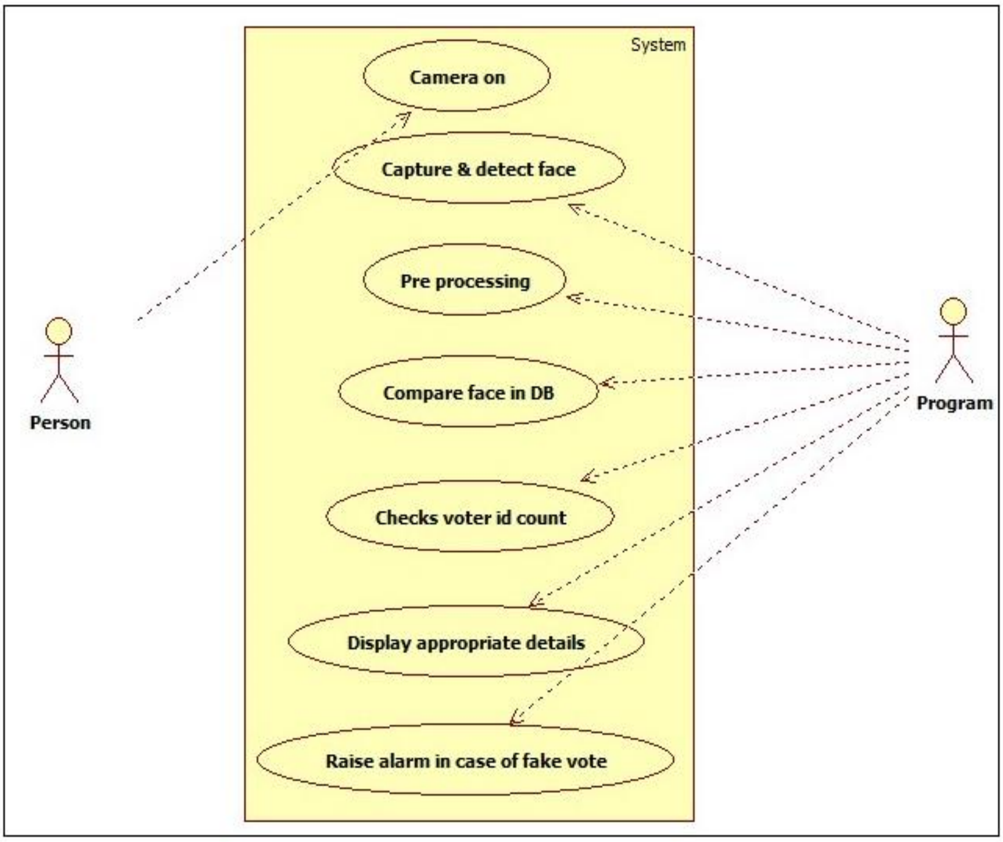
Assuring election integrity and thwarting fraudulent activities, the sequence in the comprehensive flowchart successfully depicts a complex process that combines facial recognition technology with a secure database to confirm voter IDs and monitor voting activities. The pickle library is used at the beginning of the procedure to load pre-saved face encodings, an essential step that entails obtaining information that enables each registered voter to be uniquely identified based on their facial traits. The system uses a webcam to continuously record frames of video as part of the continuous monitoring mechanism.

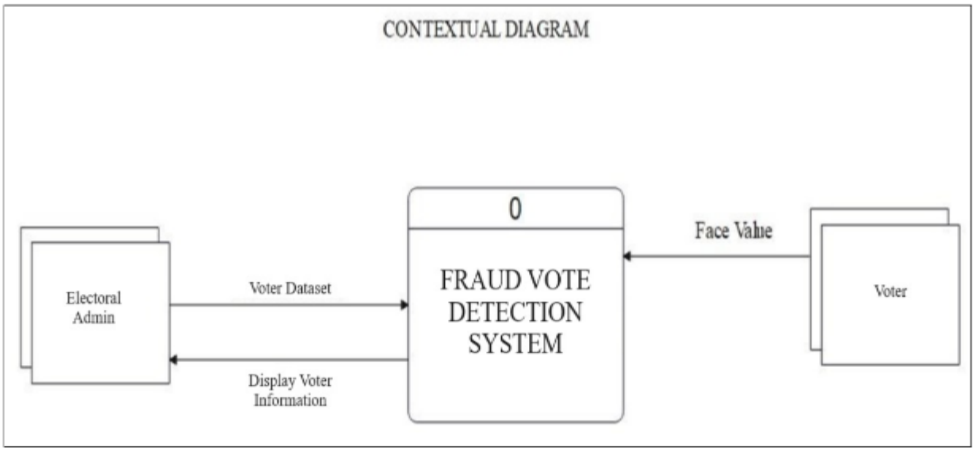
Use-Case Diagram:



An effective use case diagram can help your team discuss and represent:

1. Scenarios in which your system or application interacts with people, organizations, or external systems
2. Goals that your system or application helps those entities (known as actors) achieve the scope of system

Data-Flow Diagram:



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A Data Flow Diagram (DFD) is a traditional visual representation of the information flows Within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It can be manual, automated, or a combination of both. It shows how data enters and leaves the system, what changes the information, and where data is stored. The objective of a DFD is to show the scope and boundaries of a system as a whole.

VI. ACKNOWLEDGMENT

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VII. CONCLUSION

In conclusion using cutting-edge technology like Firebase and facial recognition, the system shows how to effectively tackle fraud during voting in real-time. The system performs exceptionally well in accurate voter tracking and identification thanks to OpenCV's image processing and facial recognition features. Its dynamic ability to provide immediate visual input improves usability. Potential future developments might concentrate on improving performance, security, and error handling. This study lays the framework for future breakthroughs in fraud detection and prevention by demonstrating the proactive use of technology to address difficulties in the electoral system..

REFERENCES

[1]. Noha E. El-Sayad , Rabab Farouk Abdel-Kader "Face Recognition as an Authentication Technique in Electronic Voting". 2013.

[2]. Roopa Shankar, Reju R Nath, Sneha T B, Sreejith K, SreeSabari N, Kala L , Prasad R Menon. "VOTERS FACE RECOGNITION AND FAKE REJECTION USING DIGITAL IMAGE PROCESSING", Volume 4, Issue 07 Journal of Emerging Technologies and Innovative Research (JETIR) 2017.

[3]. Balamurali, Potru Sarada Sravanthi, B. Rupa." Smart and Secure Voting Machine using Biometrics",2020 Proceedings of the Fourth International Conference on Inventive Systems and Control (ICISC), September 2020.

[4]. E.Vetrimani, J.Akash, C.Rishi, P.Raveena Real Time Face Recognition in Electronic Voting System using RFID and OpenCV International Research Journal of Engineering and Technology (IRJET)2020.

[5]. Citra Devi Nair Appunair, Nazirah Abd Hamid, Ahmad Faisal Amri Abidin, Mohamad Afendee Mohamed, Mohd Fadzil Abdul Kadir, Siti Dhalila Mohd Satar. "A SECURE ONLINE VOTING SYSTEM USING FACE RECOGNITION TECHNOLOGY". MALAYSIAN JOURNAL OF COMPUTING AND APPLIED MATHEMATICS 2023.