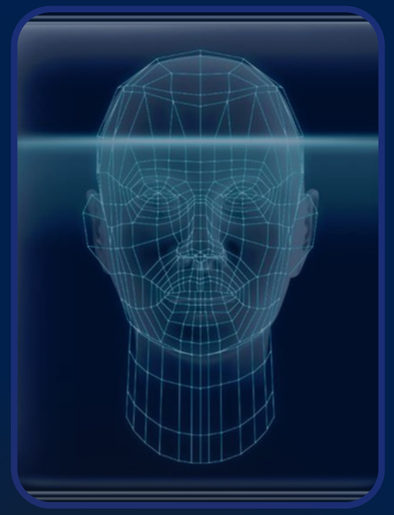
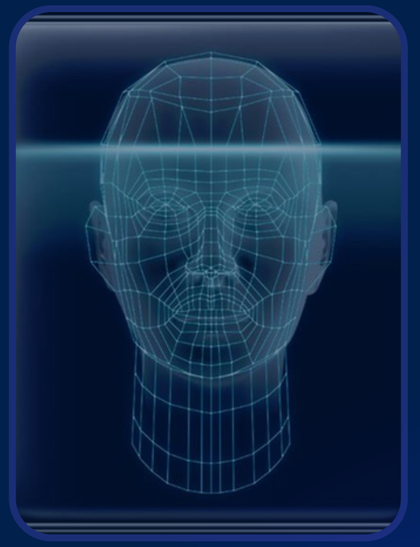
STUDENT ATTENDANCE

HUMAN FACE RECOGNITION USING TENSORFLOW AND DEEP LEARNING

GUIDED BY G.VIJAY KUMAR





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ABSTRACT

- The purpose of our project is security and verification.
- The problem we identified is lack of security for the college as there are so many students in the college.
- As well as to keep the data of the students for the future references.

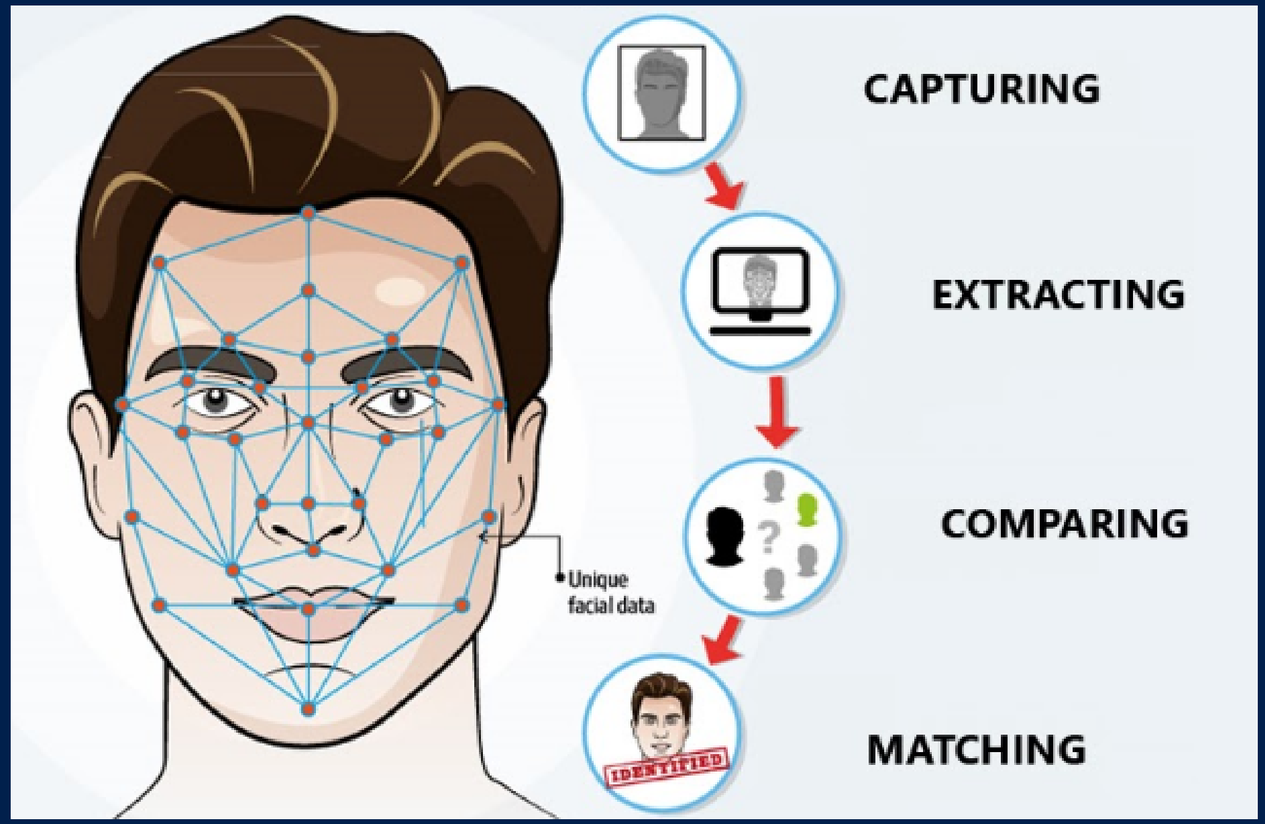
INTRODUCTION

- Our project is about taking attendance of the students via face
  recognition in real-time.
- Face recognition is a widely used system in the security realm.
- The purpose of our project is for the security maintenance for the students in the college and their chance of entering strangers.
- As well as to keep the data of the students for future reference.

FACE RECOGNITION

In our project, face recognition is a software application that verifies your identity through :

- Face detection
- Face analysis
- converting image to data
- finding match



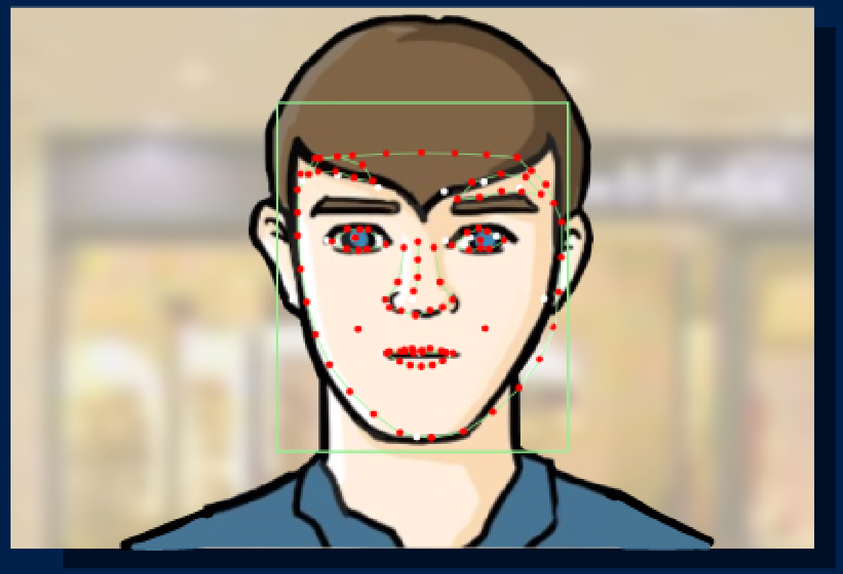
SOFTWARE REQUIREMENTS

- Python 3.x: The programming language used for developing the project.
- TensorFlow: A powerful open-source software library for building and training machine learning models.
- Keras: A high-level neural networks API, written in Python and capable of running on top of TensorFlow.
- OpenCV: An open-source computer vision library used for image processing and manipulation.
- NumPy: A Python library used for working with arrays.
- Pandas: A Python library used for data manipulation and analysis.

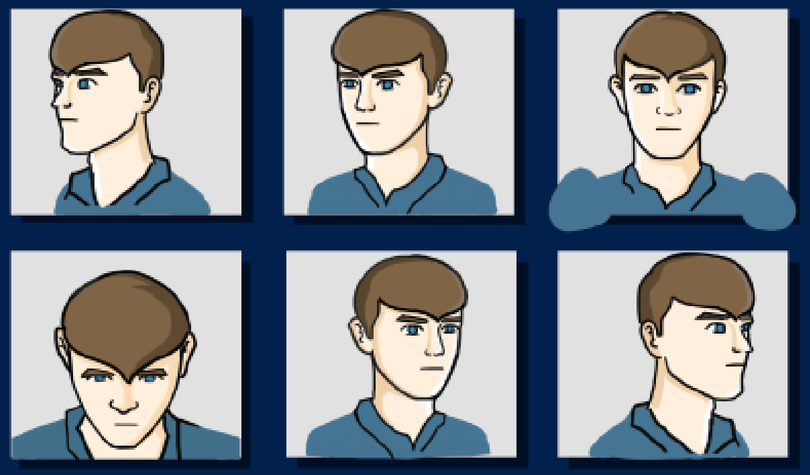
ALGORITHMS

- MTCNN (Multi-Task Cascaded Convolutional Neural Network): Used for detecting and localizing faces in the input image.
- Facenet: Used for generating embeddings for the detected faces, which are then used for face recognition.
- Support Vector Machines (SVM): Used for classification of the face embeddings into known or unknown categories.

Detection

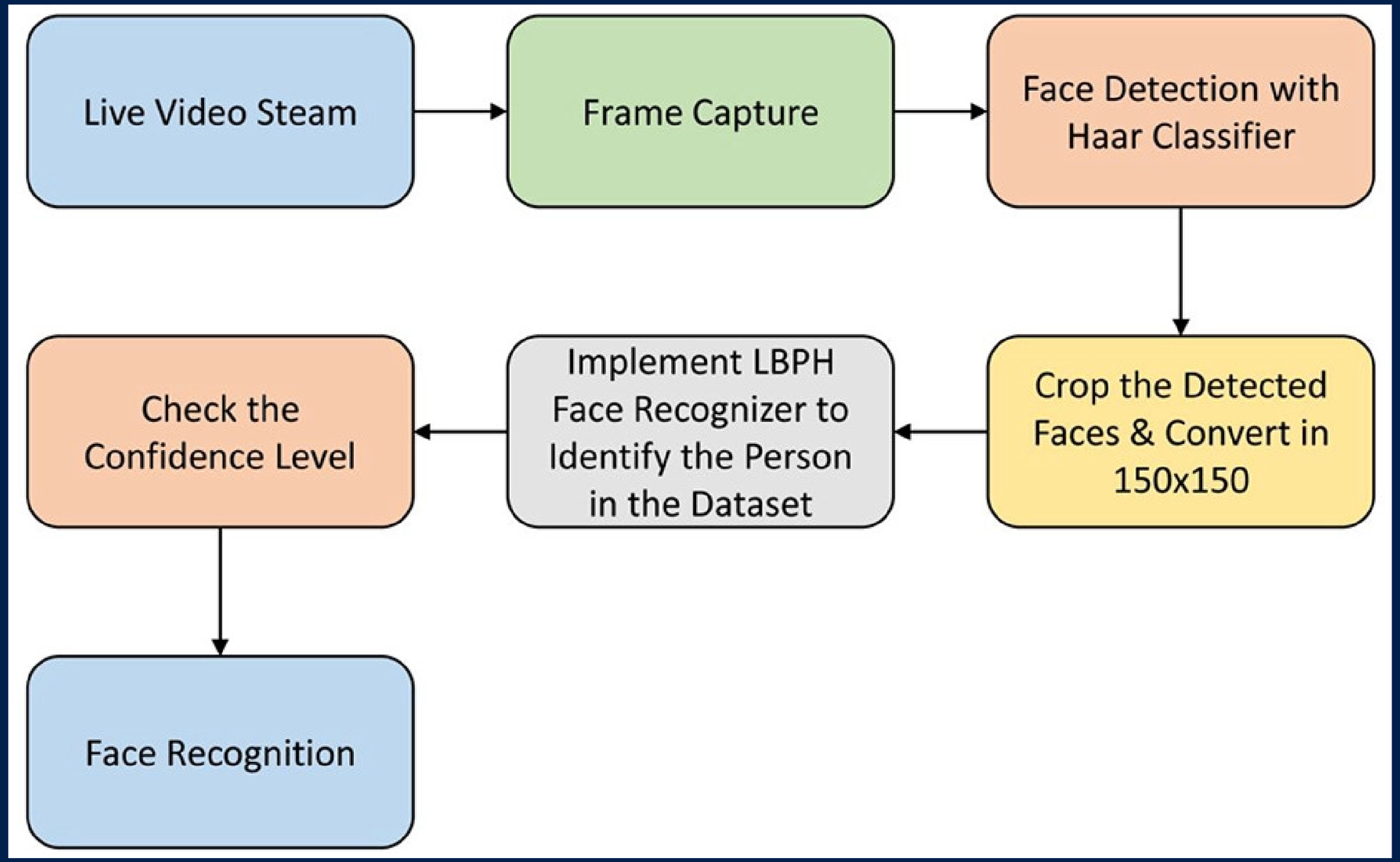


Measurement



Store

Matching


Live Video Steam
Frame Capture
Face Detection with Haar Classifier
Crop the Detected Faces & Convert in 150x150
Implement LBPH Face Recognizer to Identify the Person in the Dataset
Check the Confidence Level
Face Recognition

LITERATURE SURVEY

RESEARCH PAPER	ALGORITHM
Automated Attendance system based on Face Recognition Algorithms	Viola-Jones detection,Distance classifier/SVM
An Evaluation of Face Recognition Algorithms and Accuracy based on video in unconstrained factors	LBPH method,Eightenfaces
Class Room Attendance System using Facial Recognition System	Color based detection and principle component Analysis(PCA) for detection
Real-Time Face Recognition for Attendance monitoring system	PCA for feature detection,histogram equalization for resizing images
An efficient Attendance management System based on MATLAB and Raspberry PI	LBP,HOG,Viola-Jones and SVM methods are used

EXISTING ATTENDANCE MANAGEMENT SYSTEMS

- **TimeTec** TA: TimeTec TA is a cloud-based attendance management system that uses facial recognition technology to track employee attendance.
- **ZKTeco**: ZKTeco is a biometric technology company that offers face recognition attendance systems.
- **Suprema**: Suprema is a global leader in biometrics and security technology. They offer face recognition attendance systems that use their own facial recognition algorithm, ensuring accurate and reliable attendance tracking.
- **Hikvision**: Hikvision is a security technology company that offers a range of solutions, including face recognition attendance systems.
- **Anviz**: Anviz is a global provider of security and access control solutions. They offer face recognition attendance systems that are designed to be easy to use and highly accurate.

PROBLEMS WITH EXISTING SYSTEMS	OUR MODEL
Accuracy can be affected by lighting, angles, and occlusions, leading to inaccurate attendance records.	we tried to increase the accuracy of face recognition. By using better algorithms compared to these existing systems.
There is a risk of data breaches and hacking attempts, which could compromise sensitive employee data.	The data of the face recognition attendance system in a college will be managed by the college administration.The safety of the data depends on the ethics and morality of the college management.Keeping the data in-house reduces the risk of data theft by other companies.
The cost of face recognition attendance systems can be prohibitively expensive for smaller businesses or organizations with limited budgets.	Since, our model is created for the purpose of this college it is cost effective compared to this companies.

WHAT WE DID DIFFERENTLY ?

in our project we tried our to with following aspects of face recognition system:

- **Accurate Attendance Tracking**
- **User-Friendly Interface**
- **Customizable**
- **Scalability**

WHAT WE HAVE DONE SO FAR.....

- We have explored the concept of facial recognition using deep learning techniques.
- We have used the MTCNN algorithm to detect faces in images and extract face embeddings using the Facenet model.
- We have used the Keras deep learning library to build a model that can classify faces based on their embeddings.
- We have used various Keras layers such as Dense, Flatten, Conv2D, MaxPooling2D, and Dropout to build the model architecture.

CONT.

We have used the LabelEncoder class to encode the target labels and the Sequential class to create the deep learning model.

We have discussed the importance of hyperparameter tuning to optimize the performance of the model.

We have used the concept of tolerance to improve the accuracy of the face recognition system.

We have also discussed the importance of face size in the detection and recognition of faces in images.

CODE OUTPUT IMAGES

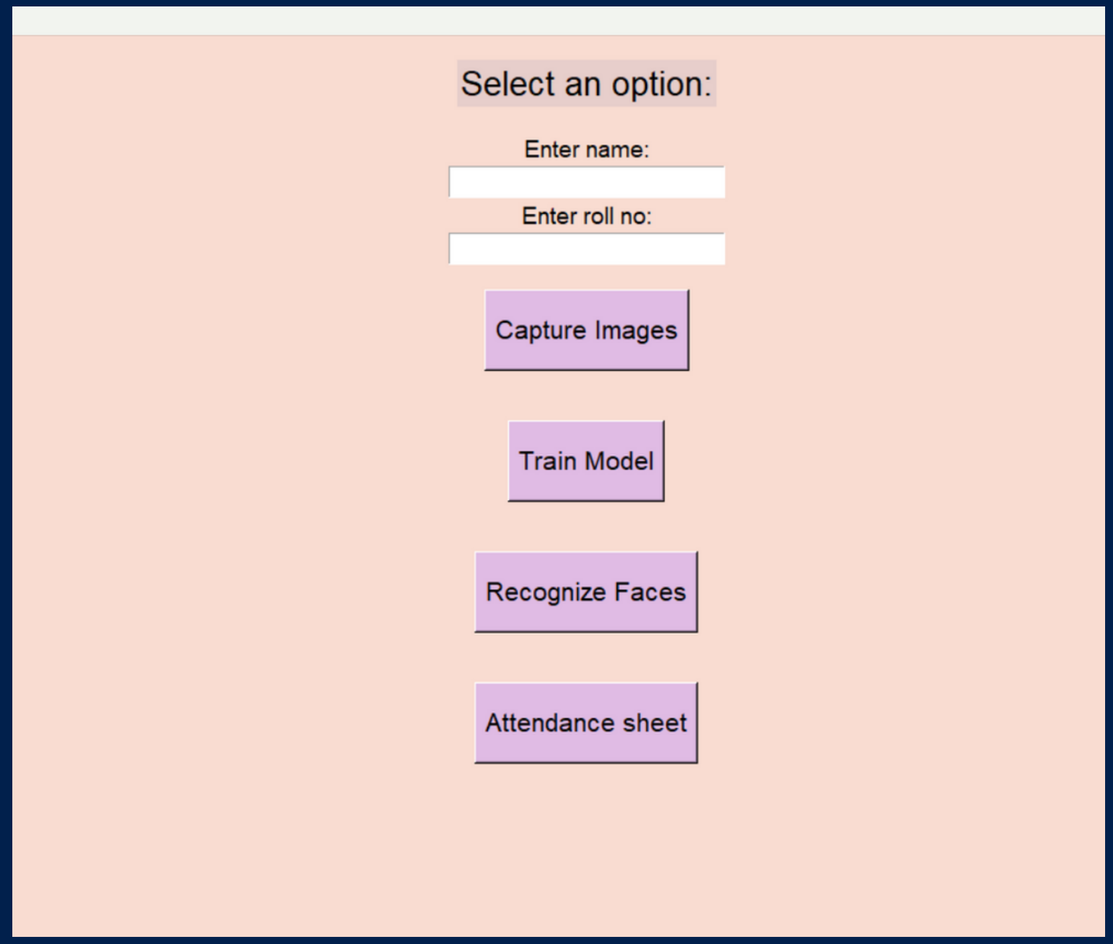


fig. Interface of the system

fig. Working of the training file

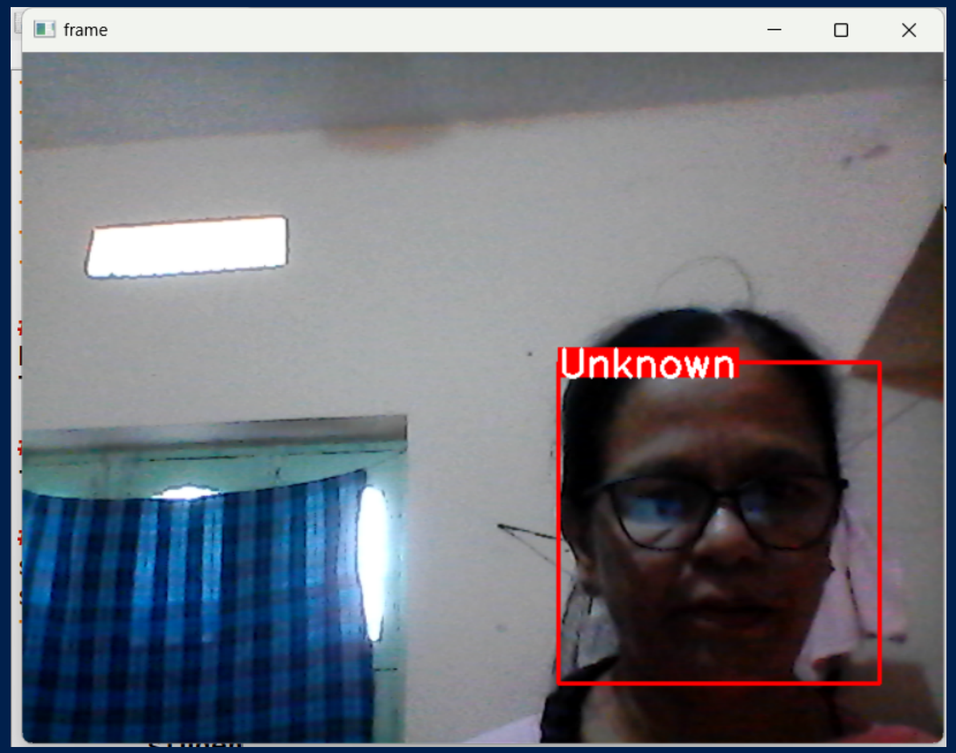


fig. This figure illustrates a facial recognition system that can identify unknown faces by analyzing facial features and comparing them to a database of known faces.

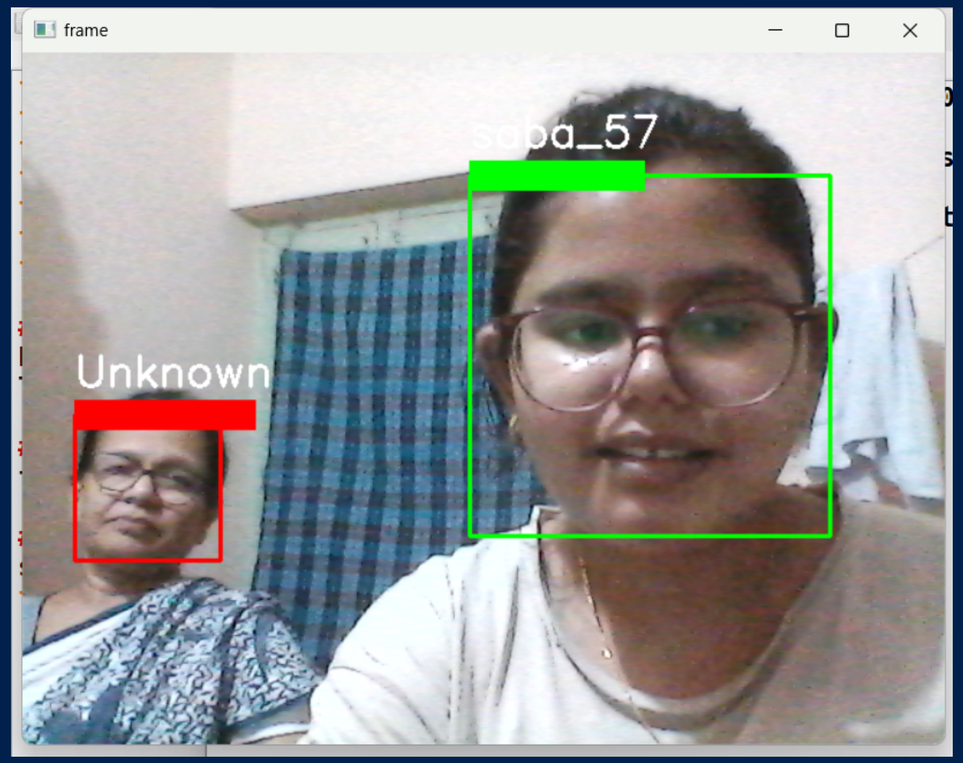


fig. This figure depicts a facial recognition system that can differentiate between a known face and an unknown face. The system uses advanced algorithms to analyze facial features and compares them to a database of known faces. If there is a match, the system identifies the face as known, but if there is no match, it identifies the face as unknown.

CHALLENGES WITH FACE RECOGNITION

- Accuracy: Facial recognition technology can be inaccurate, especially in low light or when the person's face is partially obscured.
- Security: The system can be vulnerable to hacking or data breaches, putting personal information at risk.
- Privacy: There are concerns around the collection and storage of biometric data, as it can be sensitive and open to misuse.
- Bias: The system may not work equally well for people of different races, genders, or ages due to bias in the algorithms.
- Cost: Implementing a facial recognition attendance system can be expensive, especially for small businesses or organizations.

CONCLUSION

- An automated students attendance system is necessary for learning and teaching environment.
- Most of the existing systems are time-consuming and require semi-manual work during lecture time.
- In the proposed system the aim is to provide a solution for the problems by integrating face recognition into the process of the attendance management system, which will save effort and time.
- Currently, the facial recognition system has some limitations regarding functionalities, accuracy, lighting problem, etc. that are supposed to be solved by the proposed system.


THANK
YOU