AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956

FACE RECOGNITION ATTENDANCE SYSTEM

24AIM111- INTRODUCTION TO DATA STRUCTURE AND ALGORITHMS
23MAT112- MATHEMATICS FOR INTELLIGENT SYSTEMS 2

Kailash S - CB.AI.U4AIM24017
Shreeram M - CB.AI.U4AIM24023
Mahadev M - CB.AI.U4AIM24025
Sanjay K - CB.AI.U4AIM24038

Faculty In-Charge :
Dr. Manimaran S
Dr. Prem Jagadeesan

INTRODUCTION

Face recognition is a critical technology used in security, surveillance, and social media.

This project aims to develop a robust face recognition attendance system using two key techniques – PCA and LBP.

PROBLEM STATEMENT

- Face recognition systems often struggle with varying lighting conditions, which can significantly affect the accuracy of recognition.

- Existing techniques suffer from high computational costs or are limited by accuracy.

- The challenge is to create a fast and accurate face recognition system using PCA and LBP.

DSA PART INCORPORATED

Arrays and Matrices:

- 1.Image Representation : Each face image is stored as a 2D array (matrix).
- 2.Feature Vectors : After applying PCA or LBP, features are stored in 1D arrays (feature vectors) for classification.

Graphs:

- Facial Feature Relationships : Can be used to represent relationships between facial landmarks (e.g., eyes, nose, mouth) as nodes connected by edges.

FaceList:

- Used for storing multiple face images for comparison, allowing efficient retrieval during recognition tasks.

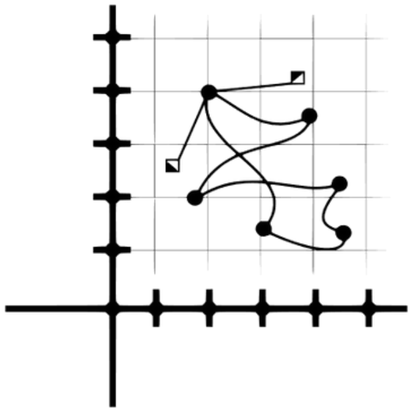
MATHEMATICS PART INCORPORATED

- **Eigenvectors and Eigenvalues:** PCA computes the covariance matrix and finds eigenvectors (principal components).
- **Local Binary Patterns (LBP):** Extracts the local features from images.
- **Support Vector Machine (SVM):** Classify the extracted features and find the optimal hyperplane that separates classes in the feature space.

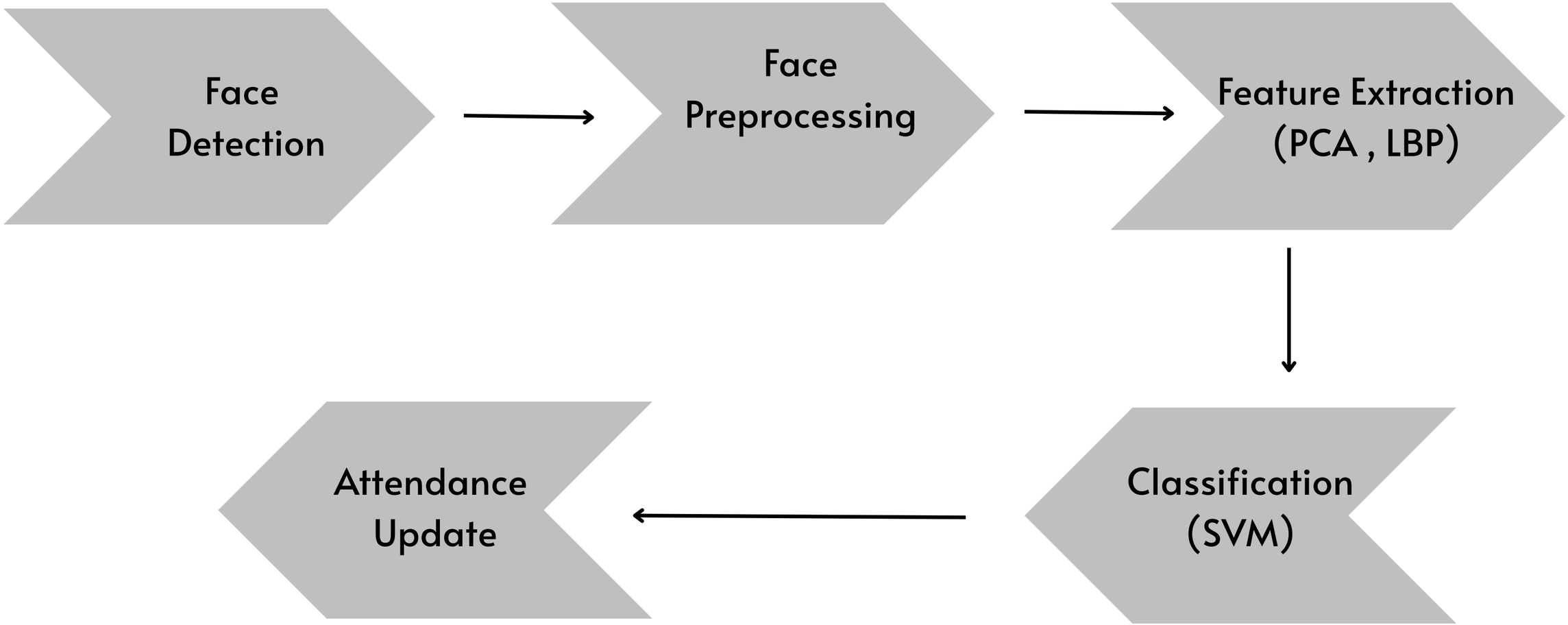
$$C = \frac{1}{n-1}(X-\mu)^T(X-\mu)$$

$$Cv = \lambda v$$

$$LBP(x_c, y_c) = \sum_{p=0}^{P-1} s(g_p - g_c) \cdot 2^p$$



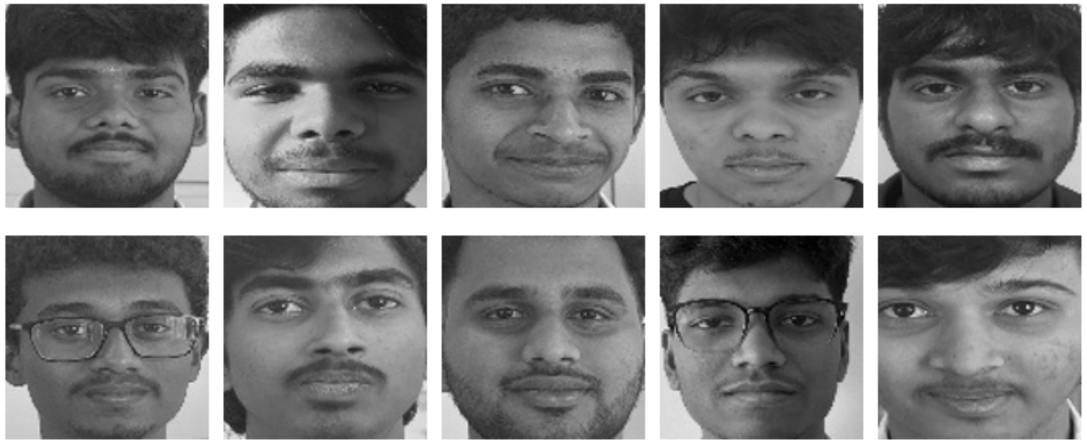
RECOGNITION PROCESS



DATASETS

- **ORL Database**

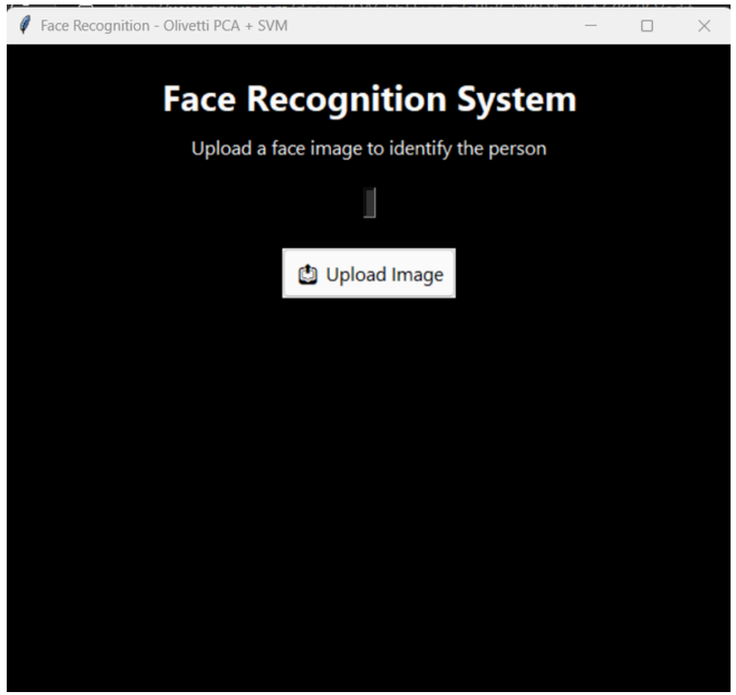
- **AIM Students Dataset**



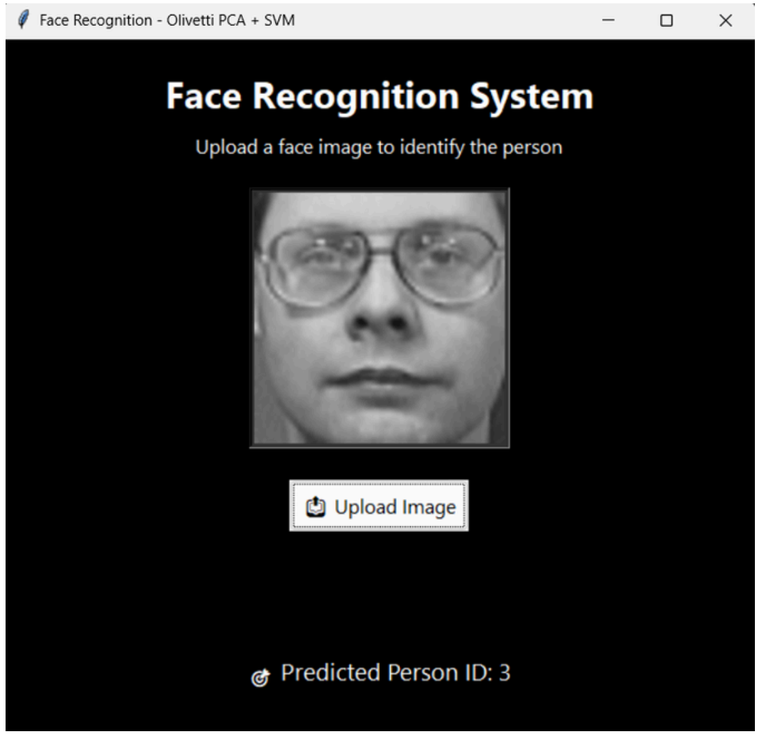
RESULTS

DATASET	MODEL	ACCURACY
ORL Dataset	SVM	**95 %**
ORL Dataset	FNN	**71 %**
AIM STUDENTS	SVM	**85 %**
AIM STUDENTS	FNN	**40 %**
LFW Dataset	CNN	**70 %**

UI - INTEGRATION



User have to upload their picture to mark their attendance



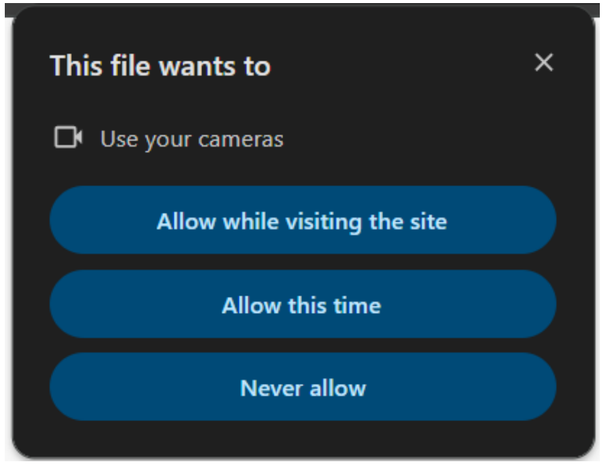
Predicted ID	Date	Time
20	20-04-2025	03:25:17
2	20-04-2025	04:15:35
3	20-04-2025	04:16:08

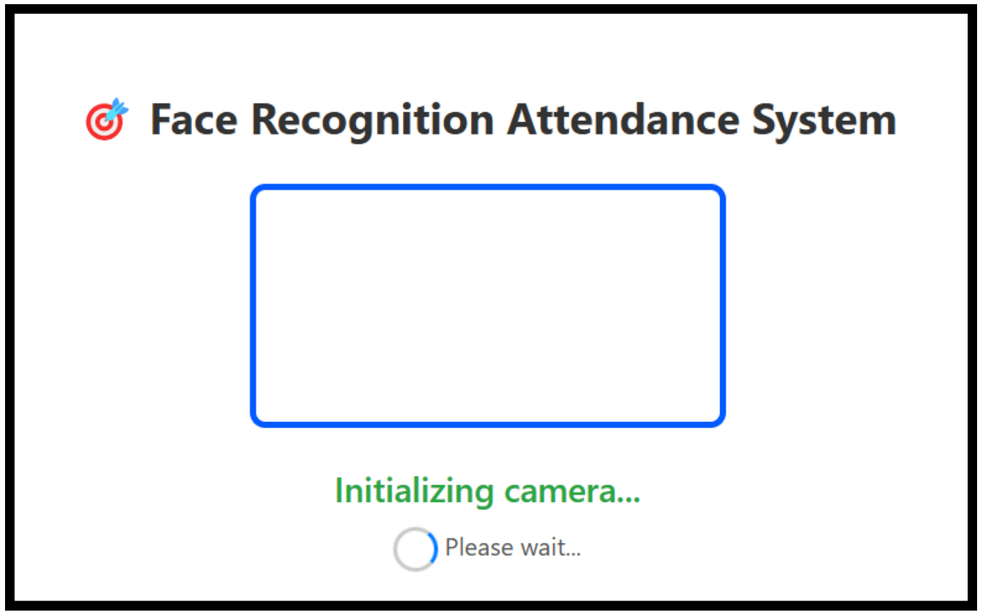
Their attendance is automatically stored in a csv file with date and time.

REAL TIME ATTENDANCE MARKING

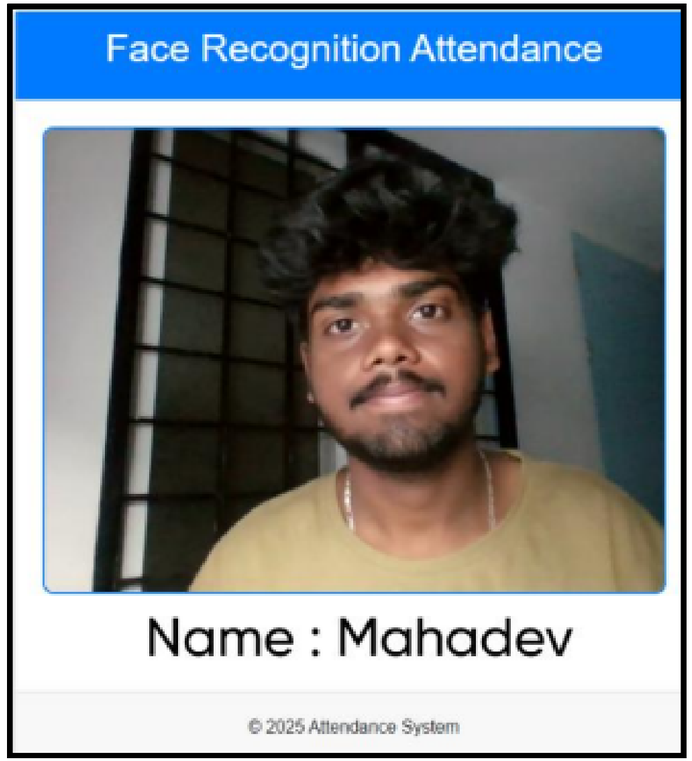
- A QR code will be given by the teacher

- Student must scan the QR code and go into the website and give required permissions





- Our model will detect the student's face and give their names.



- A CSV will be automatically created and the names of the students will be stored with date and time.

Student Name	Date and Time
Mahadev	12-04-2025 14:31
kishore	12-04-2025 14:31
Neilkumar	12-04-2025 14:32
Abhinav	12-04-2025 14:32
Sanjay	12-04-2025 14:35
Kailash	12-04-2025 14:36

- Duplicate entries will not be stored.(If a student mark attendance again)

```
[ i ] ID 3 already marked today.
[ i ] ID 3 already marked today.
```

THANK YOU