FACE RECOGNITION ATTENDANCE SYSTEM

TEAM-11

SECOND REVIEW

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PROJECT GUIDE

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PROBLEM STATEMENT

Current attendance systems, relying on manual methods like paper-based records and outdated technologies such as punch cards or RFID tags, are prone to significant inefficiencies. These methods are often error-prone and can be easily manipulated, leading to inaccuracies.ID cards or RFID tags can be lost, damaged, or misused by others. This results in unreliable attendance tracking and frequent data inaccuracies. An efficient, automated solution is needed to address these limitations.

EXISTING SYSTEM

Attendance System	Advantages	Disadvantages
Manual Attendance Marking	**Simplicity**: No need for special equipment, only pen and paper. **Customizable**: Easily adapted to various attendance policies.	**Error-prone**: High risk of human error or tampering (proxy attendance).
Fingerprint-based	**Highly Accurate**: Unique fingerprint ensures authenticity. **Fast**: Quick scanning process.	**Hygiene Issues**: Frequent contact with devices can lead to hygiene concerns. **False Negatives**: Dirty or wet fingers can cause false rejections. **Expensive**: Requires specialized equipment for scanning and software integration. **Proxy Attendance**: Making fake fingerprint leads to false entries.

EXISTING SYSTEM

Attendance System	Advantages	Disadvantages
Facial Recognition	**Contactless:** No physical contact required, making it hygienic.	**Environmental Limitations:** Poor lighting or extreme angles may affect recognition. **Privacy Concerns:** Storing facial data raises privacy and security issues. **False Positives/Negatives:** Can have difficulty distinguishing between similar faces or detecting masks/hats.
Iris/Retina Scan	**Highly Secure:** Iris or retina patterns are more unique than fingerprints. **Contactless:** Eliminates hygiene concerns.	**Expensive:** Requires advanced, costly hardware. **User Discomfort:** Some users may find it uncomfortable to scan their eyes.

EXISTING SYSTEM

Attendance System	Advantages	Disadvantages
Card Swipe (RFID based)	**Easy to Implement:** Simple setup process. **Reliable:** Can handle a large number of users with minimal error.	**Lost or Damaged Cards:** Users may lose their RFID cards, and they can be easily damaged. **Proxy Attendance:** Cards can be shared, leading to buddy punching.
QR Code-based Attendance	**Easy to Implement:** Users only need a smartphone and a QR code scanner. **Contactless:** No physical contact, making it hygienic. **Low Cost:** No need for specialized hardware except a smartphone camera.	**Dependence on Smartphones:** Users without smartphones are excluded. **Cheating:** QR codes can be shared or replicated. **Slower for Large Groups:** Scanning QR codes for large groups can take time.

Query from previous review:

Why client-server application is build?

A client-server application is built for centralized data management, efficient processing, and secure handling of tasks. It allows for scalable, remote access while offloading heavy computations to the server, ensuring better performance and easier maintenance. Only need browser to access the application without any additional installation.

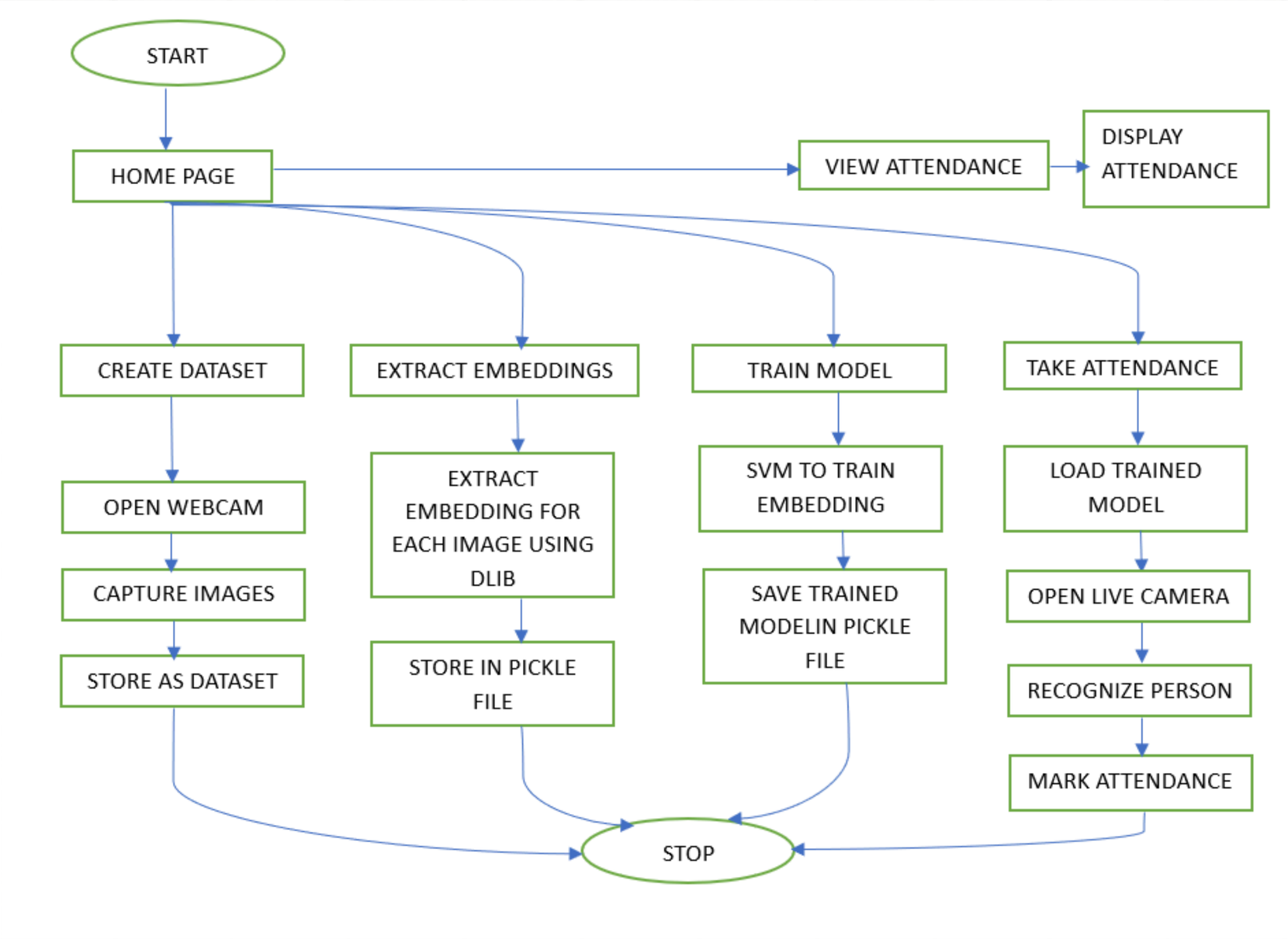
Query from previous review:

Why is SVM used, and why is it better than CNN in this context?

Efficiency: SVMs are computationally less expensive compared to Convolutional Neural Networks (CNNs). CNNs require large datasets and powerful hardware (like GPUs) for training.

Training Time: SVMs are faster to train on embeddings compared to CNNs, which require multiple layers and training epochs to learn from raw images. This makes SVMs more practical for smaller-scale or real-time applications.

PROPOSED SYSTEM FLOWCHART



MODULES

- Dataset Creation
- Preprocessing and Embedding Extraction
- Model Training
- Live Face Recognition
- Attendance Logging
- Attendance View

1. Dataset Creation STATUS:COMPLETED

Purpose:

To collect and store face images of individuals for training the face recognition model.

Components:

- Webcam or camera for image capture.
- Open cv for processing images.
- Haar cascade **in** OpenCV to detect the frontal face.

Key Deliverables:

- 50 images per individual, stored in folders named after each person.
- Successfully created and organized dataset for future use in recognition.

Dependencies:

- Functional webcam.
- Proper directory structure to store captured images.

2. Preprocessing and Embedding Extraction STATUS:COMPLETED

Purpose:

To extract facial embeddings from the images, which are used to train the face recognition model.

Components:

- Pretrained dlib model for face landmark predictor, embedding extraction.

Key Deliverables:

- 128-dimensional facial embeddings for each face in the dataset.
- A pickle file containing the extracted embeddings and associated names.

Dependencies:

- Pre-trained Dlib models.
- Properly formatted dataset images from the "Dataset Creation" module.

3. Model Training STATUS : ONGOING

Purpose:

To train a Support Vector Machine (SVM) classifier that can recognize faces based on the extracted embeddings.

Components:

- SVM classifier with a linear kernel.
- Label encoder for encoding names.
- Facial embeddings and names as input data.

Key Deliverables:

- A trained SVM model capable of predicting individuals based on facial embeddings.Pickle files for both the trained model and the label encoder.

Dependencies:

- Preprocessed embeddings from the "Preprocessing and Embedding Extraction" module.
- A sufficient number of distinct faces in the dataset for accurate training.

4. Live Face Recognition STATUS : ONGOING

Purpose:

To recognize individuals in real-time using live video feed and mark their attendance.

Components:

- Webcam for live video streaming.
- Face embedding extraction using dlib and SVM classification for recognition.

Key Deliverables:

- Real-time recognition of faces with confidence scores.

Dependencies:

- A functional webcam for video input.
- Trained SVM model and label encoder from the "Model Training" module.
- Sufficient lighting and clear camera view for accurate detection.

5. Attendance Logging **STATUS : COMPLETED**

Purpose:

To log the names of recognized individuals along with timestamps into a MySQL database for attendance tracking.

Components:

- MySQL database to store attendance records.

Key Deliverables:

- Attendance records with names and timestamps stored in the database.

Dependencies:

- Successful recognition of faces from the "Live Face Recognition" module.
- Active connection to the MySQL database.
- Timestamping mechanism to log the time of recognition.

6. Attendance View STATUS:COMPLETED

Purpose:

To provide an interface for viewing logged attendance records, including names and timestamps.

Components:

- UI to display attendance data.
- SQL queries to fetch attendance records from the database.

Key Deliverables:

- A webpage displaying all attendance records with names and timestamps.

Dependencies:

- MySQL database with attendance data from the "Attendance Logging" module.
- Proper SQL queries for data retrieval.
- Access to the web interface for viewing the records.

ALGORITHMS USED:

Face Detection : Haar Cascade Algorithm in Open cv, Dlib

Face Shape Predictor : Dlib’s 68 Landmark Predictor

Face Embedding Extraction : Dlib’s ResNet-based Face RecognitionModel

Face Recognition : Support Vector Machine (SVM) Classifier

Database : MYSQL

Backend : Python flask

Frontend : HTML,CSS,JS

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Thank you