FACE RECOGNITION BASED ATTENDANCE SYSTEM

TEAM-11

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PROJECT GUIDE:

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PROBLEM STATEMENT

Current attendance systems rely on manual methods or outdated technology, leading to inefficiencies, inaccuracies, and susceptibility to manipulation. These systems are time-consuming, error-prone, and not scalable for large organizations. There is a need for an automated, reliable, and efficient face recognition-based attendance system that can operate in real-time, accurately identifying individuals with minimal human intervention.

EXISTING SYSTEM

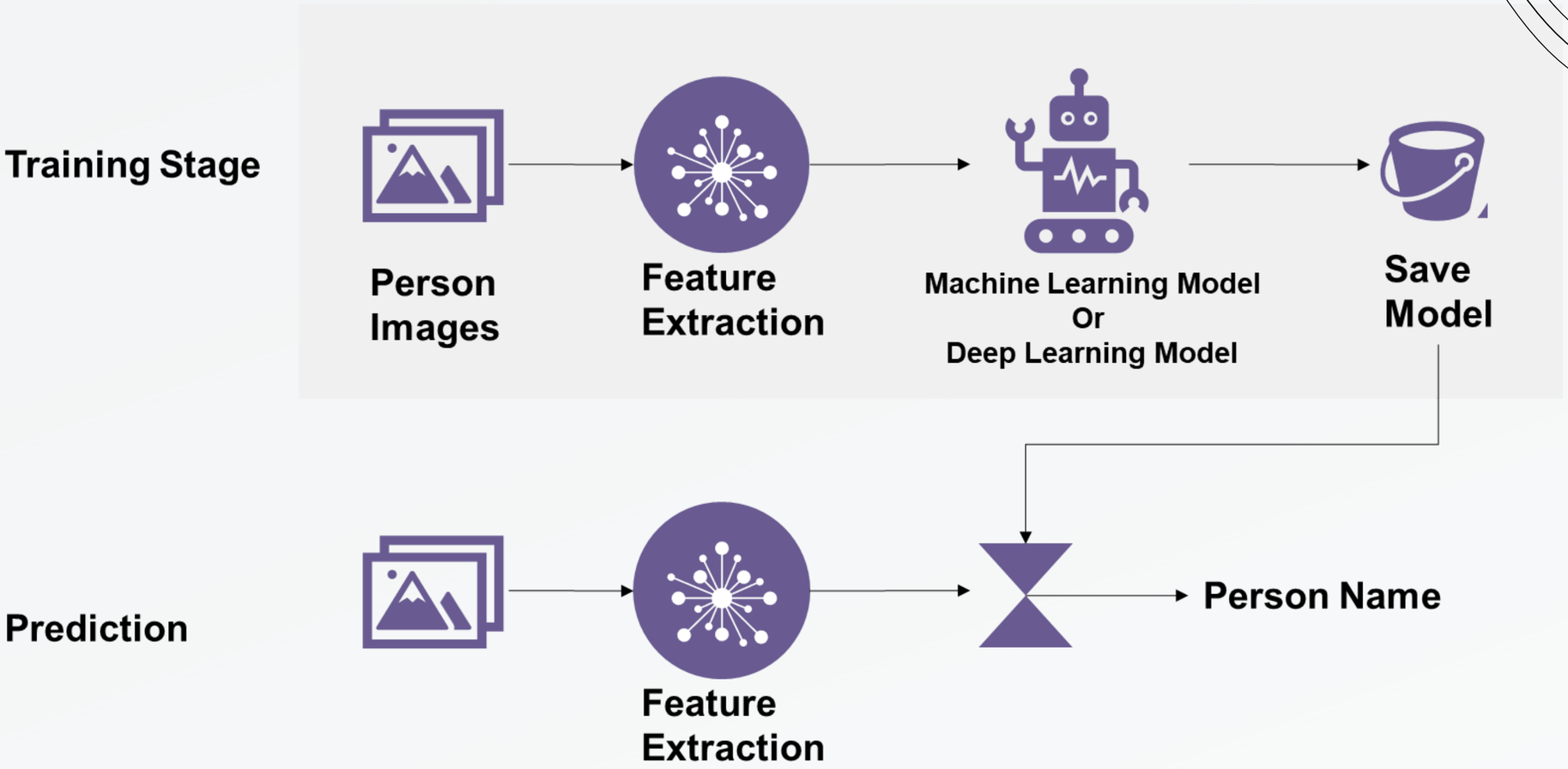
1. Manual Attendance Systems

- Time-consuming and error-prone.
- Vulnerable to manipulation (proxy attendance).
- Not scalable for large organizations.

2. Traditional Face Recognition Models

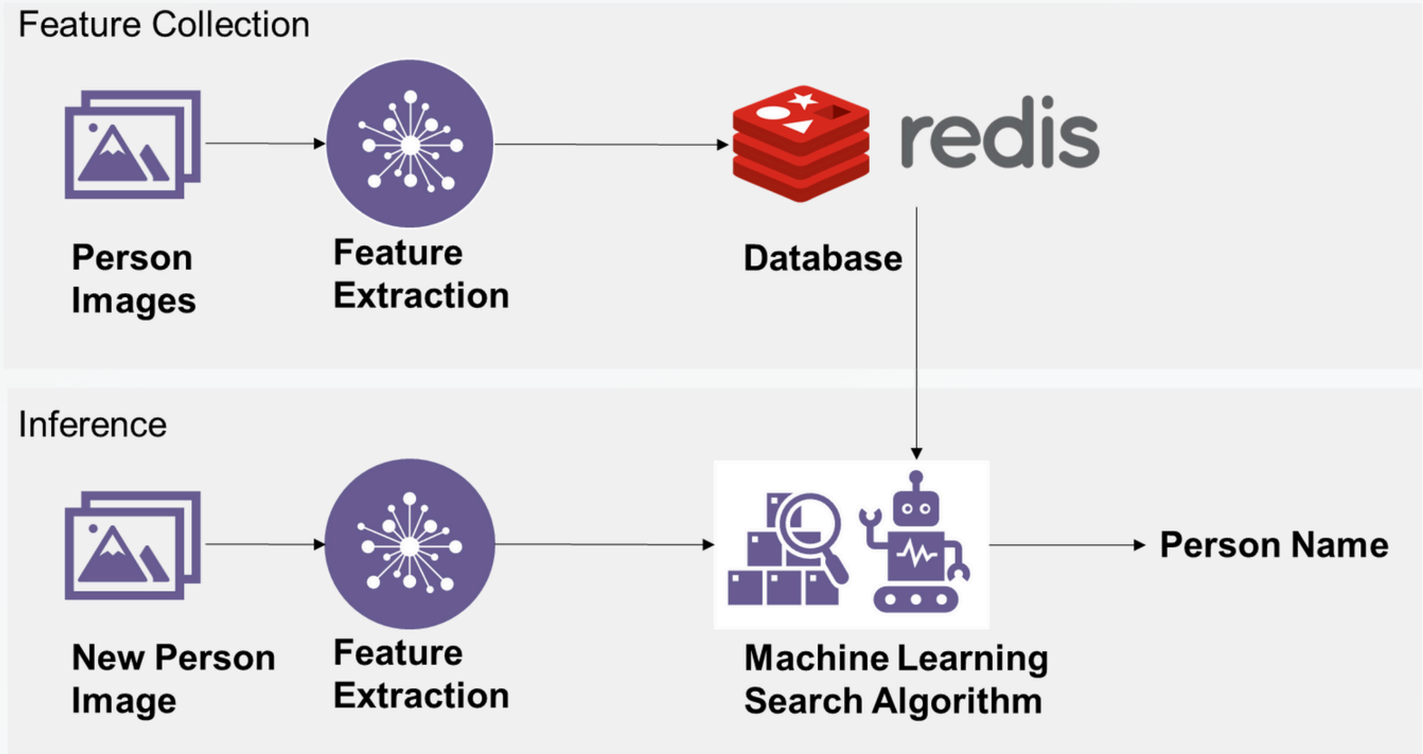
- Large Data Requirement: Requires 100-200 images per person for training.
- Static Models: Adding new individuals necessitates retraining the entire model.
- High Processing Time: Slows down as the number of individuals increases.
- Decreased Accuracy: Performance degrades with the increase in the number of classified individuals

EXISTING SYSTEM



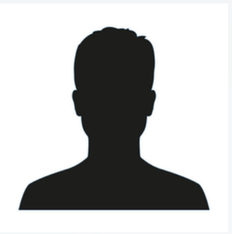
PROPOSED SYSTEM

- Automates attendance using real-time facial recognition.
- Efficient processing with fewer samples required.
- No need for model retraining when adding new users.
- Integrated with a database for storing and managing attendance records.



FLOW DIAGRAM

PERSON REGISTRATION



capture image

Data Preprocessing

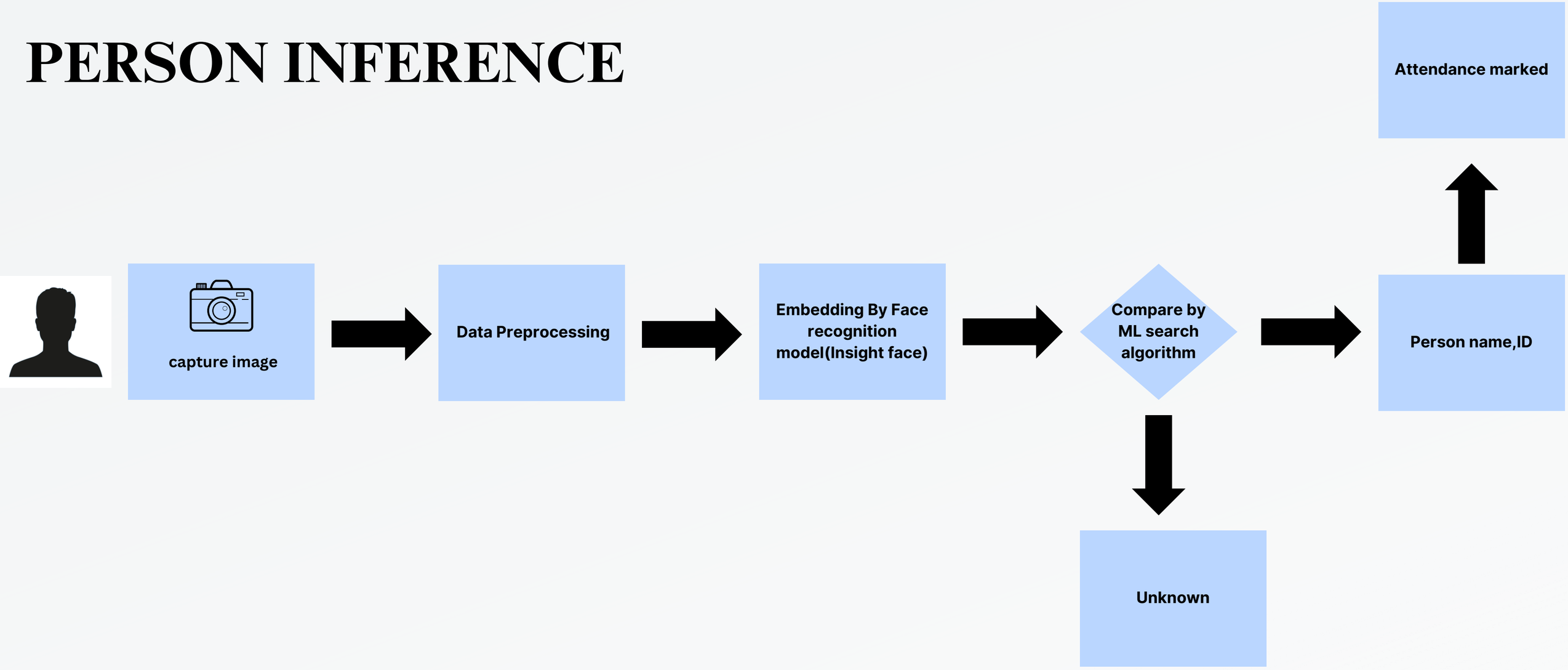
Embedding By Face recognition model(Insight face)

Database

Person name,ID

FLOW DIAGRAM

PERSON INFERENCE



MODULE IDENTIFICATION AND DESCRIPTION

- Image Capture (OpenCV)
- Feature Extraction (InsightFace)
- Embedding Storage (Database)
- Matching and Identification (ML Algorithms)
- Attendance Marking and Reporting

FUNCTIONALITY OF EACH MODULE

1. Image Capture (OpenCV)

- Captures real-time images from the camera feed and preprocesses them for further analysis.

2. Feature Extraction (InsightFace)

- Detects faces in the captured images and extracts unique facial features, converting them into numerical embeddings that represent the identity of the person.

3. Embedding Storage (Redis Database)

- Stores the facial embeddings securely in a Redis database, allowing for fast retrieval and comparison during the identification process.

4. Matching & Identification (ML Algorithms)

- Compares new facial embeddings with stored ones using various machine learning algorithms (e.g., Euclidean distance, Manhattan distance) to identify individuals or label them as "Unknown."

5. Attendance Marking & Reporting

- Logs the identified individual's attendance in the system and generates daily attendance reports, tracking entry and exit times.

ALGORITHM IDEA

1. Feature Extraction:

- Use InsightFace to extract facial features and generate embeddings from captured images.

2. Embedding Comparison : Implement multiple distance metrics and similarity measures to compare new embeddings with stored ones:
Distance Metrics: Euclidean Distance, Manhattan Distance, Chebyshev Distance, Minkowski Distance
Similarity Measures: Cosine Similarity,Hamming Distance

3. Decision Process:

- Identification: Select the closest match or highest similarity score to determine the identity.
- Unknown Label: If no match meets the similarity threshold, label the individual as "Unknown."

LITERATURE REVIEW

ONLINE ATTENDANCE SYSTEM BASED ON FACIAL RECOGNITION WITH FACE MASK DETECTION [2023]-SPRINGER

AUTOMATED FACE RECOGNITION SYSTEM FOR SMART ATTENDANCE APPLICATION USING CONVOLUTIONAL NEURAL NETWORKS[2024]-SPRINGER

AUTOMATING ATTENDANCE MANAGEMENT IN HUMAN RESOURCES: A DESIGN SCIENCE APPROACH USING COMPUTER VISION AND FACIAL RECOGNITION[2024]-ELSEVIER

THANK YOU