MIT World Peace University
School of Computer Science and Engineering

Mini Project
Third Year B. Tech, Semester 6

Project Synopsis for
Attendence Assistant

Software Development, Machine Learning, AI

Prepared By

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1 Abstract

The "Attendance Assistant" presents a forward-thinking solution for revolutionizing conventional attendance tracking in educational settings. Integrating cloud services such as Amazon S3, Amazon EC2, and Amazon DynamoDB with the official Raspberry Pi High-Quality Camera, the project offers a sophisticated hybrid architecture for efficient and scalable face recognition capabilities.

In the cloud infrastructure, Amazon S3 acts as the secure repository for images captured by the Raspberry Pi High-Quality Camera, facilitating organized storage and seamless integration with other AWS services. Amazon EC2 instances play a crucial role in managing continuous processes, serving as the backbone for route management and backend operations. Amazon DynamoDB, a fully managed NoSQL database, anchors the system, efficiently handling dynamic client data and recognition results.

At the edge, the Raspberry Pi High-Quality Camera handles real-time image capture, working in tandem with the Raspberry Pi as the edge computing device. This dynamic combination ensures preliminary image processing tasks are executed seamlessly, allowing for real-time interaction with the local environment.

The "Attendance Assistant" represents a significant leap towards modernizing attendance tracking processes. By adopting a hybrid architecture that blends the strengths of cloud services with edge computing, the project offers flexibility and scalability, catering to the evolving demands of attendance management in educational institutions.

2 Keywords

Facial Recognition, Machine Learning, Artificial Intelligence, Big Data Analysis, Attendance Tracking, Hybrid Architecture, Cloud Services, Edge Computing, Amazon S3, Amazon EC2, Amazon DynamoDB, Raspberry Pi High-Quality Camera, Automated Attendance, Modernization, Educational Technology, Scalability, Efficiency, Real-time Image Capture, NoSQL Database, AWS Services.

3 Project Objectives

1. To develop a system that can automatically track attendance in educational settings.
2. To use cloud efficiently to store and process data.
3. To make it hassle free and easy to use for teachers throughout the MITWPU Campus.
4. To make it easy to use for students to check their own attendence.
5. To Process large amounts of attendence data, and train models on it to perform multiple data science tasks.
6. To significantly reduce time spent per class on attendance tracking.
7. To Eliminate the possiblities of proxies.

4 Hardware and Software Requirements

4.1 Hardware Requirements

1. Raspberry Pi 4 Model B with 2GB RAM
2. Raspberry Pi High-Quality Camera
3. Raspberry Pi Camera Module 3
4. Micro SD Card
5. Power Supply
6. Internet Connection

Name	**Purpose**	**Cost**
Raspberry Pi Hi Quality Camera	Official camera from Raspberry Pi, more expensive for High resolution.	8000
Raspberry Pi Camera Module 3	Official camera from Raspberry Pi cheaper and highest resolution for cheapest cost.	3000
Raspberry PI 4 Model B with 2 GB RAM	To send image from camera to server.	5000

Table 1: Hardware Requirements

4.2 Software Requirements

4.2.1 Amazon S3 (Simple Storage Service):

Amazon S3 serves as the central cloud storage solution for our facial recognition project. Its secure, scalable, and organized storage infrastructure accommodates images captured by the Raspberry Pi High-Quality Camera connected to Raspberry Pi. S3's versatile bucket structure facilitates efficient organization of images and associated metadata, enabling seamless integration with other AWS services.

4.2.2 Amazon EC2 (Elastic Compute Cloud):

Amazon EC2 instances play a pivotal role in handling continuous, long-running processes essential for route management and backend operations. Offering a customizable and scalable computing environment, EC2 instances efficiently manage client routes, coordinate responses, and serve as the backbone for the facial recognition application.

4.2.3 Amazon DynamoDB:

Amazon DynamoDB, a fully managed NoSQL database, serves as the cornerstone for storing dynamic client data, images, and recognition results. Leveraging DynamoDB's scalability and low-latency access, the system efficiently manages diverse and dynamic data associated with facial recognition.

4.2.4 Raspberry Pi High-Quality Camera and Raspberry Pi:

The hardware components, Raspberry Pi High-Quality Camera, and Raspberry Pi form the edge computing segment of the project. The Raspberry Pi High-Quality Camera, equipped with a high-quality camera module, interfaces seamlessly with the Raspberry Pi to capture crisp facial images. The Raspberry Pi, acting as an edge computing device, executes preliminary image processing tasks and ensures real-time interaction with the local environment.

5 Cost Estimates from AWS

Detailed Estimate

Name	Group	Region	Upfront cost	Monthly cost
Amazon DynamoDB	No group applied	Asia Pacific (Mumbai)	205.20 USD	34.39 USD
Status: - **Description:** **Config summary:** Table class (Standard), Average item size (all attributes) (1 KB), Write reserved capacity term (1 year), Read reserved capacity term (1 year), Data storage size (10 GB) On-demand backup data storage (15 GB)				
Amazon EC2	No group applied	Asia Pacific (Mumbai)	0.00 USD	78.40 USD
Status: - **Description:** **Config summary:** Tenancy (Shared Instances), Operating system (Linux), Workload (Consistent, Number of instances: 1), Advance EC2 instance (c6g.2xlarge), Pricing strategy (EC2 Instance Savings Plans 1yr No Upfront), Enable monitoring (disabled), DT Inbound: Not selected (0 TB per month), DT Outbound: Not selected (0 TB per month), DT Intra-Region: (0 TB per month)				
Amazon Simple Storage Service (S3)	No group applied	Asia Pacific (Mumbai)	0.00 USD	3.57 USD
Status: - **Description:** **Config summary:** S3 Standard storage (100 GB per month), PUT, COPY, POST, LIST requests to S3 Standard (150000), GET, SELECT, and all other requests from S3 Standard (150000), Data returned by S3 Select (10 GB per month), Data scanned by S3 Select (100 GB per month) DT Inbound: Internet (1 TB per month), DT Outbound: Not selected (0 TB per month)				

Figure 1: Estimate from AWS

6 Block Diagram

7 Activity Diagram

Mini Project Guide / Mentor

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