**Hardware Requirements for**

***Attendance Assistant***

**Mini Project**

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**Synopsis**

This facial recognition project employs a robust combination of cloud services and edge computing to deliver efficient and scalable face recognition capabilities. The integration seamlessly incorporates Amazon S3, Amazon EC2, and Amazon DynamoDB as key AWS services, alongside hardware components such as ArduCam and Raspberry Pi.  
  
**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 ArduCam connected to Raspberry Pi. S3's versatile bucket structure facilitates efficient organization of images and associated metadata, enabling seamless integration with other AWS services.  
  
**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.  
  
**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.  
  
**ArduCam and Raspberry Pi:**  
The hardware components, ArduCam and Raspberry Pi, form the edge computing segment of the project. ArduCam, 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.  
  
This facial recognition project adopts a hybrid architecture, harmonizing cloud services for scalability and data management with edge computing for real-time image capture and processing. The synergy between AWS services and hardware components ensures an efficient and adaptable system for facial recognition, tailored to the unique demands of the project. The amalgamation of cloud and edge technologies allows for a flexible and scalable solution capable of adapting to varying workloads and client requirements.

**Hardware Components:**

**Camera**

Camera is required for Taking pictures in low light conditions in a classroom twice every class. It has to be compatible with the Raspberry PI Zero W. 2 are given below for Testing. Only 1 will be finalized.

1. <https://robu.in/product/raspberry-pi-hq-camera/> - 7900 Rs

2. <https://robu.in/product/raspberry-pi-camera-module-3/> - 2799 Rs

**Raspberry Pis for Controller**

We are using low end Raspberry Pi, Zero and Pico, because they only need to send an api http packet to the server, on AWS.

**1. Raspberry PI 4 Model B**

<https://robu.in/product/raspberry-pi-4-model-b-with-2-gb-ram/?src=raspberrypi> 4650 Rs

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| --- | --- | --- |
| Name | Purpose | Cost |
| Raspberry Pi Hi Quality Camera  Specifications:   1. Official Raspberry Pi High Quality Camera- C/CS Mount 2. Availability: In stock 3. SKU: 744163 4. Add to Wishlist 5. Sony IMX477R stacked, back-illuminated sensor. 6. Resolution: 12.3 megapixels. 7. Compatible with Raspberry Pi 1/2/3/4 boards 8. Output: RAW12/10/8, COMP8 9. Back focus: Adjustable (12.5 mm–22.4 mm) 10. Lens standards: C-mount, CS-mount (C-CS adapter included) 11. IR cut filter: Integrated   <https://robu.in/product/raspberry-pi-hq-camera/> | Official camera from Raspberry Pi, more expensive for High resolution. | 8000 |
| Raspberry Pi Camera Module 3   1. Variants: **Standard** 2. Powered autofocus. 3. Sensor: SONY IMX708 4. Resolution: 12 Megapixel 5. Viewing Angle: 76º 6. Improved low-light sensitivity. 7. Compatible with all models of Raspberry Pi\*   <https://robu.in/product/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   1. 2GB/4GB/8GB Varients 2. Quad-Core 64-bit Broadcom 2711, Cortex A72 Processor 3. WLAN 802.11 b/g/n/ac (2,4 + 5,0 GHz) 4. LAN RJ45 10/100/1000 Mbit (Gigabit LAN over USB 3.0) 5. Operating Power 5V@3A via USB Type-C Port   <https://robu.in/product/raspberry-pi-4-model-b-with-2-gb-ram/?src=raspberrypi> | To send image from camera to server. | 5000 |