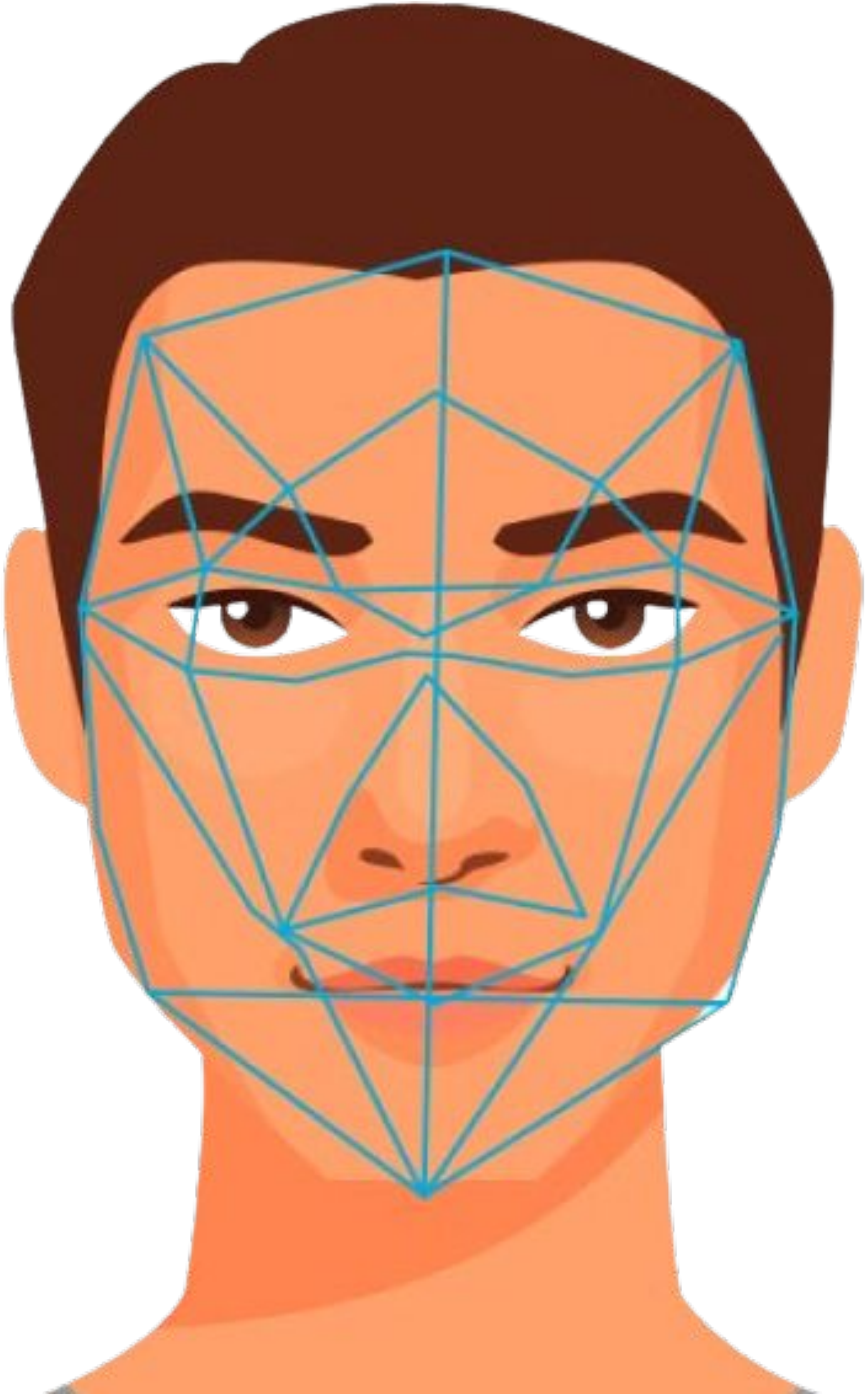
Presence

Auto-Attendance System with report generation



Presented by Team SARS

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Overview

"Presence" is an automated attendance system designed for college classrooms.
It uses facial recognition technology to track student attendance, eliminating the need for manual attendance taking. It provides valuable data insights to help educators analyse attendance patterns and make informed decisions for better student engagement and success.

Motivation

1 Time-consuming and inefficient manual attendance tracking methods in college classrooms .

2 Errors and inaccuracies in manual attendance processes can lead to unreliable records.

3 Non-effective monitoring and decision-making.

Introduction

Objectives

1. To automate attendance system for college classrooms
2. To provide insights into attendance patterns and behavior
3. To support data-driven decision-making for improved student success

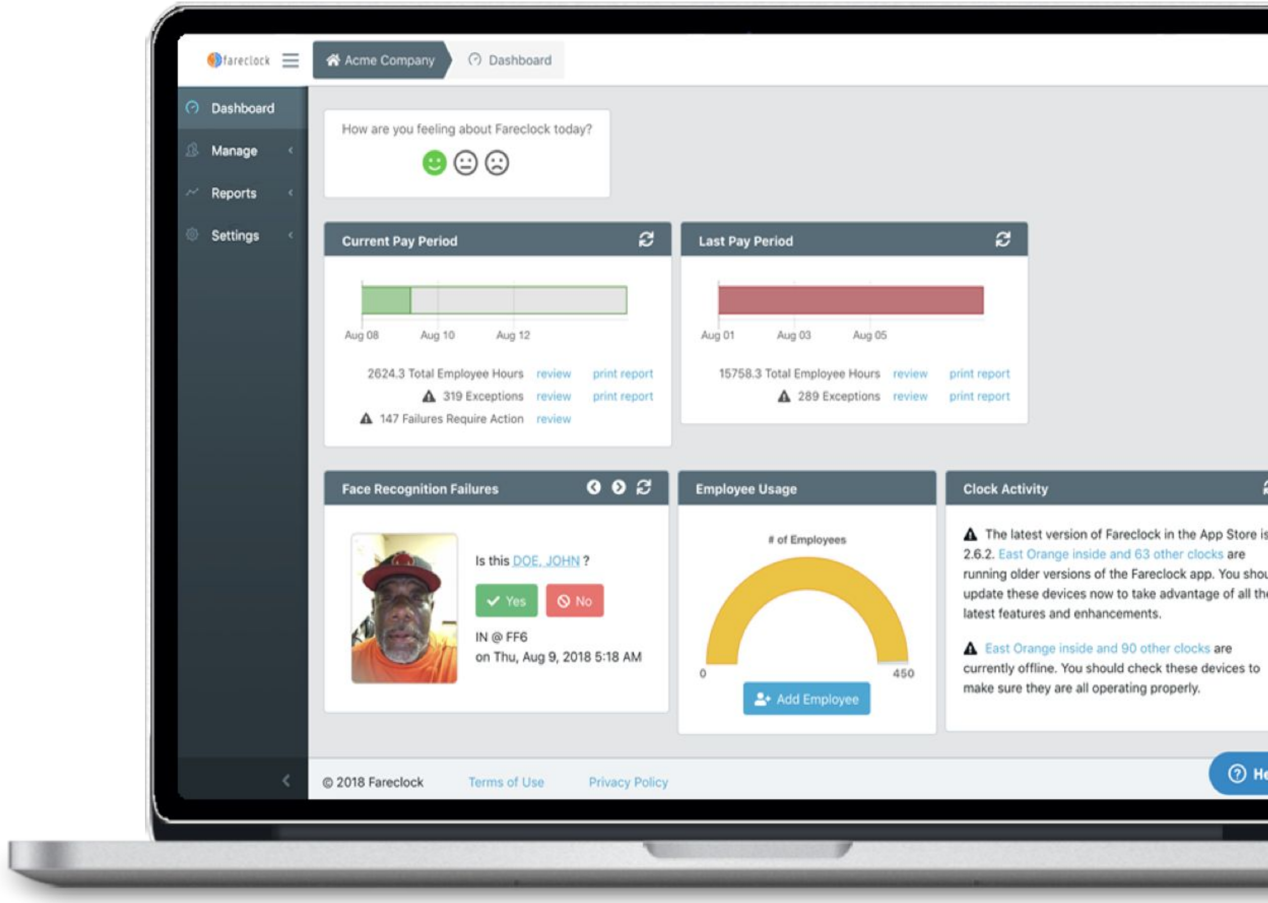
Literature Review

Fareclock 01

Fareclock[1] is a web-based time clock software designed to streamline employee time tracking, attendance management, and payroll processing.

Features

- track work hours
- face recognition attendance
- generate accurate payroll reports.


fareclock
Acme Company
Dashboard
Dashboard
Manage
Reports
Settings
How are you feeling about Fareclock today?
Current Pay Period
Aug 08
Aug 10
Aug 12
2624.3 Total Employee Hours review print report
319 Exceptions review print report
147 Failures Require Action review
Last Pay Period
Aug 01
Aug 03
Aug 05
15758.3 Total Employee Hours review print report
289 Exceptions review print report
Face Recognition Failures
Is this DOE, JOHN ?
✓ Yes
No
IN @ FF6
on Thu, Aug 9, 2018 5:18 AM
Employee Usage
# of Employees
0
450
Add Employee
Clock Activity
© 2018 Fareclock
Terms of Use
Privacy Policy
He

The latest version of Fareclock in the App Store is 2.6.2. East Orange inside and 63 other clocks are running older versions of the Fareclock app. You shou update these devices now to take advantage of all the latest features and enhancements.

East Orange inside and 90 other clocks are currently offline. You should check these devices to make sure they are all operating properly.

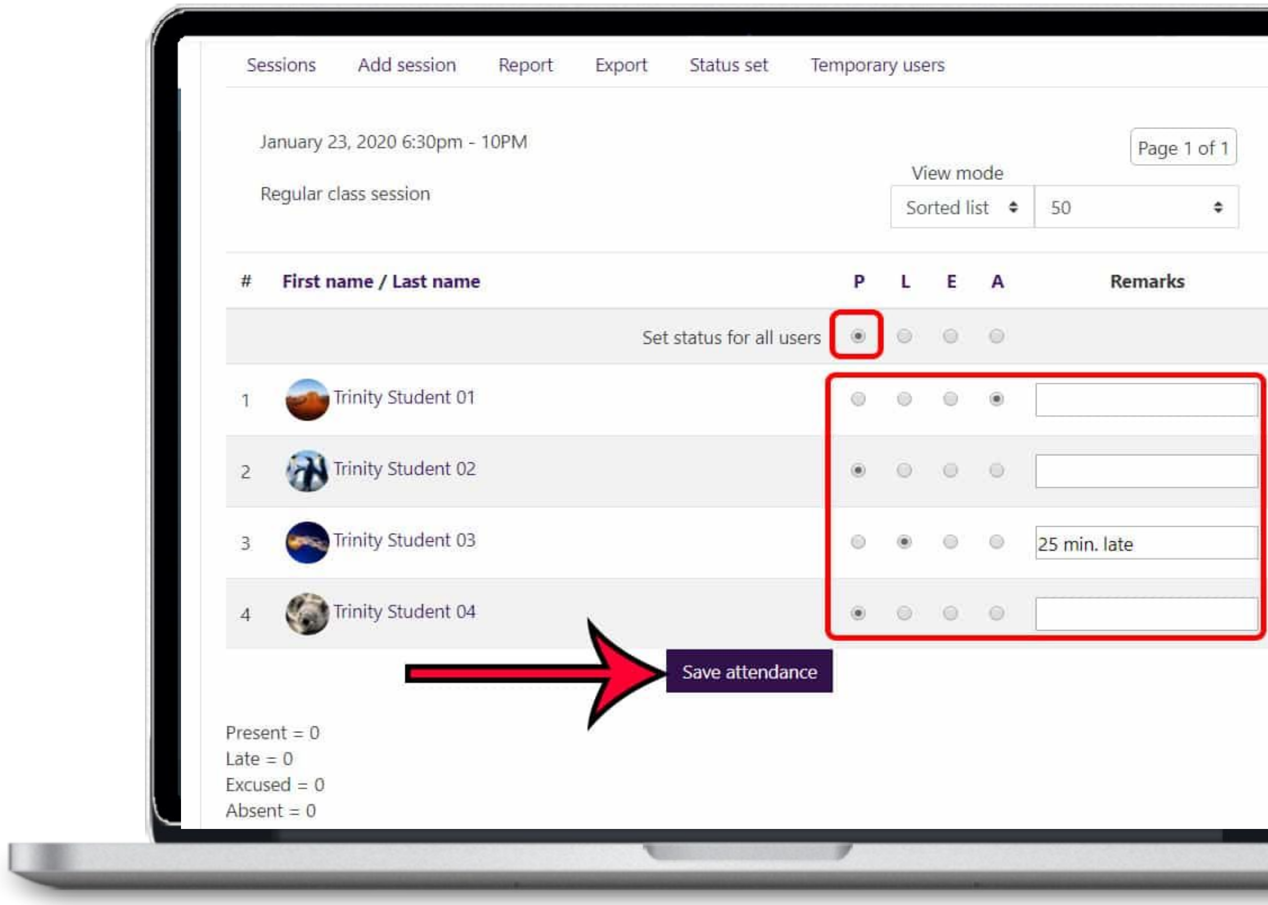
Literature Review

LMS (moodle) 02

Moodle offers attendance activity[2] to track attendance of students digitally.

Features

- Manual attendance marking by instructors
- Customizable attendance statuses (Present, Absent, Late, Excused)
- Download attendance reports in Excel or text format
- Option for students to record their own attendance



January 23, 2020 6:30pm - 10PM

Regular class session

#	First name / Last name	P	L	E	A	Remarks
	Set status for all users	●	○	○	○	
1	Trinity Student 01	○	○	○	●	
2	Trinity Student 02	●	○	○	○	
3	Trinity Student 03	○	●	○	○	25 min. late
4	Trinity Student 04	●	○	○	○	

Present = 0
Late = 0
Excused = 0
Absent = 0

How do we differ?

01 | Automated attendance tracking using facial recognition technology

02 | Ease of access to data

03 | Provides insights for optimizing class scheduling

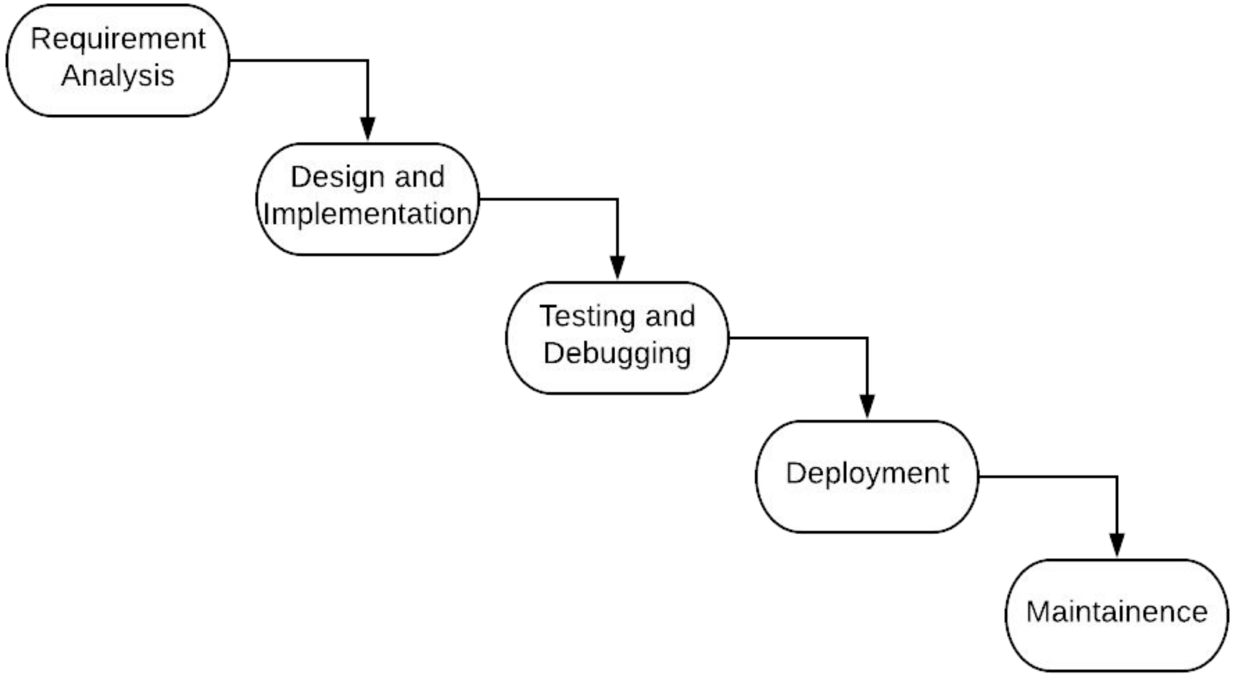
04 | Real-time attendance updates

05 | View reports

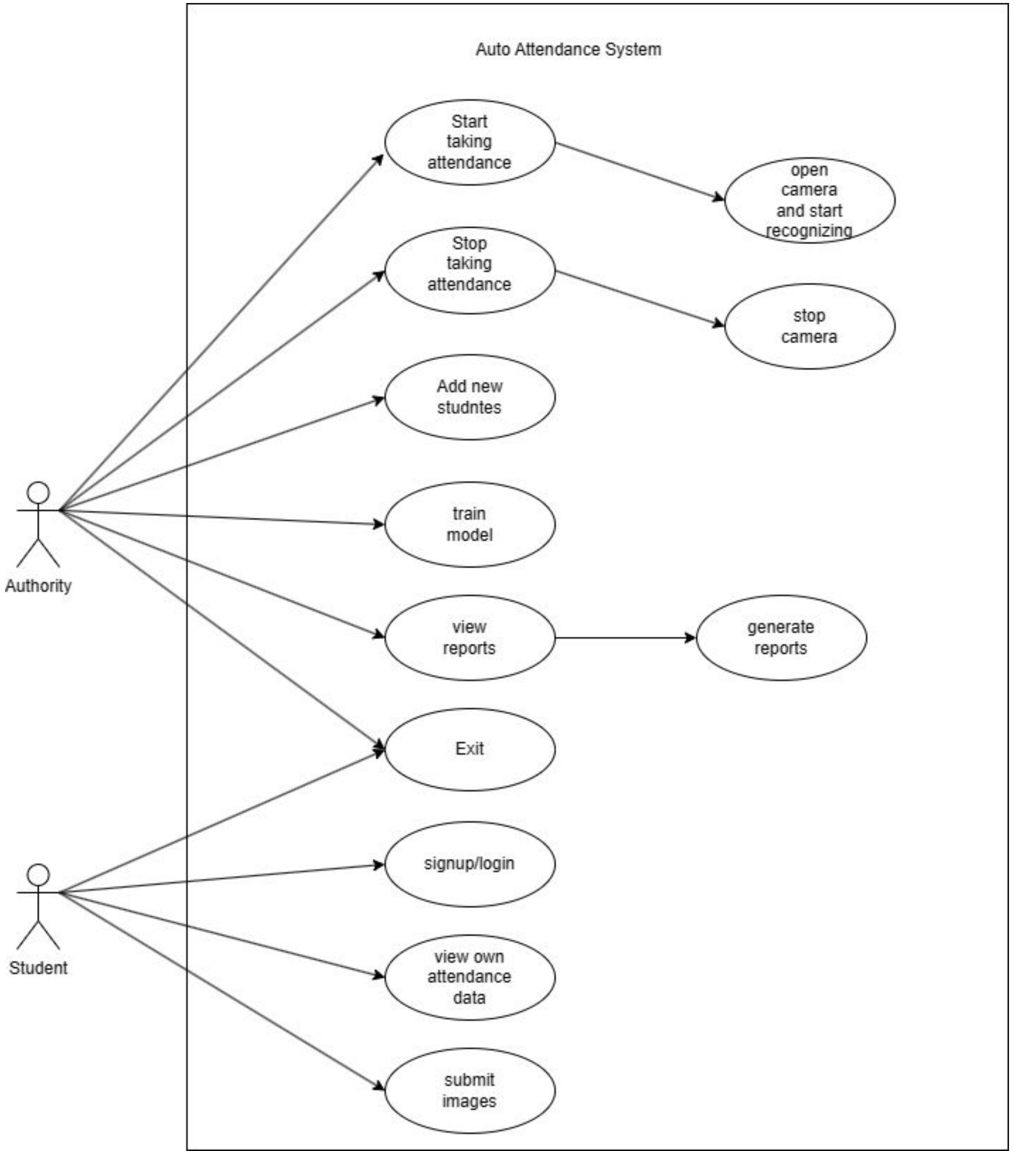
Methodology

Waterfall model

Our proposed SDLC is WATERFALL MODEL[3] because of limited time and clear goals.


Requirement Analysis
Design and Implementation
Testing and Debugging
Deployment
Maintainence

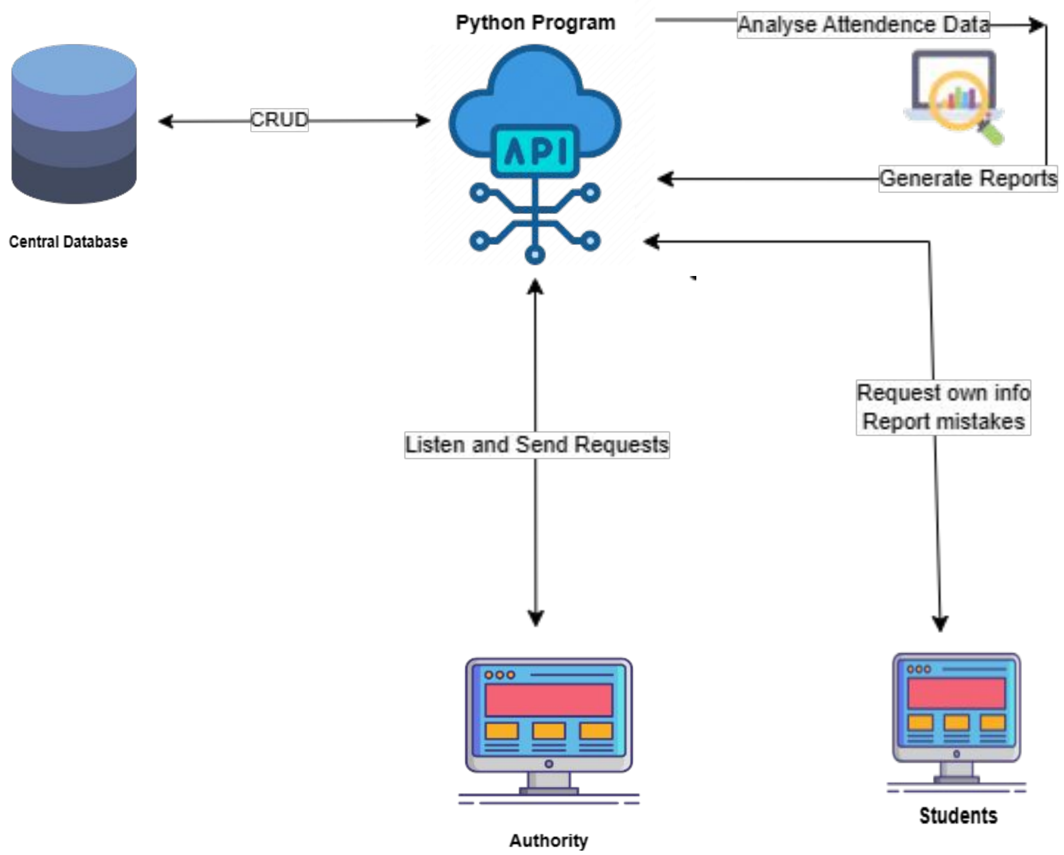
Use-Case Diagram



Methodology

Client-Server Architecture

We will divide the functionality and responsibilities of a software application into two main components



Technology

Frontend

NextJs	Meta framework of React
Typescript	Superset of Javascript with type annotations
TailwindCSS	Utility classes for each line of CSS
REST Api and Websocket	Connecting backend

Backend

Django	Python backend framework
OpenCV	Recognize faces of students
SQLite	Lightweight database
REST Api and Websocket	Sending data to frontend

Methodology

OpenCV and Deep Learning

OpenCV face recognition pipeline. The key step is a CNN feature extractor that generates 128-d facial embeddings.

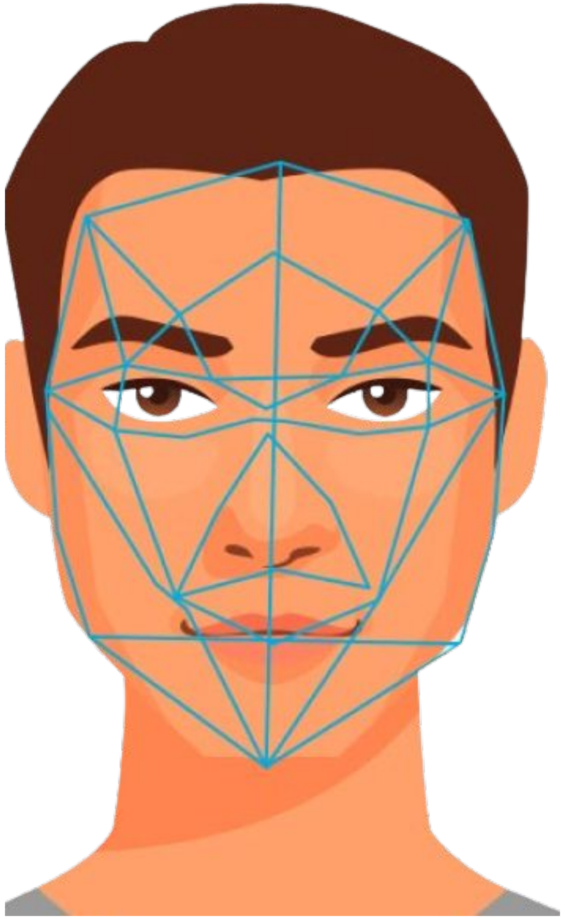
01 | Input an image or video frame

02 | Apply face detection to detect the location of a face

03 | Extract unique facial data (Crop)

04 | Recognize using trained model

05 | The model is pre-trained with ~3million images



Methodology

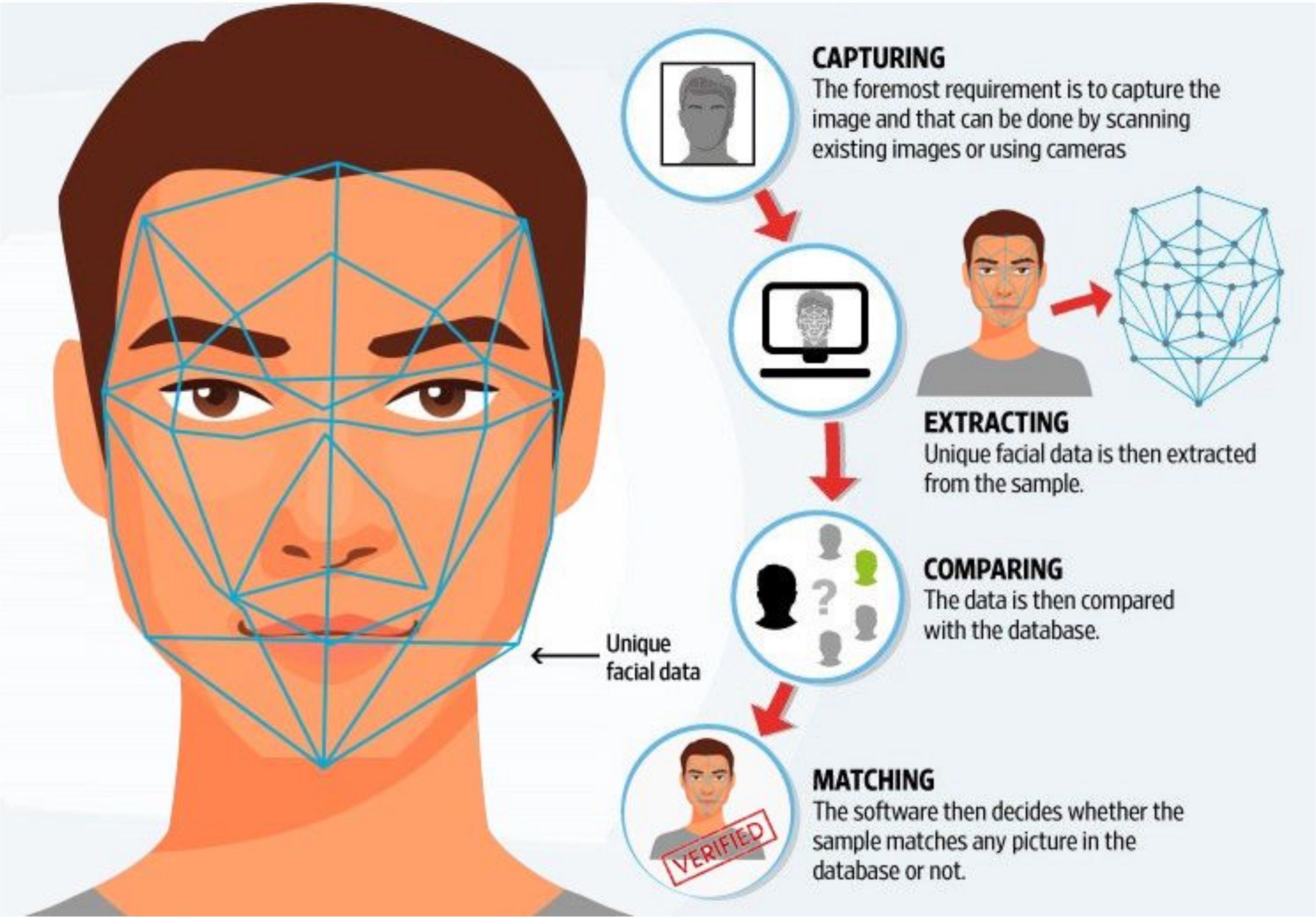
Datasets and Working

- Submit data by students through the website
- Load and pre process the dataset using pre-trained model
- Train the facial recognition model
- Generate ecodings.pickle file

Methodology

Face Recognition Process

Simplified representation of face recognition process



CAPTURING
The foremost requirement is to capture the image and that can be done by scanning existing images or using cameras

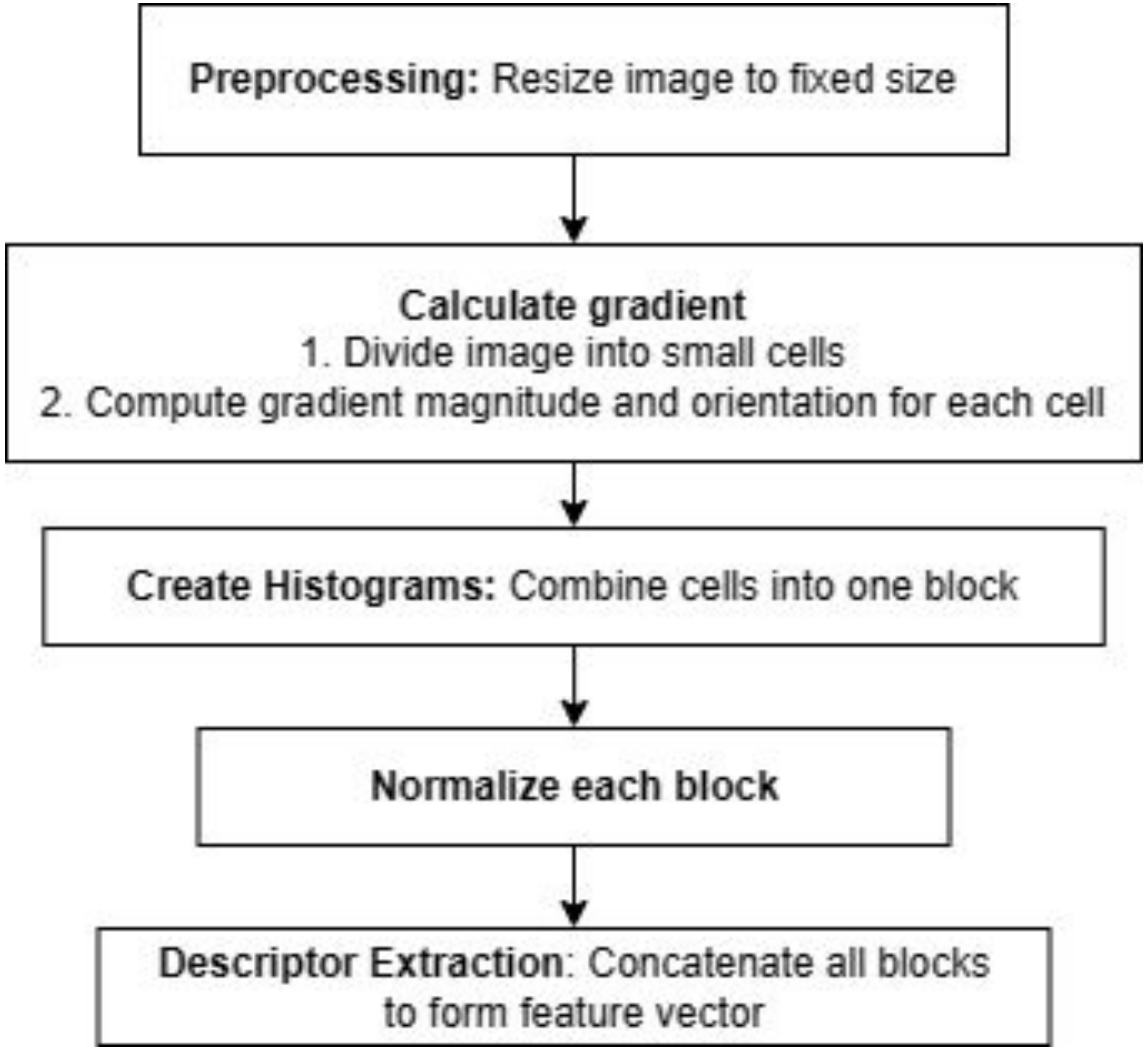
EXTRACTING
Unique facial data is then extracted from the sample.

COMPARING
The data is then compared with the database.

MATCHING
The software then decides whether the sample matches any picture in the database or not.

HOG for facial feature extractions

Focuses on the structure or the shape of an object



Preprocessing: Resize image to fixed size

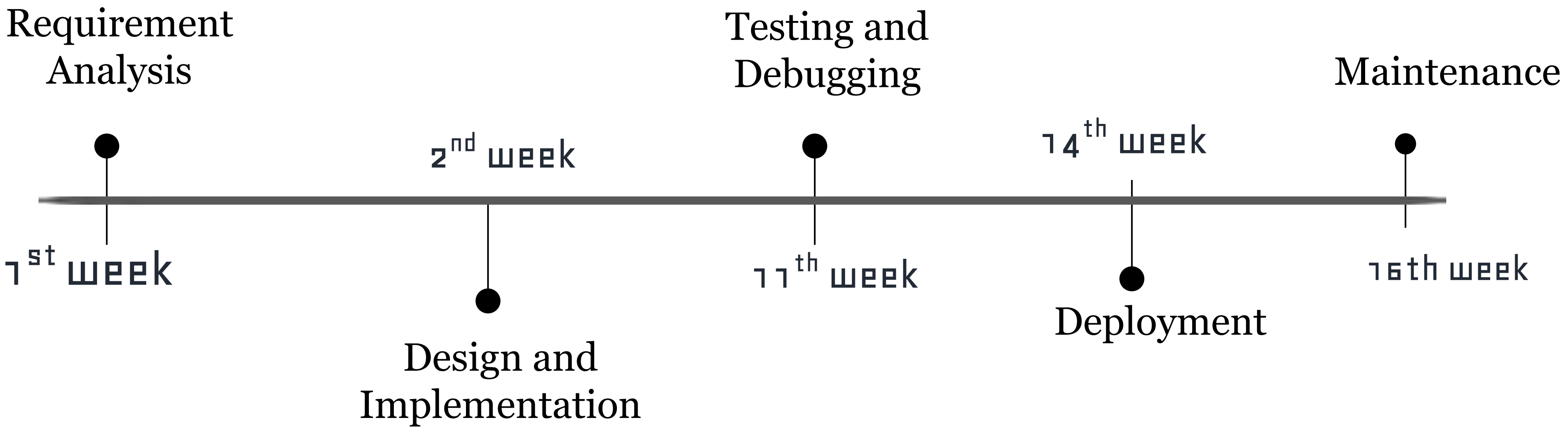
Calculate gradient
1. Divide image into small cells
2. Compute gradient magnitude and orientation for each cell

Create Histograms: Combine cells into one block

Normalize each block

Descriptor Extraction: Concatenate all blocks to form feature vector

Time Schedule



Tasks Completed

01 | Research and Requirement Gathering

02 | Design and User Interface Development

03 | Face detection and recognition Technology

04 | Data set and Model Training

05 | Database Design and Implementation

06 | Rest API and Websocket

Project Status Report

Remaining Tasks

01 | Record Attendance For each subject

02 | Data Analysis and Report generation

03 | Testing and Validation

04 | User testing

05 | Deployment

Team

Our team consists of four dedicated individuals with diverse skill sets and roles

PROJECT MANAGER

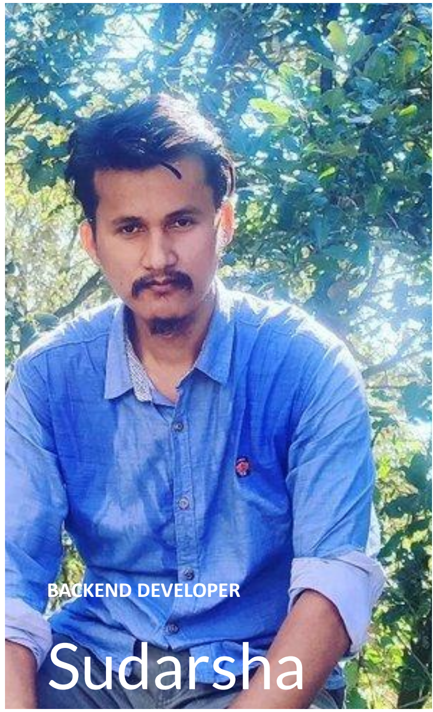
Rupesh

FRONTEND DEVELOPER

Apsara

AI DEVELOPER

Sampada



BACKEND DEVELOPER

Sudarsha

References

[1] Fareclock, https://www.fareclock.com/.

[2] Moodle, Attendance, https://moodle.org/plugins/mod_attendance.

[3] B. Lutkevich, “Definition: Waterfall model,” TechTarget, 2022. [Online]. Available: https://www.techtarget.com/searchsoftwarequality/definition/waterfall-model#:~:text=The%20waterfall%20model%20is%20a,the%20edge%20of%20a%20cliff.

[4] Rosebrock, A. (2018, June 18). Face recognition with OpenCV, Python, and deep learning. PyImageSearch. https://www.pyimagesearch.com/2018/06/18/face-recognition-with-opencv-python-and-deep-learning/

Thank you for your time!!!