Design & Development of Automatic Attendance System

A

MINOR PROJECT-II REPORT

Submitted in partial fulfillment of the requirements

for the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE & ENGINEERING

By

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May-2022

Department of COMPUTER SCIENCE & ENGINEERING

Sagar Institute of Science & Technology (SISTec)

Bhopal (M.P.)

Approved by AICTE, New Delhi & Govt. of M.P.Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal (M.P.)

Sagar Institute of Science & Technology (SISTec), Bhopal

Department of COMPUTER SCIENCE & ENGINEERING

Bhopal (M.P.)

Dec-2021

CERTIFICATE

I hereby certify that the work which is being presented in the B.Tech. Minor Project-II Report entitled **Automatic Attendance System,** in partial fulfillment of the requirements for the award of the degree of ***Bachelor of Technology*** in ***Computer Science & Engineering*** and submitted to the Department of Computer Science & Engineering, *Sagar Institute of Science & Technology (SISTec)***,** Bhopal (M.P.) is an authentic record of my own work carried out during the period from Jan-2022 to May-2022 under the supervision of **Prof. Ruchi Jain.**

The content presented in this project has not been submitted by me for the award of any other degree elsewhere.

Signature

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This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Date:30/04/2022

Project Guide	***HOD***	***Principal***
Prof. Ruchi Jain	***Prof. Bhavna Gupta***	***Dr. Keshavendra Choudhary***

ABSTRACT

This project is about the Automatic Attendance Management. The automatic attendance management will replace the manual method, which takes a lot of time and difficult to maintain. There are many biometric processes, in that face recognition is the best method. In this project, we are going to mark the attendance without human interference. In this method, the camera is fixed on the front door, and it will capture the image, the faces are detected and then it is recognized with the database and finally the attendance is marked.

Following modules are included in the project:

1. ***Admin*** :- Admin can add, remove or update any user or service staff. Admin will be chosen by the concerned organization.
2. ***Employee*** :- Employee can log in to the website and can see his/her profile and attendance report.

ACKNOWLEDGEMENT

It gives us immense pleasure to express our deepest sense of gratitude and sincere thanks to our highly respected and esteemed guide **Prof. Ruchi Jain**, Department of Computer Science and Engineering, SISTec Gandhi Nagar Bhopal, for their valuable guidance, encouragement and help for completing this work. Their useful suggestions for this whole work and co-operative behaviour are sincerely acknowledged.

We would also like to express my gratitude towards our principal **Mr. Keshavendra Choudhary** for giving me this great opportunity to do a project on Service Provider Web Application.

We also wish to expres our sincere thanks to **Prof. Bhavna Gupta**, HOD of Computer Science and Engineering, for his kind-hearted support.

At the end, we would like to thank all the friends and family members who helped us directly or indirectly during the project.

NAME	ENROLLMENT	SIGNATURE
Akash Rathor	**0187CS191015**	**.....**
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CHAPTER 1

INTRODUCTION

CHAPTER 1
INTRODUCTION

1.1 ABOUT PROJECT

This project involves building an attendance system which utilizes facial recognition to mark the presence, time-in, and time-out of employees. It covers areas such as facial detection, alignment, and recognition, along with the development of a web application to cater to various use cases of the system such as registration of new employees, addition of photos to the dataset, viewing attendance reports, etc. This project intends to serve as an efficient substitute for traditional manual attendance systems. It can be used in corporate offices, schools, and organizations where security is essential.

Following modules are included in the project:

1. **Admin** :- Admin can add, remove or update any user or service staff. Admin will be chosen by the concerned organization.
2. **Employee** :- Employee can login on the website and can see his/her profile and attendance report.

1.2 PURPOSE

The purpose of this document is to specify software requirements of the Attendance Management System Using Face Recognition. It is intended to be a complete specification of what functionality the Attendance Management System provides.

Furthermore, this project aims to automate the traditional attendance system where the attendance is marked manually. It also enables an organization to maintain its records like in-time, out time and attendance digitally. Digitalization of the system would also help in better visualization of the data using graphs to display the no. of employees present today, total work hours of each employee and their break time. Its added features serve as an efficient upgrade and replacement over the traditional attendance system.

1.3 OBJECTIVE

- The main objective of this project is to reduce the manual work.
- The system can manage employee’s presence, time-in and time-out.
- It can generate report of their availability for better visualization.

1.4 INTENDED AUDIENCE AND READING SUGGESTIONS

This document is intended for developers, project managers, marketing stuff, users, testers and documentation writers of the system. Preference to read the document is in the sequence of table of contents only. Document is organized in a manner to understand the need and implementation details of the system.

1.5 SCOPE

Facial recognition is becoming more prominent in our society. It has made major progress in the field of security. It is a very effective tool that can help low enforcers to recognize criminals and software companies are leveraging the technology to help users access the technology. This technology can be further developed to be used in other avenues such as ATMs, accessing confidential files, or other sensitive materials.

This project servers as a foundation for future projects based on facial detection and recognition. This project also convers web development and database management with a user-friendly UI. Using this system any corporate offices, school and organization can replace their traditional way of maintaining attendance of the employees and can also generate their availability(presence) report throughout the month.

1.6 INTERFACE

This application interacts with the users through G.U.I. The interface is simple, easy to handle and self-explanatory opened, user will easily come in to the flow with the application and easily uses all interfaces properly.

1.7 DESIGN AND IMPLEMENTATION CONSTRAINTS

As the system is using face recognition feature to identify each employee of the organization, it must be able to identify each of them individually. According to this, system must be capable to mark their presence for the day and it should convey the same message to the employee as well.

CHAPTER 2

HARDWARE AND SOFTWARE REQUIREMENT

CHAPTER 2
HARDWARE AND SOFTWARE REQUIREMENTS

2.1 HARDWARE REQUIREMENT

- **Processor:** Minimum 2GHz; Recommended 3GHz or more.
- **RAM:** Minimum 4GB; Recommended 8GB or more.
- Working Web Camera with clear image quality.

2.2 SOFTWARE REQUIREMENT

2.2.1 FOR DEVELOPERS

- **Technology:**
  - Django
  - OpenCV
  - Dlib
  - Open-Source Face Recognition Library
  - SQLITE Database
  - Bootstrap

- **Platform:**
  - Windows
  - Linux

- **Tools:**
  - Visual Studio Code

2.2.2 FOR END USERS

Any web browser.

CHAPTER 3

PROBLEM DESCRIPTION

CHAPTER 3
PROBLEM DESCRIPTION

OVERVIEW

- For any oraganization or institute, it is not easy to keep track of whether all their employees are arriving on time for work or are stealing time. Well, stealing time means your employees are misreporting their working time or clock in even if they are not working at all. Hence, to avoid such a situation, business owners or companies can start using the automatic attendance system. Such a system not only helps to monitor the working hours of the employees but also determine their salary and in better payroll management.

- When tracking the attendance manually, your employees may provide you with false data, and this will lead to inaccurate records. They might add extra hours on the attendance sheet to rake in overtime wages. But with the help of an automated attendance tool, you no longer have to worry about such miscalculations or errors.

This project is about the Automatic Attendance Management. The automatic attendance management will replace the manual method, which takes a lot of time and difficult to maintain. There are many biometric processes, in that face recognition is the best method. In this project, we are going to mark the attendance without human interference. In this method the camera is fixed on the front door, and it will capture the image, the faces are detected and then it is recognized with the database and finally the attendance is marked.

CHAPTER 4

LITERATURE SURVEY

CHAPTER 4
LITERATURE SURVEY

A literature survey or a literature review in a project report is that section which shows the various analyses and research made in the field of your interest and the results already published, taking into account the various parameters of the project and the extent of the project.

Plenty of research has been conducted so far on the various available methods for implementation of an effective attendance monitoring system. These methods vary in terms of the types of input method used, the types of data processing employed and the controllers used to implement the systems.

Automated Attendance System using Face Recognition proposes that the system is based on face detection and recognition algorithms, which is used to automatically detects the employee face when he/she enters and the system is capable to mark the attendance by recognizing him. We have used the HOG (Histogram of Oriented Gradients) feature descriptor with a linear SVM machine learning algorithm to perform face detection. Dlib's HOG + Linear SVM face detector is fast and efficient. When it is compared to traditional attendance marking this system saves the time and also helps to monitor the students.

CHAPTER 5

SOFTWARE REQUIREMENTS SPECIFICATION

CHAPTER 5

SOFTWARE REQUIREMENTS SPECIFICATIONS

5.1 FUNCTIONAL REQUIREMENTS

5.1.1 ACTOR ADMIN

- **Login**
    - Input: Admin credentials
    - Output: If the credentials are correct, admin will be redirected to the dashboard of the system
    - Exception Flow: If the entered credentials are incorrect then admin will be redirected to the login page again displaying an error message.

- **Register new employee**
    - Description: Admin can register new
    - Input: Employee Details
    - Output: success message displaying the user has been created.

- **Add photo of the employee**
    - Description: Admin only can access this feature. Admin can add a photo of an employee during the registration process.
    - Input: Username of an employee
    - Output: Success message record has been added.
    - Process: System will process an image and will generate necessary system data to identify each employee uniquely.

- **View employee's attendance report**
    - Description: Admin can see an employee's attendance record throughout the month or year.
    - Input: User selection
    - Output: Statistical analytics of the particular employee who is currently logged into the system will be displayed.

5.1.2 ACTOR EMPLOYEE

- **Login**
    - Input: User credentials
    - Output: If the credentials are correct, user will be redirected to the dashboard of the system.
    - Exception Flow: If the entered credentials are incorrect then user will be redirected to the login page again displaying an error message.

- **View my attendance report**
    - Description: Employee may often need to see his / her attendance record throughout the month or year. Using this feature one can see his / her attendance record till the date.
    - Input: User selection
    - Output: Statistical analytics of the particular employee who is currently logged into the system will be displayed.

- **Mark your attendance-in**
    - Input: User will scan his/her face using the external web camera.
    - Output: system will identify the user uniquely and will mark his/her in-time to the database. The same success message will be transmitted to the user.

5.2 NON-FUNCTIONAL REQUIREMENTS

A non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. A careful specification and adherence of non-functional requirements such as performance, security, privacy & availability are crucial to the success or failure of any software system.

5.2.1 PERFORMANCE

The performance of the system should be fast and accurate.

5.2.2 ADAPTABILITY

There can be changes in the details stored in the database about Employee record.

5.2.3 CORRECTNESS

The values entered by the admin while registering new user must be accurate.

5.2.4 FLEXIBILITY

If need arises in the future, software can be modified as per requirements.

5.2.5 MAINTAINABILITY

Software can be easily modified and repaired if any fault occurs.

5.2.6 REALIBILITY

No matter how many employees logged in, the system will always give correct results.

CHAPTER 6

SOFTWARE DESIGN

CHAPTER 6
SOFTWARE DESIGN

6.1 TABLE STRUCTURE

Table 6.1.1: Employee details

Attribute	**Field Name**
ID	AutoField
Name	CharField
Phone No	IntegerField
Employee ID	CharField
Password	CharField
Address	TextField

Purpose:

a) ID:-

It is the serial number of each tuple in the database, primary key, auto-increment.

b) Name:-

It stores the name of the Employee.

c) Phone No:-

It stores the phone number of the Employee.

d) Employee ID:-

It stores the employee id of the Employee.

e) Password:-

It stores the password of the Employee.

f) Address:-

It stores the password of the Employee.

Table 6.1.2: Users

Attribute	**Datatype**
Username	CharField
Email Address	EmailField
First Name	CharField
Last Name	CharField
Staff Status	BooleanField

Purpose:

a) Username:-

It holds the username of the admin.

b) Email:-

It stores the email of the admin.

c) First Name:-

It stores the First Name of the admin.

d) Last Name:-

It stores the Last Name of the admin.

e) Staff Status:-

A user marked as staff can access the Django admin.

6.2 USE CASE DIAGRAM

6.2.1 DESCRIPTION

Use Case Diagram is a graphical representation that specifies the functions or activities that the external user perform. In RSMS, it specifies the user functionalities in a graphical manner.

6.2.2 ACTORS

We have 2 types of users of the system.

1. Employee
2. Admin

Following functionalities can be performed by the admin:

- Login
- Register new employees to the system
- Add employee photos to the training data set
- View attendance report of all employees.

Following functionalities can be performed by the employee:

- Login
- Mark his/her time-in and by scanning their face
- View attendance report of self

6.2.3 USECASE DIAGRAM

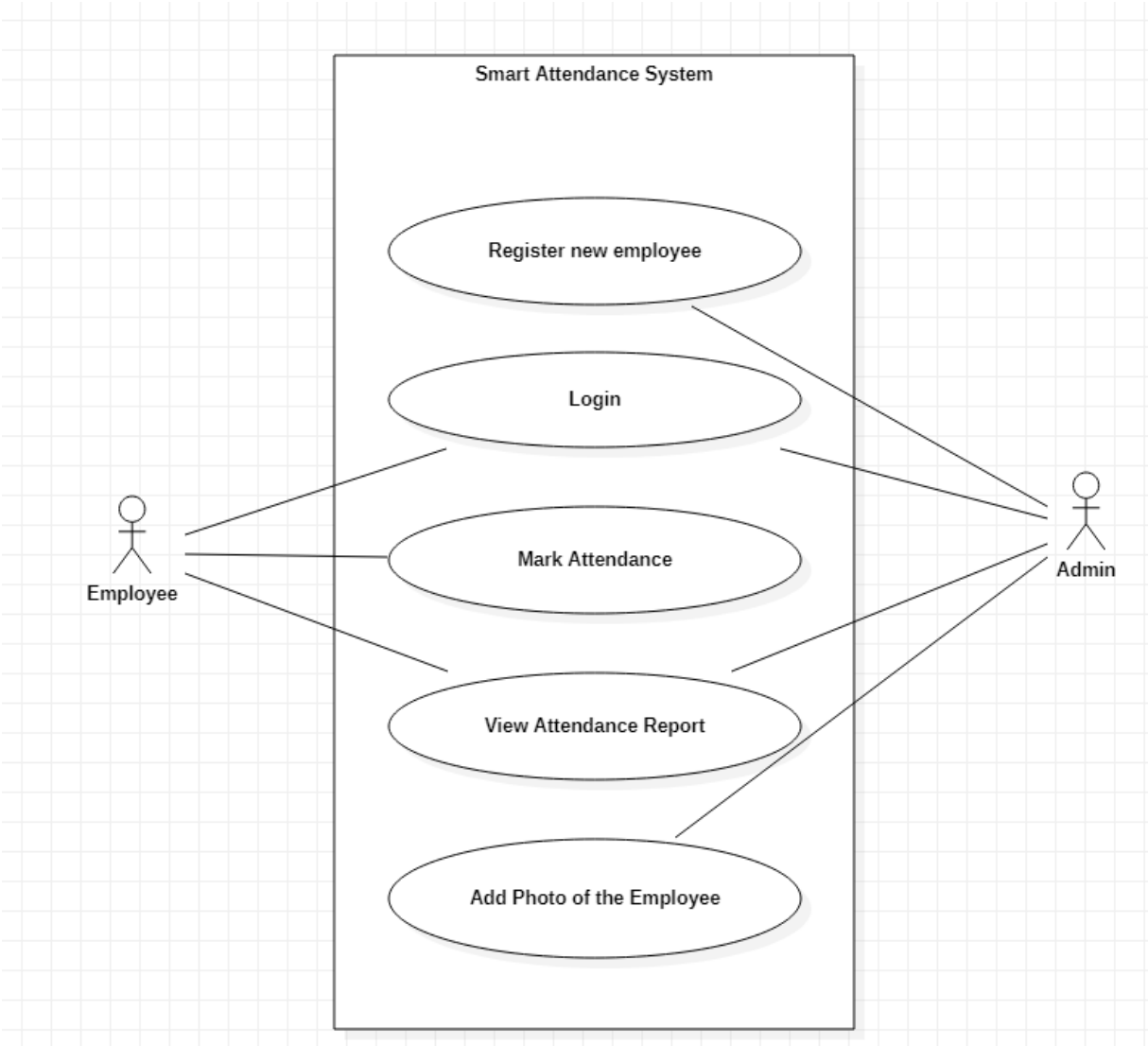

Fig. 6.2.1 Use Case Diagram

CHAPTER 7

OUTPUT SCREEN

CHAPTER 7
OUTPUT SCREEN

7.1 HOME PAGE

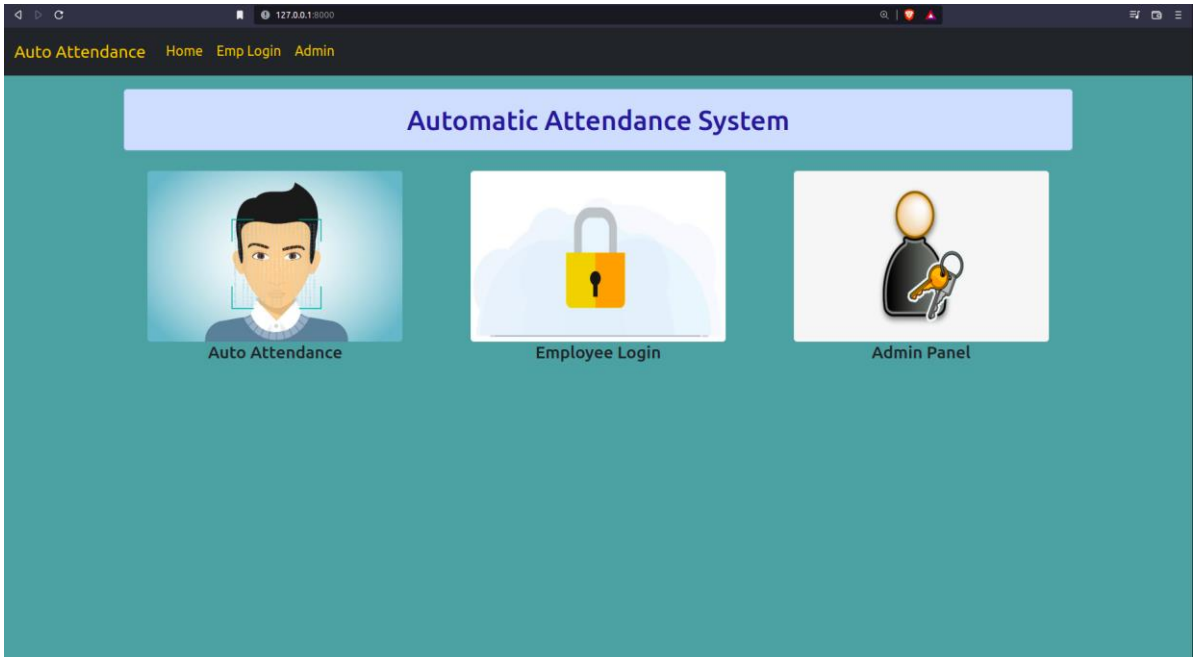

Fig.7.1: Homepage

7.2 AUTO ATTENDANCE

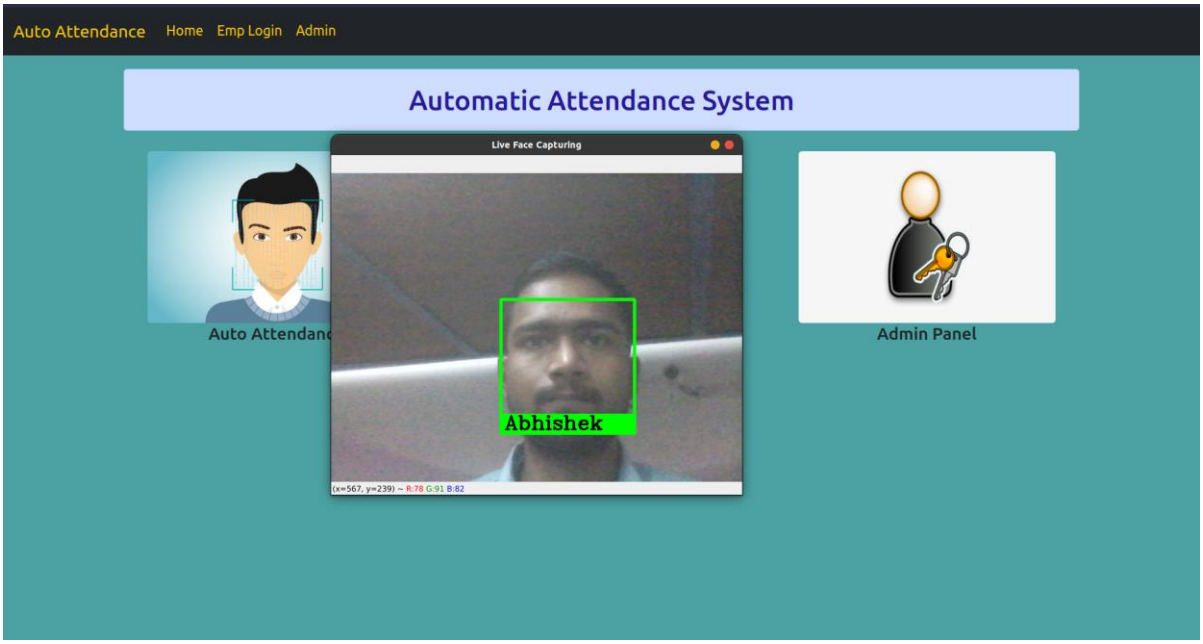

Fig.7.2: Auto attendance capturing page

7.3 ATTENDANCE MARKED SUCCESSFULLY

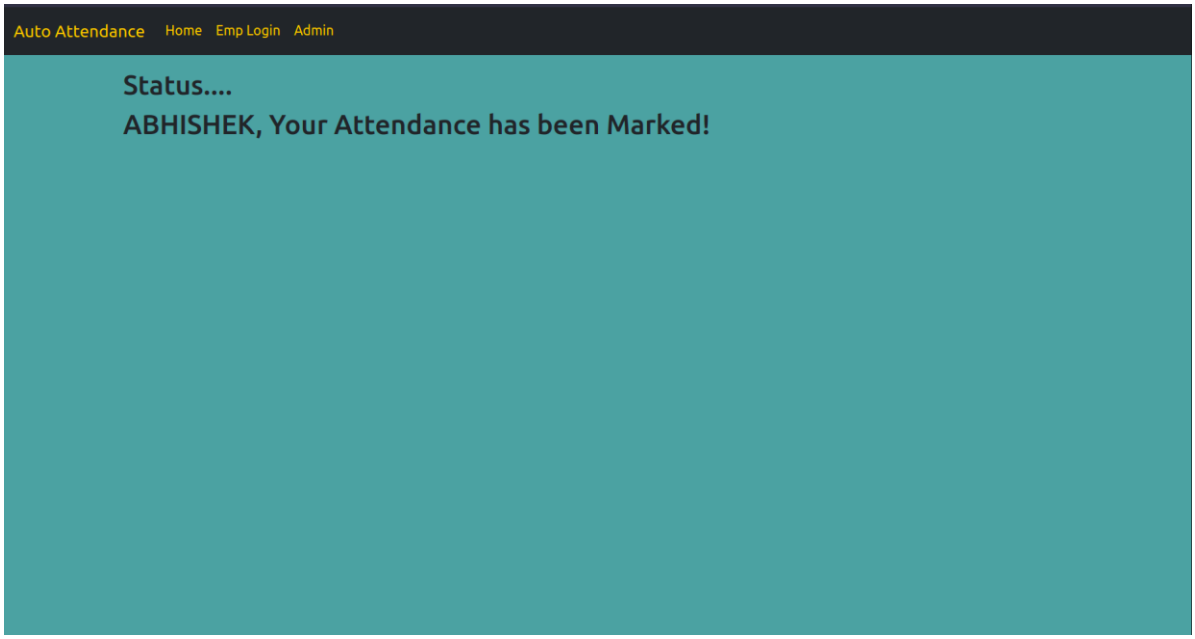

Fig.7.3: Attendence marked page

7.4 ADMIN LOGIN

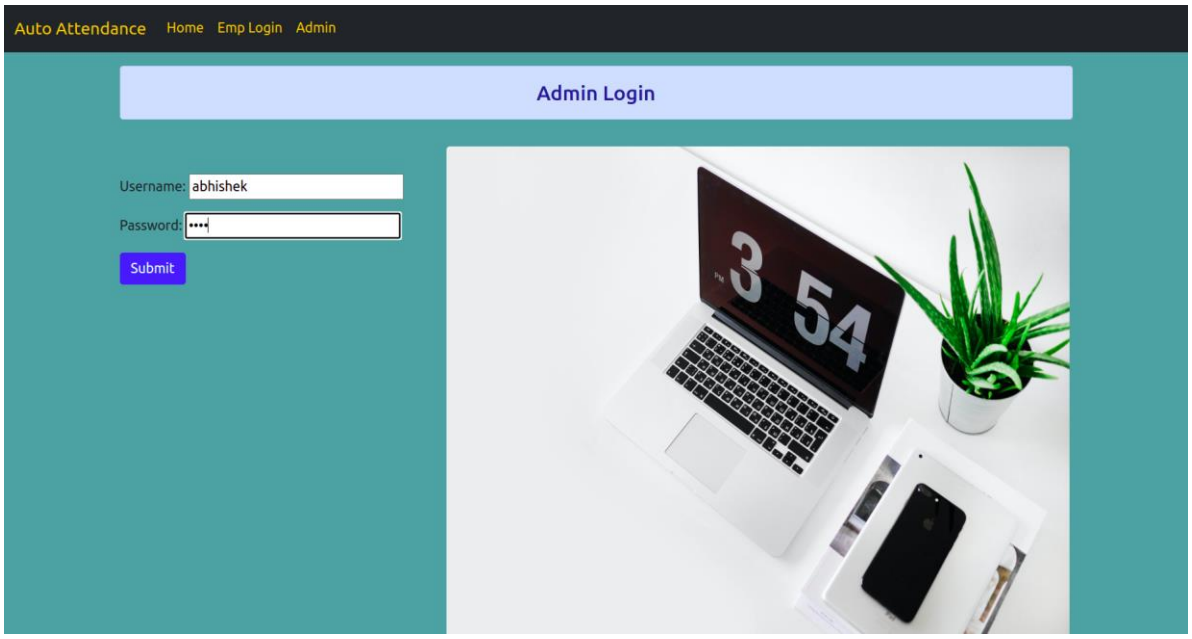

Fig.7.4: Admin Login Page

7.5 ADMIN DASHBOARD

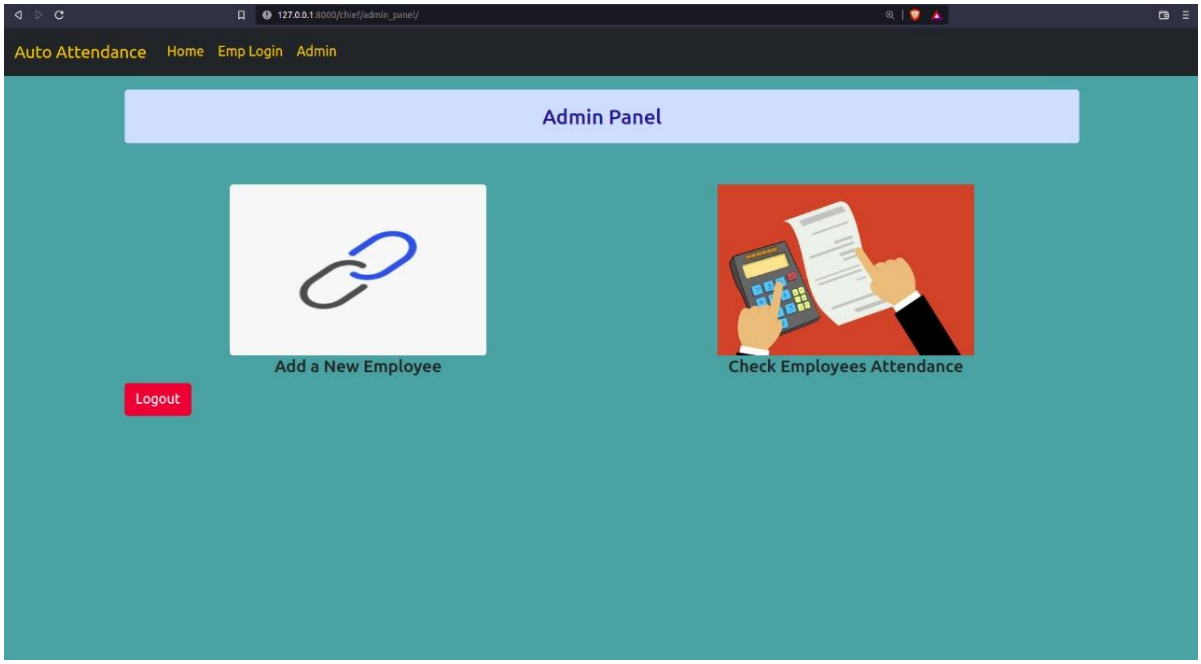

Fig.7.5: Admin Dashboard

7.6 EMPLOYEE REGISTRATION FORM

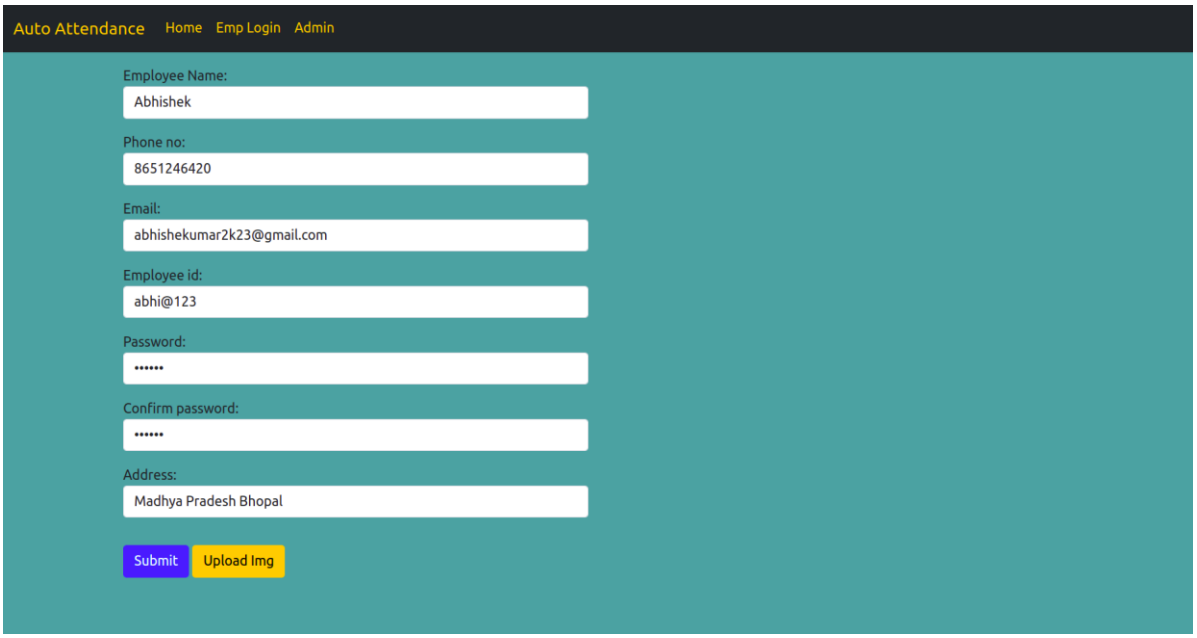

Fig.7.6: Employee Registration Page

7.7 EMPLOYEE PICTURE TAKING

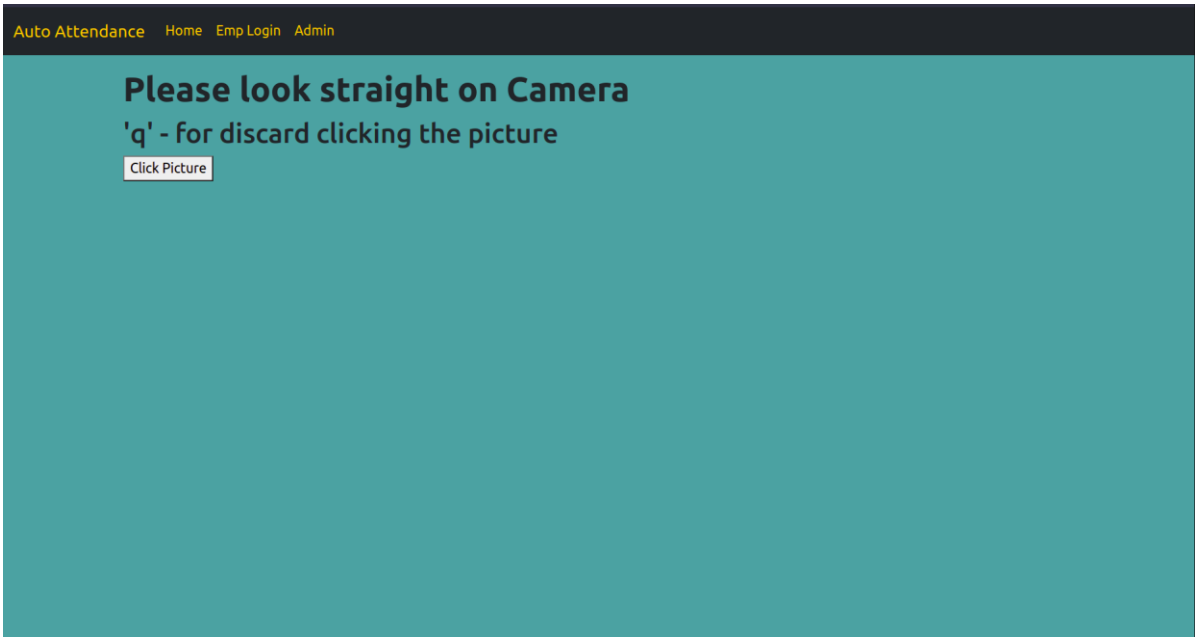

Fig 7.7: Attendance Capturing Page

7.8 ALL EMPLOYEE ATTENDANCE REPORT

Fig 7.8: All Employee Attendance Report

7.9 EMPLOYEE LOGIN PAGE

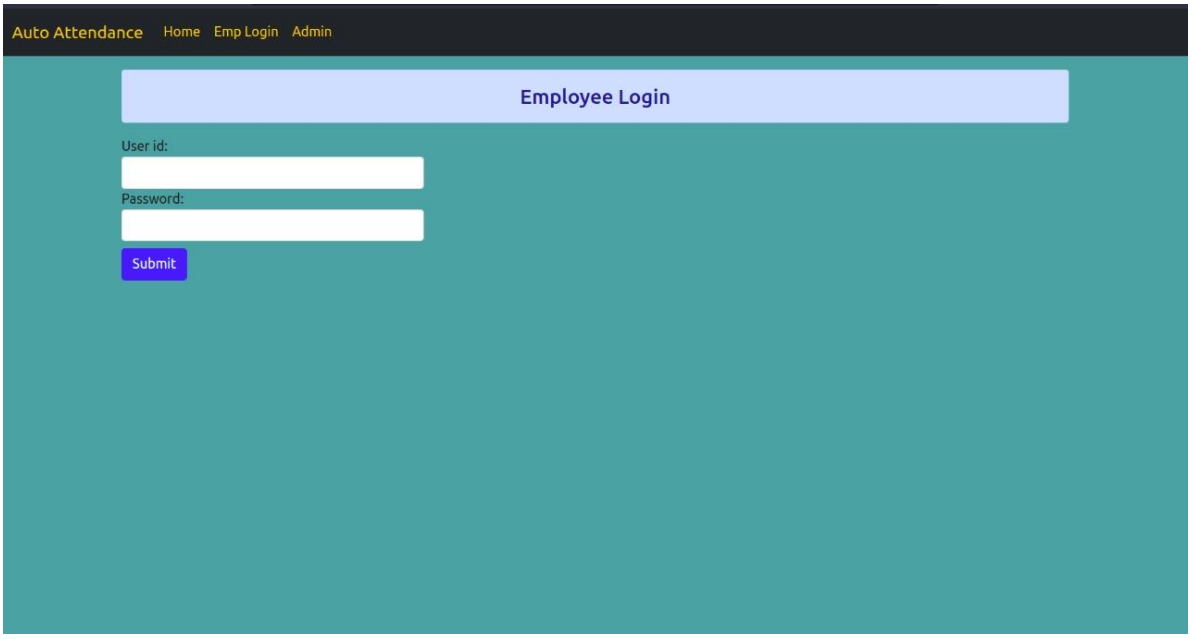

Fig.7.9: Employee Login Page

7.10 EMPLOYEE ATTENDANCE REPORT

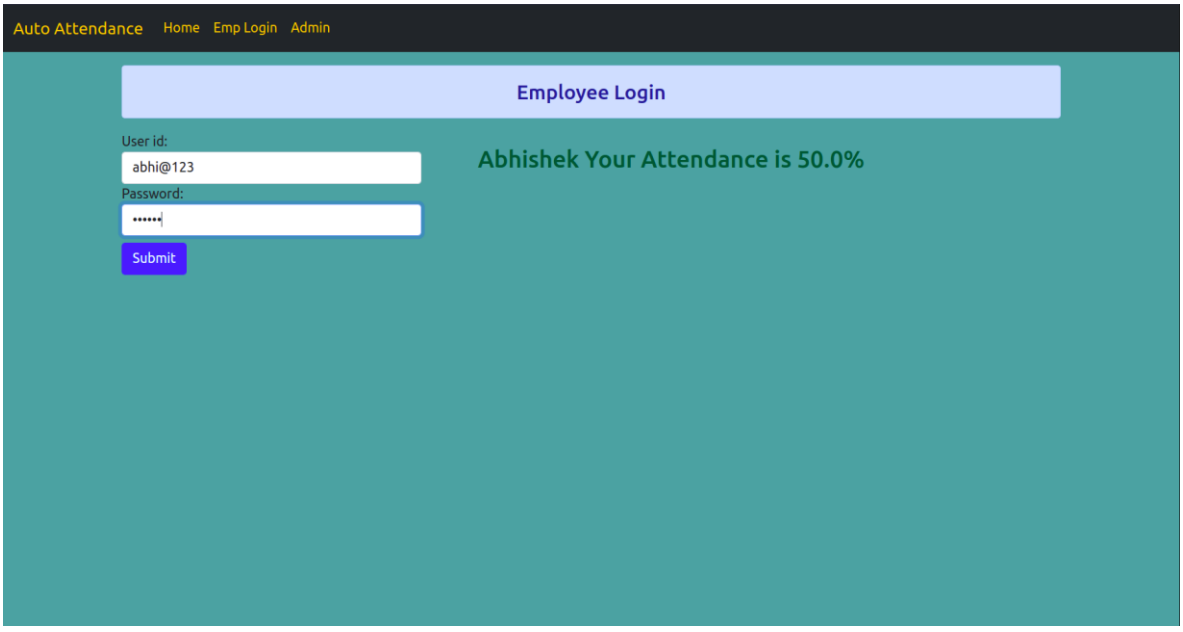

Fig.7.10: Employee Attendence Report

7.11 CONFIRMATION MAIL

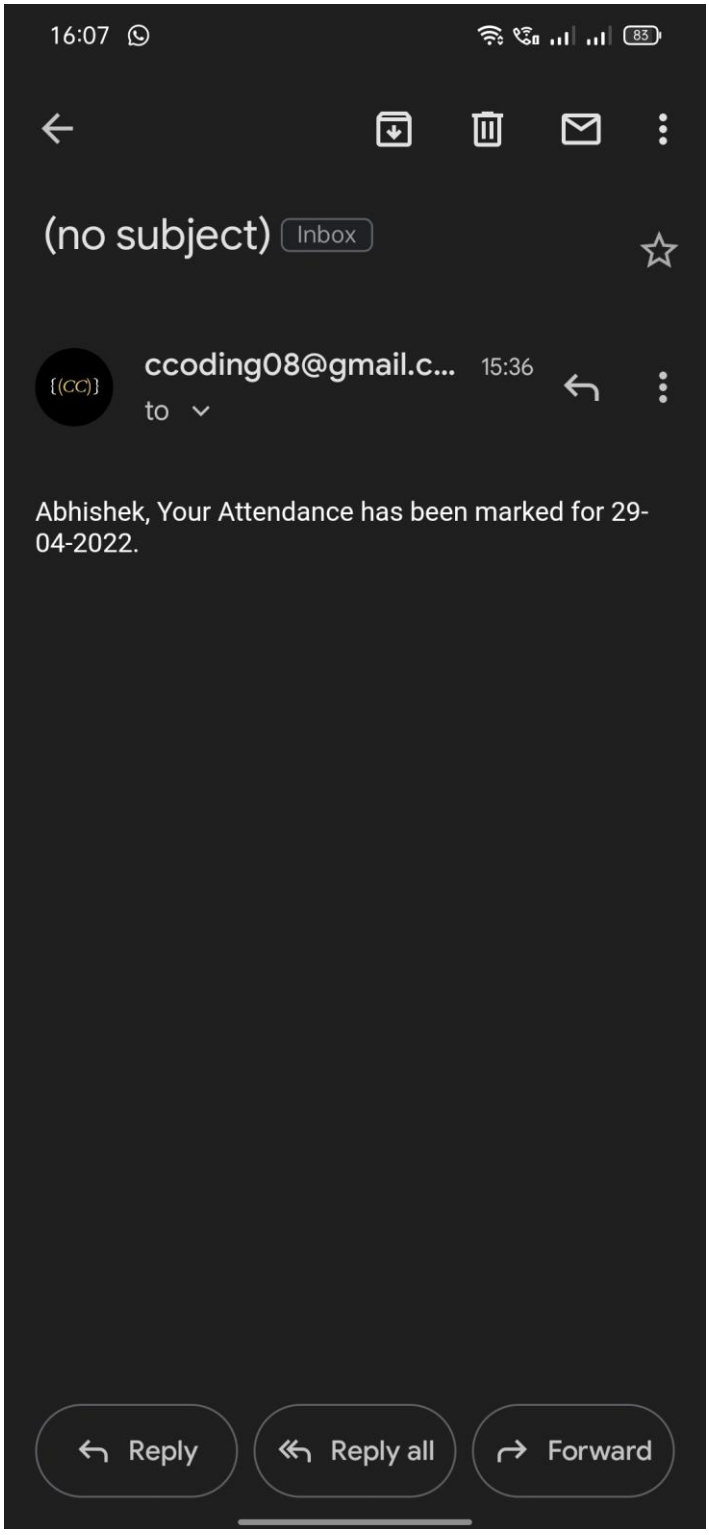

Fig.7.11: Confirmation Mail

CHAPTER 8

DEPLOYMENT

CHAPTER 8
DEPLOYMENT

STEPS FOR DEPLOYMENT

1. Inside settings folder make changes to Debug = False, initially it is True.
2. On terminal run pip > freeze requirements.txt -> It will generate a list of all the required python packages for the project.
3. Create a local Git Repository and create a free Heroku Account.
4. Install the Heroku CLI, and log in with Heroku CLI.
5. Create an app in our Heroku Account and paste the secret_key code of project (from settings) to that app.
6. Inside settings folder, provide the Heroku's app host name inside ALLOWED_HOSTS = []
7. At last export the project to Heroku using Git command, It will install all the required packages on Heroku's app taking reference from requirements.txt file.

REFERENCES

WEBSITES

1) https://docs.djangoproject.com/en/4.0/
2) https://docs.opencv.org/4.x/d9/df8/tutorial_root.html
3) https://github.com/ageitgey/face_recognition
4) https://getbootstrap.com/docs/5.1/getting-started/introduction/
5) https://www.google.com
6) https://www.w3schools.com/html/default.asp

PROJECT SUMMERY

ABOUT PROJECT

Title of the project	***Automatic Attendance System***
Semester	***VIth***
Team Members	***Abhishek Kumar, Akash Rathor, Aashish Rajput, Smriti Raj***
Team Leader	***Abhishek Kumar***
Describe role of every member in the project	***Abhishek Kumar - Backend Developer*** ***Akash Rathor - Face Recognition module*** ***Aashish Rajput - Front End Developer*** ***Smriti Raj - Front End Developer***
What is the motivation for selecting this project?	
Project Type (Desktop application, Web Application, Mobile App)	***Web Application***

TOOLS AND TECHNOLOGIES

Programming Language Used	***Python3***
IDE Used	***Visual Studio Code (version: 1.62.3)***
Front End Technologies	***HTML5, CSS, JavaScript, Bootstrap (version: 5.1.3)***
Back End Technologies	***Django (version), SQLite***
DataBase Used	***SQLite***

SOFTWARE DESIGN AND CODING

Is prototype of the software developed?	***No***
SDLC model followed (Waterfall, Agile, Spiral etc.)	***Agile***
Why above SDLC model is followed?	***Agile model has a set of guidelines that are: small, highly motivated project team and supports changing requirements. We need both guidelines to develop our project.***
Justify that the SDLC model mentioned above is followed in the project.	***We are the team of two members. Since, we didn't exactly know all the functionalities or the functionalities were frequently changing, we use Agile model, so that we could make desired changes whenever needed.***
Software Design approach followed (Functional or Object Oriented)	***Functional***
Name the diagrams developed (according to the Design approach followed)	***ER-diagram, Use Case diagram and Table Structures***
No. of Tiers (example 3-tier)	***3-tier***
Total no. of front end pages	
Total no. of tables in database	***2***
Database is in which Normal Form?	***BCNF***
Are the entries in database encrypted?	***Yes, passwords are encrypted***
Front end validations applied (Yes / No)	***Yes***
Session management done (in case of web applications)	***No***
Is application browser compatible	***Compatible for higher versions some features are not supported in older browser like safari.***

(in case of web applications)	
Exception handling done (Yes / No)	***Yes***
Commenting done in code (Yes / No)	***Yes***
Naming convention followed (Yes / No)	***Yes***
What difficulties faced during deployment of project?	
Total no. of Use-cases	***1***
Give titles of Use-cases	***Automatic Attendace System***

Project Requirements

MVC architecture followed (Yes / No)	***Yes***
If yes, write the name of MVC architecture followed (MVC-1, MVC-2)	***MVC-2***
Design Pattern used (Yes / No)	***No***
Interface type (CLI / GUI)	***GUI***
No. of Actors	***2***
Name of Actors	***Admin, Employee***
Total no. of Functional Requirements	***6***
List few important non-Functional Requirements	***Correctness, Flexibility, Reliability and Maintainability.***

TESTING

Which testing is performed? **(Manual or Automation)**	***Manual***
Is Beta testing done for this project?	***No***