Attendance!

This paper tries to provide an efficient solution for the attendance policy problem faced by many institutes

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***Abstract*—A good attendance policy is a need of the hour for every institute(whether educational or a company involving employees), as attendies are smarter in making fool the system we had. From this research paper, i am providing you a novel software system application: 'Attendiiit', which communicates with the sensors attached at each door of the room, and updates the parameters in our app.**

I. Introduction

I feel the need to introduce you with this application because,the attendance policy we had earlier is not working because students just come to the class, mark the attendance and then go back. The professors are quite disappointed with this situation. They want their students to listen to the lecture and not leave in between.Also the companies need to account for each of his/her employees.

So here we feel the need of addressing this problem. This problem can be solved by the software solution I am proposing, along with installation of some sensors after each room. These sensors are actually responsible for checking the presence of student in the class, whenever he passes the door.(Using Face-Recognition, and all techniques involved with it). The 'Attendiiit' app will give all information related to each lecture, making easy for professors to account for attendance issues, and also helping students to know their attendance.

II. Literature

There has been research going on quite recently in the development students absence and attendance system. Listing some of them, which includes Internet systems like mobile-based attendance system, web-based system, iris-based attendance system, fingerprint based attendance system(which was used in our institute), face-recognition based attendance system. There are also systems which need communication technology like Bluetooth to serve the purpose. One such system is Near Field Communication system.(Refer [2-4])

In accordance with the reference [5] Web application attendance management system used SMS software technology to send SMS easily to student's parent.The system is capable of storing all the necessary details like student's absent. The prime advantage of this methodology is that it stores and updates the student attendance and report in the Website rather than wasting paper and also saving the precious time of faculties.

The other technique includes using QR Code technology which is used to register the presence of a student by scanning the QR Code. This is information get's delivered to the server where it makes calls to the APIs.(Refer [6])

A Web-Based Student Attendance System is developed using the Radio Frequency Identification Technology, which exponentially improves the current manual process of student attendance recording and tracking system.This system proposes a semi-automated approach in capturing the student attendance, i.e. by having the students flash their student cards to the RFID reader.(Refer [7-10])

The systems proposed above require minimal hardware, NFC-tags, and NFC-enabled mobile devices. The very crucial benefit of these kind of system is that, it prevents from the tedious task of paper-work attendance, lowering the chance of losing attendance data, also can generate different presence reports easily by a click of a mouse!

III. System Architecture

A. Division of modules(Preparing Architecture):

1) Front-End : Front-End for both the mobile-app and web-app. The frontend will let users login through the portal(only through mail id's provided by institute) and will direct to dashboard. The platform is designed for both students and faculties.

The student dashboard consists of all the courses taken by that particular student in the respective semester. For each course, the app will consist of date-wise listing of attendance for the user, also showing the current status(attending/bunk). The information get's updated each second. Also the app provides information about the 'all attended classes','total classes','dates on which class is bunked','remaining classes', etc.

The faculty dashboard consists of all the courses taught by the respective faculty, and for each course, showing all the finer details like 'number of classes left', 'faculty attendance', 'class strength' etc. The faculty has the power to approve the leave application, update class schedules etc..

2) Back-End : The backend server of the app communicates with the user during authentication, getting all the courses, detailed attendance information for each course etc. Also the server regularly communicates with the sensors, we have installed beside each door, thus updating information with each time tick.

3) Database : For each of the user(under the process), the administration systems creates an entry into the database(using the mail ids for the case). The database will actually contain all the necessary information of the user stored.

4) Camera Sensors : The camera sensors are actually responsible for keeping track of each and everyone person entering/exiting the room. These sensors will be installed beside each room and they will be keep communicating with the backend server to update information in the database.

5) Notifier : The notifier is an add-on functionality given to the app, so if someone is missing a class(by miss-communication/ forgets/ bunked), then the app will notify the user through a 2min alarm, preventing the user from missing the class.

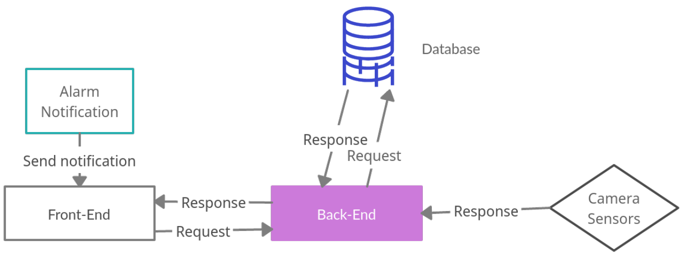
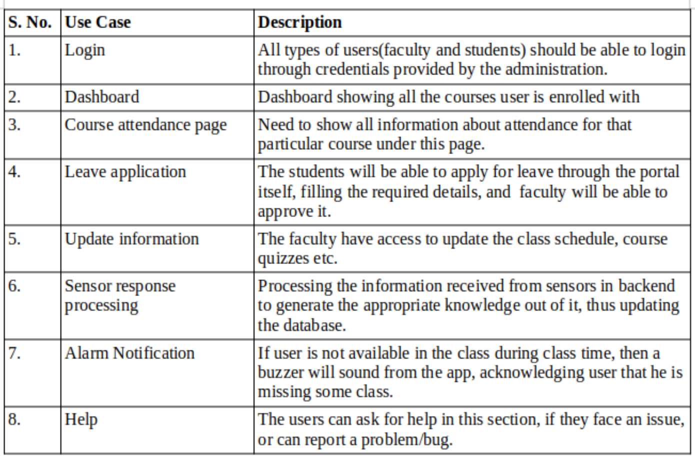


Fig. 1. Architectural Design

B. Use Cases:

Each software model contains a specific set of use-cases. The use-cases give an overview about how the user will be interacting with the system. The major use-cases are shown in the Use Case diagram below:

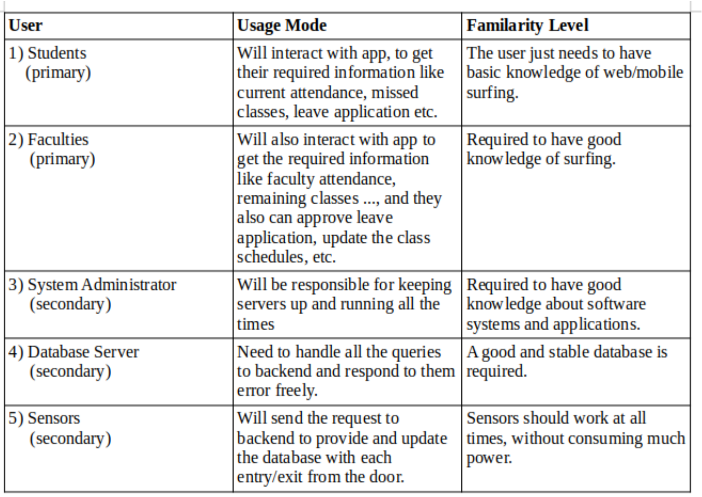


S. No.	Use Case	Description
1.	Login	All types of users(faculty and students) should be able to login through credentials provided by the administration.
2.	Dashboard	Dashboard showing all the courses user is enrolled with
3.	Course attendance page	Need to show all information about attendance for that particular course under this page.
4.	Leave application	The students will be able to apply for leave through the portal itself, filling the required details, and faculty will be able to approve it.
5.	Update information	The faculty have access to update the class schedule, course quizzes etc.
6.	Sensor response processing	Processing the information received from sensors in backend to generate the appropriate knowledge out of it, thus updating the database.
7.	Alarm Notification	If user is not available in the class during class time, then a buzzer will sound from the app, acknowledging user that he is missing some class.
8.	Help	The users can ask for help in this section, if they face an issue, or can report a problem/bug.

Fig. 2. Use Cases

C. User Profile diagram:

A Profile diagram is any diagram created in a ‘profile’ Package. The profile diagram shown below has all types of Users along with their Mode of Usage and Level of Familarity.
Below is the user profile diagram shown:



User	Usage Mode	Familarity Level
1) Students (primary)	Will interact with app, to get their required information like current attendance, missed classes, leave application etc.	The user just needs to have basic knowledge of web/mobile surfing.
2) Faculties (primary)	Will also interact with app to get the required information like faculty attendance, remaining classes ..., and they also can approve leave application, update the class schedules, etc.	Required to have good knowledge of surfing.
3) System Administrator (secondary)	Will be responsible for keeping servers up and running all the times	Required to have good knowledge about software systems and applications.
4) Database Server (secondary)	Need to handle all the queries to backend and respond to them error freely.	A good and stable database is required.
5) Sensors (secondary)	Will send the request to backend to provide and update the database with each entry/exit from the door.	Sensors should work at all times, without consuming much power.

Fig. 3. User Profile Table

D. UML Use-Case diagram:

UML Use Case Diagram is shown below:

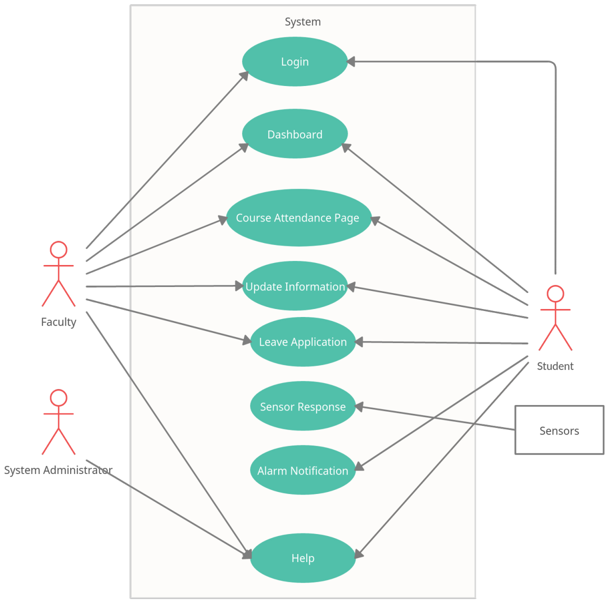


Fig. 4. UML Use-Case diagram

E. UML Sequence diagram:

UML Sequence Diagram is shown below:

F. Enlisting Classes:

Classes are enlisted below:

G. UML Class Diagram:

The Class diagram using the enlisted classes is shown below:

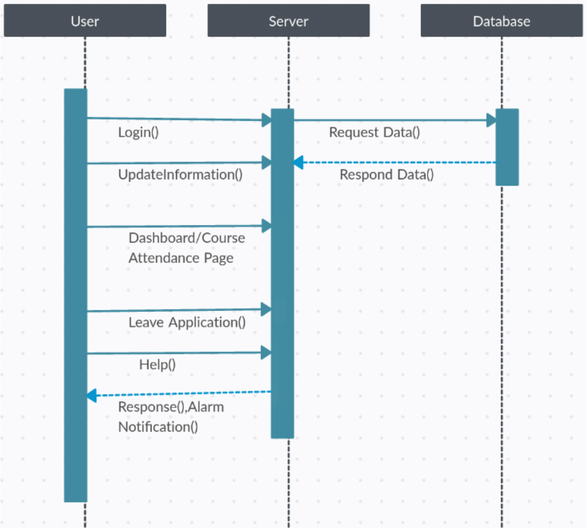
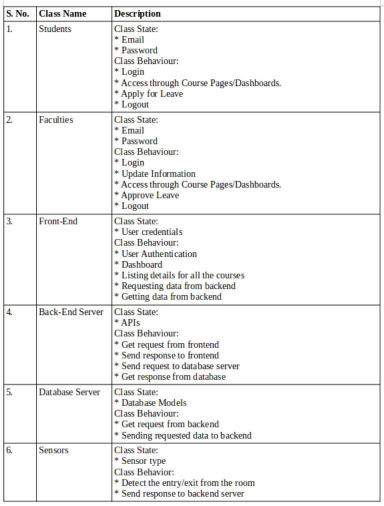


Fig. 5. UML Sequence Diagram



S. No.	Class Name	Description
1.	Students	Class State: * Email * Password Class Behaviour: * Login * Access through Course Pages/Dashboards. * Apply for Leave * Logout
2.	Faculties	Class State: * Email * Password Class Behaviour: * Login * Update Information * Access through Course Pages/Dashboards. * Approve Leave * Logout
3.	Front-End	Class State: * User credentials Class Behaviour: * User Authentication * Dashboard * Listing details for all the courses * Requesting data from backend * Getting data from backend
4.	Back-End Server	Class State: * APIs Class Behaviour: * Get request from frontend * Send response to frontend * Send request to database server * Get response from database
5.	Database Server	Class State: * Database Models Class Behaviour: * Get request from backend * Sending requested data to backend
6.	Sensors	Class State: * Sensor type Class Behavior: * Detect the entry/exit from the room * Send response to backend server

Fig. 6. Enlisted Classes

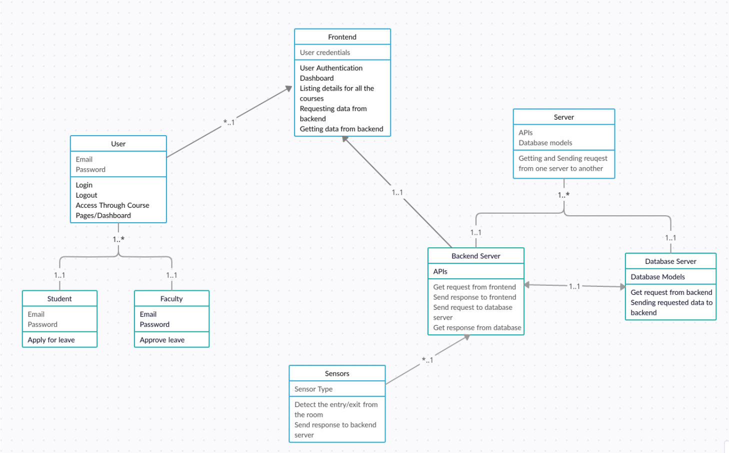

Frontend
User credentials
User Authentication
Dashboard
Listing details for all the courses
Requesting data from backend
Getting data from backend
*..1
User
Email
Password
Login
Logout
Access Through Course Pages/Dashboard
1..*
1..1
1..1
Student
Email
Password
Apply for leave
Faculty
Email
Password
Approve leave
Server
APIs
Database models
Getting and Sending reuqest from one server to another
1..*
1..1
1..1
1..1
Backend Server
APIs
Get request from frontend
Send response to frontend
Send request to database server
Get response from database
1..1
Database Server
Database Models
Get request from backend
Sending requested data to backend
*..1
Sensors
Sensor Type
Detect the entry/exit from the room
Send response to backend server

Fig. 7. UML Class Diagram

IV. Conclusion and Future Work

Thus, in most of the institutes students need to met the threshold attendance criteria before they are allowed to sit for examinations so it becomes very important to use good attendance management in educational institutions.

The ‘Attendiiit’ can be effectively used to manage attendance by not only the authorities but also the attendies as they can keep track of their attendance along with course evaluations and examinations. This prevents class strength from declining, also preventing the responsible authorities from cumbersome paper-work task.

The last but not the least, in future, i would like to integrate this app with the ‘moodle’ app of our institute(IIITH). This app is responsible for all the activities associated with the courses. It lacks the information regarding the attendance, which can be fulfilled by integrating it with ‘Attendiiit’ app, thus ripping new fruits.

V. References

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