

## Student University Network

Yash Sawant<sup>1</sup>, Manas Raut<sup>2</sup>, Ajay Kanki<sup>3</sup>, Prof. Anuradha Kapoor<sup>4</sup>

<sup>1</sup>Yash Sawant, Dept of Information Technology Engineering, Atharva College of Engineering,

<sup>2</sup>Manas Raut, Dept of Information Technology Engineering, Atharva College of Engineering,

<sup>3</sup>Ajay Kanki, Dept of Information Technology Engineering, Atharva College of Engineering,

<sup>4</sup>Prof. Anuradha Kapoor, Dept of Information Technology Engineering, Atharva College of Engineering,  
Maharashtra, India

\*\*\*

**Abstract** - "Student University Project" is a project aimed to create an online platform which can be used by students to interact with their university/education institution. This is a platform consisting of an android application and a web application where all students, teachers and other faculty members can login and use it to manage activities like course material management, timetable management, automatic attendance recording and many more. This project is developed to be the most easy, standard and effortless way of interacting with students by automating and simplifying work as much as possible.

**Key Words:** Online platform, automation, integrated, academic activities, data management.

### 1. INTRODUCTION

The "Student University Network" project is an online platform which has been specifically developed for students, with the primary goal of streamlining the interaction between students and their educational institutions. This platform has been designed to facilitate two main types of interaction. Firstly, it allows teachers to make announcements, provide private comments, and respond to queries and doubts from students. Secondly, it enables academic activities such as managing course materials, creating and updating timetables, and recording student attendance. One of the most important aspects of this project is its ability to automate as many tasks as possible. By integrating related activities with each other, this platform creates a seamless workflow that makes it easy for students to stay on top of their academic commitments. This automation not only makes life easier for students, but also helps educational institutions to reduce administrative overheads and improve efficiency. To ensure that the platform is accessible to as many students as possible, the "Student University Network" project includes an android application as its primary platform. This application has been designed to be user-friendly and intuitive, making it easy for students and teachers to use. In addition to the android application, a web application has been developed that can be used by admin users for administrative purposes.

### 1.1 Need

Despite having the technology currently there isn't any system which integrates and automates various academic activities for students and teachers. Still students need to use a bunch of applications for different purposes which have no correlation between them. Everyday for every lecture students need to look in their timetable paper, they have to search through hundreds of messages in whatsapp groups to find any relevant message. Course materials are scattered everywhere from whatsapp forwards to anonymous cloud drive links. Teachers have to take attendance manually on papers or excel sheets and then compile all information into the university's internal system. Both students and teachers waste a lot of their precious time and effort in working through these small and sometimes trivial tasks. Hence due to above mentioned problems a need to create this project was arised.

### 2. APPLICATION

The proposed system has been designed to be highly flexible and adaptable, and can be used by a wide range of educational institutions, including schools, colleges, and universities. The system has been developed to seamlessly integrate with existing internal administrative systems, which means that educational institutions can use it alongside their current processes. Each university will have their own local version of the application, which they can customise and configure according to their specific needs. This customization allows educational institutions to modify or completely change the features and functions of the system, making it ideal for institutions with unique requirements. Furthermore, the proposed system offers several benefits to educational institutions. By using this platform, institutions can improve their operational efficiency and reduce their administrative overheads. They can automate many of the tasks that would otherwise require manual intervention, freeing up time and resources to focus on other important tasks.

### 3. LITERATURE SURVEY

Numerous articles have been reviewed and their conclusions are summarised in this section. Documents that were looked at both before and during project development are presented in this section. The documents provided a better understanding of existing solutions and how the system architecture can be designed for optimal quality.

**Table -1:** Student Articles

Title	Publisher & Author	Description
Development of Cloud Learning Management Systems for Higher Education Institutions	IEEE, 2019 Panita Wannapiroon, Nutthapat Kaewrattanapat, Jakkrit Premsmith	Development of of CLMS for Higher Education System Architecture design of CLMS and study on the results of using CLMS
Models of Behavior of Agents in the Learning Management System	IEEE, 2019 Oleg Bisikalo, Olena Kovalenko, Yevgen Palamarchuk	Explains the behaviour of agents as components of a learning management system to develop models of behaviour of agents of the system
Smart Mobile Attendance using bluetooth technology	Ankit B Dubey, Nitesh Gupta, Ankit M Dubey, Nilima Nikam	Explains about bluetooth technology and tracking employees in the premises

The first paper we will examine is titled "Development of Cloud Learning Management Systems for Higher Education Institutions," published in the IEEE journal. This paper explores the benefits of using a Cloud Learning Management System (CLMS) to enhance the learning experience of students. The authors propose a system that is specifically designed to take advantage of the unique features offered by a CLMS.

Moving on to the second paper, "Models of Behavior of Agents in the Learning Management System" is another study published in the IEEE journal. This paper examines the behaviour of agents in a learning management system and explains how to develop these agents for an effective LMS system. The authors provide a detailed analysis of various models of agent behaviour and evaluate their effectiveness in improving the performance of LMS systems.

Finally, the third research paper we will review is titled "Smart Mobile Attendance Using Bluetooth Technology." This paper focuses on the use of Bluetooth technology and its applications. The authors present a system designed to track the presence of employees within the premises of a building, showcasing the potential of Bluetooth technology in attendance tracking.

### 4. EXISTING SYSTEM

- Google classroom

The Google classroom is a google workspace service which provides features like creating classrooms per course where course materials, assignments and announcements can be posted. It also contains integration for google meet for the purpose of online lectures.

- Whatsapp groups

Various universities use a common whatsapp group for their students' batches for the purpose of communicating announcements, important information and sometimes even sharing course materials and resources.

- Manual attendance and timetable

Most universities still use pen and paper for attendance records. Later this attendance record is manually analysed and data is manually entered into the organisation's internal system. Same goes to timetables where it is shared as just a piece of paper or online document.

### 5. PROPOSED SYSTEM

The "Student University Network" system that is being proposed will have the following features: First feature is the ability for admin users to create new users for students and other faculty members and manage their access and permissions in the system. Next feature is the ability to create programs, semesters and courses for students and assign professors to courses. Third feature is the ability to Divide students in batches. Next is the ability to create timetables for batches which will automatically notify students with information like lecture subject, professor and location before 10 minutes of every lecture. Next feature is the ability to Automated attendance where 10 minutes before the end of a lecture attendance of all present students will be automatically recorded. The last feature is communication groups for batches and private messaging for teachers as well.

### 6. SOFTWARE REQUIREMENTS

#### 6.1 Backend API

- Node JS
- NPM
- PostgreSQL

## 6.2 Web Application

1. Internet Browser
2. NextJS

## 6.3 Android Application

1. Jetpack compose
2. Gradle
3. Android emulator

## 7. ARCHITECTURE

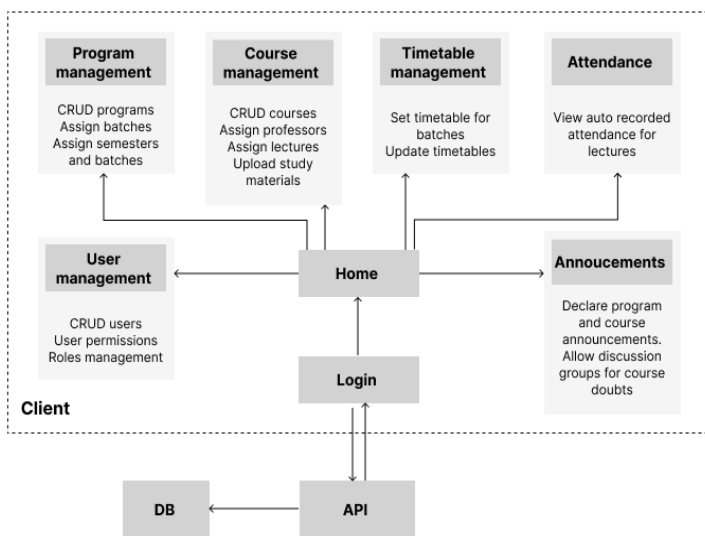


Fig - 1: Architecture

The architecture has 3 main components:

- Backend API
- Android application
- Web application

The project is divided into 6 main modules:

- **User management**  
This module controls user creation, deletion, permission management. It will be mostly used by admin users.
- **Program management**  
This module manages academic segregation of students based on enrolled program, semesters and courses in syllabus. It will be mostly used by teacher users.
- **Course management**  
This module will be a part of a program management module where teachers will upload course materials.

- **Timetable management**

In this module an assigned timetable coordinator will periodically update timetables which will automatically notify students as needed.

- **Attendance management**

This module will automatically take attendance of students

- **Announcements**

This module will contain discussion groups and program based announcements.

## 8. METHODOLOGY

### 8.1 User management

The system divides users into 3 categories: STUDENT, TEACHER and ADMIN. The user management system enables the admin users to create new users for students and other faculty members and manage their access and permissions in the system by using the above 3 categories. It ensures that each user has the appropriate level of access to the system, depending on their role and responsibilities. The system also ensures that each user has a distinct login ID and password that is specific to them. For instance, students may only have access to their course material and assignments, while faculty members may have access to grading and attendance records. It also manages users' access to application features eg: updating the timetable can only be done by the TEACHER not by student.

### 8.2 Program management

Each student is typically enrolled in only one program at a time. A program is an educational course that contains details such as the duration of the program in counts of semesters, the subjects/courses that are included, and their syllabus. To simplify program management, each stream or specialisation typically has its own program. For example, in an engineering degree, the IT stream and computer science stream will have different programs instead of being combined into a single program. This approach enables the institution to create records of existing students, which can be reused for enrolling new students in the same program. This not only saves time but also ensures that students are enrolled in the correct program. The ADMIN user is responsible for creating new programs and updating existing ones.

### 8.3 Course management

A course contains information such as the course syllabus, course materials and resources, and information sharing

platforms. These resources are essential in helping students understand the course content, keep track of assignments, and collaborate with other students. Another important aspect of courses is the management of attendance records. Each course is required to maintain accurate attendance records for all enrolled students. It helps to ensure that they meet the minimum attendance requirements. To ensure effective course management, each course is assigned a TEACHER user as professor who is responsible for managing the course. They are responsible for creating and updating the course syllabus, preparing and delivering lectures, providing exam results, and maintaining accurate attendance records. The TEACHER user is also responsible for providing feedback to students, answering their questions, and facilitating discussions in the course.

### 8.4 Automated attendance

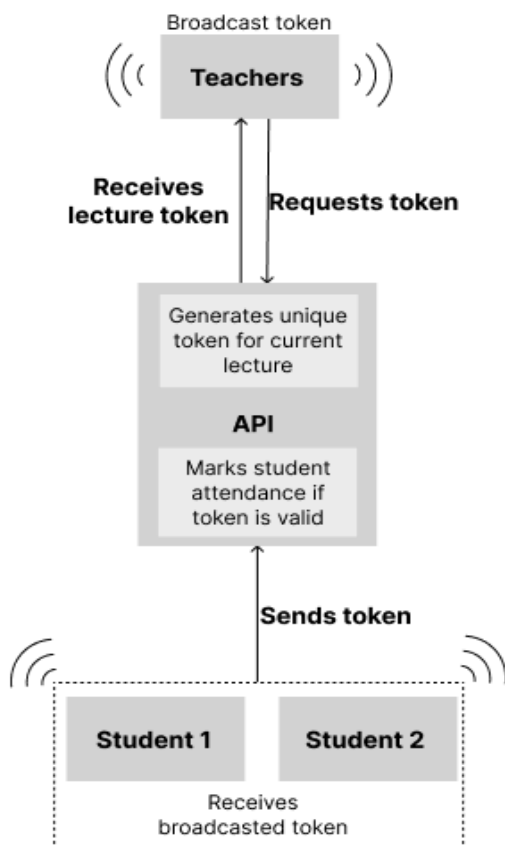


Fig - 2: Attendance algorithm

In this system, an attendance algorithm has been developed that streamlines the entire process, making it more efficient and accurate. The algorithm consists of six essential steps that ensure that the attendance procedure is executed correctly. The first step is the scheduling of the attendance algorithm, which is set to run ten minutes

before the end of each lecture. This ensures that the teacher has enough time to complete the lecture and mark the attendance of students. The second step involves the teacher requesting the API to start the attendance procedure.

The API generates a new unique token for the ongoing lecture and sends it to the teacher as a response. In the third step, the teacher uses Bluetooth services such as BluetoothLEAdvertiser or Nearby API to broadcast the token to the students. The fourth step involves the students receiving the token and sending it to the API for verification of attendance for the ongoing lecture. In the fifth step, the API verifies the token and checks if the student is enrolled for that lecture. If all conditions are satisfied, the student's attendance is marked. Finally, in the sixth step, after the lecture ends, the attendance token expires, preventing students from marking proxy attendance. The attendance algorithm streamlines the entire attendance process, making it more efficient and accurate, ensuring that students attend their classes regularly and on time.

### 8.5 Announcements

An announcement will be of two types: first type is global or program announcements. Global announcements are intended for all users of the institution and are used to share information that is relevant to everyone. Announcements like holidays, event organisation or emergency notifications, etc. can be announced as global announcements. Next are program announcements which will be only shared to students of a particular program. These announcements will be shared by the TEACHER user for purposes like course notes, exam notices and other important notices related to the course

### 8.6 Timetable notifier

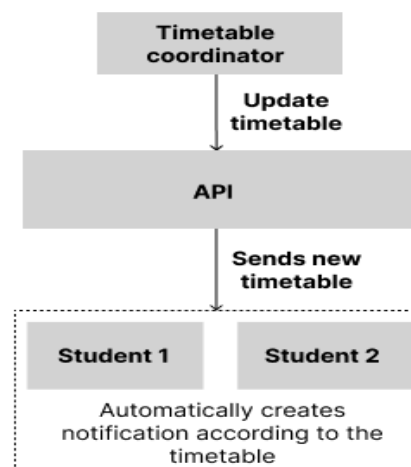


Fig - 3: Timetable notifier algorithm



The timetable notifier streamlines the entire process of schedule management, ensuring that students are always up-to-date with their schedules and never miss a class. It eliminates the need for manual reminders and ensures that the students are well-prepared for their classes, ultimately enhancing their academic performance. The timetable notifier consists of three essential steps that ensure the students receive the latest timetable updates and notifications. The first step involves the timetable coordinator updating the timetable and sending it to the API. In the second step, the API sends the new timetable to the students as per the program they are enrolled in. This ensures that the students receive the timetable for their specific program. The third step involves the client automating the notifications ten minutes prior to the lecture as per the local time and sending it to the students specific to the particular lecture with details of it. This ensures that students receive timely reminders before their classes, enabling them to prepare adequately for the lecture.

## 9. FUTURE SCOPE

The project in the future can be extended to include online courses and lectures, with live lectures sessions or recorded videos which removes any dependence of university on external meeting conference tools and adds more to the integration of the application. Cloud storage facilities can be added so that various materials files and media can be stored and shared on the platform. Students' performance can be measured by using statistical analysis on students tracked data.

## 10. CONCLUSION

Thus the proposed application "Student University Network" is an innovative system that has been designed to simplify academic activities and make the learning experience more enjoyable. It is an all-in-one platform that covers all the basic academic activities necessary for students and teachers' interaction. With automation and integration features that enhance the system's workflow, it is expected to become the most convenient and easy way for students and teachers to interact with each other. This means that users can easily connect with their peers and professors on the platform without the need for complicated procedures.

## 11. REFERENCES

[1] O. Bisikalo, O. Kovalenko and Y. Palamarchuk, "Models of Behavior of Agents in the Learning Management System," *2019 IEEE 14th International Conference on Computer Sciences and Information Technologies*

(CSIT), Lviv, Ukraine, 2019, pp. 222-227, doi: 10.1109/STC-CSIT.2019.8929751.

- [2] P. Wannapiroon, N. Kaewrattanapat and J. Premsmith, "Development of Cloud Learning Management Systems for Higher Education Institutions," *2019 Research, Invention, and Innovation Congress (RI2C)*, Bangkok, Thailand, 2019, pp. 1-6, doi: 10.1109/RI2C48728.2019.8999877.
- [3] Ankit B Dubey, Nitesh Gupta, Ankit M Dubey<sup>3</sup>, Nilima Nikam "Smart Mobile Attendance System using Bluetooth technology", 2019, International Research Journal of Engineering and Technology (IRJET) ISSN: 2395-0056
- [4] Apoorv, Raghav, and Puja Mathur. "Smart attendance management using bluetooth low energy and android." *2016 IEEE Region 10 Conference (TENCON)*. IEEE, 2016.
- [5] Baharin, Siti Khadijah, Zalikha Zulkifli, and Samsiah Binti Ahmad. "Student absenteeism monitoring system using Bluetooth smart location-based technique." *2020 International Conference on Computational Intelligence (ICCI)*. IEEE, 2020.
- [6] Burke, E., Jackson, K., Kingston, J.H. and Weare, R., 1997. Automated university timetabling: The state of the art. *The computer journal*, 40(9), pp.565-571.
- [7] Mokhtari, Mozghan, et al. "Developing a model for the university course timetabling problem: a case study." *Complexity* 2021 (2021): 1-12.
- [8] Weaver, D., Spratt, C. and Nair, C.S., 2008. Academic and student use of a learning management system: Implications for quality. *Australasian journal of educational technology*, 24(1).
- [9] Bharamagoudar, S.R., Geeta, R.B. and Totad, S.G., 2013. Web based student information management system. *International Journal of Advanced Research in Computer and Communication Engineering*, 2(6), pp.2342-2348.
- [10] Liu, Z., Wang, H. and Zan, H., 2010, October. Design and implementation of student information management system. In *2010 International symposium on intelligence information processing and trusted computing* (pp. 607-610). IEEE.
- [11] Naveh, G., Tubin, D. and Pliskin, N., 2010. Student LMS use and satisfaction in academic institutions: The organisational perspective. *The internet and higher education*, 13(3), pp.127-133.

- [12] Sanmorino, A. and Fajri, R.M., 2018. The Design of Notification System on Android Smartphone for Academic Announcement. *International Journal of Interactive Mobile Technologies*, 12(3).
- [13] Gentner, C., Günther, D. and Kindt, P.H., 2022. Identifying the BLE advertising channel for reliable distance estimation on smartphones. *IEEE Access*, 10, pp.9563-9575.
- [14] Radhakrishnan, M., Misra, A., Balan, R.K. and Lee, Y., 2015, October. Smartphones and ble services: Empirical insights. In *2015 IEEE 12th International Conference on Mobile Ad Hoc and Sensor Systems* (pp. 226-234). IEEE.
- [15] Gentner, C., Günther, D. and Kindt, P.H., 2022. Identifying the BLE advertising channel for reliable distance estimation on smartphones. *IEEE Access*, 10, pp.9563-9575.