

Faculty of Engineering & Applied Science



SOFE 4610U
Design & Analysis of IoT

Project Proposal: RFID Attendance System

Group#: 2

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Project Description

This project is aimed to make the process of attendance easier and more efficient. The goal is to make an IoT-based RFID Attendance System using the Arduino Board, Adafruit.io platform using the MQTT broker, RFID Module and RFID Cards. Arduino and RFID scanner will work together with the MQTT broker and the Adafruit.io platform to connect and display the attendance data. RFID is Radio Frequency Identification which can then be analyzed from the platform. This eliminates the need for paper attendance which can not be easily manageable. The RFID reader and Tag is also a newly developed mechanism that can be used within this project making it an IoT-based project.

Problem Statement

The attendance system in most educational institutions is an entry written based where faculty members are required to mark student's attendance on a piece of paper. For most lectures, tutorials and laboratory sessions, students are required to validate their presence by signing their name on an attendance slip. Some faculty members organize excel spreadsheets in a way to mark their student's attendance. These methods are not reliable as the risk of wrongly entered attendance data and misplacing the slips is very high. If the attendance written slips are missing or damaged then the attendance data will be lost. This is a disadvantage to faculty and students of educational institutions as it will be a hassle process to attempt to restore those records. Manually recording attendance in general is a very time-consuming process. For faculty members to collect student's signatures will take time away from the actual class session. Although manual attendance systems include some pros, they are disadvantageous in the long run.

The IoT-based RFID attendance system will be an advancement in attendance system software solutions. The system will assist in taking the attendance of the students that are present in a specific class including lectures, tutorials or laboratory sessions. In this system, every student will be given their student ID card that will act as an RFID card [1]. The students will be expected to scan their student ID cards on the attendance system which consists of an RFID module. This will record the student's attendance and also the time they scanned their cards at. This is beneficial for the students who attend class just a few minutes late as they will still be able to get their attendance marks in[1]. The advantages of this system are that it records attendance data right away, it provides real-time tracking of the date and time when the student cards are scanned, the attendance data will be more accurate than the data from the manual attendance systems, and the IoT-based RFID system will be able to store all data to a cloud framework such as Adafruit.io where faculty members can easily access this information[1].

Project Requirements

Functional:

REQ-1: Create class session

REQ-2: Create student profile with information upon attendance

REQ-3: Checking real-time student attendance

REQ-4: Record absent students

REQ-5: Notify instructor of absentees

REQ-6: Summary of weekly attendance report

REQ-7: Able to search students by name or student id

Non-Functional:

REQ-1: Easy to use tracking and updating system

REQ-2: Software must only be available to instructor

REQ-3: Authorized personnel only can use the system

REQ-4: Database should be backed up periodically

Use Cases:

Use Case	Description
UC-1: Create class session	Instructor will be able to create the class session. This will hold all important information on the class like the meeting times, meeting place, class list etc.
UC-2: Create student profile	When a student's card is read a student profile will be made, which holds their first name, last name, student id and any other additional important information the instructor will need.
UC-3: Log student attendance	When a student's card is read their attendance to the open class session will be recorded. This will hold their student profile and the time of arrival.
UC-4: View student/class attendance	The instructor will be able to view the student's attendance and the total class attendance. There will be a summary report for this, weekly reports can be made.

UC-5: Absentee Notification	The instructor will receive a notification when a student who is absents card is not read within the class time.
UC-6: Search student	The instructor will be able to search for a particular student.

References

- [1] P. Uniyal, “Automated attendance system VS manual (pros and cons 2022),” *truMe*, 22-May-2022. [Online]. Available: <https://www.trume.in/automated-attendance-system/>