NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY
Mini Project | 6th Semester | 2022 -2023
SYNOPSIS

Project Title: IoT based Classroom Automation and a Custom—Built App

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Team:

Project Leader: Shiv Shikhar Sinha

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Aim/ Objective:

In this project, we have built a sustainable, simple yet effective IoT-based Classroom automation system which focuses on making lives more convenient while saving energy resources. The app lets admins (mainly Teachers and CRs) to control and monitor routine tasks, devices, and appliances in classrooms remotely.

The field of IoT has seen significant growth in the past few years, and Classroom Automation is one of the domains where IoT can play a crucial role. IoT-based Classroom Automation solutions can help teachers automate routine tasks, monitor student behaviour and progress, and create a more interactive learning environment.

Technical Details:

This system uses NodeMCU and Firebase Realtime Database. The system allows users to remotely control devices using a custom-built Android App, which communicates with the Google Firebase Realtime Database over the internet.

To implement the system, we first connected the NodeMCU to the Firebase Realtime Database using the ESP8266WiFi library. We then programmed the NodeMCU to listen for changes in the database and turn on/off the status of devices based on the incoming data. We also built a custom Android App which we named “REVAMP” from scratch using Android Studio and written in JAVA language, which communicates with the Firebase database using the Firebase API. The app allows users to control the devices by sending data to the Firebase database, which is then received by the NodeMCU over the internet.

In future iterations of the project, we plan to add a DHT11 temperature and humidity sensor to the system, which will allow users to monitor the environmental conditions in real-time.

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Aspects of Classroom Automation	What has been done in IoT?	What has not been done yet?
Attendance Management	IoT-based attendance management systems have been developed, which use RFID or face recognition to mark attendance automatically.	More accurate attendance management systems that can detect when a student is present in the classroom or not.
Lighting and Temperature Control	IoT-based solutions for controlling lighting and temperature in the classroom have been developed.	Integration with weather forecasts to automatically adjust lighting and temperature.
Security and Surveillance	IoT-based security and surveillance systems have been developed, which use cameras and sensors for monitoring the classroom.	The development of systems that can identify suspicious behaviour and alert the teacher or security personnel.
Interactive Whiteboards	IoT-based interactive whiteboards have been developed, which allow students to interact with the board using their devices.	Integration with AR/VR technologies to create more immersive learning experiences.
Personalized Learning and Feedback	IoT-based systems have been developed, which use sensors and analytics to provide personalized learning experiences and feedback to students.	Integration with AI/ML technologies to provide more accurate feedback and personalized learning experiences.
Task Automation and Management	IoT-based systems have been developed, which can automate routine tasks like setting up equipment or preparing teaching materials.	Integration with chatbots or voice assistants to provide more seamless task automation and management.

We may also explore additional functionalities for the app, such as:

Customizable LED colors and brightness levels

Scheduling and timer-based LED control

Voice and gesture-based LED control

Integration with other IoT devices and platforms, such as Amazon Alexa or Google Home.

Overall, this project demonstrates the potential of IoT and cloud-based technologies to create innovative and interactive systems for home automation and beyond.