Institute of Engineering and Technology, DAVV, Indore

B.E IV Year Electronics and Telecommunication

Project Proposal

SmartEduGuard (Smart Classroom Door**)**

Section- **A**

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Introduction

The Smart Classroom Door System is an innovative solution designed to revolutionize classroom management within educational institutions. In today's dynamic educational landscape, it has become increasingly important to optimize the utilization of resources, enhance security, and ensure the well-being of students and faculty. This project aims to address several critical issues faced in traditional classroom settings by harnessing the power of technology and automation.

In conventional classrooms, the process of unlocking and locking doors, taking attendance, ensuring timely student arrivals, and monitoring health parameters can be a manual and often inefficient task. Professors and educators frequently grapple with the challenges of maintaining order and facilitating an effective learning environment. Additionally, the need for stringent security measures and the management of unexpected emergencies cannot be overlooked.

To tackle these issues comprehensively, our Smart Classroom Door System integrates various hardware and software components, leveraging advanced technologies to streamline classroom operations. This system focuses on creating a seamless, automated, and secure environment conducive to learning and teaching.

Objectives of the Project

The core objectives of this project are to:

- Automate the process of door access control, allowing authorized personnel, primarily professors, seamless entry into the classroom.

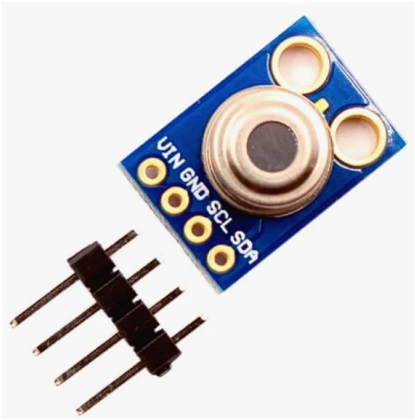
- Notify students about the commencement of their respective classes, ensuring punctuality and reducing disruptions.

- Implement an accurate student counting mechanism to monitor classroom occupancy in real-time.

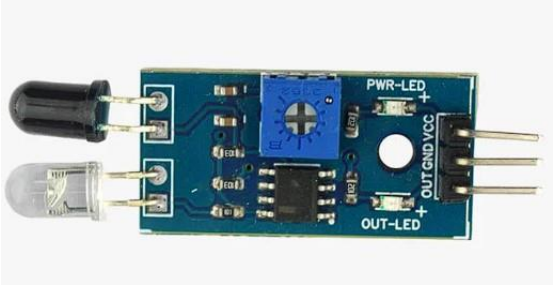
- Integrate a temperature sensor to monitor students' health, enabling early detection of any anomalies.

- Develop an emergency override mechanism for situations where immediate access is required, coupled with notifications to higher authorities for transparency and security.

Hardware / Software/ technology to be required for the project work:



MLX90614 Infrared Temperature Sensor

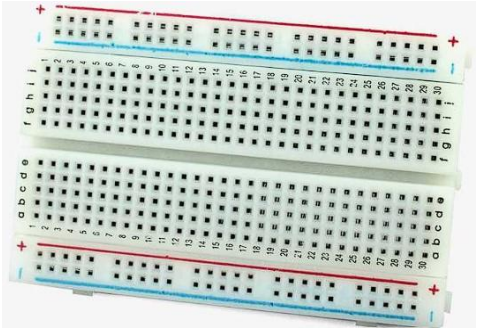


IR Sensor Module

4- Pin Push Button

Servo Motor

Arduino Uno



Bread Board

GSM MODULE

Project Description: Design and Implementation

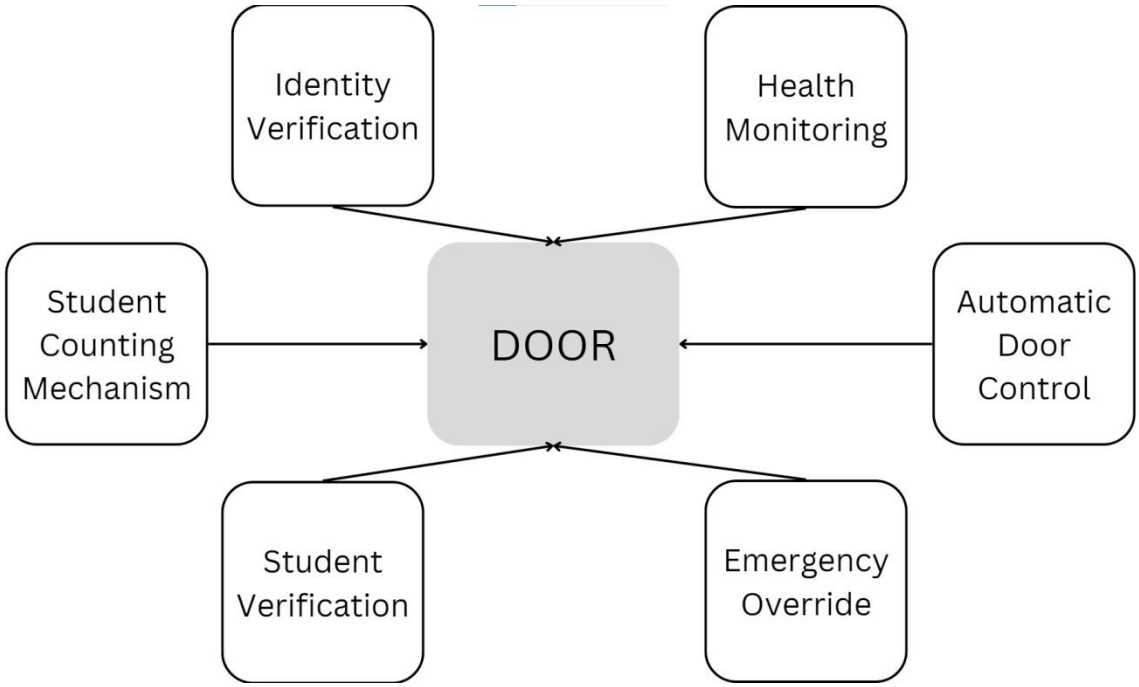


Fig: Block Diagram of Smart Door System For Classroom.

Identity Verification: The project begins with the critical task of identity verification. Authorized personnel, primarily professors, will be provided with unique identification cards or tokens. These tokens will be equipped with RFID (Radio-Frequency Identification) technology. When a professor approaches the classroom door, the RFID reader mounted on the door scans the professor's token. If the identity is verified successfully, access is granted.

Student Notification: Upon successful identity verification, the system initiates the student notification process. An integrated GSM (Global System for Mobile Communications) module sends notifications to all registered students for the particular class. These notifications include information about the class's subject, timing, and location. This ensures that students are promptly informed, reducing disruptions caused by late arrivals.

Automatic Door Control: After identity verification and student notification, the system activates the automatic door control mechanism. A servo motor is

responsible for physically opening the classroom door. This process is smooth and quick, allowing for a hassle-free entry for the professor.

Student Counting Mechanism: Simultaneously, the system employs a student counting mechanism to monitor classroom occupancy. Ultrasonic sensors strategically placed at the entrance record the number of students entering the classroom. This data is continuously updated and can be accessed in real-time through a web-based interface or mobile application.

Health Monitoring: One of the innovative features of this system is health monitoring. A temperature sensor is incorporated into the system to measure the body temperature of students as they enter the classroom. If a student's temperature exceeds a predefined threshold, an alarm is triggered, alerting the professor and administrators. This early detection can help prevent the spread of contagious diseases within the educational institution.

Emergency Override: In the event of an emergency or any unexpected situation, an emergency override button is available. Pressing this button unlocks the door immediately, allowing for swift access. However, every use of this button triggers a notification to higher authorities, ensuring transparency and security.

Expected Outcomes of the Project

1. Enhanced Classroom Management:

Automated Access Control: The system's ability to automatically grant access to authorized personnel, primarily professors, streamlines the process of classroom entry. This eliminates the need for manual key-based access, reducing delays and disruptions caused by misplaced or lost keys.

Punctuality Improvement: By notifying students about class schedules promptly, the system encourages punctuality. Reduced late arrivals lead to more effective use of instructional time and improved focus on learning.

2. Real-time Classroom Occupancy Monitoring:

Accurate Student Counting: The student counting mechanism provides real-time data on the number of students present in a classroom. Educators and administrators can access this information, helping them make informed decisions regarding resource allocation and space utilization.

3. Health Monitoring and Early Detection:

Timely Health Alerts: The integration of a temperature sensor enables the system to monitor the health of students. If a student's body temperature exceeds the predefined threshold, the system triggers an alert. Early detection of potential health issues can prevent the spread of contagious diseases and safeguard the well-being of the entire educational community.

4. Security and Emergency Response:

Emergency Override Mechanism: The availability of an emergency override button ensures immediate access in crisis situations. This feature enhances the security of the classroom while allowing for swift responses to unexpected events.

Notification to Higher Authorities: Every use of the emergency override button triggers notifications to higher authorities, ensuring transparency and facilitating a coordinated response to emergencies.

5. Improved Teaching and Learning Experience:

Minimized Disruptions: With automated door access and student notifications, interruptions due to late arrivals are significantly reduced. Professors can

commence classes smoothly, creating a more conducive environment for teaching and learning.

Efficient Resource Allocation: Real-time occupancy data empowers educational institutions to allocate resources more efficiently. This includes adjusting classroom sizes, scheduling classes optimally, and deploying teaching staff effectively.

6. Healthier Educational Environment:

Preventing Disease Spread: The health monitoring component contributes to a healthier educational environment by identifying potential health risks early. This proactive approach can minimize the transmission of illnesses within the institution.

7. Technological Advancement:

Adoption of Modern Technology: The implementation of the Smart Classroom Door System showcases the institution's commitment to leveraging advanced technology for the betterment of education. It positions the institution as an innovator in the field of classroom management

References (in IEEE format)

Quartz Components : https://quartzcomponents.com/ (Only this link is used for all purpose)