International Journal of Research in Interdisciplinary Studies
Volume 3, Issue 5, May 2025
https://www.ijris.com | ISSN (Online): 2584-1017

Examination Hall Centralized Mobile Detection System Using IoT

S. B. Nalawade[1], Pratik Milind Paikrao[2], Ketan Ramdas Lalge[3*], Vijay Shivanand Mundhe[4]
[1]*Professor, Department of Electronics & Telecommunication Engineering, Sinhgad College of Engineering, Pune, India*
[2,3,4]*Student, Department of Electronics & Telecommunication Engineering, Sinhgad College of Engineering, Pune, India*

Abstract— This project proposes a technology to detect a cellphone that is being used by a restricted user in a restricted area, and also show the location of the user, to prevent the user from continuous use of the cellphone. the right number is checked. However, it is often busy and take time for an outsized number of scholars. Therefore, to avoid his problem, automated detection and identification of phones has been integrated. Currently there are mobile jammer to jam the whole network, but only to seek out cell phones of scholars who have been present within the exam hall there. It automatically detects the activity telephone within the e-hall and displays this information with the mobile detector on the remote computer (administrator) within the GUI until it detects the message, room number, location, etc. That is, it determines the precise place. Calculates the space between position (detected) and detector, identify increasing boundaries, and add new dimensions to rooms like remote computers, switch from one room to a different.

***Index Terms*— Detection system, IoT, Mobile detection, Exam Hall.**

1. Introduction

This project proposes a technology to detect a cellphone that is being used by a restricted user in a restricted area, and also show the location of the user, to prevent the user from continuous use of the cellphone. the right number is checked. How- ever, it is often busy and take time for an outsized number of scholars. Therefore, to avoid this problem, automated detection and identification of phones has been integrated. Currently there are mobile jammer to jam the whole network, but only to seek out cell phones of scholars who have been present within the exam hall there. It automatically detects the activity telephone within the e-hall and displays this information with the mobile detector on the remote computer (administrator) within the GUI until it detects the message, room number, location, etc. That is, it determines the precise place.

Calculates the space between position (detected) and detector, identify increasing boundaries, and add new dimensions to rooms like remote computers, switch from one room to a different. The centralized nature of the system allows for comprehensive coverage and coordination across multiple examination rooms, ensuring that no area is left unmonitored. The IoT based architecture enables remote access and control, allowing administrators to oversee multiple examination centers from a single control point. This not only enhances security but also reduces the burden on human invigilators, leading to a more efficient and secure examination process.

This system leverages IoT technology to create an intelligent, monitoring network capable of detecting unauthorized mobile devices within the examination hall.

2. Research Elaboration

A. Research Background and Motivation

With the rise in smartphone usage, cheating in examination halls using mobile devices has become a serious concern. Traditional methods like manual invigilation and CCTV fail to detect hidden or silent phones effectively. This project aims to develop a centralized IoT-based mobile detection system to automatically identify unauthorized devices in exam halls.

B. Motivation

The motivation behind developing the Examination Hall Centralized Mobile Detection System using IoT arises from the growing misuse of mobile phones during examinations, which threatens academic integrity. As smartphones become more advanced and accessible, students often attempt to use them for unfair advantages. Traditional monitoring methods, such as human invigilation and CCTV, are not sufficient to detect hidden or silent devices. This project aims to introduce an automated, real-time detection system using IoT technology to address this challenge. By reducing the dependency on manual surveillance and ensuring a fair examination environment, the system promotes honest academic practices and provides a scalable solution for educational institutions.

C. Result

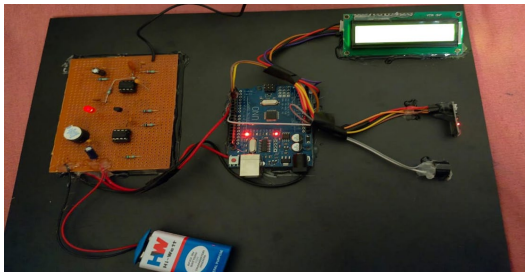

Fig. 1. Hardware of mobile detection

*Corresponding author: ketanlalge.scoe.entc@gmail.com

D. Objectives

- Develop a system that detects unauthorized mobile devices in an examination hall using IoT-based technology.
- Centralize and monitor mobile device detection data in real-time across multiple examination halls.
- Ensure the system is easy to deploy, scalable, and provides timely alerts to invigilators.

E. Proposed System Design

This project proposes a technology to detect a cellphone that is being used by a restricted user in a restricted area, and also show the location of the user, to prevent the user from continuous use of the cellphone. the right number is checked. However, it is often busy and take time for an outsized number of scholars.

F. System Requirements

1) Hardware Requirements

Arduino Uno: Microcontroller for managing input/output operations.

Voltage Sensor: To detect signal strength from mobile phones.

LCD 16x2 with I2C Module: For real-time display of detection alerts.

Wi-Fi Module (ESP8266): For transmitting data to the centralized system.

Buzzer: Alerts invigilators with sound upon detection.

Power Supply Unit: Batteries, adapter, and voltage regulator components.

Circuit building components: Breadboards, Resistors, Capacitors, Switches, LEDs, Connectors, Diodes, PCBs

Software Requirements:

Arduino IDE: To program and upload logic to Arduino Uno.

Embedded C/C++: Language used for microcontroller programming.

Web Dashboard (Optional): For centralized monitoring (can be developed using Node.js, Firebase, or PHP/MySQL stack).

G. System Architecture

Detection Layer: Uses voltage sensors to detect signal emissions from unauthorized mobile phones.

Processing Layer: Arduino processes signal and activates buzzer/LCD display.

Communication Layer: Wi-Fi module sends detection data to a central monitoring server.

Monitoring Layer: Centralized control centre displays information from multiple exam halls in real-time.

H. User Workflow and Interface Design Setup Phase

Install the system in each exam hall. Connect to power and verify Wi-Fi connectivity.

1) Detection Phase

Once the exam starts, the system continuously monitors for mobile signals. On detection, buzzer sounds and details are displayed on the LCD.

2) Monitoring Phase

Alerts and data are sent to a centralized dashboard (optional), enabling invigilators or admins to take action. Logs are stored for future audits.

3) Interface Design

LCD interface shows real-time detection alerts (e.g., "Mobile Detected!").

Web Dashboard UI (if implemented): Map-based or table layout showing exam hall ID, detection time, and status.

I. Technology Selection

Arduino Uno: Chosen for its low cost, ease of use, and sufficient I/O ports for sensors and modules.

Wi-Fi Module (ESP8266): For efficient wireless communication.

I2C with LCD: Reduces wiring complexity and allows compact display of data.

Voltage Sensor: Accurately detects signal emissions from mobile devices.

IoT-based Architecture: Facilitates remote monitoring and data centralization.

J. Data Flow

Detection Signal → Arduino Processing → Trigger Buzzer & LCD → Send Data via Wi-Fi → Central Server

Methodology:

1) Designed a mobile signal detection system using Arduino Uno, voltage sensor, buzzer, LCD display, and ESP8266 Wi-Fi module.
2) Voltage sensor detects fluctuations in electromagnetic signals from mobile phones.
3) Arduino processes the input and triggers the buzzer and LCD alert upon detection.
4) Detection data is sent wirelessly to a centralized monitoring system using the Wi-Fi module.
5) Conducted testing in different environments to validate detection accuracy and response time.
6) Ensured continuous operation using a regulated power supply with battery backup.
7) Implemented WPA2 encryption and physical casing to secure data and protect hardware from tampering.

Expected Outcomes:

1) Effectiveness of Detection

The system should provide high accuracy in detecting mobile devices, minimizing false positives and negatives. Effective detection in all areas of the examination hall, ensuring no blind spots.

2) 2. Realtime Monitoring

The system can send alerts to invigilators when a mobile device is detected, allowing for quick intervention. Maintains logs of detection events for review and analysis.

3) Student Behavior

A decrease in incidents of cheating related to mobile devices, as students are deterred by the presence of detection systems.

Increased awareness among students regarding mobile device policies during examinations.

4) Operational Efficiency

Automation of mobile detection reduces the workload on examination staff, allowing them to focus on other supervisory duties.

Potential reduction in examination misconduct related costs.

5) User Feedback

Gathering feedback from students and invigilators regarding the system's effectiveness and impact on the examination experience.

6) Technical Performance

The performance of hardware and software in various conditions, including varying signal strengths and potential interference. The ability to scale the system for larger examination venues or multiple examination halls simultaneously.

K. Future Work

The integration of advanced technologies, such as artificial intelligence and machine learning, can improve detection accuracy by analyzing patterns of de- vice usage and distinguishing between authorized and unauthorized devices. Additionally, expanding the system to monitor a broader range of devices, including smartwatches and wearables, will be essential as technology evolves. Ensuring data privacy and compliance with regulations will require ongoing refinement of data handling practices and transparent communication with students about their rights.

3. Conclusion

In conclusion, the "Examination Hall Centralized Mobile Detection System Using IoT" effectively addresses the challenge of unauthorized mobile device usage in examination settings. By leveraging IoT technology, the system provides real-time detection, centralized monitoring, and timely alerts, enhancing the security and integrity of the examination process. This scalable and automated solution significantly reduces manual oversight, ensuring a fair and controlled testing environment across multiple examination halls.

Acknowledgment

We would like to express our heartfelt gratitude to everyone who contributed to the development and success of the "Examination Hall Centralized Mobile Detection System Using IoT" project. We extend our sincere appreciation to our mentors and faculty members at Sinhgad College of Engineering for their invaluable guidance, insightful feedback, and unwavering support throughout this research journey.

We are also grateful to the survey participants and interviewees whose perspectives on mobile detection challenges and IoT and personal experiences provided essential insights that shaped our approach. Their input was instrumental in refining our platform's objectives and features.

Special thanks to our families and friends for their constant encouragement and understanding. Their support was a great source of motivation. Finally, we would like to acknowledge the collaborative efforts of our team members, whose dedication and hard work were crucial in bringing this project to fruition.

References

[1] M. Tunga, "A college attendance management system with mobile phone detector proposed framework," in International Journal of Instrumentation Science and Engineering, 8(1):9-20, 2022.

[2] E. Ataro, S. D. Madara, S. Sitati, "Design and testing of mobile-phone-detectors," 2023.

[3] H. Verma H, R.D. Tiwari, S. Mishra, S. Srivastava, A. Singh, H. Tripathi, "Intelligent cell phone detector system at 4g bands of frequencies," in *IOSR Journal of Electronics and Communication Engineering*, 12(2):55-9, 2023.

[4] https://www.elektormagazine.com/magazine/elektor200205/17237

[5] J. A. Dar, "Centralized mobile detection in examination hall using Arduino duemilanove (ATmega328)," in International Journal of Scientific & Engineering Research. India, 5(8):191-204, 2022.