

INTELLIGENT IOT-BASED CELL PHONE DETECTION SYSTEM FOR EXAM SECURITY

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ABSTRACT

This project proposes designing and implementing a centralized mobile detection system for examination halls using IoT technology. With the increasing use of mobile devices, unauthorized access to smartphones during examinations has led to concerns regarding academic integrity. The proposed system utilizes multiple sensors to detect active mobile devices within the examination hall and sends alerts to the invigilators. The detection system incorporates signal-detecting sensors, a microcontroller, and a cloud-based monitoring system for updates. The project aims to enhance security and prevent malpractice in examinations by identifying and restricting mobile device usage efficiently.

Keywords: Mobile detection, IoT, RF signal detector, remote monitoring, examination security.

I. INTRODUCTION

The presence of mobile phones in examination halls poses a significant challenge to maintaining fairness and integrity in academic evaluations. As students increasingly rely on electronic devices, ensuring a mobile-free environment during exams is crucial. Traditional methods of monitoring, such as manual checks, are often ineffective and time-consuming. To address this issue, this project introduces an IoT-based centralized mobile detection system. The system employs RF signal detectors to identify mobile activity and sends alerts via an IoT platform to invigilators. The integration of microcontrollers and cloud-based technology ensures an automated and efficient monitoring process.

II. RELATED WORK

1) Detection of Active Mobile Phone in Exam Hall. Et.al. Najla Aiman Nazar, Ili Najaa Aimi Mohd Nordin, Muhammad Rusydi Muhammad Razif, Noraishikin Zulkarnain and Nurulaqilla Khamis. This

paper informed that the use of mobile phone as a cheating tool in the examination hall among students have considerably increased a burden to invigilators to ensure integrity in examination hall. Many active mobile phone detection schemes had been proposed as the solution to this problem. However, the detection system function in a small detection range of 1.5 to 2 meters from the detection circuit and does not distinguish various frequency bands of radio frequency signals. In order to have diverse range of RF mobile phone signals detection for alerting the invigilators of their specified monitoring region, antenna is proposed to be used. This is done by antenna design simulation using Computer Simulation Technology (CST) software. Two types of antenna; single- dipole antenna and multi-band dipole antenna are simulated to know the characteristics of VSWR, gain and total efficiency. From the simulation results, multi-band dipole antenna shows acceptable VSWR value which are approximate to 2 V, gain is equal to 2.85 dB and total efficiency is equal to 2.484 dB for 2.4 GHz signal. The results imply positive event that multi-band antenna can be a preferable tool in elaborating accurate RF signal detection of active mobile phone in examination hall.

2) Using CNN to Detect the Use of Mobile Phone in Examination Rooms. Et.al. Reuben Moyo; Stanley Ndebvu; Michael Zimba. This paper explained that in recent years, the automotive industry has seen significant advancements in the field of computer vision and artificial intelligence, leading to the development of innovative solutions for car damage identification and categorization. Accurate and efficient assessment of vehicle damage is crucial for

insurance claims processing, vehicle maintenance, and resale value estimation. This abstract provides an overview of the keycomponents and methodologies involved in car damage identification and categorization using computer vision and machine learning techniques. The proposed system

Exams play a crucial role in the learning process, and academic institutions invest significant resources to ensure their integrity by preventing cheating by students or facilitators. Unfortunately, cheating has become rampant in exam environments, compromising their integrity.

3) Examination hall centralized mobile detection using arduino duemilanove. Et.al. Kiran Kumar Humse, Chethan K Mahadevaswamy and Sudheesh.K. V. This paper informed that this paper 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 takes 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.

III. PROBLEM STATEMENT

In recent years, there has been increasing issues relating to the use of mobile phones and camera in restricted areas. The mobile phone provides many ways for a student to cheat in an examination hall. The mobile phones are strictly prohibited inside the examination rooms. One of the existing approaches is to ensure the students are free of mobile phones in examination hall is by manual inspection in the entrance. Manual inspection cannot fully reveal

the students having mobile phones all the time. These devices will ensures the connectivity between a student sitting inside the hall and outsiders have been considerably increased a burden to invigilators to ensure that malpractices are not committed during exams.

IV. OBJECTIVES

The detection of signals which are emitted from the hidden wireless camera,

microphones, mobile phone. Here we try to prohibit the unauthorized use of mobile phones by using a detector, that sense the presence of an activate mobile phone signals radiated by them and also the wireless camera which radiates rf signal. Efforts have been put in place to tackle this issue but they all have their own shortcomings. The circuit can detect the signals during video or audio transmission from hidden camera and microphones also incoming calls and outgoing calls, messages and video transmission from mobile phone.

V. METHOD OF IMPLEMENTATION

1. Hardware Setup

- **Wi-Fi Module:** Detects unauthorized mobile signals.
- **Arduino Microcontroller:** Acts as the central processing unit, receiving signals and communicating with the IoT platform.
- **Buzzer:** Activates when an unauthorized mobile device is detected.
- **LCD Display:** Shows detection status.
- **Power Supply:** Power source with optional battery backup for uninterrupted functionality.

2. IoT Integration

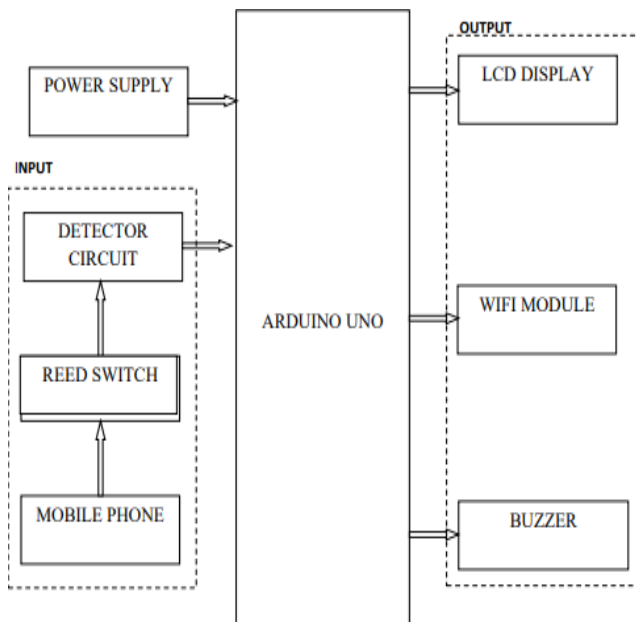
- **Install Required Libraries:** Use Blynk library in Arduino IDE for cloud integration.
- **Create an IoT Project:** Configure Blynk/Firebase for monitoring and alerts.
- **User Authentication:** Implement secure access for monitoring personnel.

3. Software Installation

- Initialize Arduino, buzzer, LED, LCD, and relay module.
- Connect Arduino to the IoT platform via Wi-Fi.
- Scan for unauthorized mobile signals using RF, or Wi-Fi scanning.
- Trigger buzzer and LED alerts upon detection.

- Display detection status on the LCD screen.

VI. SYSTEM ARCHITECTURE



VII. WORKING

1. The RF signal detector continuously scans for mobile signals in the examination hall.
2. If a mobile signal is detected, the Arduino microcontroller processes the data and triggers an alarm.
3. The relay module activates the buzzer and LED indicator to alert invigilators of unauthorized mobile usage.
4. Data is sent to the IoT platform, allowing remote monitoring and instant notifications.
5. The LCD screen displays the detected mobile signals along with their intensity levels.

VIII. SYSTEM COMPONENTS

The system comprises several components, each playing a specific role ensuring the safety of the environment.

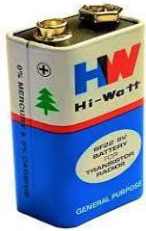
- **Arduino :** This microcontroller processes the signals received from the detector circuit. It act a brain of system executing a program instruction based on the input.



- **Detector Circuit :** This likely refers to sensors or circuits tht specific detects the input and conditions such as motion, temperature, or other environmental factor.



- **Power Supply :** Provides the necessary power to circuit components including the detector circuit, Arduino Uno, and other modules. It ensures that the system operates reliably.



- **Wi-Fi Module :** This module is used for communication purposes. It can send data from arduino to external system such as cloud server, mobile app, and other connected devices.



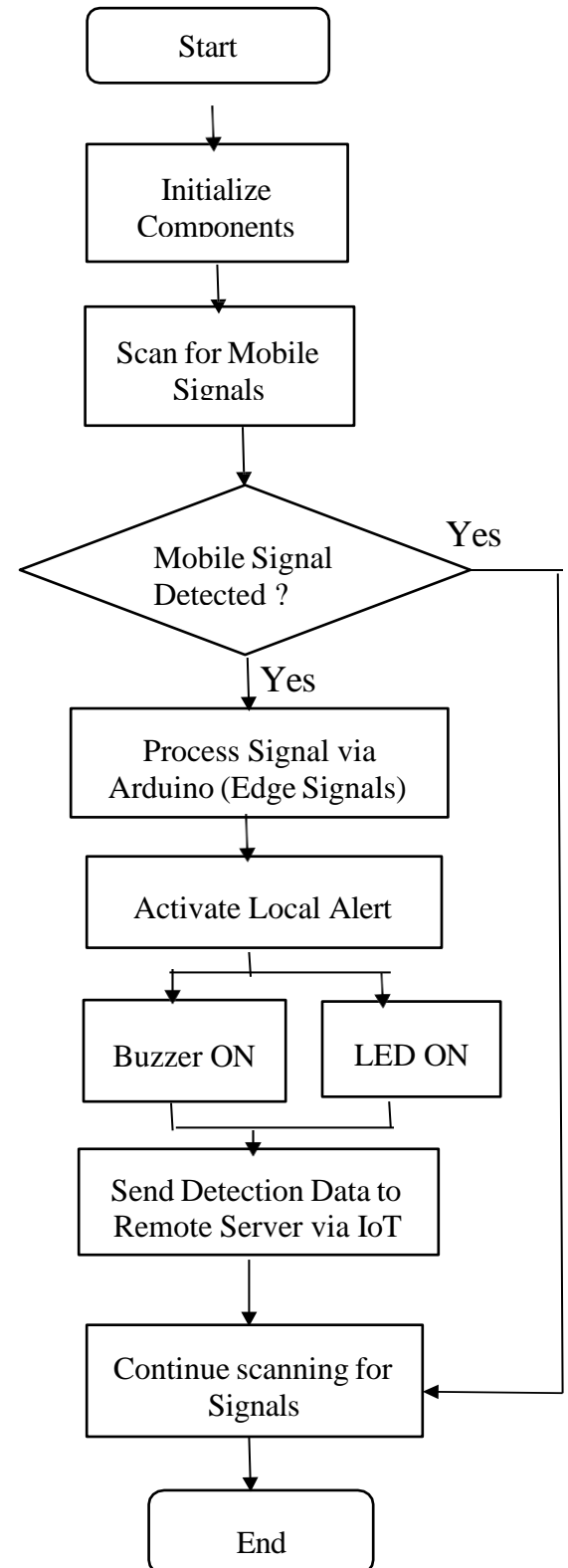
- **Buzzer :** Acts as an alert and notification mechanism. When certain conditions are met, the Arduino triggers the buzzer to sound and alarm, providing an immediate audible warning.



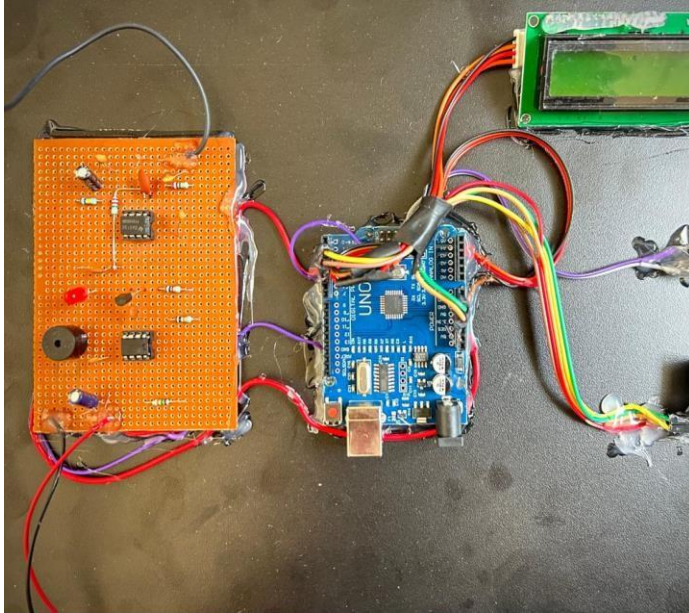
- **Reed Switch :** It uses magnetism to open and close an electrical circuit.



IX. METHODOLOGY



X. MODEL



XI. FUTURE SCOPE

- Integration with advanced technologies like AI for better detection accuracy.
- Development of more portable and discreet detectors.
- Enhancement in detecting newer communication technologies (e.g., 5G).
- Automated logging and reporting of detected devices.
- Integration with overall exam management system.
- Potential used in other secure environments (e.g., conferences, meetings).

XII. CONCLUSION

The system effectively detects unauthorized mobile devices through IoT-based sensors and monitoring, minimizing human intervention and enhancing security. By integrating Wi-Fi signal detection, it accurately identifies active mobile devices and alerts examination authorities immediately. The implementation and testing demonstrated high accuracy, reliability, and scalability. Future improvements could include Overall, this system contributes to maintaining the integrity of examinations by preventing unfair practices and ensuring a controlled assessment environment.

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