International Journal of Early Childhood Special Education (INT-JECSE)
DOI:10.48047/intjecse/v13i2.21225 ISSN: 1308-5581 Vol 13, Issue 02 2021

IOT-ENABLED SECURITY: ENHANCING PRISON SAFETY WITH A MONITORING AND ALERTING SYSTEM FOR INMATE ESCAPES

[#1] VOLADRI PRAVEEN KUMAR, Assistant Professor
[#2]JAKKULA GAGAN
[#3]BANDI AKHILA
Department of Electronics & Communication Engineering
SREE CHAITANYA INSTITUTE OF TECHNOLOGICAL SCIENCES, KARIMNAGAR, TS.

ABSTRACT: It is quite surprising how regularly people get freed from prison. Unfortunately, the actual number of hostages who have escaped around the world is unclear, but such instances are constantly covered in the news. The very thought of having a large number of convicts is frightening. As a result, we would want to propose an Internet of Things (IoT)-based system for monitoring convicts that can correctly and quickly detect instances of incarceration violations and notify the proper authorities. A gadget built on a microcontroller achieves the goal by leveraging radio frequency technologies. Each convict is provided an RF tag that allows for accurate position tracking within the facility. With the information provided, the two central tracking units are used to monitor and assess each prisoner. Every inmate is equipped with an RFID tracker that sends a secure wireless message with a unique prisoner code. The central system is unable to receive a prisoner's code upon their departure from the grounds. The receiver circuitry then alerts management to initiate suitable procedures for a specific inmate. At this point, the system sends the offender's information to the officers' alerting site, allowing them to quickly find and catch the inmate before he flees fifty meters from the facility. We created an online alerting portal system using IOT Gecko that can gather data from tracking devices, display alerts, and set alarms over the internet.
Keywords- IOT, alerting system.

1. INTRODUCTION

The rapidity with which people get freed from jail is very impressive. Unfortunately, no one knows for certain how many hostages have been released around the world, despite the fact that these tales are frequently covered in the media. The prospect of having so many convicts is terrifying. As a result, we propose an Internet of Things (IoT)-enabled jail surveillance system capable of swiftly and effectively detecting instances of prison infractions and immediately alerting the appropriate authorities. The goal is achieved by the use of a microcontroller-based device that employs radio frequency technology. Each prisoner is issued an RF tag, which allows them to be reliably tracked throughout the facility. Based on the information provided, the two central tracking devices monitor and rate each prisoner. Each prisoner has an RFID tracker that sends a private wireless communication using their unique prisoner code. Once a prisoner leaves the grounds, their code cannot be sent to the central server. Following that, the receiver hardware instructs management to initiate the appropriate measures for that specific prisoner. At the moment, the technology rapidly alerts the police where the perpetrator is, allowing them to apprehend him within fifty meters of the facility. We created an alerting portal system based on the internet of things (IOT) with the help of IOT Gecko. This system can collect data from tracking devices, transmit messages, and activate alarms from afar.

Fig.1: Example figure

So, we recommend using the Internet of Things (IoT) to monitor prisoners. This manner, if someone attempts to run, the system can rapidly notify the appropriate personnel. A microcontroller-based device uses radio frequency technologies to achieve its aim. All of the detainees are issued an RF tag that allows us to pinpoint their exact location in the building. The two central tracking units are employed to keep an eye on each prisoner and examine all of them based on the information provided. Each prisoner wears a radio frequency (RF) tag that continuously sends a unique code. The central system cannot receive a prisoner's code when they leave the building. When this occurs, the receiver

circuitry directs the management to take action against a specific prisoner. The system now sends the prisoner's information to the officers' warning site, allowing them to immediately locate and apprehend the prisoner before he gets 50 meters away from the facility. We are using IOTGecko to create an online alerting portal system that will receive information from tracking devices, display alerts, and trigger alarms via the internet.

2. LITERATURE SURVEY

IoT based Prisoner and Prevention System:

At the moment, there are a few security guards and a surveillance camera at the jail to monitor any illegal activity by convicts who are approaching the wall to escape. These strategies could be easily utilized by convicts to persuade authorities to change their thoughts. Prisoners seize this opportunity to escape their confinement. Adding pressure monitors to the perimeter wall, deploying drones, image processing-based CCTV surveillance, and installing CCTV surveillance are all options for dealing with this issue. These approaches are pricey and may not always provide accurate information on the prisoner's location. As a result, the Internet of Things (IoT) was employed to create a system for tracking down runaway inmates. This research examined two methods: i) Using a light source, laser, and GSM module to detect persons breaking in near the exterior wall; ii) Geofencing.Each prisoner would have a portable device equipped with a microprocessor, GPS, and GSM technology that would not break. Regular phone calls will be made to jail officials, and alarm systems will sound if anyone attempts to break through the geofenced outer wall. Latitude and longitude coordinates can be used to track the prisoner's exact position even while he is not in custody. The main concern with using this module is that the batteries don't last long. The battery would expire since the device was continually receiving latitude and longitude information. The portable technology may draw power from a variety of sources, including wireless charging, solar power, and movement.

Prison Monitoring IBEACON and Arduino Microcontroller:

To monitor the movements and actions of convicts inside a prison, utilize an Arduino controller and a cardiac sensor. Ibeacon and GPS technology are used to deliver messages to prisoners' phones or computers, follow the movements of prisoners who have fled the prison, and record each prisoner's personal information so that they may be located and lead back. Ibeacon is utilized in a variety of applications and situations, including disaster recovery, navigating stores, and keeping a watch on patients. An approved user is supplied information about the prisoner's location, which is then assessed by calculating the person's time and speed as they cross the street. Following that, an iBeacon and a heartbeat sensor are placed to the prisoner's hand to facilitate tracking. The receiver monitors the detainee's whereabouts and physical condition. Based on the location and signal strength of Bluetooth transmitters in specific areas, data will be kept in pre-configured base stations. The information will be saved at the base station closest to the individual. It provides data at a low frequency to provide additional verification of Ibeacon.

GPS based Hadcuffs System(using PIC 18f4550and GSM):

The purpose of this project is to use GPS and GSM technology to reduce the reliance on human error in correctional tracking systems. Law enforcement and police departments must maintain track of a suspect's location or prevent them from leaving a specific region. This makes it difficult to keep a close eye on them. The enormous number of individuals incarcerated makes it extremely difficult to locate a runaway who avoids arrest by hiding behind anything that cannot be broken or taking an underground path. Because of the current situation, we recommend deploying a handcuff system with GPS and GSM technologies to monitor and locate the culprit. This means that the prisoner can now move freely within a defined region. If a prisoner stays in a specific location, his or her system will remain within the coverage area of the jail, housing, or institution. However, it will not monitor their movements outside of that area. This is accomplished via radio frequency (RF) technology. As soon as the prisoner exits the specified area, the system detects that signals are no longer being transmitted from the jail emitter to the receiver. The prisoner has escaped, thus the system sends an alarm message to the target. The GPS system uses the GSM module to transmit an SMS with the prisoner's current coordinates, allowing the system to determine their whereabouts. This system uses a PIC family microcontroller to completely automate surveillance, house arrests, and patient tracking.

2.4 Bluetooth in Wireless Communication:

Bluetooth is a wireless data transfer system that enables computers and tablets to communicate without the use of wires. Short-range radio signals are utilized to accomplish this. Bluetooth has numerous advantages for end users, wireless network providers, and content creators because it enables them to apply new technologies in novel ways. This article examines the construction and operation of Bluetooth. This paper describes how to create a model capable of recording, printing, monitoring, and managing eight process variables simultaneously using a distributed control system. Furthermore, it provides a detailed discussion of how Bluetooth works and what it can be used for. Using the IISS structure, we provide a thorough description of how Bluetooth technology can be used to automate industries. Bluetooth technology is widely employed in industrial robotics applications. Industrial automation refers to the installation of machines in places where people once worked. It refers to managing or monitoring a factory, office, or

industrial action. In factories, a variety of equipment are linked together. These can range from simple data acquisition devices (I/O) to more complicated ones like as sensors, one-loop controls, and programmable controllers. A supervisory system functions as a human-machine interface (HMI) for data storage and monitoring. An IISS is a device that monitors all of the company's gadgets. The interface card serves as a link between the device and the PC. A transmitter connects the components in parallel, serving as a link between them. One method is to use the computer to connect to the device remotely, while the switches can be used to physically access it. An exercise simulated the process of connecting a personal computer to company devices. In addition, we used the computer language C to construct a software package that allows us to monitor the control room and PC remotely. The facts of the story demonstrate how Bluetooth technology is becoming increasingly crucial.

3. IMPLEMENTATION

It's actually astounding how many individuals get out of jail. It is impossible to estimate exactly how many jailbreaks occur around the world, however we are aware of and keep up to speed on a number of such situations. It is understandably frightening to consider that there may still be many captives out there. So, we'd like to propose an Internet of Things (IoT)-based system for monitoring prisoners that can rapidly and accurately identify cases of jail breaches and notify the appropriate authorities. The system accomplishes the task by utilizing radio frequency technologies and a circuit based on a microcontroller. All of the detainees are issued an RF tag that allows us to track where they are in the building. The two central tracking units are employed to keep an eye on each prisoner and examine all of them based on the information provided. Each prisoner has an RFID tag that transmits an electrical code that is unique to them. The central system cannot receive a prisoner's code when they leave the building. When this occurs, the receiver circuitry directs the management to take action against a specific prisoner. The system now sends the prisoner's information to the officers' warning site, allowing them to immediately locate and apprehend the prisoner before he gets 50 meters away from the facility. In this scenario, we're using IOTGecko to create an internet-based system for alerts. This system will receive data from monitoring devices via the internet, display messages, and trigger alerts.

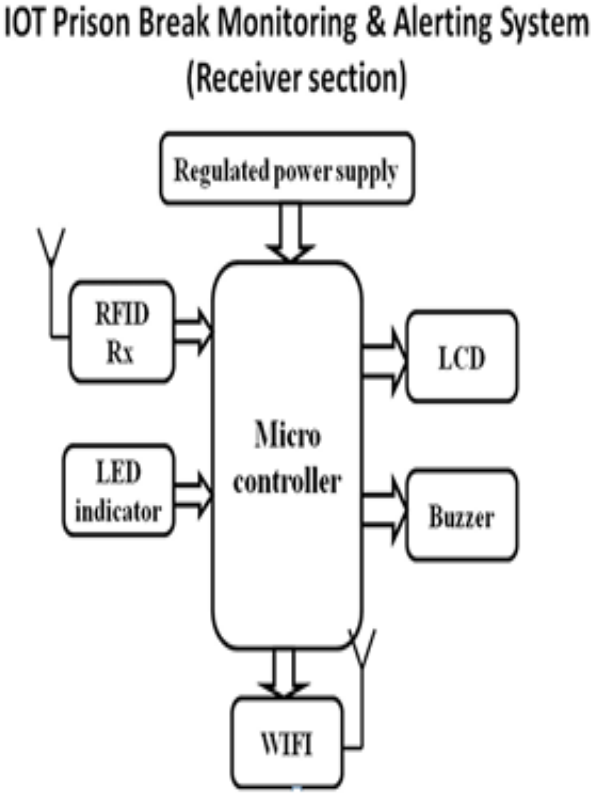

Fig.2: Block diagram

POWER SUPPLY:

All digital devices require a controlled power source. This post will cover how to obtain a controlled positive power source from the main power supply.

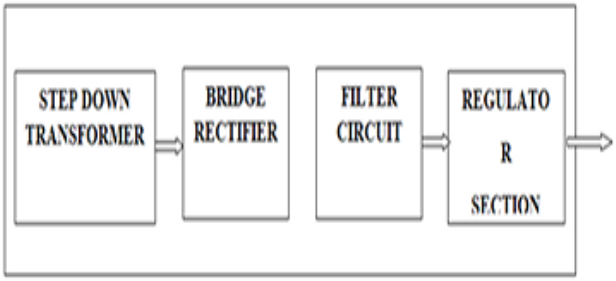

Fig.3: Power supply

TRANSFORMER:

A transformer consists of two coils: the primary and secondary windings. They are connected via electrical wires that are inductively coupled, commonly known as CORE. When the main current changes, it alters the magnetic field inside the core, resulting in an induced alternating voltage in the secondary coil. If you attach a load to the secondary, an alternating current will flow through it. If everything works properly, the magnetic field should transfer all of the energy from the main circuit to the secondary circuit.

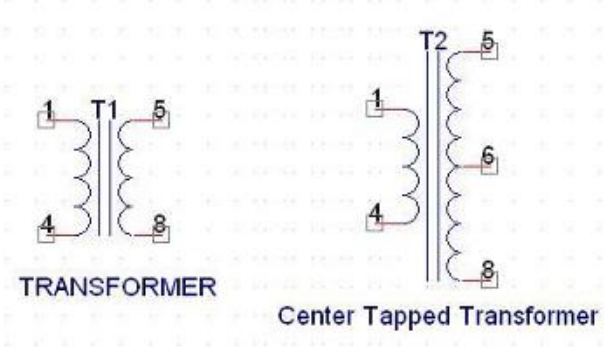

Fig.4: transformer

LCD MODULE:

An LCD screen is used to display interactive messaging. We're looking at a high-tech LCD panel with two lines of 16 letters each. The gadgets are connected to this screen. The steps to shake hands on the monitor are shown below. The control pins run from D0 to D7 on the data lines. The data lines are located at pins RS, RW, and EN. The remaining pins include a ground link (GND) and voltages of +5V and -5V. The RS pin selects which registers to use, the EN pin turns on the chip, and the RW pin allows for reading and writing. The monitor has two internal registers, each with a byte width. When the register select (RS) value is set to 0, a single register is utilized to store commands. When RS is set to 1, the other register is used to display characters. The gadget also includes a part of random access memory (RAM) that can be modified by the user. This is known as the character RAM. Users can create and store their own photos in this area, which can subsequently be shown as a dot matrix. Hex command byte 80 will be used to indicate that address 00h in the display RAM is being used, allowing you to distinguish between these two data locations.From ports 3.2 to 3.4, you can adjust the read/write levels and register selection. Port 1 is for the command or data type. The tasks assigned require varying amounts of time to run on the screen. To ensure that the screen is refreshed, look for a logic high or busy signal in bit 7 of the LCD. LCD, which stands for "Liquid Crystal Display," is a useful tool for correcting and creating user interfaces. Everyone understands that the HITACHI 44780 LCD controller may be used for a variety of purposes since it makes attaching the controller to an LCD simple and seamless. These LCDs are inexpensive and easy to connect to a device.

Fig.5: LCD

BUZZER:

A sound-sending device, such as a buzzer or beeper, might be electrical, electromechanical, or mechanical. Buzzers and beepers are frequently used to time, alert, and validate user input, such as when the mouse is pushed or the keyboard is pressed.

DOI:10.48047/intjecse/v13i2.21225 ISSN: 1308-5581 Vol 13, Issue 02 2021

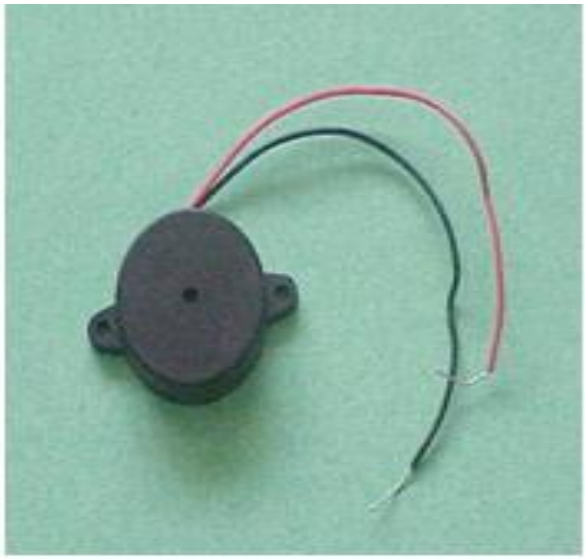

Fig.6: Buzzer

5. EXPERIMENTAL RESULTS

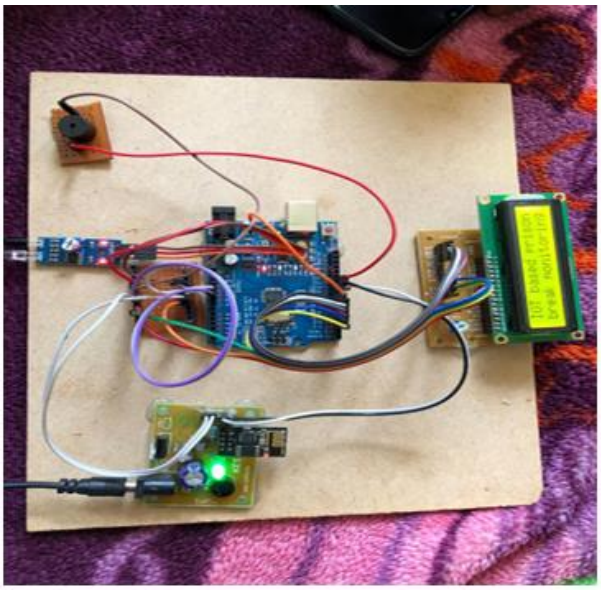

Fig.7: Output screen

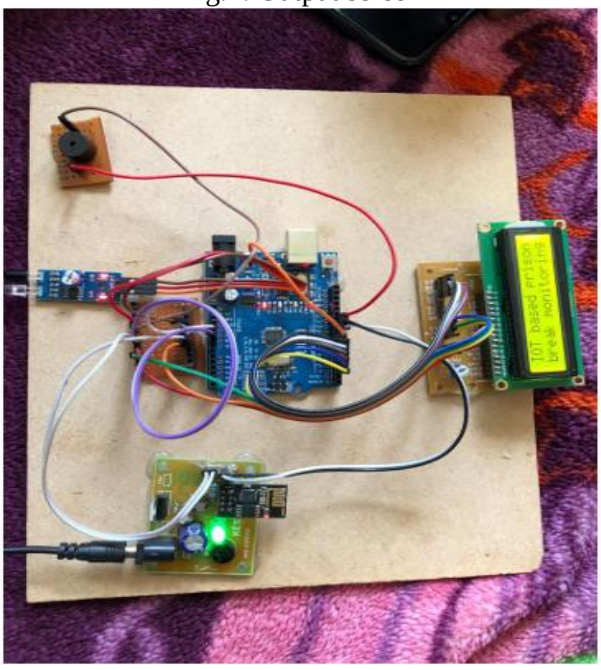

Fig.8: Output screen

6. CONCLUSION

The project's findings indicate that implementing this strategy in our jails would strengthen national security plans. Because of this strategy, the amount of jailbreaks varies from year to year.

REFERENCES

1. VaishaliRane, Harshada Vijay Gawde, Himanshu Sudhakar Kushwaha, Niragi Mahesh Masalia, TwinkleRajesh Panchal, “IOT Prison Break Alerting and Monitoring System (P BAS)”;PramanaResearchJournal;ISSN:2249 2976;|Volume-9Issue-22019
2. Dr. J.Cynthia, C.BharathiPriya, Dr. Nageswara Guptha M;“IoT based Prisoner Escape Alert and Prevention System”;International Journal of Pureand AppliedMathematics;ISSN:1314-3395; |Volume120 No.6 2018,11543-11554
3. S. Abraar, S. Banuselvi, B. Kowsalya; “Prison Monitoring IBEACON and Arduino Microcontroller”;IJSDR1803026 International Journal of Scientific Development and Research (IJSDR); ISSN: 2455 2631;March2018IJSDR|Volume3,Issue-3
4. AshishBaghel, RushinDeshmukh, VivekKausadikar, “GPS based Hadcuffs System(using PIC 18f4550and GSM)”;International Journal for Scientific Research & Development(IJSRD); ISSN:2321-0613 |Volume5,Issue-4,2017
5. AnuPS,Shibu V,Jabir KVT, Preetha Mathew, “A High Security Prison Management System Implementation Using RFID CARD”;Anu PSetal, Int.J.Computer Technology &Applications(IJCTA);ISSN: 2229 6093|Volume 6(1),89-92
6. K.V.S.S.S.Salram, N.Gunasekaran, andS.RamaReddy, "Bluetooth in Wireless Communication"; IEEE Communications Magazine, June 2002, pp.90-96.
7. Pooja, Sneha,Neha, “MonitoringSystemforPrisonerwith GP SusingWirelessSensorNetwork(WSN)”, IJCA;|Volume 91No.13,April2014.
8. BadriNath,FranklinReynolds,RoyWant,“RFID Technology andApplications,”IEEECSand IEEE ComSoc,Vol. 5, No. 1, 2006,pp. 22-24.
9. PankajVerma;J.S. Bhatia,"Design andDevelopment of GPS-GSMBasedTracking System with Google Map Based Monitoring" Internation al Journal of Computer Science, Engineering and Applications(IJCSEA) Vol. 3, No. 3,June 2013.
10. El-Medany ;Al- Omary ; Al-Hakim, ”A cost Effective Real Time Tracking System Prototype Usingintegrated GPS/GSM Module", Wireless and mobile Communications (ICWMC),2010 , 6th Internationalconference .Sept 10. International Journal of Computer science, Engineering and Application (IJCSEA)vol.3,no. 3,June 2013.