



IoT-based Geofencing application for kids and Ladies safety using RSSI

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Abstract:

This paper presents a study on IoT based geofencing application for kids and lady's safety using RSSI with Geo-fencing Capabilities. This system provided a high- security system that prevents kids and ladies from being missing. By using the Internet of Things (IoT) It also issued an alert to the user based on the boundary of the location. In this study, the system user easily monitors and track the location of their children's. This system is able to issue an alert when the transmitter and receiver get disconnected or exited the geofence area. This system is separated into two parts which was the hardware and software. The user can monitor their children's location by simply sending one SMS. We will test prototype system by moving hardware around the geofence area. Child safety and tracking is a major concern as the greater number of crimes on children and women are reported nowadays. With this motivation, a smart IoT device for child and women safety and tracking is developed to help parents and government to locate and monitor their children and loved ones. The above system ensures the safety and tracking of women and children.

Key words – IoT, Children Safety, GPS, GPRS , Arduino Nano.

I. INTRODUCTION

Internet of Things plays a major role in every day-to-day life. The major difference between IoT and the embedded system is that a dedicated protocol/software is embedded in the chip in the case of the embedded system, whereas, IoT devices are smart devices. The development of sensors technology, availability of internet-connected devices; data analysis algorithms make IoT devices act smart in emergency situations without human interventions. So, IoT devices are applied in different fields such as agriculture, medical, industrial, security, communication applications, etc. IoT systems are useful within a system to do deeper integration, analysis, and automation. IoT contributes to technology through advances in hardware, software, and modern tools. Child and women safety is a challenging problem nowadays due to antisocial elements in society. The crime rate is increasing day by day. Schools and workplaces need high surveillance for ensuring the safety of children and women. Smartphones are playing a major role in ensuring safety, where some mobile-based applications provide alert systems. During the emergency, mobile apps alert the control room of nearby police stations or caretakers of children. There is a large number of location tracking devices are available in the market, but it does not provide



the complete solution to the problem. The solution to this problem is to design an IoT device, which senses the child's and women's location and environment and during an emergency, it should send the alert to the parents automatically. In today's era safety of kids and ladies is the biggest challenge in front of parents and the government also so by accepting this challenging job we are designing a system that will help everyone to take care of their loved ones while doing their regular routine work. In this project, we are going to introduce an IoT-based system that will continuously monitor the WIFI network using RSSI (received signal strength indicator) and will take decisions according to received signal strength. In the current generation, we have reached a point where we can't live without technology. Smartphones are becoming smarter each day, provides new features that make our life much better. The crime rate of child molesting, kidnapping increased to a rate where it's hard to handle them by the authorities. This paper discusses how to prevent this to a rate that can be controlled. How we can use technology to decrease it to a level. Today smartphones are the basic need of the user today, providing lots of features that make our life so simple and easier. This paper is focused on the safety of children. Today safety of the children is substandard. The proposed application is developed on the android platform, the basic techniques required mentioned below: 1)Geo-Fencing 2) GPS (Global Positioning System) 3) SMS (Short Messaging Service).

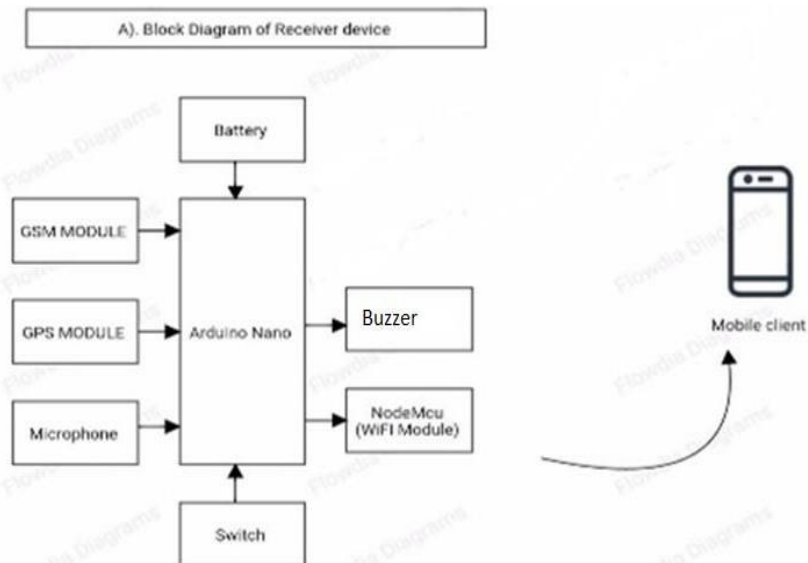
II.BACKGROUND

Using a Wi-Fi module system will detect the available WIFI network and will calculate signal strength using RSSI algorithm i.e., received signal strength indication. If the system identifies that signal strength is above 30% then the system will continue to detect signal strength and the system will not take any action if the signal strength is above or equal to 30%. If the system detects signal strength is below 30% system will trigger a buzzer and will wait for some delay that is approximately 60 seconds and will search for strong signal strength. After 60 seconds if the system finds fine signal strength, then the buzzer will get turned off otherwise the system will start executing the action loop written in the program. Firstly, the system will check the mode which is set by the user using a manual switch present on hardware. GSM Module sends GPS coordinates latitude and longitude by SMS. We will do Reverse Geocoding. Reverse Geocoding convert Lat Long to a readable address. The life of the child and woman can be saved. The system is fixed on the bus or in any vehicle so that the vehicle is going on a routine route or not can be identified by the GPS tracker. Nowadays the digital technology plays a major role in connecting persons via the internet. The android-based solution is provided to parents for tracking the children. Internet is the one that will connect different components through a single device and is connected to the server. Parents track their children in the location tracker by GSM. In the day-to-day scenarios, missing child cases are increasing gradually. Child caring is a major issue. Different types of methods are used to find good solutions. There have been many methods implemented to solve it. In, the child-caring problem global position system (GPS) based solution with two nodes was proposed. In these two nodes, one node is a child node that contains a Bluetooth module and a GPS receiver.

III.BLOCK DIAGRAM AND DISCRPTION

The Block diagram of the project consists of two sections one is transmitter section and the receiver section. The transmitter section consists of a 9 v battery, an on/off switch, and Node MCU that is (wi-fi) module. The

battery is used to provide a continuous uninterrupted power supply to the transmitter circuit. An off switch is



used to control the power on and power off operations of the transmitter circuit.

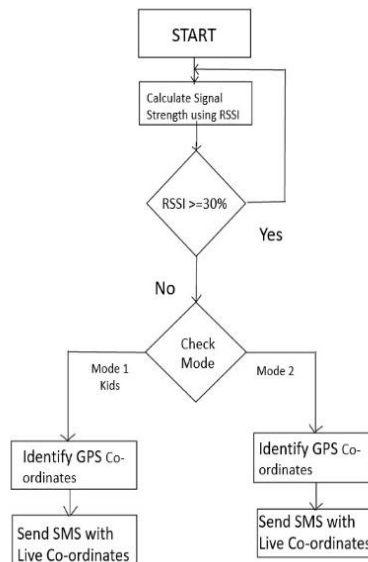
Node MCU is used to generate a local WIFI network. Receiver section: The receiver section consists of, Arduino nano, GSM module, GPS module, microphone, buzzer, switch, battery, and node MCU. Arduino nano: We are using Arduino nano as a controller to the project which will control all input and output devices and will make decisions according to data which is received from input devices. we are using the GSM module to send SMS in emergency situations to the family members and police control room. Its output device to the Arduino nano. We are using a GPS module to get live location coordinates of the device to identify the location, its input device to the Arduino nano. Node MCU is serially connected to the Arduino nano. It is used in receiving section to receive signal strength and identify the percentage of the signals using RSS that is received signal strength indicator. Node MCU will continually communicate with Arduino nano using the serial protocol and provide RSSI data to the controller. Microphone: Microphone is used as an input device to Arduino which is used to record voice in emergency situations on live call on SIM card on GSM module. The buzzer is an output device to Arduino nano which is used to notify users in emergency situations. If the RSSI value comes below the threshold then the buzzer will get turn on.

Algorithm:

- 1] Start
- 2] Connect to local network created by transmitter section or created by mobile hotspot.
- 3] Calculate signal strength using RSSI.
- 4] Check signal strength whether it is below 30% or above.
- 5] If RSSI value is greater than 30 % then get back to calculating signal strength again.
- 6] If signal strength is below 30% then check mode selected by hardware switch.
- 7] Check live GPS co-ordinates.

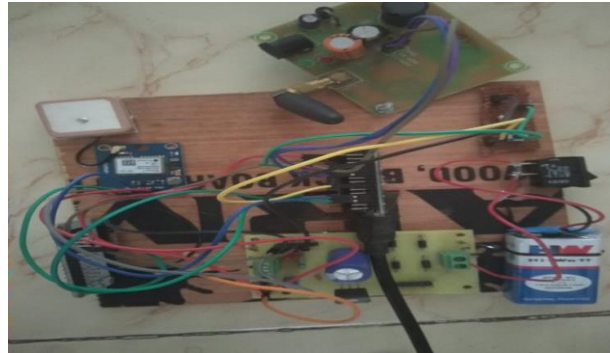
8] Send emergency alert with live location through SMS

Flowchart:



IV.RESULT AND DISCUSSION

The system has been tested and results were separated into two parts which are the software and hardware. The hardware components used were the Node MCU module and GPS module. For the software, Arduino IDE and Proteus design suite are used as a platform for this system. The hardware was tested for its functionality, efficiency, and compatibility with the software. The whole system was then tested for the software interfacing and stability of the hardware with one another. The system was tested in real-time to make sure that the functionality of the software and hardware was in a stable condition. The final implemented circuit shown below which represents our system design. A combination of Node MCU and GPS module was tested in order to access their compatibility. Each of the devices had its function, and it needed to verify if the combination had been working efficiently. Completed code with the GPS library was compiled and uploaded to the Node MCU by using Arduino IDE. Once the codes were uploaded, Node MCU initialized the comparison to the GPS module. To make sure if the GPS module had been initialized with the satellites, the LED on the module blinked every two seconds and continuously receive the signal. It transferred the signal to the Node MCU Serially. The latitude and longitude appeared in the serial monitor, and it showed that the GPS had been successfully verified by the Node MCU. Geofencing was tested for its functionality and efficiency in real-time situations. CONCLUSION: IoT-based geofencing application for kids and lady’s safety helps parents monitor their children and ensures child’s safety.



Some of the best works implemented in past rely on SMS-based tracking which is not helpful to get an accurate location, but in our proposed system we have provided real-time tracking. We have added Emergency messaging service and Geo-fencing to enhance the system. Whenever the child or woman leaves the geofenced boundary an emergency message will be sent to the parent. And also, if the parent wants to know the recent places visited by the child, they can see through this application. Therefore, we can conclude that this application provides a solution for children missing and this paper takes the advantage of smartphones which offer rich features like Google maps, GPS, SMS, etc.

V.CONCLUSION

IoT based geofencing application for kids and ladies safety helps parents for monitor their children and ensures child's safety. Some of the best works implemented in past relies on SMS based tracking which is not helpful to get an accurate location, but in our proposed system we have provided real time tracking. We have added Geo-fencing and Emergency messaging services to enhance the system. Whenever the child leaves the geofenced boundary an emergency message will be sent to the parent. And also, if the parent wants to know the recent places visited by the child, they can see through this application. Therefore, we can conclude that this application provides solution for child missing and this paper takes the advantages of smart phones which offer rich features like Google maps, GPS, SMS etc.

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