

Design and Construction of A Panic Button Alarm System for Security Emergencies

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Abstract:

This paper presents the design and construction of a panic button alarm system for security emergencies which is used for real time monitoring of security emergencies such as theft, threat to life and property. The main objective of this project is to provide real time monitoring of different security emergency events and to provide location of distressed individuals through GPS mapping system using Google map. This project is achieved using ArduinoUno microcontroller which acts as the brain of the system where all instructions are carried out, Wi-Fi module which gives Wi-Fi access to the microcontroller and the security control centre, GPS module which gives location of push button when triggered by an individual in a threatening situation. This design saves time to contact security in times of security emergencies and can be deployed in rural areas where access to security is limited.

Keywords- WiFi Module, GPS, Google Maps, Arduino uno, Microcontroller, Alarm System, Panic Button.

1. INTRODUCTION

A well coordinated security system gives security personnel timely alert for action to be taken to save life and property from destruction. Security systems should be built and placed at strategic locations which should be connected to a central security control centre where the location of a triggered push button is displayed on a google map screen using GPS monitoring system. The security system built can be deployed in rural areas where we have less security personnel. This system is utilized as a low-cost security system which is installed in various locations ranging from market places, stalls, supermarkets, street corners. This paper presents a panic button alarm system for security emergencies, the system is basically made up of an ArduinoUno microcontroller, a Wi-Fi module and a GPS module. The system development, analysis and discussions are also presented in this paper [1], [2], [3], [4].

2. METHODOLOGY

The development of the system starts from the design stage of the system where instructions are

programmed in a sequential manner. The system starts from the ON state to the activation state to the state where readings are taken from the GPS module to the state where location is sent by the Arduino through the Wi-Fi module. This is shown in a flow chart in figure 1 below. The methodology is summarized as follows:

- Design of a panic button alarm system
- Construction of the model
- Prototype testing
- Validation

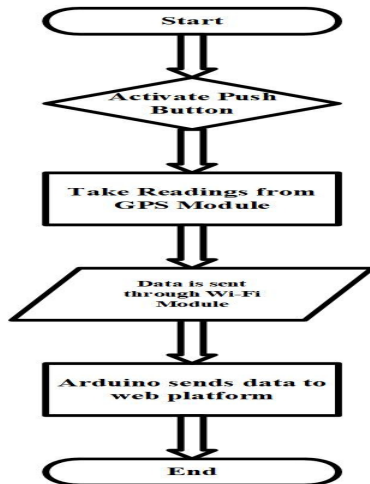


Fig. 1. System Flowchart

3. SYSTEM ANALYSIS

Panic button alarm system is a system designed for security emergencies to give GPS locations in real time to distressed individuals in threatening situations. This system basically comprises of an ArduinoUno microcontroller, Wi-Fi module, and a GPS module, and a push button which is the trigger point. These components are analyzed below [5], [8], [10].

I. Arduino microcontroller

Arduino microcontroller is a microcontroller that senses the physical environment with the use of sensors. The Arduino microcontroller in this project is used due to its easy interfacing and less capital in financing. It is designed to coordinate the activities of the system such as sending GPS location of a triggered push button to the interface at the central security control centre which is displayed through google map. The system was constructed using a 9 volt battery. Figure 2 below shows the ArduinoUno used.



Fig. 2 Arduino Uno

II. Wi-Fi Module

The Wi-Fi module used in this project is the ESP8226 Wi-Fi module. This module serves as the wireless communication link which is responsible for giving the microcontroller and security control centre access to the Wi-Fi network. Figure 3 below shows the diagram of the Wi-Fi module [7]



Fig. 3 ESP8226 WiFi Module

III. GPS Module

The GPS module which stands for global positioning system is a system module that gives the exact positioning of the triggered push button. The GPS module transmits location data to the ArduinoUno microcontroller, the ArduinoUno then transmits the GPS location to the security center through the Wi-Fi module. GPS Module is shown in figure 4 below [6], [9].



Fig. 4 GPS Module

4. Result and Discussion

Physical Design

The designed prototype was constructed in a plastic casing. This design can be reproduced and fixed at strategic locations. The figure 5 and 6 below shows the prototype in its casing.



Fig. 5 Physical Design



5. Software interface

The display software interface used in this project is google map because of its extensive mapping system. The GPS location is shown immediately on the security centre interface when the push button is activated. Figure 7 below shows the interface

Fig. 6 Physical Design

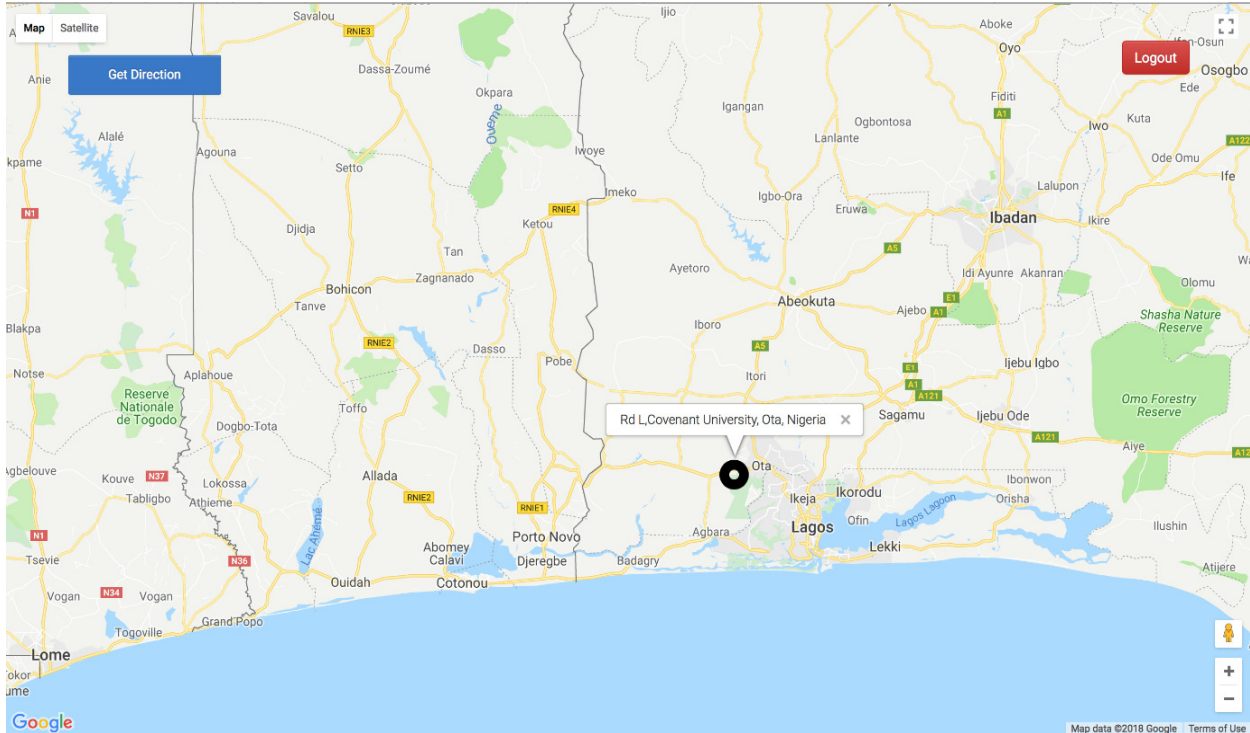


Fig. 7 Google Map software interface

6. CONCLUSION

This prototype was constructed and worked well. The system was powered to an ON state and the push button was triggered. The location of the triggered push button was displayed on the laptop screen which acted as our control centre. This paper solves the problem of delay in contacting security when there are security emergencies. The GPS module sends location of the triggered push button while the WiFi module acts as a wireless communication link.

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