

Original Article

# A Practical Method for Person Tracking and Alerting System in Risky Situations

Gowtham P<sup>1</sup>, Maharaj Manohar<sup>2</sup>

<sup>1,2</sup>Department of Electronic Communication Engineering, PSNA College of Engineering and Technology, Tamilnadu, India.

Received Date: 22 November 2021

Revised Date: 24 December 2021

Accepted Date: 18 January 2022

**Abstract:** As the frequency of crimes, assaults on the public, and thefts worldwide has increased significantly, general public safety is now a crucial aspect. In such circumstances, we must consider the public's safety precautions. For quick and improved system response, we use a high clock speed ARM 7 LPC 2148 microcontroller, RF connectivity, and GSM connection. By tracking a person's whereabouts and informing the necessary team members to rescue the person by sending SMS to the helpless, we will employ a clever and unique method for tracking a person in precarious circumstances. Additionally, we employ rescuing access modules that are attached to each street light pole to generate alerts at the person under peril. These modules notify by LED on and off, buzzer sound, and message that a person is in danger on an LCD.

**Keywords:** Public safety, women safety, children safety, embedded systems, ARM9, 89S52, GPS, RF communication, GSM, location identification, SMS, embedded C.

## INTRODUCTION

Any nation's development must take into account public safety. Everyone wants to live a trouble-free, quiet life. However, in the real world, everyone must deal with a variety of issues. Some of these issues include thefts, assaults, and crimes committed against anyone anywhere in the world. As a result, it is a significant and paramount parameter that must be prioritised. Women are frequently threatened and attacked, and the number of crimes against them has been rising steadily. Kidnapping of children is another important issue that requires our attention. The general public avoids leaving the house with expensive jewellery, cash, or other valuables because they are afraid of being attacked. The issue persists despite the government's extensive efforts to regulate attacks against the public.

For the past 25 years, women have been participating in a variety of activities, including education and work in a variety of professions. They contribute to our nation's progress, among other things. However, an increase in crime against them can lead to a bad environment and prevent them from leaving, which will be a big concern for us. Kidnapping of children is also one of the main issues. Both parents and kids experience a sense of insecurity as a result. Children find it difficult to quickly repel intruders. This issue persists despite extensive security and surveillance measures. Theft is also on the rise daily. In this process, men as well as women and children are attacked. The assailants steal expensive equipment, cash, and jewellery. In this procedure, members of the public are occasionally attacked, wounded, or they pass away. The impact of this issue on the nation's development is significant. If this issue worsens daily, no foreign investors, students, tourists, or other visitors will come to our nation. A peaceful and safe nation can draw in a variety of foreign businesses and organisations, increasing the employment prospects and allowing our nation to grow. This issue also affects economic growth.

## LITERATURE SURVEY

This research detailed a mobile tracking application that uses LBS to locate friends and uses the GPS as a location

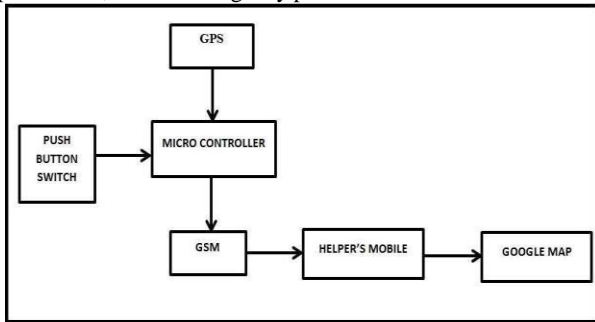
provider via the physical location of the mobile network. This develops a client-server system that enables users to identify and track friends and get alert messages when they are close by using a radius defined by the administrator. The system contains GPS and GSM systems that allow users to share their current position with trusted contacts. Our technology is linked to Google Map in order to track people's locations in real time. The system will look like a gadget. The user may employ it (for example, like a watch). To receive support, the user merely needs to press a button. The stored contacts will thereafter get a transmission of the user's position. The assistant can then decide that the user is in a difficult situation and can help them immediately away. Global Positioning System (GPS) and Global System for Mobiles (GSM) are both included in the system, and a UART (Universal Asynchronous Receiver Transmitter) is used to operate both of them. By using the system's push button, the aid seeker may get assistance whenever they need it. The location of the assistance seeker is subsequently sent to the helper through a Google-map URL. We also cannot ensure that the user will get the message at the same address. As a result, for tracking reasons, the assistant will get location updates every two minutes.

## CURRENT SYSTEM

The current system that we used was "An Innovative Approach for Women and Children's Security Based Location Tracking System." This approach is necessary in circumstances like being abducted by an unknown person or being missing. Therefore, the main goal of this initiative is to offer security in these areas. The device is extremely portable. The primary service used in this area is short message service (SMS). The assistant needs a mobile phone with internet access that is solely used to display the location on a map. To communicate their whereabouts, the person seeking assistance needs a gadget with GPS and GSM services. Help seekers have complete control over this mechanism. The system's architecture comprises of a SIM card for radio connection, a GPS transceiver for satellite position retrieval, a programmed UART (Universal Asynchronous Receiver/Transmitter) microcontroller to pass location data into the link's default



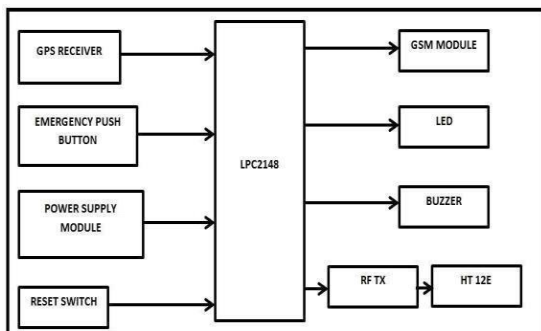
parameters, and an emergency push button.



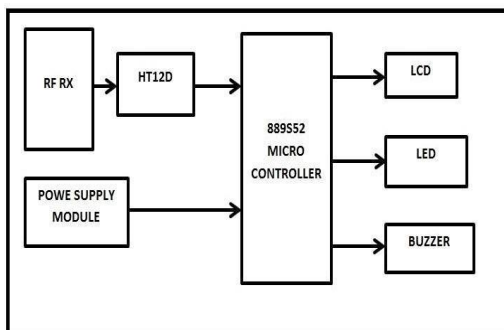
**Fig: Existing System Block Diagram**

**PROPOSED SYSTEM**

Police stations, hospitals, and volunteer service centres will all be treated as rescue centres for the purposes of this project, and we will collect their mobile numbers to add to the database. When a problem arises, the position information are recorded, and rescuing centres within a 2-kilometer radius are found by GPS locations and automatically notified through SMS to send help to the person in danger. To provide light and audible signals to alert the surroundings, we will introduce LED and buzzer. Here, we will use each street light poll as a point of reference and introduce the rescue access module, which is made up of an LED, a buzzer, and an LCD and operates on the electricity from the street lights. Rescue access module generates a buzzer and LED signal whenever a problem arises. The location of the person who is under threat is also shown on the LCD. The neighbouring populace can be informed and the helpless can be rescued.



**Fig: Block Diagram of proposed system carried by user**



**Fig: Block Diagram of proposed system of rescue access module**

**WORKING PROCEDURE**

The user carries the system module unit that we suggest. Each street light pole has a rescue access module

attached to it. The user promptly clicks the emergency push button whenever a threat or issue arises. It provides digital input to the microcontroller, which uses the GPS receiver to determine the person's location and sends a location tracking link to the rescuer whose contact information was previously saved by the user as well as to the closest access point for assistance, such as a police station or other organisation. With the provided tracking position details, we can use Google Maps to locate the person who is in danger. Additionally, it causes the user-portable system's buzzer to emit a sound signal and continuously turns the LED on and off. It is simple to alert locals.

The data from the ARM 9 microcontroller is transmitted via the HT 12E encoder and passed to the rescue access module's RF receiver, which is located at a street light pole, by the RF transmitter. The RF receiver transfers the data to the HT 12D decoder after receiving it from the RF transmitter. It then transmits the decoded data to the 89S52 microcontroller. The Incorporated C programming language, which is embedded in the 89S52 microcontroller, is used to continually turn on and off the LED and generate sound signals from the buzzer. Additionally, it shows on LCD that a person is in danger. The LED and buzzer can alert anyone passing by that direction, and they can instantly rescue the individual. The main benefit of this method is that RF communication only has a 100-meter range. Therefore, we can readily assist the individual who is in danger by scanning the area within 100 metres of us. It takes very little time to save someone, and it happens swiftly. Once the issue has been resolved, pressing the reset button returns the entire machine to its initial state.

**SOFTWARE TOOLS USED**

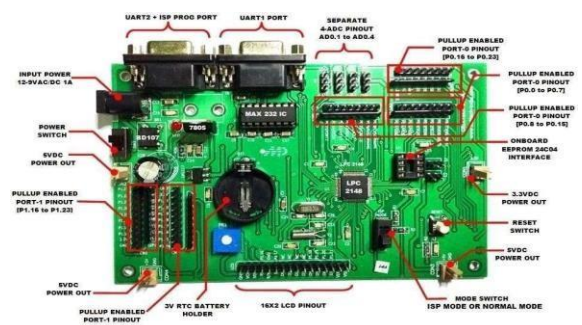
- Keil µ Vision
- C51 Compiler /A51 Macro Assembler

The C51 Compiler or A51 Macro Assembler receives source files that were created using the Vision IDE. Source files are processed by the compiler and assembler, which produce replacement object files.

A complete ANSI version of the C programming language, the Keil C51 Compiler covers all of the language's fundamental features. Numerous features have also been developed to directly support the 8051 architecture.

**HARDWARE TOOLS USED**

**A) LPC 2148 Microcontroller**



**Fig: Model Board - ARM LPC 2148**

- On-chip static RAM
- Interrupt controller

- Fast Interrupt Request
- Pin connect block
- 10-bit ADC
- USB 2.0 device controller
- UARTs
- I2C-bus serial I/O controller
- SPI serial I/O controller
- Watchdog timer
- Real-time clock
- Pulse width modulator

### B) System control:

- Crystal oscillator
- PLL
- Code security
- External interrupt inputs
- Memory mapping control
- Power control
- Emulation and debugging
- 89S52 Micro Controller
- APB bus

### C) Flash Magic Tool:

We utilise software called flash magic tool to download the hex file into the microcontroller board. The Embedded Systems Academy's Flash Magic Windows programme provides quick access to all the ISP functionalities offered by the gadgets.

These features include:

- Programming the Flash memory;
- Changing the Boot Vector and Status Byte;
- Reading Flash memory;
- Running a blank check on a sector of Flash memory;
- Reading and writing the security bits;
- Erasing the Flash memory (specific blocks or the entire device).
- Using a new baud rate directly (high speed communications)

Utilizing the Program Flash Magic that is connected to the MCU through the Serial Port of the computer PC, Hex files can be downloaded into the Flash Memory of the MCU in the Board.

### Proceeding to Download Hex File into MCU

- RS232 Cable Interface between BoardUART-0 and the RS232 Serial Port of the PC (CN3).
- Power the board; in this instance, we can see that red LED 1 is on.
- Turn on the jumper BR4 (INT1).
- Launch the programme Flash Magic; the output will be displayed as in Figure 6.2.
- We configure values into the software as follows to begin establishing the starting values as requested.
- Pick a COM port (in this example, it is COM1).
- Select a 9600 baud rate.
- Select LPC2148 as the device.
- Change the interface to None. ISP Set the crystal oscillator at a frequency that corresponds to the

internal board value.

- Since it is 12.000MHz in this instance, we must set to 12.

### APPLICATIONS

- In an emergency, it can be used to locate children and save them.
- When the public is in danger, this technology makes it simple to save them.
- This system can ensure the safety of women.
- We can utilise this technique to rescue elderly folks in an emergency.

### RESULTS



Fig: Hardware system of module which is carried by the user block diagram



Fig: Hardware system of rescue access module



**Fig: SMS alert**  
**CONCLUSION**

We can draw the conclusion that by employing "A smart strategy for person tracking and warning system under vulnerable conditions," we can improve public safety and reduce crimes, assaults, and thefts against people. It has a very low cost and is simple to apply. Any life that is saved is worth celebrating. Peace and economic growth are constants in nations with higher levels of safety and lower crime rates.

**FUTURE SCOPE**

We can expand this system to automatically rescue the person in danger by using sensors like body temperature sensors and heartbeat sensors, but caution must be exercised because if any common tensions cause the body temperature sensors or heartbeat sensors to activate, a panicky situation may result.

**REFERENCES**

- [1] Wang, Zhihua, Zhaochu Yang, and Tao Dong. "A review of wearable technologies for elderly care that can accurately track indoor position, recognize physical activities and monitor vital signs in real time." *Sensors* 17.2 (2017): 341.
- [2] Moreira, João, et al. "Improving the semantic interoperability of IoT Early Warning Systems: the Port of Valencia use case." *Enterprise Interoperability VIII*. Springer, Cham, 2019. 17-29.
- [3] McDonald, Kathryn M., et al. "Implementation science for ambulatory care safety: a novel method to develop context-sensitive interventions to reduce quality gaps in monitoring high-risk patients." *Implementation Science* 12.1 (2017): 1-17.
- [4] Soltanmohammadlou, Nazi, et al. "Real-time locating systems and safety in construction sites: A literature review." *Safety science* 117 (2019): 229-242.
- [5] Booch, Grady, et al. "Object-oriented analysis and design with applications." *ACM SIGSOFT software engineering notes* 33.5 (2008): 29-29.
- [6] Elnaggar, R., Vittorio Cortellessa, and Hany Ammar. "A UML-based Architectural Model for Timing and Performance Analyses of GSM Radio Subsystem." *Proc. of the 5th World Multiconference on Systemics, Cybernetics and Informatics (SCI)*, Orlando, FL. 2001.
- [7] Monti, Giuseppina, et al. "Wearable logo-antenna for GPS-GSM-based tracking systems." *IET Microwaves, Antennas & Propagation* 10.12 (2016): 1332-1338.
- [8] Saha, Debashis, and Amitava Mukherjee. "Pervasive computing: a paradigm for the 21st century." *Computer* 36.3 (2003): 25-31.
- [9] Khaizer, Mohammed, and K. Santha. "Design and Implementation of Vehicle Tracking System using GPS/GSM/GPRS Technology and Smartphone Application." *International Journal of Scientific Engineering and Technology Research* 4 (2015): 35.
- [10] Lysecky, Susan, and Frank Vahid. "Automated application-specific tuning of parameterized sensor-based embedded system building blocks." *International Conference on Ubiquitous Computing*. Springer, Berlin, Heidelberg, 2006.
- [11] Murtada, Ahmed, and Abdalhamid Mansor. "Mosque finding and mobile profile changing application." *2015 International Conference on Computing, Control, Networking, Electronics and Embedded Systems*

- Engineering (ICCNTEE). IEEE, 2015.
- [12] [10] Dave, V., and Amit Welekar. "Design of an Android Application to provide Emergency Service." *International Journal on Recent and Innovation Trends in Computing and Communication* 3.3 (2015): 1484-1488.
- [13] [11] Ayyasamy, A., L. Sai Ramesh, and V. Sathiyavathi. "Iclique Cloak Approach for Protecting Privacy of Mobile Location with Image Processing Techniques." *International Conference on Image Processing and Capsule Networks*. Springer, Cham, 2020.