



# Implementation of Panic Button in Mobile Phones

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## ABSTRACT

Our objective in this paper is to present a feasible solution to send a SoS message in a phase where the phone is switched off. SoS distress signal is an abbreviation for “save our souls” or “save our ship.” But in reality, “save our souls” and “save our ship” are backronyms, and the letters don’t actually stand for anything. Morse code string of three dots, three dashes, and three dots all run together with no spaces or full stops (... ---...). Since three dots form the letter “S” and three dashes form an “O” in International Morse code, though, the signal came to be called an “SOS” for the sake of convenience. In the existing System, it deals with send SoS message to the given emergency number when the phone in ON condition by using a SoS app, The major problem arise here is when the device is switched off the SoS message cannot be send, our system become the solution for this problem. In our proposing system there is a secondary battery storage, which only use for the emergency services. The GPS and GSM modules are works within it. Here uses a secondary power source and Adding an separate button to send SoS messages, When the SoS button is pressed the phone starts sending an alert message which contains the current location and the alert SMS to the contact that already registered for this service in our device. Raspberry Pi and Arduino (ATmega 328) are the major components.

**Keywords:** SOS distress signal, Morse code, Panic Button, Raspberry Pi, Arduino (ATmega 328).

## I. INTRODUCTION

Implementation of panic button in mobile phone is a system that use to help people when they are in urgent situation. For example when a people kidnapped by a kidnapper, during the extreme situation, they can just press one button from the mobile phone even if mobile is switched off all the personal information will be send through SMS to 5 or more important person or even some government official that set by the user. The personal information of the user, the coordinate of the user current location and the emergency message set by the user will attach together in SMS and send. The best way to curtail your probability of becoming a dupe of violent crime (robbery, sexual assault, rape, domestic violence) is to recognize, defence and look up resources to help you out of hazardous situation. If you’re in dilemma or get split from friends during a night out and don’t know how to find back residence, this mobile with you will guard you and can reduce your risk and bring assistance when you need it. There are several app reduce the risk of sexual assault on women by informing control center and their

associates through SMS, but in lay of those this apparatus have much more efficient way to inform those this respected personals and also has a defending system which cannot be provided by existing app.

Our system that ensures the safety of women. It reduces the risk and helps us in need by identifying the location of person who is in danger. A chaotic world has become a ground for numerous natural disasters and man-made disasters. Natural disasters like Tsunamis, flood, earthquakes, hurricanes and storms or human caused events like large scale terrorist attacks or nuclear disasters, power sources may be totally destroyed and make the mobile batteries completely drained off. This situation makes the rescue operations extremely difficult to help the trapped survivors. Getting ‘Right data at a right time’ is a tough challenge in case of any pre and post crisis situation because “A minute delay in seconds may cost someone’s life” there. A remedy for this is the development of Smartphone technology. Here predefine the contacts in the SoS system that used for the emergency situation ,if such a situation occurs an

emergency message will send to the corresponding contacts .But the main problem is when the device is in poweroff condition (no battery charge) this technique is not works. Therefore this paper propose a system known as "Implementation of panic button in mobile phones". This SoS method also work in switch off conditions by using a backup power

## II. RELATED WORKS

Sujit Rai et.al [1] An app is capable of sending the emergency messages via push notification and sms services to the selected contacts in one's smartphone informing them about the current happenings and telling the whereabouts of the user in the event anything goes wrong. A fully functional security app, It will be equipped with some of the most astounding features including reports, events, emergency contacts, gps integration, custom push notification, co-attendees of the events and capability to function efficiently in multiple event types. Pramod Sonawane et.al[2] Having a smartphone makes it much more convenient to check your email, social media or even your bank account while on the go. But there are also limitations of smartphone because we cannot connect directly to a USB or Ethernet cable with our phone and other multiple devices. So we provide the solution of that making pi phone using raspberry pi which is advancement in smartphone. Ravi Sekhar Yarrabothu et.al [3] This paper presents Abhaya, an Android Application for the Safety of Women and this app can be activated by a single click, whenever need arises. A single click on this app identifies the location of place through GPS and sends a message comprising this location URL to the registered contacts and also call on the first registered contact to help the one in dangerous situations. Priyanka Shinde et.al[4] This application collected speed and location information from the Global Positioning System (GPS) receiver, used the Google Maps Application Programming Interface (API) to determine the location of nearby hospitals, and gives message to hospitals and relatives, if a person need a help. Premkumar.P et.al[5] Introducing a device which ensures the protection of women. This helps to identify protect and call on resources to help the one out of dangerous situations. Anytime you senses danger, all you had to do, is hold on the button of the device. The system resembles a normal watch which when activated, tracks the place of the women using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to sos contacts and the police control room. S.Mythili et.al[6] This paper provide a comprehensive overview of existing emergency applications by evaluating its operations, benefits and limitations. It provides an alternative direction to vanish the conventional problem having manual intercession and reporting emergencies R.Hari Sudhan et,al[8] This paper,

Arduino UNO ATMEGA-328 microcontroller is described in a detailed manner. Arduino software is installed in the computer and so that we can edit and upload the program according to the applications. Mainly these arduino software supports c and c++ programming languages.

Hugo Paredes et.al[9] This paper presents SOSPhone, a prototype of a mobile application that was developed to enable users to make emergency calls using an iconographic touch interface running in a touchscreen mobile device. The prototype implements the client-side of the application and was demonstrated and evaluated by a large number of users, including people without any disability, emergency services professionals and deaf people. This paper describes the SOSPhone prototype and presents the results of the interface evaluation process. Above papers only discuss about the sending distress signal when the device is ON condition. Our work overcome this Disadvantage.

## III. METHODS AND METHODOLOGY

### A. Hardware components:

- a) Raspberry pi 3 B+:



Figure 1: Raspberry Pi 3 B+

The entire single-board computer measures just 3.35 x 2.2 x 0.67 inches on its own about the size of a deck of cards and fits into a variety of cases and housings. The board weighs 1.8 ounces. On the board is everything you need to either use the Pi as a little desktop or build it into your next project. The standard ports are all there, with four full-size USB 2.0 ports, a Gigabit Ethernet jack (max speed 300 Mbps), a single HDMI output and a 3.5-millimeter, four-pole jack that doubles as a stereo audio and composite video port. A microSD card slot is used for installing storage, meaning you can add as little or as much storage space as you can get on a microSD card.

The Pi 3 B+ has a quad-core Broadcom BCM2837B0 and a Cortex-A53 processor clocked at 1.4 GHz. It gives you full 64-bit support and offers more power than previous iterations of the Pi, including the immediate predecessor, the Pi 3. There's 1GB of LPDDR2 SDRAM for memory and a microSD card slot that you'll use for storage and

loading, for whichever operating system you want to put on it.

**b) ATmega 328:**



Figure 2: ATmega 328

ATmega 328 has 1KB Electrically Erasable Programmable Read Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply. Moreover, ATmega-328 has 2KB Static Random Access Memory (SRAM). Other characteristics will be explained later. ATmega 328 has several different features which make it the most popular device in today's market. These features consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM pins, programmable Serial USART, programming lock for software security, throughput up to 20 MIPS etc. ATmega-328 is mostly used in Arduino. The further details about ATmega 328 will be given later in this section.

**c) GSM module:**



Figure 3: GSM module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment

Identity) number similar to mobile phones for their identification.

The MODEM needs AT commands, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular network.

**d) GPS module:**



Figure 4: GPS module

GPS receivers are generally used in smartphones, fleet management system, military etc. for tracking or finding location. Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth. GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS. GPS receiver needs to receive data from at least 4 satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites. This GPS receiver is used in many applications like smartphones, Cabs, Fleet management etc. GPS receiver uses a constellation of satellites and ground stations to calculate accurate location wherever it is located. These GPS satellites transmit information signal over radio frequency (1.1 to 1.5 GHz) to the receiver. With the help of this received information, a ground station or GPS module can compute its position and time.

**B. Software Components:**

**a) Raspbian OS:**

Raspbian is a Debian-based computer operating system for Raspberry Pi. There are several versions of Raspbian including Raspbian Stretch and Raspbian Jessie. Since 2015 it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers. Raspbian is highly optimized for the Raspberry Pi line's low-performance ARM CPUs.

Raspbian uses PIXEL, Pi Improved X-Window Environment, Lightweight as its main desktop environment as of the latest update. It is composed of a modified LXDE desktop environment and the Openbox stacking window manager with a new

theme and few other changes. The distribution is shipped with a copy of computer algebra program Mathematica and a version of Minecraft called Minecraft Pi as well as a lightweight version of Chromium as of the latest version.

#### b) Arduino IDE:

The Arduino integrated development environment (IDE) is a cross-platform application (for windows, macOS, LINUX) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiringproject, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub *main()* into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program *avrdude* to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

#### c) Embedded C:

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C.

The microcontroller programming is different for each type of operating system. Even though there are many operating system are exist such as Windows, Linux, RTOS, etc but RTOS has several advantage for embedded system development.

#### d) Python shell:

Python is a very useful programming language that has an easy to read syntax, and allows programmers to use fewer lines of code than would be possible in languages such as assembly, C, or Java. The Python programming language actually started as a scripting language for Linux. Python programs are similar to shell scripts in that the files

contain a series of commands that the computer executes from top to bottom. Unlike C programs, Python programs don't need to be compiled before running them. However, you will need to install the Python interpreter on your computer to run them. The Python interpreter is a program that reads Python files and executes the code. It is possible to run Python programs without the Python interpreter installed though. Programs like Py2exe or Pyinstaller will package your Python code into stand-alone executable programs. Python 2 and Python 3 come pre-installed on Raspbian operating systems, but to install Python on another Linux OS or to update it, simply run one of these commands at the command prompt:

```
sudo apt-get install python3
Installs or updates Python 3.
sudo apt-get install python
```

#### e) Tkinter Package:

Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter outputs the fastest and easiest way to create the GUI applications. Creating a GUI using tkinter is an easy task.

##### To create a tkinter:

1. Importing the module – tkinter
2. Create the main window (container)
3. Add any number of widgets to the main window
4. Apply the event Trigger on the widgets.

Importing tkinter is same as importing any other module in the python code. Note that the name of the module in Python 2.x is 'Tkinter' and in Python 3.x is 'tkinter'

```
import tkinter
```

## METHODOLOGY

### A. Architectural block diagram:

When panic button is pressed wake up controller is enabled, it send wake up signals to the Raspberry pi 3 B+, secondary relay and ATmega 328. This is for enabling all these components ,if primary power is ON in all these components they will enable ,else raspberry pi will not enable therefore this help to determine device is switch ON or OFF.

Secondary relay is part which the switching of power take place. This is used to switch the control of secondary power to the ATmega 328.

Raspberry pi is one of the core component of our proposed system. It consist of overall packages required

for a mobile device or a mini pc, it has built in processor, RAM and I/O ports. An exclusive kit from Cana Kit that includes the fastest model of the Raspberry Pi family - the Raspberry Pi 3 Model B+ The Raspberry Pi 3 Model B+ is the latest production Raspberry Pi 3 featuring a 64-bit quad core processor running at 1.4 GHz.

## B. Flow Chart:

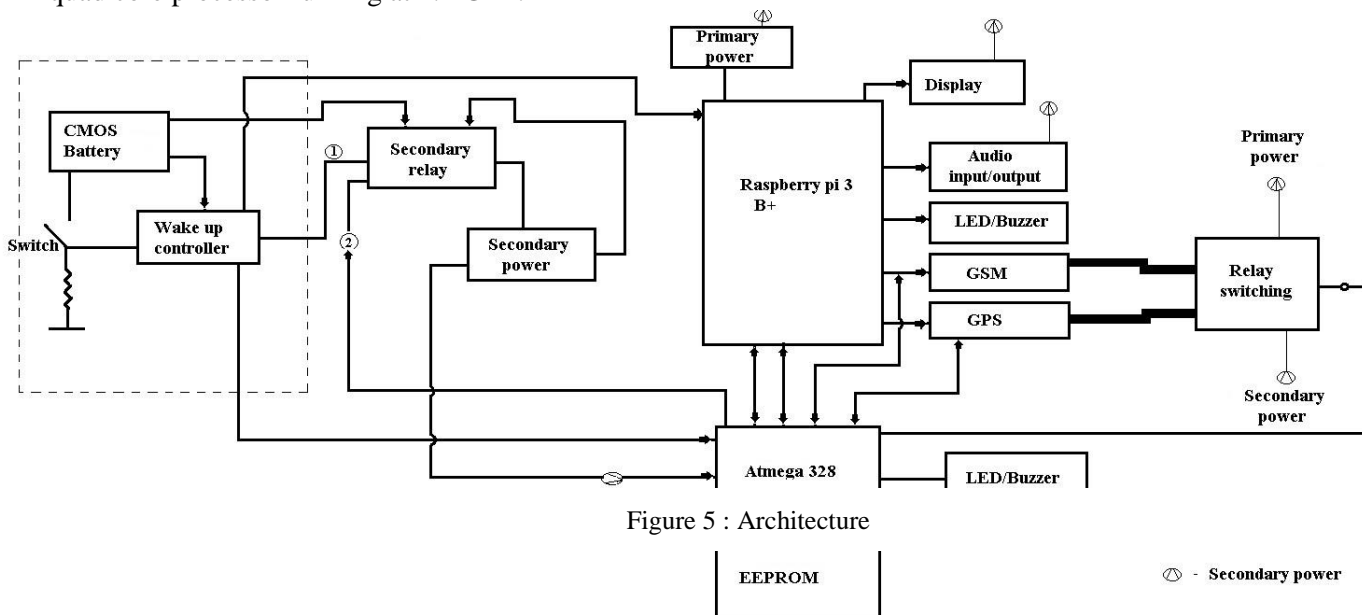


Figure 5 : Architecture

In our device Raspberry pi 3 B+ receive signal from the wake up controller and check if the device has availability of the primary power then all the components associated with the raspberry pi will work and the SoS message with GPS location will send with the help of this primary battery along with the help of ATmega. If primary power is not available then raspberry pi cannot send signal to ATmega ,the ATmega takes complete control.

ATmega 328 is the high-performance Microchip 8-bit AVR RISC-based microcontroller. Here is the message to be send and programs are written. The reverse switching is occur between ATmega and secondary relay, that is ATmega take the control of secondary relay. Therefore Secondary power also under the control of ATmega. ATmega check raspberry pi is ON or OFF ,if primary power is ON raspberry pi send signal to ATmega, so ATmega do not need to worry about the control of GSM or GPS module(work with primary power).Else when the primary power is OFF raspberry pi do not work so no signal is received in ATmega therefore it takes the control of GPS and GSM modules(switch to secondary power using relay switch based on the signal from ATmega 328).

GSM/GPRS module is used to establish communication between a computer and a GSMGPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication.

A GPS navigation device, GPS receiver, or simply GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position.

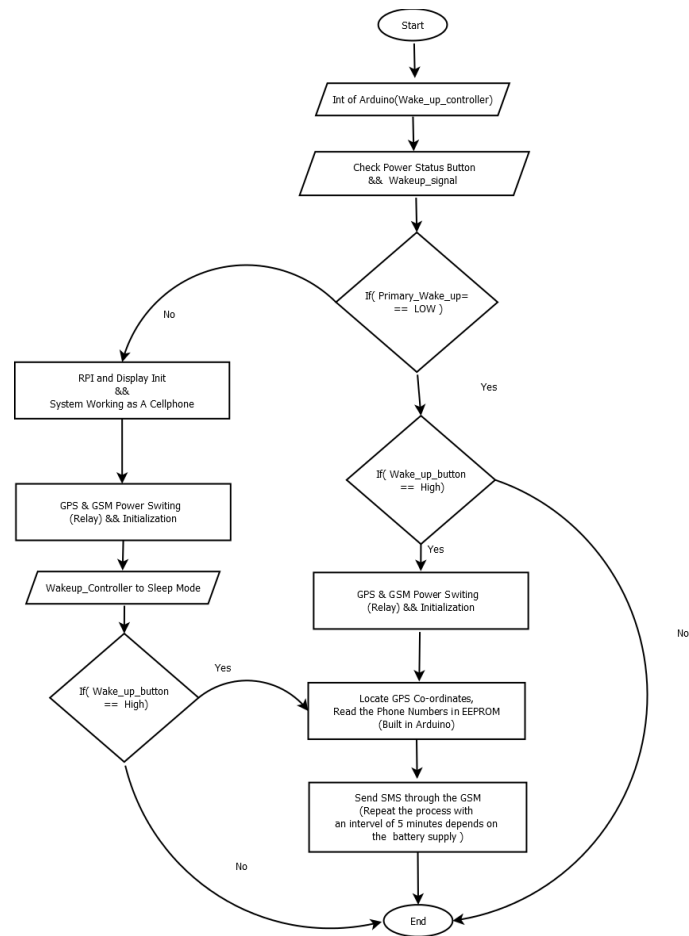


Figure 6 : Work flow diagram

## IV. RESULTS AND DISCUSSION

In our proposed system we implementing a dedicated panic button in mobile phones it helps to overcome the disadvantage of normal SoS emergency messaging system ,that is this panic button can be work in both switch on and switch off conditions of mobile devices. Here in the implementing mobile, it has a secondary battery along with the primary battery .CMOS battery and secondary battery has low power than the primary battery because these batteries are used only for send SoS message and current GPS location in switched off condition of the mobile device .Primary battery is used for the normal working of the mobile.



Figure 7 : Interior of Device

## V. CONCLUSION

In our proposed system Raspberry pi 3 B+ and ATmega 328 are the core part of our proposed system. We program the device with the help of python. Unlike other existing mobiles our proposed system has an additional secondary power supply or backup power for the emergency situation. we are mainly focus on the mobile phone in switched off or battery fully drained condition. In normal mobile phones if it is switched off GPS and GSM module cannot work so our system shows a remedy for that problem.

While the mobile phone has no power to switched on if any emergency situation occurs we do not have any way to contact others for help or simply we cannot send a emergency SoS message. If a disaster situation may occur no power is available for charge mobile phone so if anyone stuck any where we cannot inform other people for help. But our device shows a solution for this. It is also mainly helpful for the women who likes to travel.

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