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Sos Smart Device

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Abstract: India is becoming a superpower in the fast-paced world of today thanks to its advancements in technology and other areas. However, there hasn't been a significant decline in the crime rate against women and children. For this reason, in order to lower the number of crimes against women and children, greater awareness and technological assistance are required. Our proposed "Safety Device using IOT" would employ a GPS tracking system to follow the victim's whereabouts continuously, call registered phone numbers, and send out continuous SMS messages with the victim's location. We are attempting to address the current need for widely available, affordably accessible technology with this system that we are developing.

I. INTRODUCTION

In the modern society, women's personal safety is especially important because of the higher chances of assault and harassment. This study proposes a novel "Safety Device using IoT" that addresses this problem. It is based on an Arduino Nano, NEO6M GPS module, GSM technology, SOS button, RF transmitter, and RF receiver. This movable gadget seeks to empower people on their commutes or solo journeys, particularly women and children. The device starts a series of procedures to guarantee the user's safety when the SOS button is pressed. It instantly notifies pre-registered phone numbers—which may belong to family, friends, or local authorities—of distress signals. The gadget dials these numbers at the same time to warn them of the possible threat.

By enabling users to enter several phone numbers, the technology increases the number of people who can receive help. This safety equipment stands out due to its real-time GPS tracking feature. The device constantly shares and updates the user's current position while the distress signals are being sent. For the contacted authorities to react as soon as possible and efficiently, this information becomes essential. Distress signals can be received by law enforcement organisations in addition to parents and friends, guaranteeing a thorough and quick response network. The device's design places a high value on functionality and ease of use, making it suitable for a broad spectrum of users. Furthermore, the system's cost-effectiveness highlights its objective of offering a necessary service to the greatest number of users. This safety device comes to light as a workable and cost-effective way to improve personal safety by utilising the Internet of Things and combining essential technologies, especially for vulnerable people navigating the difficulties of travelling alone in today's society.

II.SYSTEM ARCHITECTURE

The transmitter end and the receiver end are the two pieces that make up the system. The block diagram for the transmitter and receiver ends is shown below. The first step was installing the Arduino IDE and configuring the development environment. Next, we wrote the code to manage a number of features, such getting GPS data, observing the panic button and activating the buzzer or alarm. We have a transmitter and a receiver with us. While the receiver has an SOS button, the transmitter requires an external power source

(a battery, 9V to 12V). We provide quick access and activation of the panic button for users in an emergency by integrating it with the Arduino.
The pin in the receiver component is first initialised, then it is linked to the digital pin of the Arduino nano, and finally it is connected to the breadboard's ground via a third connection. The TX and RX pins are initialised and linked to the digital pins of the Arduino nano (4,5), and the GPS is powered by the Arduino nano (VCC) when connecting a GPS module to an Arduino to obtain location data. The RX and TX pins of a GSM module must first be initialised before being linked to the digital pins of a tiny Arduino (2,3). We employ power banks as an external provider. The Arduino Nano's digital pin (7th pin) is used to connect the alarm/buzzer, which is configured to play loudly.

When we press the SOS button on the transmitter, a signal is released, which is then picked up by the RF receiver on the receiving end. An Arduino Nano that has been programmed to detect signals sends a command to the GSM 800c module to send SMS to the registered phone numbers, and a command to the GPS NEO6M module to track the victim's location. Additionally, the receiver end buzzer will beep. The block diagram for the transmitter and receiver ends is shown below.

· GPS Module: The user's location will be ascertained using this module. The GPS module will communicate with the Arduino via serial connection.
The Arduino board will function as the ``````````, but once clicking on it, they will be redirected to a phishing website called "xn--80ak6aa92e.com."

III. HARDWARE

♣ ARDUINO NANO

The Arduino Nano, a tiny and versatile microcontroller board, is powered by the ATmega328P. It is designed for small-scale projects that require a board with lots of low-profile connectivity options. The board features eight analogue input pins, fourteen digital input/output pins, and a 16 MHz quartz crystal oscillator. In addition, it features a USB interface for programming and power as well as a DC power connection that accepts inputs between 7 and 12 volts. The board is compatible with most Arduino shields and can be programmed using the Arduino IDE. It is a well-liked choice for do-it-yourself projects, such as GPS-enabled safety devices for women, due to its small size and versatility.

♣ GSM 800c The capability of GSM 800C to offer voice and data services to mobile devices is one of its primary features

It combines time-division multiple access (TDMA) and frequency-division multiple access (FDMA) techniques to maximise the usage of the available frequency spectrum. The 9.6 kbps data transfer rate of the GSM 800C is sufficient for email and standard web browsing. It also makes SMS (short message service) possible, which has become a widely used global communication method. Another important feature of GSM 800C is security. An array of authentication and encryption techniques protects calls and data transfers against unwanted access.

♣ NEO6M GPS MODULE

Utilising signals from GPS satellites, the NEO-6M is a popular and adaptable GPS module that offers precise timing and location data. This little and energy-efficient gadget supports up to 50 channels and has a high update rate of up to 5Hz. Its notable feature is its built-in backup battery, which guarantees dependable operation even under trying circumstances and a shorter repair time. The NEO-6M module uses the NMEA protocol for communication and may transmit data in a variety of standard and custom forms. All things considered, its accuracy, speedy updates, and consistent performance in a variety of applications make it a preferred option.
to convert lower-dimensional space to higher-dimensional space in order to tackle this issue.

♣ R/F TRANSMITTER

A piece of electronic equipment known as a radio frequency (RF) transmitter produces radio waves, which are then sent into the atmosphere by its antenna. Among the common components seen in transmitters are an amplifier, a modulator, and an oscillator. While the oscillator generates a carrier signal at a specific frequency, the modulator alters the signal to transport information such as voice, music, or data. The amplifier increases the signal's strength so that it can pass through the antenna. Typically, an RF transmitter's specifications include its output power, modulation method, and frequency band of operation. The frequency range of the transmitter determines its access to the radio spectrum, and the output power of the signal determines its range.

♣ RECEIVER FOR RF

A radio frequency (RF) receiver is an electrical device that receives and processes radio frequency signals. In wireless communication systems, it is often used to extract information from modulated RF waves. The characteristics of an RF receiver, such as its frequency range, sensitivity, selectivity, noise figure, dynamic range, and linearity, define how well it performs in terms of its ability to receive and process RF signals.

♣ OTHER COMPONENTS :

- ♣ Buzzer
- ♣ Jumper wires
- ♣ Breadboard
- ♣ Female to male headers
- ♣ Male to male headers
- ♣ 9V battery

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IV. RESULTS AND DISCUSSION

Machine learning methods have been imported using the Scikit-learn tool. The training set and testing set of the dataset are separated in 70:30 ratio. Testing sets are used to assess classifier performance, and training sets are used to train each classifier. Classifier performance has been assessed by computing the accuracy score, false positive rate, and false negative rate.

Throughout this section, we will be using the metrics defined below:

1) True Positive (TP) - Attack data that is correctly classified as an attack.

2) False Positive (FP) - Normal data that is incorrectly classified as an attack.

3) True Negative (TN) - Normal data that is correctly classified as normal.

4) False Negative (FN) - Attack data that is incorrectly classified as normal.

We will be using the following measures to evaluate the performance of our proposed solution:

$$Accuracy = TP + TN / TP + TN + FP + FN$$

The accuracy measures the proportion of the total number of correct classifications.

$$Precision = TP / TP + FP$$

The precision measures the number of correct classications penalized by the number of incorrect classications.

$$Recall = TP / TP + FN$$

The recall measures the number of correct classications penalized by the number of missed entries.

$$F\text{-}measure = 2\ Precision\ Recall / Precision + Recall$$

The F-measure the harmonic mean of precision and recall, which serves as a derived effectiveness measurement.

Table 1.: Result of Proposed System (RF)

Metrics	**Proposed System (RF)**
Precision	52.09
Recall	91.66
F-Measure	64
Accuracy	94.55

Fig 1: Accuracy Graph

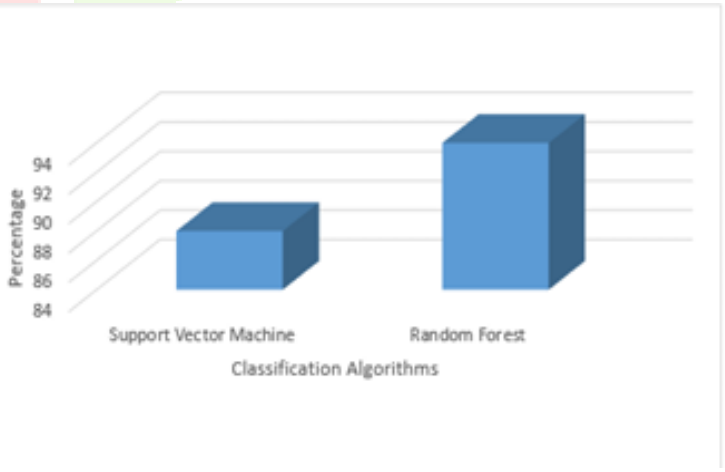

Fig 2: Accuracy Graph

V. CONCLUSION

There are several opportunities to address safety concerns and provide women with a sense of security by utilising an Arduino and GPS tracking system to construct a women's safety device. Through the use of GPS tracking and Arduino technology, this device offers real-time position monitoring and distress signal activation, enhancing human safety in potentially dangerous situations.

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