

SOS SWITCH

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Abstract

This project is about a new SOS switch system that makes it easy for people to send emergency messages and make calls when they need help. It can be used in smartphones, wearables, vehicles, and home devices. The system uses wireless tech like GSM to share important info, like the user's location, with chosen contacts.

Introduction

Sometimes, emergencies happen, and it's crucial to get help fast. Our project focuses on creating a simple SOS system that anyone can use. We got the idea from worrying stats, especially about unreported emergencies, especially those affecting women.

In places like India, reported cases of rape are high, and there's likely more that go unreported. Cities like Delhi have seen a big increase in these cases, showing we need better safety measures. Crimes against women, especially during travel, are also on the rise.

A survey from Huffington Post tells us that single women travelers, a big group on overnight trips, face risks. This points to the need for a full solution to make journeys safer.

Our SOS switch system is our answer to these issues. It's a tech solution meant to be quick and effective during emergencies. This paper explains how the system works and why it's important, joining the conversation about using technology to make society safer.

Literature Review

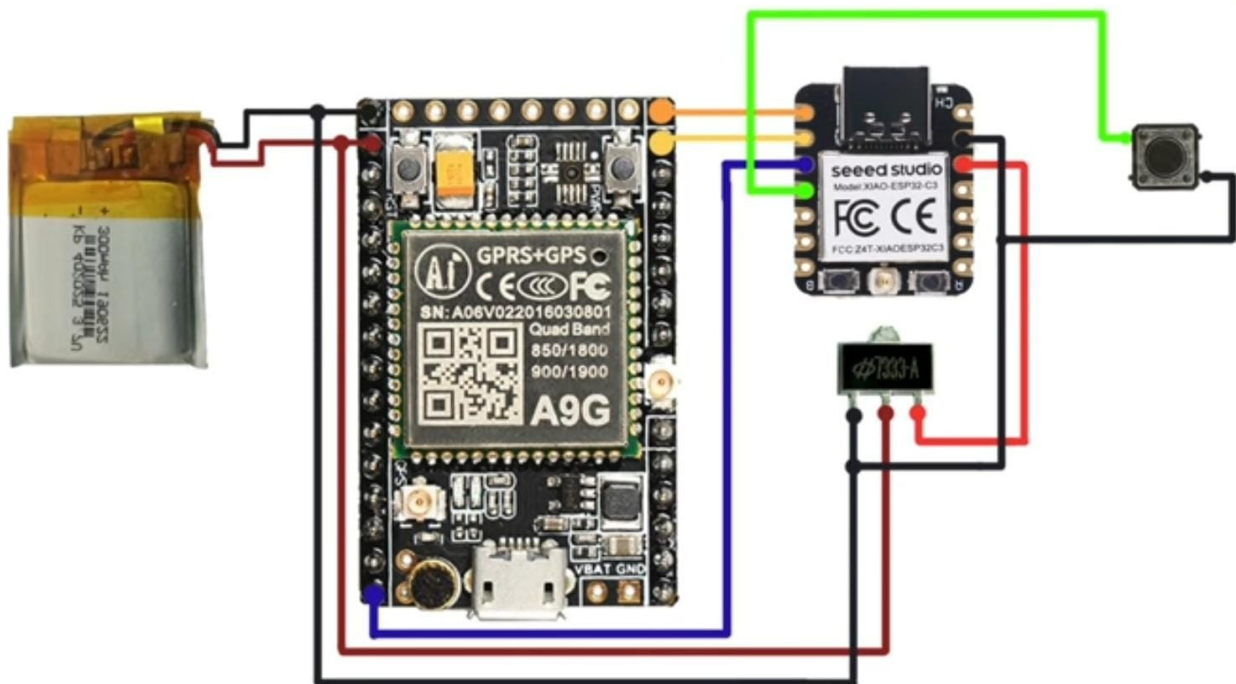
[1] explores using GPS and GSM technology on mobile devices for tracking individuals. By combining GPS and GSM or using GSM alone with a historical database, the study demonstrates reliable tracking results. Test drives showed promising outcomes, supporting the feasibility and effectiveness of the combination of GPS and GSM tracking. [2] introduces a wearable device designed for personal safety. It can send an SOS signal with the user's location and a live video stream to predefined contacts. Activated by a button, shaking, or voice commands, the device also features a loudspeaker to play alerts. This wearable aims to assist users in emergency situations and alert nearby people. [3] focused on women's safety, this paper presents a safety band utilizing GPS, Bluetooth, and a switch-over methodology. The device sends text messages to contacts, enhancing women's security. The band is designed to reduce user burden by using various technologies and offers multiple advantages, contributing to women's confidence in their daily lives. [4] proposes an IoT-based safety device for women, utilizing fingerprint-based connectivity. The device automatically alerts nearby people and the police when the user is unsafe, incorporating features like a shockwave generator for self-defense. The design includes additional features such as sending group messages and audio recording, aiming to enhance women's

safety. [5] discusses a method for estimating the angle of arrival of Bluetooth signals using a switch antenna array. This method improves the accuracy of indoor localization, addressing challenges caused by noise, multipath effects, and frequency/phase shifts. The proposed method holds promise for applications in the Internet of Things (IoT) domain. [6] presents a concept for an IoT-based GPS tracking system, this paper utilizes a micro-controller and GPS module to provide continuous tracking and SOS capabilities. The device communicates location data to registered users and a central server via GSM modules. During SOS mode, nearby devices in the database are alerted, forming a community of secure users. [7] analyzes the impact of different features on the reliability and efficiency of the Bluetooth mesh network. The study explores message repetition schemes, transmission randomization methods, acknowledgment schemes, and network layer security mechanisms. It identifies open issues and challenges, contributing to ongoing research in Bluetooth mesh technology. [8] proposes a system using smart sensors to monitor a soldier's location and alert during dangerous situations. The system integrates IoT and provides vital signs monitoring, allowing timely assistance. This wearable device, smartphone app, and cloud server combination aims to enhance soldiers' safety and communication in the battlefield. [9] explores the use of IoT, machine learning, and image processing for accurate road accident detection. The proposed system includes a Raspberry Pi, camera, accelerometer, GPS module, and SOS switch. The system captures accident images, assesses severity using a neural network, and sends location and images to emergency services via an SMS gateway, aiming to reduce response time and save lives.

Proposed Architecture

Components:

- > A9G board
- > XIAO C3 (Speed Studio XIAO RP2040 Microcontroller)
- > Lithium ion battery
- > HT7333
- > Push button
- > On/Off button



Discussion

FUNCTIONALITY:

- > A9G board: Provides GPS/GSM capabilities for sending distress signals with location data.
- > XIAO C3: Enables wireless control and configuration of the device.
- > Lithium ion battery: Powers the system.
- > HT7333: Regulates voltage, ensuring stable operation.
- > Push button: Allows the SOS signal to be sent when needed.
- > On/Off button: Powers the device on or off.

USER INTERFACE:

- > Push button: User can press this to send an SOS signal.
- > On/Off button: User can press this to power the device on or off.

SAFETY MEASURES:

- > HT7333: Prevents overvoltage by ensuring a stable supply of 3.3V.
- > Lithium ion battery: Has built-in safety measures to prevent overcharging and overheating.
- > A9G board & XIAO C3: Use secure protocols for data transmission.

Results

The proposed SOS switch system, consisting of an A9G board, XIAO C3, lithium-ion battery, HT7333, push button, and on/off button, aims to provide a reliable and user-friendly solution for sending emergency signals. The system utilizes GPS and GSM technologies to transmit distress signals, including the user's location, to chosen contacts.

In the literature review, various technologies and devices addressing safety concerns were explored. These included wearables for personal safety, IoT-based solutions for women's security, and systems for soldier monitoring and road accident detection. The insights gained from these studies contribute to the understanding of existing safety measures and potential improvements.

Conclusion

The SOS switch system presented in this project responds to the pressing need for a straightforward and effective solution in emergency situations. Leveraging wireless technologies and insights from existing literature, the proposed architecture integrates user-friendly components to enhance accessibility. The functionalities, such as the A9G board for GPS/GSM capabilities and the XIAO C3 for wireless control, contribute to the system's efficiency.

The safety measures implemented, including voltage regulation by HT7333 and secure data transmission protocols, underscore the

commitment to user safety. The proposed system addresses the alarming statistics of unreported emergencies, particularly those affecting women, by offering a versatile SOS solution that can be integrated into various devices.

In conclusion, the SOS switch system represents a step forward in leveraging technology for personal safety. Its user-friendly interface, robust functionality, and commitment to safety measures position it as a promising tool to contribute to the overall well-being and security of individuals in emergency situations. Future work may involve real-world testing and user feedback to further refine and optimize the system for practical use.

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