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# Child Safety Wearable Device Using Wireless Technology

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ABSTRACT

The project aims to enhance children's safety by utilizing wireless technology to track their daily commute to and from school. The system incorporates GSM technology and diverse localization techniques to develop a solution that enables parents to confirm their child's adherence to the proper route, such as boarding the school bus, entering or leaving school premises, and getting on and off the school bus. The study delves into the system's technology and architecture and showcases a prototype. The following stage involves a testing phase to verify the system's correct functioning. Overall, this proposed system could offer parents a sense of reassurance by enabling them to monitor their child's movements during their commute, which could prove particularly beneficial for parents who worry about their child's safety, particularly those residing in high-crime areas or having special needs children.

**Keywords :** Arduino UNO, Heartbeat, Temperature sensor, Tilt sensor, GSM /GPS, LCD, buzzer.

## I. INTRODUCTION

To ensure the safety of children in busy environments, and provide parents with peace of mind, a variety of technologies and strategies could be implemented. These could include GPS tracking, which would allow parents to monitor their child's location in real-time, facial recognition technology to detect the child's face in crowded areas, temperature sensors to alert parents of sudden changes in environmental conditions, a bus tracking system to monitor the child's bus route, and a mobile app that integrates all these features and allows for easy communication with school officials in case of an emergency. By combining these technologies and strategies, the safety of children in crowded areas can be ensured, and parents can feel reassured about their child's wellbeing.

## II. OBJECTIVES

The main objective is to help parents to locate their children in easy manner. Parents can utilize several methods to locate their children easily and ensure their safety. These methods include GPS tracking devices

that can be attached to the child's belongings, mobile phone tracking, wearable technology like smartwatches, implementing a buddy system where children stay together, and educating children on safety measures such as staying in well-lit areas and avoiding strangers. By combining technology with education, parents can feel confident that their children are safe and secure.

## III. LITERATURE SURVEY

1. This device enables parents to stay connected with their children using a Wi-Fi module and IoT technology. By connecting to the device, parents can access their child's information at regular intervals, ensuring their safety even when they are not physically present. The data is stored permanently in the cloud, allowing for easy access to past records for future reference.

2.The main subject of this paper is the use of SMS text messaging for communication purposes. With the help of specific keywords, parents can send messages to the device and receive replies in return. The device is equipped with various sensors that can detect the child's approximate location, body temperature, as well as the temperature and humidity of the surrounding environment, and even the child's heartbeat.

3.This paper discusses a system in which parents can send text messages to a tracking device using specific keywords such as "LOCATION," "TEMPERATURE," "UV," "SOS," and "BUZZ." The device can reply with the child's accurate location, which is displayed through Google Maps. By offering this level of security, the system provides parents with a means of keeping their children safe in today's world.

4. Numerous wearable devices are currently available in the market for tracking children using Wi-Fi and Bluetooth. However, these mediums can be unreliable when it comes to communication between parent and child. This system, on the other hand, utilizes text messaging via SMS for communication purposes, greatly reducing the chances of communication failure when compared to Wi-Fi and Bluetooth.

## IV. PROPOSED SYSTEM

The device proposed appears to have significant potential in improving child safety. By integrating various sensors and devices, it can provide parents with valuable information regarding their child's whereabouts and overall health. In addition, the utilization of Arduino modules that can be sewn into fabrics may increase the device's convenience and comfort for children. The inclusion of data on human behaviour and responses to various situations could be particularly helpful, enabling parents to detect any signs of anxiety or distress. It might also prompt bystanders or emergency services if a child is in danger or under stress. Overall, this device may serve as a valuable tool for parents seeking to guarantee their child's safety and well-being. It will be intriguing to observe the technology's evolution and how it may be further developed in the future.

## V. COMPONENTS

5.1. Arduino Uno

The ability to integrate Arduino modules into fabrics is a noteworthy feature that can enhance the device's comfort and convenience for children while minimizing the risk of loss or removal. Arduino's versatile platform offers ample room for customization, making it possible to create tailored digital devices for child safety. Nonetheless, privacy and security concerns must be considered, particularly about transmitting personal data.

5.2. Tilt Sensor

Tilt sensors are designed to detect changes in the angle or tilt of an object in relation to gravity. They utilize various sensors, including accelerometers and gyroscopes, to generate an electrical signal that is proportional to the object's angular displacement. These sensors have a wide range of applications in different fields, such as robotics, electronic gaming, automobile safety mechanisms, and construction equipment. Infrared flame detectors, on the other hand, use special lenses to focus the infrared radiation emitted by flames onto a detector. The detector produces an electrical signal upon sensing the fire, which triggers a warning system or alarm. These detectors are commonly used in industrial settings with high fire risks, such as chemical plants, oil refineries, and manufacturing facilities.

5.3. GSM (Module)

GSM (Global System for Mobile Communications) is a digital cellular technology utilized for mobile communication, which functions within the 2G frequency band. It is widely utilized around the globe for voice and data communication and is an open standard. Various applications employ GSM modules, including wireless communication devices, remote monitoring systems, and IoT devices.

By using these modules, devices can connect to the internet, transmit SMS and MMS messages, and make phone calls through the cellular network. In the case of radiation monitoring devices, a GSM module can receive data from the device and transfer it to a host server via a text SMS, allowing for remote monitoring of radiation levels without requiring physical access to the device. Furthermore, GSM modules can send alerts and notifications if abnormal radiation levels are detected, creating an early warning system for potential hazards.

5.4 Temperature Sensor

LM35 is an integrated circuit (IC) temperature sensor that delivers precise output voltage proportional to the temperature in Celsius without any moving parts that could be susceptible to mechanical damage or oxidation. Its low self-heating feature is a significant benefit, allowing for highly accurate temperature measurements in applications that require it. The LM35 also exhibits a low temperature coefficient, meaning that its output voltage remains relatively constant even when there are changes in ambient temperature. Its linear output response, which changes by 10mv per degree Celsius, enables easy conversion of output voltage to temperature in Celsius. Moreover, the LM35 has a broad temperature range, making it suitable for various applications, as it can measure temperatures from -55°C to 150°C.Given its reliability and precision, the LM35 is widely employed in temperature control systems, automotive applications, and environmental monitoring, among other fields.

5.5. Heartbeat sensor

A heart rate sensor, referred to as a heart rate monitor, tracker, or sensor, is an electronic gadget that utilizes sensors or electrodes to detect and measure the electrical signals produced by the heart, to determine the heart rate in beats per minute. These sensors are typically placed on the skin, such as the chest, wrist, or finger, and the information is displayed on a receiver or display unit. Heart rate sensors are widely used in wearable devices, such as fitness trackers and smartwatches, to track physical activity and monitor heart health. Additionally, they have clinical applications in medical settings to diagnose and treat heart conditions.

5.6. GPS

The Global Positioning System (GPS) is a navigation system based on a network of satellites developed by the United States Department of Defence. It operates

via ground-based control stations communicating with orbiting satellites, providing highly accurate location and time data to users worldwide. GPS receivers equipped with an antenna pick up signals transmitted by the satellites and use them to determine the user's precise location, speed, and direction of travel. GPS has numerous applications, including mapping, surveying, navigation, and tracking, and is an essential tool in transportation, emergency services, and military operations. It is also widely used by consumers in their everyday devices, such as smartphones and cars.

5.7. BUZZER

An electronic device that generates sound to provide feedback or sound an alarm is known as a buzzer. The device typically contains an electromechanical component that vibrates at a specific frequency when an electrical current passes through it, resulting in an audible sound. Buzzers are widely utilized in electronic games, security systems, timers, and other electronic gadgets, providing users with cost-effective and straightforward auditory feedback or alerts.

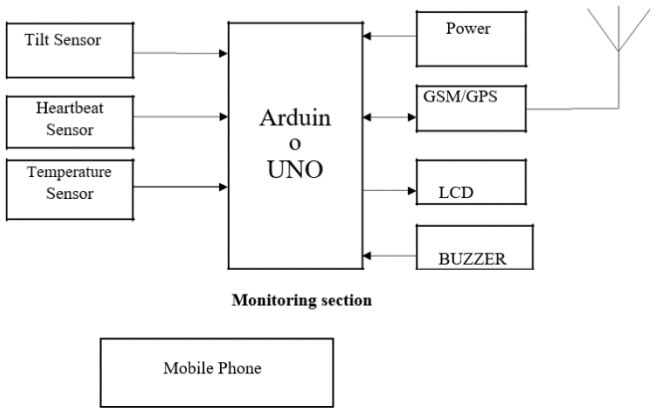


Fig 1. Child Safety Wearable Device Using Wireless Technology

## VI. Results and discussion

The description provided seems to be that of a GPS tracker designed specifically for children, intended to help parents monitor their child's location and ensure peace of mind in case of an emergency. These trackers utilize GPS technology to locate the child and may also incorporate Wi-Fi or cellular networks to provide more precise location data. Typically, compact and wearable, the battery life of these devices can vary but is often designed to last for several days or weeks on a single charge. Additional features

may include geofencing, which enables parents to establish virtual boundaries and receive notifications if their child crosses them. While child tracking devices can be useful in promoting safety, it is crucial to utilize them responsibly and respectfully, while also maintaining open communication with your child about the device and its purpose.

## VII. Conclusion

The project undertaking would help in improving the wellbeing and security of children. This will help the authorities to solve the child missing cases easily and reduce crime rates in society.it will improve social security as well as parent's insecurities, everyone in this era using smart device and gadgets which will be helpful for the parents to use IOT based device. Child safety is the most common problem in the world.by this project, the child missing, and kidnap issues can be brought down and help the society.

## VIII. Acknowledgements

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## Authors' contributions

SriKarna conceived the presented idea, and Harshitha developed the theory and performed the computations. Namratha verified the analytical methods and provided guidance, while both Harshitha and Namratha offered support and supervision to SriKarna. All authors discussed the results and contributed to the final manuscript. Mrs. E Shilpa also provided invaluable guidance with her expertise.

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