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Child Safety Wearable and Visually Impaired Assistive Device with Location Tracking System Using IoT

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Abstract

The idea of a smart wearable system for children and visually impaired is discussed in this paper. The key advantage of this wearable above others is that it can be used with any cell phone and does not required an expensive smart phone are a very tech-savy individual to operate. The GPS, GSM, Wi-Fi and Arduino technologies were used to create a smart wearable gadget for kid safety and to assist visually impaired people with a location tracking system. The prototype system uses a heartbeat and temperature sensor to monitor the health of children. The child will be safe from threads as a result of this. There are many wearable's available now a days that crack children's everyday habits and activities and also assist in locating them utilizing Wi-Fi and Bluetooth services. However, it appears that both the parent and the child are communicating in securely. As a result, the goal is to create a text and Email enabled link in between child's wearable and the relevant parent via SMS. Global System for Mobile Communication is the primary concept behind this. For issuing an emergency alarm, the proposed solution is wearable gear with cellular network and Wi-Fi connectivity. When the push button is touched, an alarm is sent in variety of ways, including SMS and Email, in the event of emergency.

Keywords: GPS, GSM, Wi-Fi, Arduino, Wearable device.

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I. INTRODUCTION

Security becomes an important issue. In 2020 there were 31.6 million in population are visually impaired and 34.33 percent were children. Basically children or blind persons cannot able to complaint about their abusement which they face their daily life to their parents and

assistive persons. The children and blind persons cannot able to know what really happens in their surroundings. It makes very difficult to parents and assistive persons to identify their children and blind peoples where they went that they get afraid of their children. At the moment, there are a variety of wearable's on the market that maybe used to track children's daily activities as well as to locate them using Wi-Fi and Bluetooth appear to be a shaky communication between caregivers and the target. As a result, the study is on SMS text enabled communication that is practically ubiquitous. The wearable device sends a text message with the child's current position, which when tapped brings up Google Maps instructions to the child's location, allowing parents to keep track. They can be characterized by the **onboard** button pressed when they cannot able to know where they are. By pressing this button the children and blind people can be easily identified by their parents and their caretakers. For this situation an assistive device and Location Tracking System is required to know where they are and they can easily monitor their children and blind people via Email and SMS.

In order to track their location and find an identity of the child and visually impaired persons a GPS module is used.

II. LITERATURE SURVEY

Falls have been identified as a serious health risk not only for the elderly, but also for persons with neurodegenerative disorders like epilepsy, and are seen as a major impediment to living independently. The ability to detect falls quickly would not only reduce health risks by allowing for faster medical intervention, but it would also make independent living a safe choice for the elderly [1]. In this research, we suggest a fall detector that includes multiple algorithms for robust fall detection, such as thresholding and wavelet transforms, and leverages accelerometers found in smart phones. Our fall detection system was built using an Android 2 smartphone. We conducted a series of tests to assess the performance of the fall detector that was implemented. Although using cellphones for fall detection has recently been researched, analysing the efficacy of resilient algorithms rather than thresholding has not been explored before, to the best of our knowledge. Our results show that, as compared to a simple threshold method, wavelet transformations offer greater true positive performance while dramatically lowering the number of false positives. Aside from fall detection, our solution also gives location information about the individual who fell using Google Maps and the available GPS interface, which is sent to users, such as caretakers, via SMS, email, and Twitter messages.

We modified this paper by avoiding the smart phone use. Hence the expense of the system can be reduced.

Because human life is more valuable than everything else, a mechanism is provided here to save human lives as soon as possible. When a car collides with an acifent, the car's number and the location's GPS coordinates are promptly sent to the owner's family and a nearby police station, guaranteeing that the needy receive timely assistance. The technology is designed to locate the site of a vehicle collision by delivering a message through a system

installed within the vehicle [2]. It also protects your vehicle from theft. The AVR microcontroller ATmega328 is used in this system for cost-effective and easy programming, as well as a GPS module for vehicle tracking and a GSM module for sending alert messages to approved numbers. . This system also has an emergency switch that can be turned off by SMS; in the event of a car theft, the owner can learn the vehicle's current location and use that information to stop the vehicle by sending a pre-programmed SMS message to this system. After receiving an SMS message from the owner, this device disables the ignition system, causing the vehicle to stop working. Only after inputting a safe password will it return to its previous state.

We employ the technology of GPS location tracking and sending messages over the GSM module with the help of this paper.

A car monitoring and employee security system based on GPS and GSM inegrates the installation of electronic gadgets in a vehicle with custom-designed computer software that allows the company to trace the vehicle's locations. GPS technology is used in car tracking systems to locate the vehicle. Vehicle information can be accessed on electronic maps or using specialized software over the internet [3]. Employee safety, particularly for women employees, has been a top focus for most firms as a result of catastrophes such as burglary and rape cases. Even while the corporation takes reasonable efforts to keep its employees secure, the current system has some severe flaws. Finally, there is no fool proof technique for tracking outsiders. To avoid this problem, we will create a system that would give employees better security. The automobile unit is installed into the vehicle. When the employee is picked up by the car, he or she must exchange the RFID card. Through the GSM module, the microcontroller verifies the RFID card number to its database records and sends the employee's id, cab id, and cab position co-ordinates to the business unity. The message will be received by the GSM modem in the company unit. If an employee encounters a difficulty, he or she will press the button. When the microcontroller detects an action, it sends a signal to the GSM, which coordinates with the company unit and police. In addition, the microcontroller will send a signal to the relay, which will cut off the ignition and bring the automobile to a complete stop. The GSM modem will be the one to receive the message. The serial port will then be used to send the message to the computer. On the computer, the employee's name, ID, and taxi position coordinates (longitude and latitude) are displayed. After the data has been downloaded to the computer, it can be analyzed further. The corporation unit can maintain track of the car this way.

We are attempting to develop a low-cost system because this system is too pricey. This system will be more user-friendly and compact.

Every girl's thought is one day they will be able to go around freely on the streets at all hours of the day and night without fearing for their safety. This study proposes a fresh approach to using technology to safeguard women **[4]**.A shrieking alarm that uses a real time clock to seek help and produce an electric shock to injure the attackers as a form of self defense is also included in this system. The key benefit of this system is that, unlike other apps that have been developed previously, it does not require the user to have a Smartphone. Precision and

dependability are ensured by the employment of advanced components. In any emergency circumstance, the belt contains all of the attributes that would leave no stone left in assisting the victim.

The biggest disadvantage of this technique is that the sufferer is at risk of receiving an electric shock. In the new proposed system, the disadvantage is overcome. When there is no way to press the watch's button, we must nevertheless send a message. As a result, we adjusted it to send an alert message whenever the location changed. It is more expensive and heavier. As a result, transporting this system is an extremely challenging undertaking. The suggested new system will address these flaws in the current system

[5] This paper is about women's safety with GPS based alert system. People are coming up with new strategies to defend themselves in the wake of the atrocity in Delhi, which shocked the nation and made us aware of women's safety concerns. We're going to show you a device that ensures women's safety. This aids in the identification of threats and the mobilisation of resources to assist the individual in escaping perilous circumstances. All you had to do if you sensed danger was hold down the device's button. A PIC microprocessor, a GSM module, and GPS modules make up the gadget. When activated, the system resembles a standard watch and uses GPS (Global Positioning System) to track the women's movements and transmits emergency alerts to SoS contacts and the police control room through GSM (Global System for Mobile Communications).The key advantage of this system is that, unlike other previously established applications, it does not require the user to have a smartphone. Precision and dependability are ensured by the employment of advanced components. The watch has all of the capabilities that will leave no stone unturned in assisting the customer in any emergency circumstance current system.

III. METHODOLOGY

In the Fig 1(a) Block Diagram shows the accelerometer sensor, GPS, GSM, a Wi-Fi module, and an Ardunio. If fall is noticed, the accelerometer sensor detects motion of the body. GSM modules allow the described system deliver the alert messages to caretaker's mobile phones through Short Message Services (SMS) along with a Google map link for cellular network position information the cellular. The phone's global positioning satellite receiver communicates with the location sensor. So each ten minutes the GPS module will provide its location to the microcontroller, which will be stored. This is used to monitor and identify the location; the data will be saved in the cloud.

The hardware is controlled by an Arduino UNO, which serves as developed system which is in centralized unit. Ardunio UNO is a flexible, and simple to use programmable microcontroller.

Open sourced microcontroller board that can be used in a wide range of applications. Low weight and capacity with software and hardware in the system the UNO is the most popular arduino. Because of its smaller size, the controller may be used on any development board, and designers can easily transport it around the boarding systems.

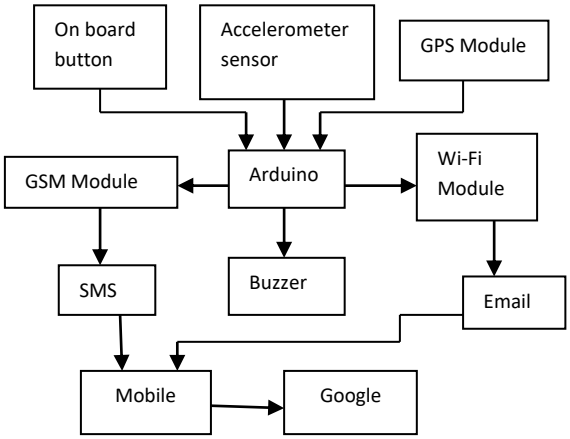

Fig 1. Block Diagram

Fig 1 (a) Arduino UNO R3

UNO should not have more GPIO, but it does have a more powerful CPU than other Arduino microcontroller. If the applications are basics of such as GPS sensor, motor controller, or alarm, a UNO microcontroller is a better choice. The reset button is more powerful and returns the controller to its original position in UNO. Wi-Fi Module belongs to the transmission layer of IoT transmission layer. The Wi-Fi module sends an alarm signal to a cloud sever using email services such as Gmail and SMS updates the location, date and time.

Buzzer also be used when child is separated from the parent by pressing the buzzer it will provide the large sound.

The accelerometer sensor ADXL335 accurately detects velocity, which is most likely attributable to body movement. By wear this on the touching the on-board button, which waistband, the suggested system can be engaged by help to set a baseline reading for three-axis accelerometer. The system's working status is shown via an LED indication. Any significant accelerating pressure shifts will lead the sensor output value to exceed the specified limit.

Fig 2(a) Accelerometer Sensor

The developed scheme performs the necessary actions, such as sending SMS and email messages, as well as activating the buzzer to call attention from nearby persons.

When activated, the on-board button also acts as emergency button. If alerting action is failed, presses the on boards switch for one second to directly change all the signals.

From the other side, system can be turned off by pushing the same button for five sec every ten minutes, the GPS Module will collect data and store it in the primary control unit. This is used to track and record the user's or elderly person's whereabouts.

The system is first turned on by activate the on-board button. The three axis accelerometer readings will have a baseline set automatically by the main control unit, which will also receive position information from the GPS module.

After that, the recommended system enters rest method and collect position data each 10 minutes using the GPS device. The obtained longitude and latitude would be saved in a central command unit’s memory.

The warning mode is activated if the accelerometer reading exceeds the threshold value.

By pressing the on-board, you can manually activate alert mode .When in alert mode the device can send the warning notification through Emails and SMS as well as link in the Google Map.

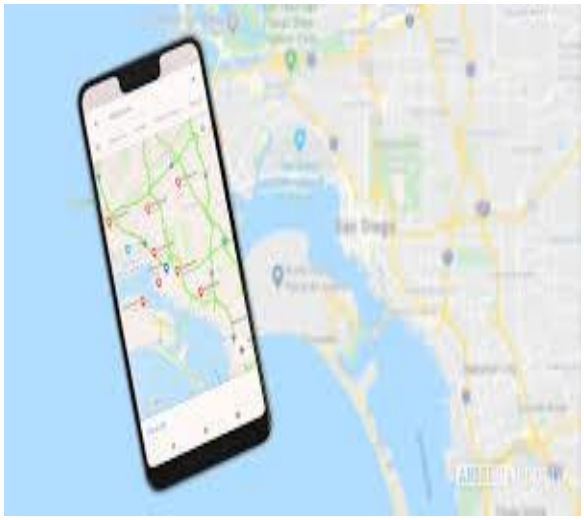

Fig 3 (a) Google location

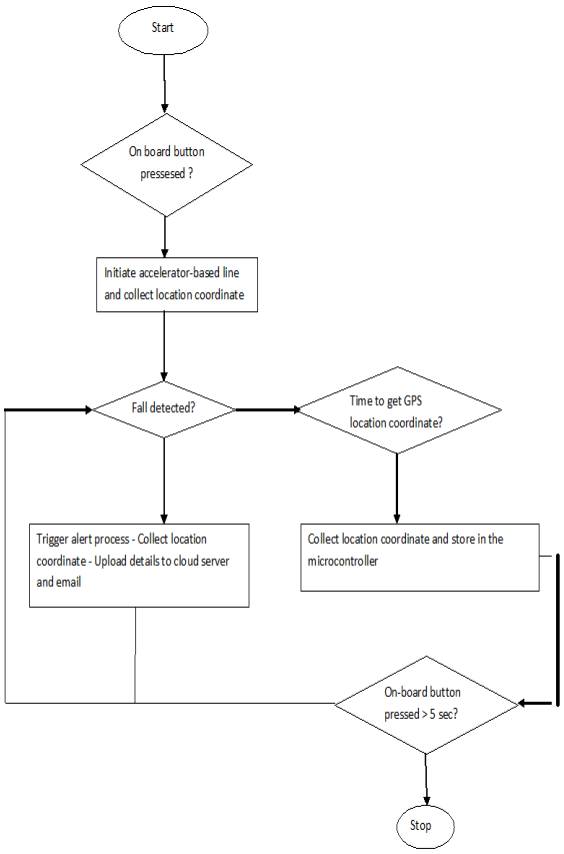

Fig 4. Flow Chart

III. CONCLUSION

If there are any accidents, the location tracking system presented in this research allows caretakers to reach out to the child person in a timely manner. The prototype has been created and is being put through its paces. It was demonstrated that the suggested system can send

emergency SMS and emails via GSM and cloud server, respectively. Furthermore, the proposed solution also saved event information on a cloud server and displayed it on a blog. Visually impaired individuals who live alone are required ongoing monitoring in the event of an emergency. Smaller prototypes will be developed in the future for real-world testing to assess the proposed system's performance

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Dr A.Vasantharaj is currently working as an Associate Professor at Excel Engineering College (Autonomous), which is approved by AICTE, New Delhi and Affiliated to Anna University, Chennai. He received his bachelor's degree in the Department of Electronics and Communication Engineering from Bharathidasan Engineering College, Tirupattur under Anna University, Chennai in the year 2006, and Masters degree in Power Electronics and Drives from Easweri Engineering College, Chennai under the Affiliation of Anna University, Chennai in the year 2008 and Doctorate from Anna University, Chennai in the year 2018.Prof. Vasantharaj has been in the field of Teaching and Research for the past 13 years. His area of Expertise includes Embedded System, Sensors and Wireless Communication, Internet of Things etc., He is also a Life Time Senior/ Fellow member in ISTE, IFERP, SDIWC, IAENG and ISRD.

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