



INTELLIGENT CHILD SAFETY SYSTEM USING MACHINE LEARNING IN IoT DEVICES

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ABSTRACT:

Due of their vulnerability, tracking and protecting children is of highest importance. A sophisticated smart security system is now required due to the rise in crimes including child abduction, child trafficking, child abuse, and so forth. In order to help parents, watch and track their children in real time instead of having to constantly be nearby, a self-alerting "INTELLIGENT CHILD SAFETY SYSTEM USING MACHINE LEARNING IN IOT DEVICES" was developed. This system is meant to be worn by the child as a wrist band, hand glove, arm band, or belt on a daily basis. The technology is made to watch over children's whereabouts and physical health in real time. An Arduino controller, a Raspberry Pi, and sensors that track changes in parameters like temperature, BVP (blood volume pulse), and GSR (galvanic skin response) are all included in this electronic system. GPS and GSM modules are also utilized by the system. The Decision Tree Classifier algorithm uses sensor value inputs to identify any distress scenario. A text message containing the victim's location is sent to the registered contact numbers using a GSM module and tracked using a GPS module. The innovative aspect of this work is the greater precision of the autonomous decision-making process.

Keywords: Child safety, GPS, GSM, sensors, Arduino, Raspberry-Pi, decision tree classifier, autonomous decision, and intelligent child safety system employing machine learning in IoT devices.

INTRODUCTION:

In today's world kidnapping and trafficking of children has increased by 84% for the past 3 years according to a survey done in Delhi. 180 children get kidnapped daily in India.

Tracking and monitoring of the missing child is very difficult. In this project we are trying to make a system which will track the child using GPS, GSM, and Arduino. GPS is a service which offers astonishing performance to get the device's particular location within seconds and sends its location over a 20 to 30 sec time interval depending on the device's accuracy. Consequently, GPS can be utilized to trace a missing child's whereabouts.

Nowadays, women and children are facing various issues like sexual assaults. Victims' life will be significantly impacted by this brutality. Additionally, it has an impact on their well-being and emotional stability. These acts of violence are becoming more prevalent every day. Even school children are kidnapped and sexually abused. Because of the lack of security in our culture, a nine-month-old girl child was abducted, raped, and then murdered. As a result of seeing these acts of violence against women, we are inspired to take action to protect women and children. As a result, we have decided to suggest a device in this project that will serve as a tool to safeguard the security of women and children. Women's notifications and current whereabouts are sent to various mobile numbers in their contact list using a microcontroller, GSM, and GPS module. This initiative will also serve as a safety precaution that will temporarily stun the enemy. This effort will enable us to protect numerous women and children from the society's vile elements.

Women's safety in India is increasingly a serious concern. The National Crime Records Bureau reports that in 2016 there was an 82% rise in sexual harassment compared to the prior years. 95% of rapists were family members, acquaintances, or neighbours across all cases, not random strangers. In the wake of the rape and murder of young women, the majority of public discourse has focused on indignation, punishment, and stricter regulations. All across the world, women and children are subjected to abuse or molestations on a daily basis. Protecting women from these predators is essential. She must defend herself because laws by themselves will not always shield her from harm. To do that, a self-defence tool is required.

We are able to connect the gadgets in the kid's module to the web server with the aid of Arduino. The GPS kit's data will be collected by Arduino and sent to the web server.

The data will then be sent from the web server to the parent's Android application, giving the parent access to their child's present location. In this project, GPS will be utilized, and an alert containing the child's current location will be sent to the Android mobile. As a result of this system's reliance on GPS capabilities, the cellular network is essential to its operation. If the cellular network is unreliable or unavailable, it will not function completely.

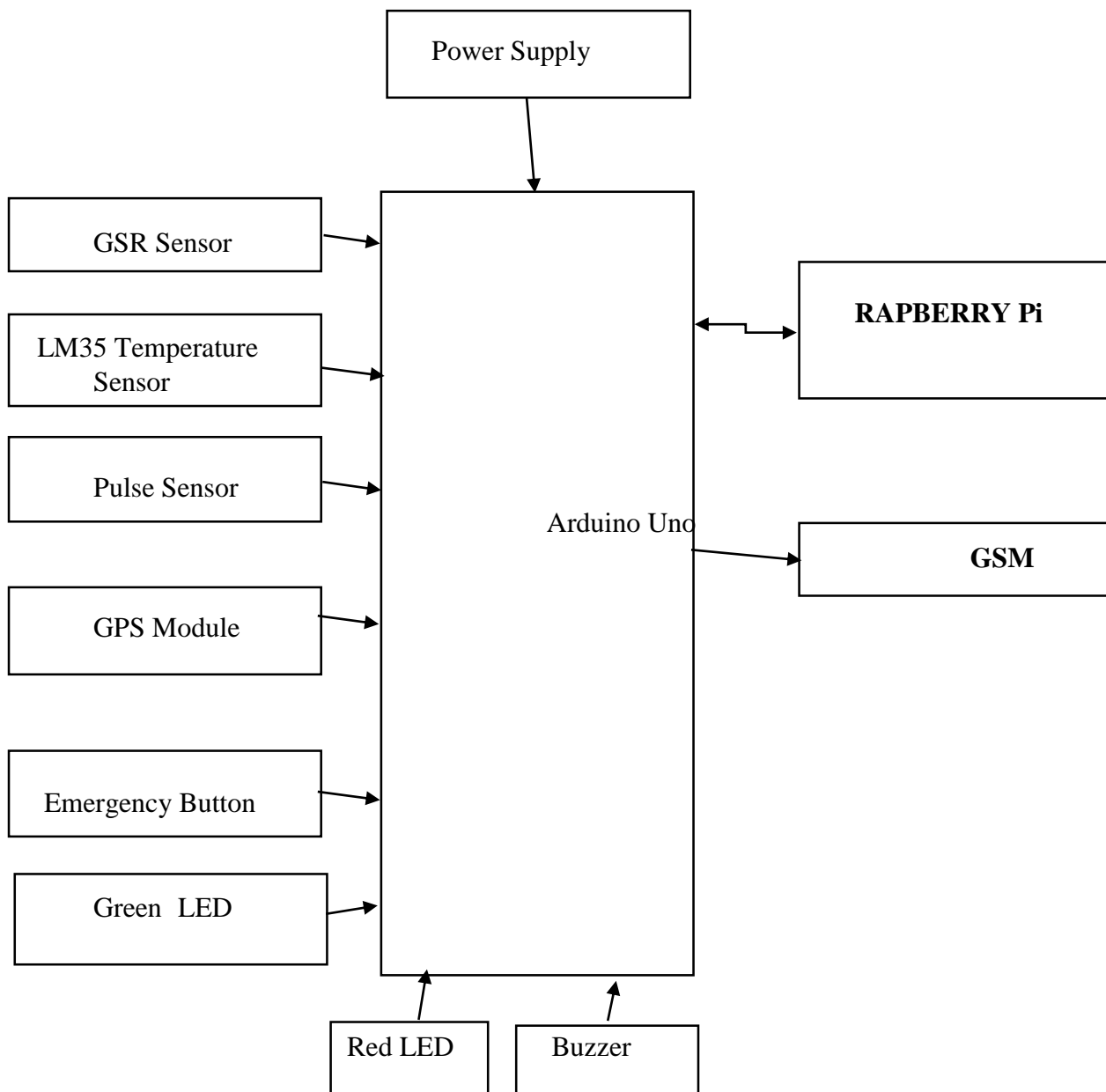
EXISTING SYSTEM:

The “Design and Construction of a Panic Button Alarm System for Security Emergencies”, requires manual triggering of the panic button in case of any emergency. In addition to that, it uses Wi-Fi which is not as reliable as GSM. In “A novel approach to provide protection for women by using smart security device”, the GSR (galvanic skin response) measurement is not used. The GSR proves to be an influential parameter in determining emotional stress. In addition to this, usage of a threshold may lead to false alarms.

U. Chowdhury et al considered the usage of heart rate but the GSR was not considered. A common drawback of all the existing systems is the use of a threshold to detect an abnormal situation. This is inaccurate as it can lead to many false alarms and the values of some vital parameters may even remain normal or fall below the threshold during an emergency. These limitations can be overcome by incorporating an intelligent system using machine learning

PROPOSED SYSTEM:

- Proposed system is developed to aid parents to monitor and track their children in real time as an alternate to stay beside them.
- This system is intended as an everyday wearable device on the child, in the form of wrist band, hand glove, arm band or a belt.
- The system is designed to continuously monitor the location and body vitals of children.
- This electronic system comprises of an Arduino controller, a Raspberry-Pi, and sensors to detect the changes in parameters such as temperature, BVP (Blood Volume Pulse) and GSR (Galvanic Skin Response).
- The system also uses a GSM and GPS module.
- Decision Tree Classifier Algorithm is used to detect any distress situation with sensor values as inputs.
- The location of the victim is traced using a GPS module and is and is send to the registered contact numbers as a text message using a GSM module.
- The novelty of this work lies in the autonomous decision-making process with increased accuracy.

BLOCK DIAGRAM:**Fig: Block Diagram****WORKING:**

An autonomous alerting child safety system is presented here. An Arduino Nano is used as a micro-controller which receives the values of the pulse or BVP (Blood Volume Pulse), GSR (galvanic skin response) and temperature from different wearable sensors. It also accepts the state of the emergency button (1 or 0). Along with the parameter values, the location in terms of latitude and longitude is sent to the Arduino using a GPS module. The Arduino sends the collected parameter values to a Raspberry-Pi for decision making.

The decision of whether an alert is to be sent or not is done with the help of the Decision Tree Classification Algorithm running on the Raspberry-Pi. This system makes use of a Raspberry-Pi for machine learning only in order to increase the accuracy and make a more precise decision. Using Raspberry-Pi as the main controller instead of the proposed Arduino-Raspberry-Pi combination will make

the system bulkier as the former requires individual ADC (analog to digital convertors) for each and every sensor and module.

Two LEDs, red and green are used for status indication purposes (instead of an LCD display which makes the system bulky). The red LED turns on in case of a signal failure in the GSM or the GPS module. The green LED blinks 3 times when the alert is sent successfully. A buzzer is used to alert the people in the proximity.

The whole system is powered using a portable power bank which is compact.

RESULT:

Fig depicts the Intelligent Child Safety System prototype. A virtual environment was used to test its autonomy. Healthy volunteers of different ages and gender were exposed to five brief video clips from different horror films to imitate the parameters of a dangerous situation. In this investigation, significant changes in BVP, GSR, and temperature were seen. The sensors were successful in identifying these changes, and the signals were transmitted to the Arduino. The Raspberry-Pi received the signals after which the categorization procedure was effectively completed.

When the red led is on, we must presume that everyone, including kids and women, is in danger. In contrast, if the green led is lit, the person is secure. A buzzer will sound and a GPS position will be shown when a child is in danger.

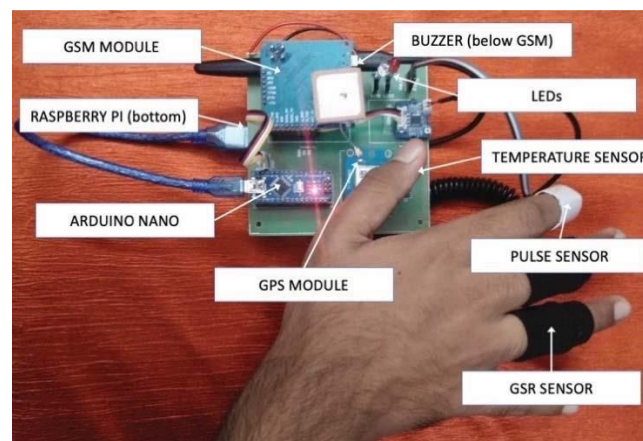


Fig. Intelligent Child Safety System

ADVANTAGES

- By using this device, we can reduce the missing of children's and women.
- Using this device, we can locate the position of the children's and women who are in danger.
- The main advantage of the system is that this device small and easy to carry.

CONCLUSION:

GPS-based automatic tracking and alarm systems that are smart and sophisticated can be useful for protecting people with disabilities, kids, women, and other groups. These tracking devices assist by improving the likelihood that the victim will be located by using an automatic calling system. Any object can be tracked and located exactly in a faraway area using this technology. A tracking system could be used as a security precaution.

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