IoT based child safety monitoring device

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***Abstract*: Children are the backbone of a country, and when their future is affected, it affects the country's overall growth. Our system provides an environment in which this problem can be efficiently resolved. Parents can easily monitor their child in real-time as if they were her next door and focus on their career without manual intervention. . In today's world, violent act against the children has increased unprecedently and the victims are found in dangerous conditions, where they cannot take the cell phone to contact the family members or police. In recent days, accident happens lot and missing children are rapidly improving. Our project focuses on helping a lost child with the help of proposed wearable device and reunited with the parent. To locate the current area GPS method is used and a GSM modem is helping to share the information via SMS message to the predefined numbers and the nearest police stations.**

***Keywords*: Children Safety, GPS, GPRS, Sensors.**

INTRODUCTION

In modern life, Child safety is an alarming issue. When travelling in lonely areas, child are vulnerable to different threats, eve teasing and harassments. This makes them feel helpless. The key idea planned in this project is based on an advanced technology that offers "Smart child Safety" to safeguard the Child and this planned structure will be highly effective from other existing techniques in helping the victims. The inspiration for developing the wearable device comes from the improving requirement for protection for Child as there can be a condition of the Child getting missing in the highly packed zones.

Regulators have given special attention to privacy concerns of online services targeted toward children. The Federal Trade Commission's Children's Online Privacy Protection Rule (COPPA) places specific requirements on these services, including that they must "establish and maintain reasonable procedures to protect the confidentiality, security, and integrity of personal information collected from children [1]

Technology is the best way to solve this problem. That's the reason to develop this project that can act as a rescue device and protect at the time of danger. The motivation behind this project is an attempt to focus on a security system that is designed merely to serve the purpose of providing security to women so that they never feel helpless while facing such social challenges. An advanced system can be built that can detect the location and health condition of person that will enable us to take action accordingly based on electronic gadgets like GPS receiver, GSM, pulse rate sensor, flex sensor, MEMS accelerometer, body temperature sensor. We can make use of number of sensors to precisely detect the real time situation of the women in critical abusive situations. The heartbeat of a person in such situations is normally higher which helps make decisions to detect the abnormal motion of the women while she is victimized. [7]

1. PURPOSE

In many countries like India, Child abuse is one of the major social evil leading to poor emotional health of the future citizens. Child abuse and neglect occur in different situations, for a different range of reasons at different places. Children often experience more than one form of abuse at a time. The abuse can take many forms such as physical, emotional, psychological, neglect, domestic violence etc. Recent research by McGill University (2015) showed that emotional abuse of a child may be as harmful as physical abuse and neglect. A child facing abuse in any of the above forms is at risk of being isolated; experience anxiety, depression, and mental trauma; face difficulties in learning and developing social relations.[2]

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EXISTING SYSTEM

Security method children planned in existing papers allow instant answers in any harassment in public places, societies, etc. It is not advisable to keep children unattended at a social event or outdoor. This method resolves both the problems by using GSM and GPS. [5]

A model has been planned at another paper helps to ensure the protection of children. Since the emergency person in danger can't be able to respond proficiently in dangerous conditions, an emergency device is required, which gets available information in case of emergency. The aim of the device is to help parent locate their children with ease. This also provides an SMS enabled communication medium between children and parent GSM mobile. More real time precise location of the child upon selecting will afford direction to the child's location, so the parent can keep track[6]

OBJECTIVE OF SYSTEM

- To design and create a proper wearable device which is comfortable to the child.
- To find the exact location of the child GPS module is used.
- To send the safety message GSM module is used.
- To identify the panic situation of the child various sensors, like Heartbeat and a temperature sensor, MEMS accelerometer, etc. are used.

LITERATURE SURVEY:

"Restraint Use for Child Occupants in Dubai, United Arab Emirates", Inam Ahmad , Brian N. Fildes, David B. Logan are authors of this paper, this paper published in 2022. This paper presented The overall objective of the current study was to investigate the behaviours and knowledge of parents/carers in relation to safe child occupant travel in the Emirate of Dubai in the United Arab Emirates (UAE). A community survey was completed by 786 participants who were responsible for the safety of 1614 children (aged 10 years and younger). The survey included questions related to the type, frequency and appropriateness of restraint use for their eldest child. Overall, 24 percent of participants reported that they 'never/almost never' restrained their eldest child while travelling in a motor vehicle, with this proportion increasing with child age. For example, though 89 percent of participants reported that they restrained their infants.

"Road safety perspective of small children" is paper of Marian Gogola, 2020. The current situation of road safety focus on the reduction of accidents, and mainly serious injury accidents in general. This paper focus on the topics of road safety of children and pupils from the perspective on their present in the transport network as side walk, etc. The paper presents the analysis from the parental perspective of small children road safety. There is significant change of children behavior under and without parental or adults supervising. In the 33% cases, the children are alone, the situation was dangerous or risky.

"A Research on Child Safety Wearable devices" is paper of P. Nandhini, K. Moorthi. In paper explain that in today's world child and women are less secure and have many issues regarding their security purpose. They have to undergo among various difficult situations and have to prove themselves every time in all critical conditions. So, for their security and safety purpose government has provided security through rules and regulation to the society. Although there are many existing systems for security purpose need of advanced smart security system is increased. In order to overcome such problems smart security system for child and women is implemented.

"Enhanced security system for school children and woman transportation using arduino" is paper of Ranjana.R and Vinoth.K. This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during the daily transportation from and to school. The system consists of two main units, a bus unit and a school unit. The bus unit the system is used to detect when a child boards or leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert message accordingly. Identifying children RFID tag number using RFID reader along with corresponding bus number and driver phone number and then check for absentees, if any absentees found, send SMS to the child's parent with bus number and driver number. One button system should be there for women's individual safety system, when the button is pressed an emergency message is sent to any number with current location from the GPS module.

PROPOSED SYSTEM

- The purpose of designing of this system is, to identify the panic situation of the children with the help of wearable device.
- The device contains Heartbeat Sensor, Temperature Sensor, MEMS Accelerometer, GPS and GSM Module along with the Microcontroller for detection of the Children Activities.
- The Proposed device is connected with server via internet, which helps to real time tracking of their children.
- The intended solution proceeds the advantage of finding the absolute location of the kid by GPS service and the information is updated to the end user, i.e. their parent or relatives of the children through the mobile application and also through SMS.

SYSTEM ARCHITECTURE

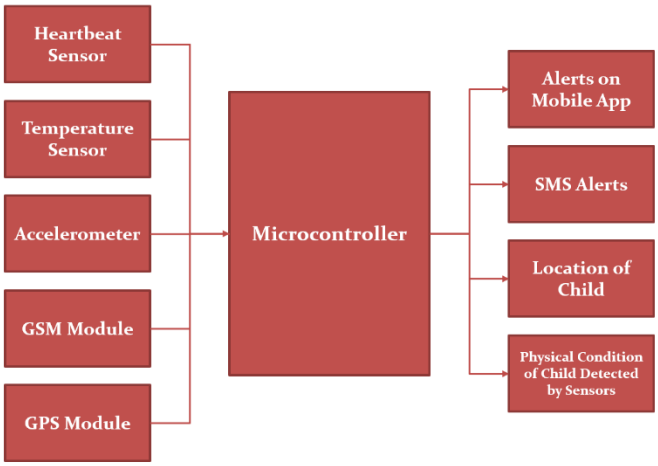

Fig -1: System Architecture Diagram

ADVANTAGES

1. Cost Effective solution
2. Identifies exact Panic Situation of Child
3. Live tracking of Child
4. SMS Alerts
5. Notification to Nearest Police Station in case of Emergency
6. Comfortable Wearable Device for Children**.**
7. Mobile App Alerts

APPLICATION:

1. Child safety.
2. Women safety.
3. Blind people security.

FLOW DIAGRAM:

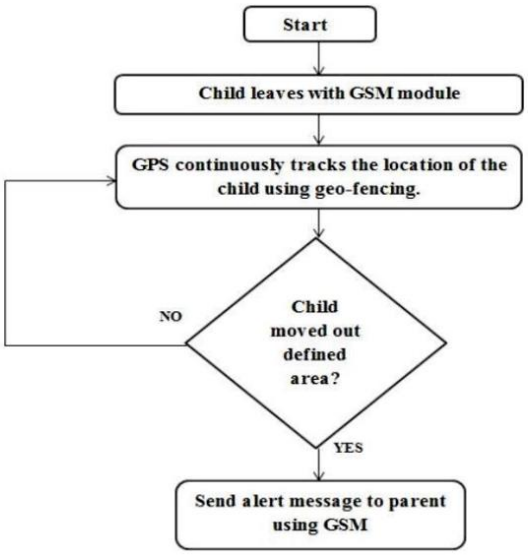

Fig-2: Flowchart

METHODOLOGY

Our proposed model contains various sensors which measure different parameters on a regular basis. In case of emergency a message will be sent to parents and/or police, by either pressing the panic button or pronouncing the keyword [3] This section discusses the architecture and the design methodologies chosen for the development of the Child Safety wearable device. Micro-controller controls the system architecture of the wearable with an Arduino boot-loader. The system architecture of the wearable is based and controlled by micro-controller. The system focuses on sending an SMS text enabling communication medium between the child's device and the parent. For monitoring the child, we use temperature sensor and heartbeat sensor. For temperature measurement of the child dh11 sensor is used, and heartbeat sensor to track the heartbeat of the child. Ultrasonic sensor and IR detects the obstacles that are near the child. GPS Location sensor determines the real-time location of the child. The GSM Module used to send SMS. It is user friendly so there is no need for the parent to learn about new technology.[4]

SYSTEM REQUIREMENTS

- **Software Used:**

1. Python 4.4 or above
2. Android Studio
3. Arduino IDE

- **Hardware Used:**

1. Temperature Sensor
2. Heartbeat Sensor
3. Accelerometer
4. GSM Module
5. GPS Module
6. Connecting Wires
7. Node MCU

CONCLUSION

The proposed system provides the exact methodology to track the location of the children to their parents. This design is proposed to solve most of the dangerous disputes challenged with child and will help them to be protected. It is used to locate the lost children in any time with the real time location and also send the notification to their parent or guard. We developed a wearable IOT device with the help of various modules like GSM Modules, MEMS accelerator, GPS Tracker, etc. for better communication and find the correct location of the child at the time of Emergency. If any accident or incidence happens, emergency notification with location sends to the parents and also to the nearest police station in case of emergency.

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