

Monitoring Device for Child Safety

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Abstract - The main goal of this technology in this study is to find a way for a child's wearable to send SMS messages to a parent or guardian that will get them what people call "smart child safety" for children. This was created to let parents access their children easier. Nowadays, many wearables use Wi-Fi and Bluetooth systems to track what children do on a daily basis and to find where they are but Wi-Fi and Bluetooth seem to be an unreliable means of communication between parents and their children so this paper is based on the idea if you can have a way of talking to a person familiar with sending SMS text messages and the way this would make sense is GSM mobile communication is almost everywhere.

Keywords: IOT, Children, Safety, GSM, GPS.

I. INTRODUCTION

The latest technology that joins the world is called Internet of Things (IOT). It links together many systems, devices and applications so that we may create automation in all areas. The present situation has seen a sharp rise in child abuse and parents want their children safe and protected. Child tracking systems are in pervasiveness in the world to make sure parents that their children are free from hazardous alerts. Security is given by a smart program that includes latest technologies. Connected smart bands on mobile by means of Internet of Things programs to give child with knowledge. The device can be used by parents to find the whereabouts of their child. The main object of this project is to switch to independent hardware that does child safety measures. IOT devices like Pulse, temp, motion and ultrasonic sensors are used in the system hardware architecture. All these sensors are coupled to the GPS module of Arduino UNO board which give information and results based on the child's conditions and forward their present location so that other members of family follow them. Hence, the sensor gets activated and the information reaches the training dataset. When the analysis found there is an abnormal, then the application will be notified.

II. RELATED WORK

Strong encryption and secure communication are essential, according to Chu et al.'s [1] analysis of the security and privacy concerns of IoT-based kid's toys. Moodbidri and Shahnasser [2] developed a child safety wearable device using GPS and GSM modules for real-time tracking and alerts.

A wearable system with an emergency alarm mechanism was created by Nandhini and Moorthi [3] to guarantee the safety of women and girls. A low-cost child safety gadget with GPS/GSM integration for location tracking was proposed by Lavanya et al. [4]. A wearable that analyzes physiological and environmental data and gives alerts in dangerous situations was introduced by Jonna Dula et al. [5]. Overall, earlier research shows that wearable and IoT technologies have the potential to improve kid safety; but, issues with privacy, battery efficiency, and dependability still need to be addressed.

III. EXISTING SYSTEM

Today, child safety systems use IoT wearables that connect to GPS and mobile phone networks to find the kid's place and tell parents or guardians. Moodbidri and Shahnasser. [2] Created a device that can trace the child in real time, and Chu et al. [1] failed to find key threats to the safety and privacy of the IoT enabled children's toys. Jonnadula et al. [5] described a sensor-based child safety device that experiences unsafe events and Nandhinith and Moorthi [3] and for alert-based wearables Lavanya et al. [4] suggested wearables for sending SOS signals depending on the child's place. Though these systems make the safety safer, they have limitations such as limited battery duration, low power consumption, short-time range and slow speed that show the need of a better, safe mechanism.

IV. PROPOSED SYSTEM

The goal of this system is to deal with lack of current child safety devices by building a smart wear that can watch in real time, give safe talk, and help in a timely manner. Unlike old systems [1]-[5], which were mainly GPS tracking and high alarm, the new model has high sensors, internet of things, and

store records in the cloud in order to give positions and safety alarm all the time that is more reliable. It uses less energy and has better hardware following a low power and a safe way to pass on data. When something is not normal like changing position or announce a trouble, it may even tell parents or whoever while GSM, Wi-Fi, or cell phone tools. This not only makes child safer but solve problems related to fast action, battery life and secure from intrusion as written earlier.

that can be seen. There are many sensors of heat for eyes, such as thermocouples, resistance heat detectors and thermistors.

B) Pulse Sensor

A pulse sensor measures a person's earned time. It is an Arduino heart rate sensor that can be plug and play. The pulse wave of heart can be obtained without any pain by sense changes in blood vessel volume. It makes the hardware greater with Electronics for noise cancellation and amplification.

C) GSM and GPS Module

GSM functions to relay emergency messages to friends, family and the local police station besides transferring signals from smart bands to smart phones. A GPS module uses the receiver's latitude/longitude to track the present location of the victim.

D) SPO2 Sensor

It finds the saturation of oxygen. It does this comparison between the light of how much is taken up by the red and the light of how much from infra-red. As the oxy Hb and deoxy Hb are of high or low amount, the comparison of what is shot-up by red light as in relation fed up with by IR changes.

E) Remote Monitoring Section

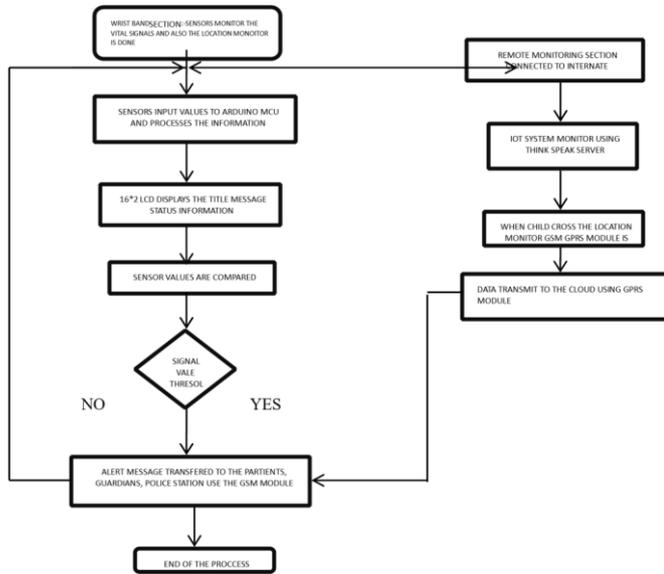


Figure 1: Flow Chart

V. BLOCK DIAGRAM

Description of Block diagram:

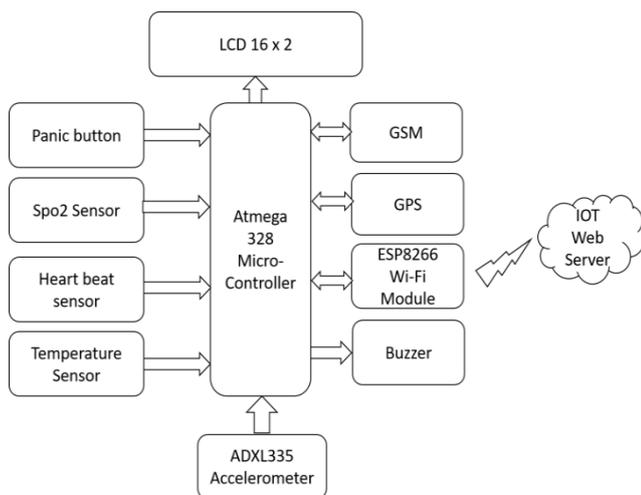


Figure 2: Block Diagram

A) Temperature Sensor

A sensor for heat is used to find out the heat of anything or where it is found then changes the reading into some energy

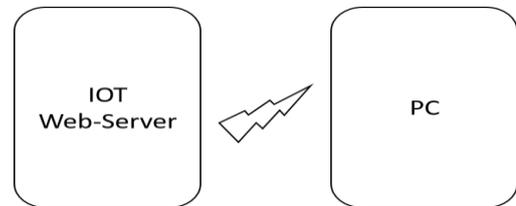


Figure 3: Monitoring Section

The use of the IOT based remote monitoring was discussed in the remote monitoring section. The monitoring component consists of a PC for remote monitoring attached with an Internet of Things (IOT) module. IOT is a system which allows things to be sensed or controlled remotely over efficient new network infrastructure with very many devices attached. This has an internet connection that can give service for 365 days on the year, 24 hours on the day without fails, so care can be taken all the time hence avoiding service problems. The supervision process is real time supervision which is in the form of a graph that differs according to time span. They (devices) take in useful data using the help of different existing technologies and pass data on their own between other devices.

VI. COMPONENTS REQUIRED

A) Hardware Components

ESP8266:

The ESP8266 is a common cheap Wi-Fi module that is used in Internet of Things. It can be used in many ways because it has many GPIO pins, peripherals, and features. Its pinout, some of the things you need to think about when using it, is described in full detail below.

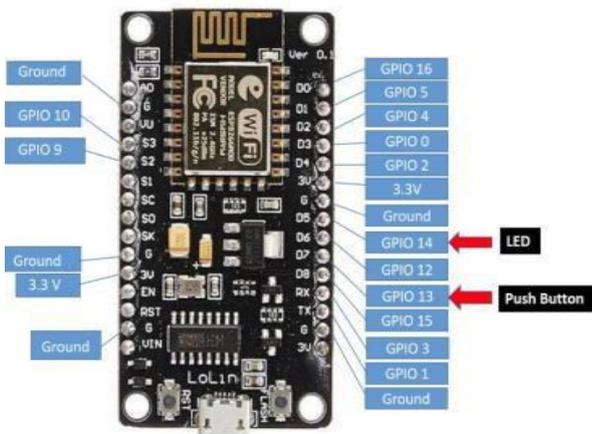


Figure 4: ESP8266

SIM800L:

The SIM800L is a tiny quad-band GSM part (850/900/1800/1900 MHz) that transmits simple UART-based AT commands to carry out SMS, voice calls and GPRS data. It can only work on 2G networks and needs an external antenna. It also needs a micro-SIM card to work. It only works on a steady 3.4–4.4V power supply (preferably 4.0V). Its peak current can be as high as 2A so good power regulation is needed.



Figure 5: SIM800L

An electric gadget called a GPS module makes use of signals from satellites in the Global Positioning System to very carefully find out time, where it is, how fast it is going, and how high it is. It usually has a thing from outside or that is built in to lift up satellite signals while doing work on the 1.575 GHz (L1) band of those signals. Most GPS modules use UART to work with microcontrollers, and they make strings of text called NMEA phrases that display coordinates and other navigation info. They tend to need a source of power of 3.3–5V, have backup RAM for faster cold start, and work best outside with a good view of the sky in order to get a good GPS signal.

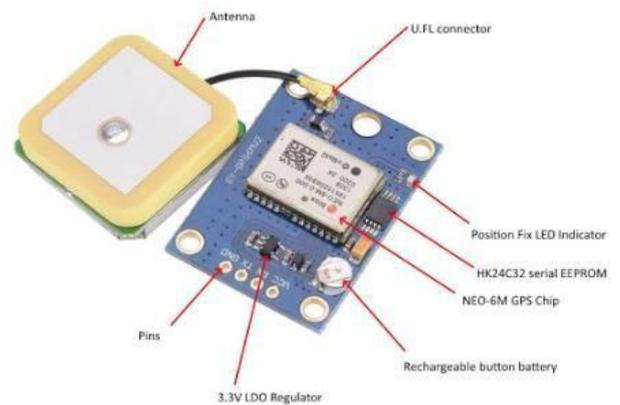


Figure 6: GPS Module

Pulse Oximeter Sensor:

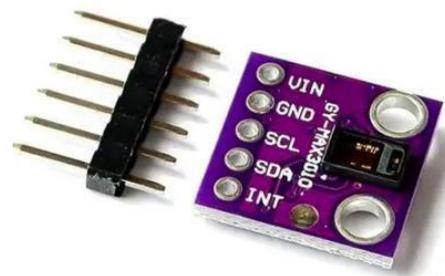


Figure 7: Pulse Oximeter Sensor

A pulse oximeter probes a person's blood o_2 sat (SpO_2) and pulse rate - after shining red and it light through the fingertip cat: By measuring how much light is taken up by the oxygenated vs. unoxxygenated blood - a pulse oximeter is a sensor device that probes a person's blood o_2 sat (SpO_2) and pulse rate. Usually, they measure reflection or transmission of light using a photodiode, then they process the signals with built-in algorithms, then they output measurements in real time through a microcontroller interface or a display. Wearable medical monitoring health gadgets often rely on pulse oximeters which are non-invasive and must be placed properly to give good results.

Fall detection accelerometer:

A fall-detection accelerometer is a direction sensor that finds sudden changes in motions or shock that come with a fall. It does this by measuring speed in order around one or more of the three axes. It has pre-set limits or use software to find strange ways of moving that are irregular. It follows the data on free-fall speed, fast shaking, shock from the fall, and being still after a fall. Many accelerometers (like the MPU6050, ADXL345, and LIS3DH) have electronic links like I2C or SPI, interrupts, and work on very little power. They make the microcontroller very quick to respond in the form of a fall. They are used a lot in safety gear, body worn sensors, and in elder and fall sites monitoring.

- Pin 1: VCC
- Pin 2: GND
- Pin 3: SCL
- Pin 4: SDA



Figure 8: Fall detection accelerometer

LCD 16x2

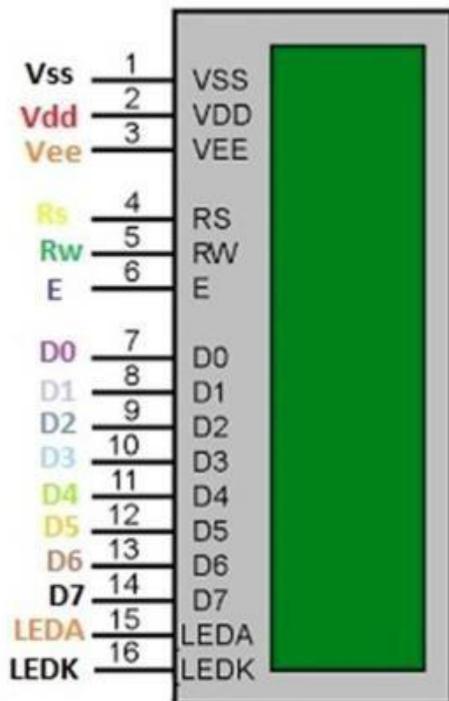


Figure 9: LCD 16x2

B) Software Requirements

Thing speak: Thing Speak is an Internet of Things (IoT) cloud platform that allows for real-time sensor data collection, storage, analysis, and visualization. It provides easy-to-use channels for devices to send data using MQTT or HTTP protocols. It automatically builds dashboards and charts to keep track of things. MATLAB analytics is another feature of Thing Speak that allows users to analyse data, run algorithms, and create automated actions or raise alarms. It is loved for remote sensing, data logging, and smart surveillance work because it can work with microcontrollers such as ESP8266, ESP32, Arduino, and many types of Internet of Things.

VII. METHODOLOGY

The papers looked at the ways of making safety gear that kids can wear and that are made from the Internet of Things and some sensors and data links. They looked at the security and safety of things that are connected to the Internet. In theirs. Other wearables that can track kids and Save parents from rapidness. They used a GPS and GSM to let another unknown and in danger. They used one the use of a computer and Internet of Things for true follow-up and alarms, see wearable tech applied to and women Safety and monitoring test of a wearable 'wearable' for located Anywhere for Monitoring the We searched about a baby safety wearable with international GPS, the transmission of contacts alarms, and safety sensors. a kid safety wearable connected to a GPS, GSM, and panic button system conf gab said to give parents or gear face situations where there are more accidents. These approaches often handle real-time policy, alarm development and secure data.

VIII. IMPLEMENTATION

The authors of this research used microcontrollers such as Arduino or Raspberry Pi in order to combine hardware and software. To acquire and forward data instantaneously emergency notifications sensors such as GPS, GSM, temp, and pulse rate sensors were connected. System software was built with either Python or embedded C to enable communication via the serial ports and facilitate data acquisition from the sensors. The use of IOT platforms as well as cloud servers resulted in parents or guardians being able to remotely monitor their micro-lives via mobile and web interfaces with data visualization possible. These prototypes displayed the ability to communicate, monitor the health, and raise quick alarm systems in real life with sample size study taking place. It also proved that smart wearable physical safety and kid protection can be done.

IX. RESULTS AND DISCUSSION

X. CONCLUSION

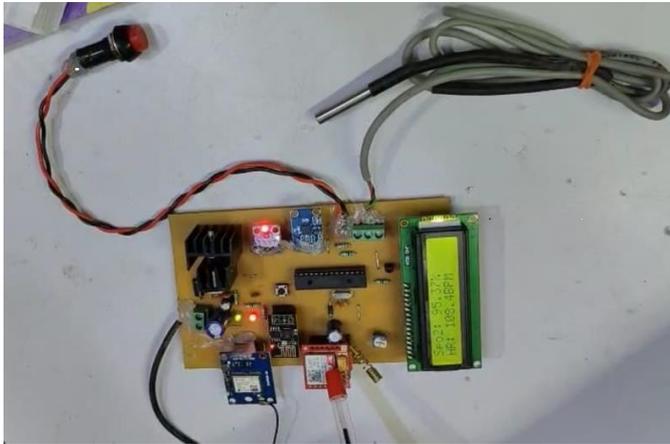


Figure 10: Output of the child monitoring

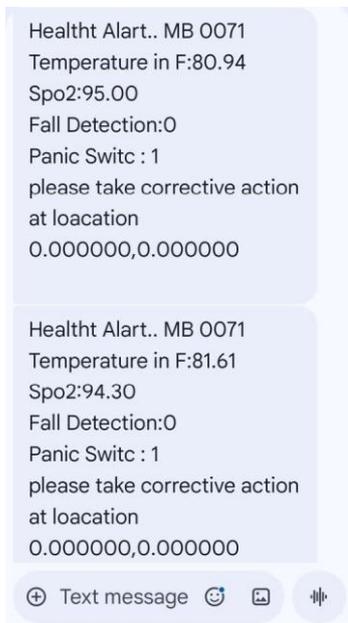


Figure 11: Output of Health Alert message

Protection of children is done through an IoT based activity tracker system and similarly, women and oldies can be protected easily and in shortest time possible. The first priority of this system is on a wireless system which can immediately monitor a defined zone, communicate securely and detect accurate and fast safety immediately. This marks the start of this model applicable to many security zones around the schools, organization and stores where these zones come when attacks. This is going to be a very fragile and workable system. Everyone will have benefit with the instant action response of it. The activity tracker can be uses more proficiently in case of juveniles, olds, sick and who have a disabled situation. The device is having live cameras for even more accurate and perfect data.

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