CHAPTER 1

INTRODUCTION

1.1 Motivation

The motivation for this wearable comes from the increasing need for safety for children in present times as there can be scenarios of the child getting lost in the major crowded areas. The prime motivation behind this paper is that we know how important technology is in our lives but it can sometimes can't be trusted, and we always need to have a secondary measure at hand. The secondary measure used in this project is the people present in the surrounding of the child who could instantly react for the child's safety till the parents arrive or they could contact the parents and help locate them. The secondary measure implemented was using a bright message and sound sensor present on the wearable device which when activated by the parents via SMS text should display the message and sound an alarm which a bystander can easily spot as a sign of distress. Hence this paper aims at providing parents with a sense of security for their child in today's time.

1.2 SCOPE

For surveillance of the child surroundings, to get a clearer picture of the location or place, this wearable can also be incorporated a camera module in it. The hardware that can be used would be an ad fruit TTL serial camera or any other camera module. Since the major focus of this wearable is the GSM module which is a better alternative than Bluetooth, Wi-Fi or ZigBee due to the short range and connectivity issues. Therefore, for this project using the GSM technology is beneficial for us as the cellular range is vast and since all the communication between the wearable and the user is taking place via SMS, therefore no internet

connectivity is required. But, still, the GSM module possess the added advantage of using GPRS which enables the board to use the internet if required.

1.3 OBJECTIVE

These Wearable Device allow parents to track their children in crowded/public places or when they are out of sight say at school, picnic or an outing. Parents can use these smart-watches to track the location of their lost kids.

1.3 EXPECTED DELIVERABLES

- We can track our child easily and about their activities.
- Not only about tracking we can know every moment of them, by this device we can save our child up to an extent.
- This device is mainly for child safety and we can also find the health status when they are in dangerous situation.
- Parent get a Text message regarding location and status of the child according to the emergency alert coded in the project ...where it follows as
- 1)- The location message sent to parent in an emergency situation , allows to locate the child through a real time Google map using GSM and GPS.

- 2)- The status message which came to parent states that the child is in danger , and key is that it detects through Sound sensor and Heart beat sensor, where message will be sent in any critical situations

CHAPTER 2

LITERATURE REVIEW

2.1 HISTORY

The child safety device is capable of acting as a capable IOT device it provides parents with the real time location, surrounding temperature along with distress alarm buzzer for their child's surroundings and the ability to locate their child or alert by standers in acting to rescue or comfort the child .The smart child safety wearable can be enhanced much more in future by using highly compact ardiuno modules but also a more power efficient model will have to be created which will be capable for holding the battery for longer time period. It helps parents to keep track if the temperature around their kid is not proper for their kid. The child safety wearable can be enhanced much more in future by using ardiuno modules . Child safety wearables are often designed to be waterproof and durable, as they are intended to be worn by active children who may engage in outdoor activities or get their devices wet. Child safety wearables have gained popularity in recent years as a means to provide peace of mind to parents and ensure the safety of their children, especially in crowded or unfamiliar environments. helps parents know to where their child is at any given time, ensuring they are safe and within predefined boundaries. The device will reply back the real time accurate location of the child and will also provide the surrounding temperature, or any of the data asked by the parents. The child safety devices must be non-removable in order to track child activity without child interventions. So, all these points have been considered in our devices.

2.2 COMPONENTS

2.2.1 GSM

GSM means Global System for Mobile Communications. A GSM module works by connecting to the GSM network through a SIM card. The SIM card provides the module with a unique identification number, which is used to identify the device on the network. The GSM module then communicates with the network using a set of protocols, which allows it to send and receive data.

The GSM network is a digital cellular network that uses a set of protocols to enable communication between devices. The network is divided into cells, which are each serviced by a base station. The base station communicates with the devices in its cell, and the cells are interconnected to form a network.

The GSM module plays a crucial role in the communication between devices and the GSM network. It is responsible for establishing and maintaining the communication link between the device and the network. The module also handles the encryption and decryption of data, which ensures the security of the communication.

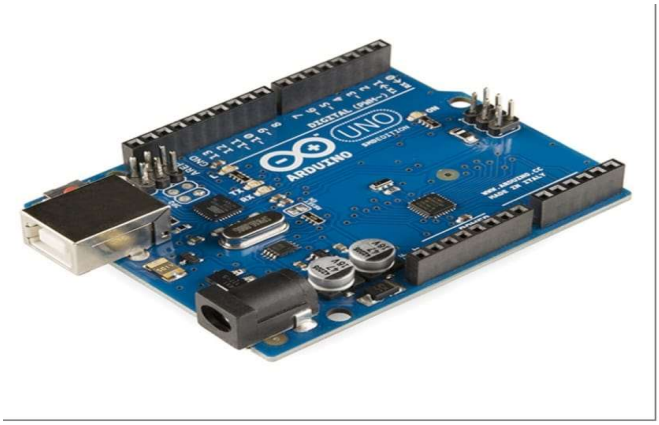
2.2.2 BREADBOARD

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit. A breadboard is used for building temporary circuits or proto types. It is used to designers because it allows components to be removed an replaced easily. It is useful to the person who wants to build a circuit to demonstrate its action ,then to resue the components in another circuit breadboards are two types solder and solderless, we preferred in our project solderless.

2.2.3 ARDUINO UNO

Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. The Arduino Uno power supply can be done with the help of a USB cable or an external power supply. The external power supplies mainly include AC to DC

adapter otherwise a battery. The adapter can be connected to the Arduino Uno by plugging into the power jack of the Arduino board. Similarly, the battery leads can be connected to the Vin pin and the GND pin of the POWER connector. The suggested voltage range will be 7 volts to 12 volts. Arduino **Uno** can detect the surroundings from the input. Here the input is a variety of sensors and these can affect its surroundings through controlling motors, lights, other actuators, etc.



2.2.4 POWER SUPPLY

A power supply is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current ... All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output or rail connections that deliver current to the load. Power supplies generally refer to generators, power plants, batteries, and solar cell (photovoltaic cell). This section describes the basic knowledge of power supply units (power supply circuit) that convert power into a power suitable for electrical appliances.

2.2.5 CONNECTING WIRES

Electrical wires operate by offering a path of low resistance to the flow of current through them. When an electric wire comes in contact with a power source, there is a movement or flow of electric charge or electrons in the wire. connecting wire allows travels the electric current from one point to another point without resistivity. Resistance of connecting wire should always be near zero. Copper wires have low resistance and are therefore suitable for low resistance

2.2.6 SOUND SENSORS

A sound sensor is defined as a module that detects sound waves through its intensity and converting it to electrical signals. sound sensor consists of an in-built capacitive microphone, peak detector and an amplifier. Sound sensor Module. The module that is used to detect the sound or audio signal intensity in several sound detecting applications such as switches, security systems, home automation systems, monitoring systems, etc, is called the sound sensor module. It contains a microphone to detect the presence of sound signals. sound sensor detects sound waves and converts them into electrical signals. It combines a microphone and processing circuitry on a small board. It measures sound intensity and produces a digital output signal using a microphone and LM393 level comparator chip.

2.2.7 HEART BEAT SENSORS

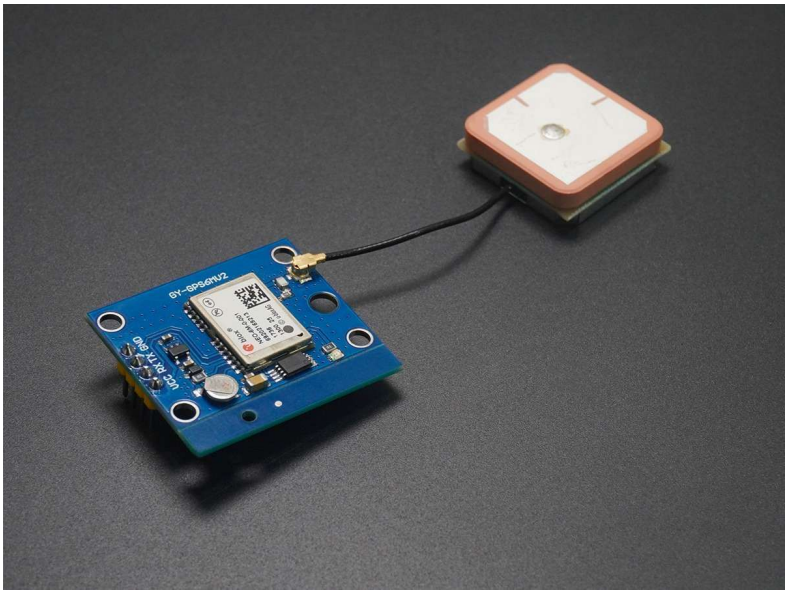
Heart beat sensors are designed to give digital output heart beat when a finger is placed on it. When the heart beat detector starts working, the light emitting detector (LED) blinks simultaneously for every heartbeat. Heartbeat sensors can be effective in monitoring your heart rate, but they are not always accurate. Factors such as skin colour, body hair, and movement can affect the

accuracy of the sensor. The heartbeat sensor is based on the principle of photoplethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (avascular region). In the case of applications where the heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by the blood, the signal pulses are equivalent to the heartbeat pulses.

2.2.8 GPS

GPS means the Global Positioning System is a satellite-based radio navigation system owned by the united states government and operated by the united states space force. It is one of the global navigation satellite systems (GNSS) that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. It does not require the user to transmit any data, and operates independently of any telephonic or Internet reception, though these technologies can enhance the usefulness of the GPS positioning information. It provides critical positioning capabilities to military, civil, and commercial users around the world. Although the United States government created, controls and

maintains the GPS system, it is freely accessible to anyone with a GPS receiver. Some GPS receivers are so accurate they can establish their location within one centimeter (0.4 inches). GPS receivers provide location in latitude, longitude, and altitude. GPS works by communication between its different components, similar to GLONASS, BeiDou, and Galileo satellites. GPS has three parts or elements. These components work together to make sure that the navigation, timing, and positioning information sent across are consistently accurate. The parts are the space segment, control segment, and receivers.



2.3APPILCATIONS

- This device will affect very well to parents or guardian of children.
- The child safety wearable system acts as a smart device. Child's surroundings can be located with the help of accurate and precise real-time location. Surrounding environment temperature.
- The child safety wearable device system acts as a smart device.

2.4 ADVANTAGES

- Easy Availability and affordability.
- Tracking made Easy.
- Smart watch is technology in disguise.
- Tracks kids when they reach school or arrive home from school.
- Track kids when they are untraceable in a crowded space.
- Track kids when they are away from home and out of your sight.
- Guarantees peace of mind to parents.

2.5 DISADVANTAGE

- Bulky and uncomfortable.
- Requires a time commitment to review and analyze data.
- Devices could lead to over-trust or under-trust.
- Devices could lead to distraction.
- Data security and privacy could be compromised with legal, financial and personal consequences.

CHAPTER 3

3.1 METHODOLOGY

The child safety wearable system acts as a smart device. Child's surroundings can be located with the help of accurate and precise real-time location. Surrounding environment temperature along with SMS are provided in this system. To overcome the drawback of the existing system and to upgrade to the new requirement's ,we are trying to add a new feature where the device can detect the cry of the child and parents get notified of that incident.

A child safety wearable device is a technological solution designed to enhance the safety and security of. These devices are typically worn by children in the form of a wristband, pendant, or smartwatch children h, and they offer various features to help parents or guardians monitor their child's whereabouts and well-being. Child safety wearables have gained popularity in recent years as a means to provide peace of mind to parents and ensure the safety of their children, especially in crowded or unfamiliar environments.

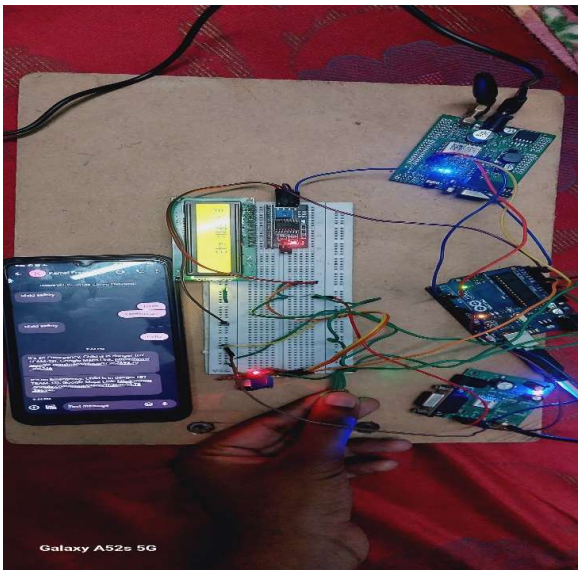
The user, therefore, can conveniently view the information on the cell phone. The physical characteristics of the wearable device are proposed to be as a wrist watch which remains placed around the wrist of the child during times. when the child is not being accompanied by an adult/parent. For the moment the design is not made compact, since the main focus now has been to show that this concept of smart wearables would be highly impactful for the safety of children. The wearable system runs on a battery with an output voltage of 5V. In order to maximize power consumption, the wearable device has been programmed to provide GPS and image information only upon request by SMS text via GSM shield.

3.2 COMPONENTS LIST

Sl. No	Components	Amount	Weight
1	Power supply	30	80gms
2	Arduino uno	1136	150gms
3	GSM	1250	50gms
4	GPS	524	38gms
5	Sound sensor	135	5gms
6	Heart beat sensor	198	10gms
7	Bread Board	190	150gms
8	Connecting wires	100	100gms

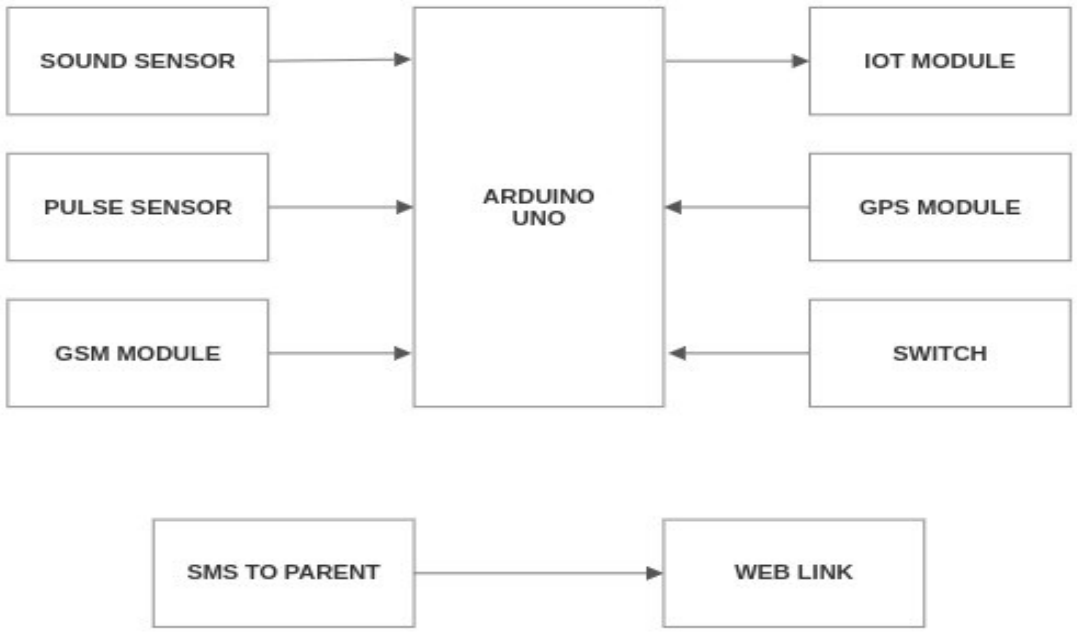
3.3 PROPOSED DESIGN

The child safety wearable system acts as a smart device. Child's surroundings can be located with the help of accurate and precise real-time location. Surrounding environment temperature, SOS light along with Distress buzzers are provided in this system. These helps in locating their child. These also aids the bystanders to rescue the child. The smart child safety wearable can be boosted considerably in the future by using extremely squeezed Arduino modules like Lily Pad Arduino which can be embroidered into fabrics. Also as a future scope, more power efficient model can be created that holds the battery for a longer time.



This paper using the GSM technologies is beneficial as the cellular range is vast and since all the communication between the wearable and the user is taking place via SMS and therefore no internet connectivity is required. But, still, the GSM module possesses the added advantage of using GPRS which enables the board to use the internet if required.

3.4 BLOCK DIAGRAM



3.5 DESCRIPTION

The moment there are many wearable in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere.

The main focus of this project is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere. The parent can send a text with specific keywords such as "LOCATION" ,"STATUS" etc., the wearable device will reply back with a text containing the real time accurate location of the child and sensing the status of the child that he/she is crying or in any trouble.

The sensors detect the sound and alert notification goes to respective parents or guardians. There are many wearable devices in the market which are used to locate the children only through WIFI and Bluetooth. The purpose of this device is to help parents locate their children with ease. At the moment there are many wearable in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child.

3.6 OBSERVATIONS

- This paper using the GSM technologies is beneficial as the cellular range is vast and since all the communication between the wearable and the user is taking place via SMS and therefore no internet connectivity is required. But, still, the GSM module possesses the added advantage of using GPRS. Which enables the board to use the internet if required.

- Parents, whether at home or office, are always worried about the safety of their kids. The fear of losing your child to avoidable circumstances is the concern area for all mommies and daddies. On the other hand, a smart watch equipped kid is always traceable and reachable in case of contingencies and emergencies. This in fact, offers great solace for parents, who are relieved at the thought of maintaining an uninterrupted connectivity with their children, anytime, anywhere. Enough to of course, guarantee the much-needed peace of mind.

- The physical characteristics of the wearable device are proposed to be as a wrist watch which remains placed around the wrist of the child during times when the child is not being accompanied by an adult/parent. For the moment the design is not made compact, since the main focus now has been to show that this concept of smart wearables would be highly impactful for the safety of children. The wearable system runs on a battery with an output voltage of 5V. In order to maximize power consumption, the wearable device has been programmed to provide GPS and image information only upon request by SMS text via GSM shield.

- Tracking a child was never this easy. These Wearable Device allow parents to track their children in crowded/public places or when they are out of sight say at school, picnic or an outing. Parents can use these smart-watches to track the location of their lost kids.

- There are plenty of options readily available. It is easy to buy a smart watch for kids of your choice online. What's more, these magnificent tech gadgets don't burn a big hole in your pockets and make up for an affordable buy. Now a smart watch is just a click away! Besides ,these smart-watches lend a style statement to your fashion conscious kids.

CHAPTER 4

4.1 RESULTS AND DISCUSSION

This paper using the GSM technologies is beneficial as the cellular range is vast and since all the communication between the wearable and the user is taking place via SMS and therefore no internet connectivity is required. But, still, the GSM module possesses the added advantage of using GPRS which enables the board to use the internet if required. In all the situations, testing of the GPS module will be done. This would respond back to the user's smart phone very quickly. The current location of the wearable system can be seen from the GPS module with exact accuracy and also shows exactly where it is present. Sometimes it can be seen that the wearable is marginally off from the exact location. This mismatch in the exact location of the wearable can tum out to be serious in a real life situation, where the parent may be misled to the incorrect location of the child. Therefore, it is found that NEO6MV2 GPS module is effective in providing the accurate location with worthy response time and in great accuracy. The smart child safety wearable can be enhanced much more in the future by using highly compact Arduino modules such as the Lily Pad Arduino which can be sewed into fabrics. Also a more power efficient model will have to be created which will be capable of holding the battery for a longer time. The child safety wearable system acts as a smart device. Child's surroundings can be located with the help of accurate and precise real-time location. For the success of an innovative product, it must not only serve the real purpose but also be easy to use. Wearable devices, in particular, must be ergonomic, light, easy to use, and preferably water resistant.

CHAPTER 5

5.1 CONCLUSIONS

Hence we have concluded that this device as important role in child's safety so we have decided to do this project to implement device which is rare now a days. This helps the parents to find their children's location easily By this device we can avoid violence against children. This is one step to reduce violence, theft, missing cases, trafficking etc. The problems with the already existing system reviewed are limited range as they are either Wi-Fi or Bluetooth based. Many available devices are not wearable and are too costly for a common man to afford. Battery life of the devices is major concern for the devices. The child safety devices must be non-removable in order to track child activity without child interventions. So, all these points have been considered in our devices.

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