CHAPTER 2

LITERATURE REVIEW

1.Child Safety Monitoring System Based on IoT - N. Senthamilarasi , N.Divya Bharathi , D.Ezhilarasi , R.B.Sangavi

Basically, children cannot complain about abuse which they face in their daily life to their parents. They can’t even realize what actually happens to them at their age. It is also difficult for parents to identify their children are being abused. In this system, the collected values from every sensor like temperature sensor, pulse rate detection sensor, metal detection sensor, and the location value from GPS are used to detect the status of the child and alerts the respective guardians using GSM accordingly.

It uses both web application as well as mobile application or either one of it as the front end user interface, cloud, and database as the back end for storing and retrieving information, and a device for monitoring. With the help of GPS, we can easily perform the Geo-fencing concept, in which we will be able to feed a particular boundary to that Device. If the child goes beyond that particular boundary specified, the respective guardians will receive an alert call using GSM. In our system, we use several components like, 1.Temperature sensor 2.Pulse sensor 3.GPS 4.GSM 5.Web camera 6.Raspberry pi microprocessor.

Disadvantages:

- It is difficult to monitor when there occurs any hindrance to satellite communication or any network issue.
- There also occurs time delays in video streaming through the server.
- Hence in the future, these issues can be overcome by using the Zigbee concept or accessing the system without the internet and using high-speed server transmission.

2.Child Safety Wearable Device - Mansi Kashyap, Shuchita Saxena, Shivani Agarwal, Rohini Singh.

Smart child safety wearable devices. Firstly, various systems and devices available are defined. Basic child safety device comprises a GPS, GSM, Arduino or any other Microcontroller, Panic button and the sensors to keep the track of child's movement, position, temperature etc. Design of the child wearable device is a key factor for making the child wear the device happily.

This project focuses communication mode to be in SMS text form using GSM. The parent will send a keyword in form of SMS "SOS", "BUZZ", "LOCATION", "TEMPERATURE" etc., to the devices. 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. It helps parents to keep track if the temperature around their kid is not proper for their kid. The secondary idea implemented was distress alarm buzzer and a bright SOS Light on the device that can be activated by the guardians via sending the keywords in the SMS. Parents can text the keywords to ON the SOS signal brightly and can also send the keyword to sound an alarm which a people near child or bystander can instantly help the child's till the parents arrive. People around could also contact the parents and help them to reunite child with his or her parents. Hence this project provides parents a sense of protection for their kid in today's unsafe environment.

Disadvantages:

- The drawback is the limited range of devices, wearable or not and smart wearable technology.
- Most devices are still held back and governed by technical limitations like battery capacity.

3.Smart IOT Device for Child Safety and Tracking - M Nandini Priyanka, S Murugan, K N H Srinivas, T D S Sarveswara Rao, E Kusuma Kumari.

Child safety and tracking is a major concern as the number of crimes on children are reported nowadays. With this motivation, a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children. The system is developed using LinkIt ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during an emergency. The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same. The above system ensures the safety and tracking of children.

In , the parent can send a message to the GSM module, according to the message information the GSM module replies back with particular details of the children. The location can be seen on the Google map. When a particular child is facing an emergency situation, the device button should be pressed so that the device captures the image along with the user information to the enrolled mobile numbers. The life of the child can be saved within no time. In , for the children's point of view GPS, GPRS and GSM are used to monitor the speed and location tracking purpose. The system is fixed on the bus or car or in any vehicle so that

whether the vehicle is going on a routine route or not can be identified by the GPS tracker,the speed of the bus can also be extracted. Now-a-days the digital technology plays a major role in connecting people via the internet. For tracking the children, the android based solution is provided to parents. The Internet is the one that will connect different components through a single device and is connected to the server. Parents track their children in real time using the location tracker by GSM and the microcontroller used is ARM-7 LPC2148. In day to day scenarios, missing child cases are increasing gradually. Child caring is a major issue

Disadvantages:

- There is a possibility of getting wrong readings while the children is playing
- because during play the children’s body temperature will rise and the heartbeat and pulse will get high
- so there will be a possibility of getting the mis-readings and the unwanted notification.
- This will make the parents panic and make parents check the child's locations continuously .

4.IoT-based Child Security Monitoring System - Lai Yi Heng, Intan Farahana Binti Kamsin

Their system is proposed with enable tracking of the child's location and capturing of data remotely such as temperature, pulse,respiratory rate, quality of sleep , to show the child's actual data with reference values, enable sending of notification if the child is out of location or when the device realizes abnormal conditions situations,to trigger the alarm and enable automatic video recording whenever the emergency button is pressed, then, emergency notification along with real-time video will be sent to and display in the parents' mobile apps, develop a prototype of IoT wearable smart band connected to parents' mobile apps so that they can monitor the actual condition of children at anytime and anyplace.

For this research, online questionnaires and semi-structured interviews are employed. Online questionnaires serve as quantitative research to measure users' attitude, behavior and factors influencing their acceptance towards the child security system. After that, a semi-structured interview is conducted as qualitative research helping in understanding trends, users' preferences, opinions and thoughts about current conditions and IoT-based child security systems. Besides, 50 parents nursing one or more children at most 12 years old are participating in this research. Quota sampling is adopted in this research.

Disadvantages:

- Their proposed device is not robust enough .
- It does not contain sufficient functions to operate like a mobile . Furthermore, this system does not record video and send it to parents during an emergency situation.
- Besides, SOS light function is not available in both systems.

5.Smart Wearable Device for Child Safety Using IOT - HM SABAA FATHIMA, V. SENTHIL MURUGAN

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. Therefore, it is intended to use the SMS as the communication type between the parent and child's wearable device, as this has fewer chances of failing when compared to Wi-Fi and Bluetooth. The platform on which this project will be running on is the Arduino Uno microcontroller board based on the ATmega328P, and the functions of sending and receiving SMS, which is provided by the Arduino GSM Module using the GSM network.

The GSM module functions as a trigger for the Arduino Uno to request data from its various modules connected to it. If an SMS text with specified keyword is sent to request the current location or GPS coordinates is sent to the GSM module via the user's phone, then the GSM module triggers the Arduino Uno to request the current GPS coordinates. The wearable device is tasked with acquiring various data from all the different modules connected to it. It comprises Arduino Uno based on the ATmega328P microcontroller. The wearable system runs on a battery or any external source. For determining the real time location of the child NEO6MV2 GPS module has been used which communicates with the Arduino Uno through a 9600-bps software serial interface.GSM Shield which in turn triggers the Arduino Uno to execute the GPS code to fetch the current, accurate location of the GPS

module. In order to measure the temperature of the surroundings of the child, a LM35 sensor is used.

Disadvantages:

- The child safety wearable device can act as a smart device. It provides parents with the real-time location, surrounding temperature,
- SOS light along with Distress alarm buzzer for their child's surroundings and the ability to locate their child or alert bystanders in acting to rescue or comfort the child.
- 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.

6.IoT Based Smart Gadget for Child Safety and Tracking - N. Manjunatha, H. M. Jayashree, N. Komal, K. Nayana

This paper is mainly streamed towards child safety solutions by developing a gadget which can be tracked via its GPS locations and also a panic button on gadget is provided to alert the parent via GSM module calling for help. Parental android app is developed to manage and track the device anytime.

Smart gadget device is always connected to parental phone which can receive and make phone calls and also receive SMS on gadget via GSM module, also a wireless technology is implemented on device which is useful to bound the device within a region of monitoring range,if device is moving out of monitoring range then an alert will be triggered on binding gadget, this helps you keep a virtual eye on child. Health monitoring system on gadgets checking for parameters like heart beat/pulse rate and temperature is included which can be monitored on parental app. Gadget also monitors whether it is plugged on by hand or not using a contact switch and alert the parent as soon as it is unplugged.

Disadvantages:

- This paper mainly focuses on child safety solutions which contain two major devices namely Smart gadget and BLE Listener device.
- The system also includes an Android app namely Parental App which will be developed and installed on parental phone.
- This paper consists of 6 modules namely Live Location Tracking,Panic Alert

System,Stay Connected Feature, Health Monitoring System,Gadget Plug and Unplug Monitoring,Boundary Monitoring System.

7.A Smart Security for Child Safety - P.Soundarya, M.Nivetha Kumari and J.Jayachitra

This security Wearable Device will keep the child safe and also the abuse against the child will be decreased. The parent of the child will get continuous updates about their child status so that they cannot be afraid about their child when they are not being with the child. This will create some fear to those who are involved in harassment and child trafficking.This application will prevent the child from harassment and kidnapping.

Child tracking is mainly based on two units: a GPS watch unit and Android monitoring unit. The GPS wearable device unit contains a GPS receiver, Flexiforce Sensor, Temperature Sensor, MEMS accelerometer. This device unit is attached to the hands of the Child. Using the GPS receiver we can monitor the movement of the students and child. This GPS receiver will work under the control of GPS satellite and then if the device unit is removed or gets tampered the FlexiForce Sensor will alert the authority with the help of Bluetooth Connection with Android App. This FlexiForce is available in the bottom of the watch which makes a grip we can monitor while removing the watch unit from the hand. The MEMS accelerometer present in the device unit is used for monitoring the sudden fall and Attack of the Child and child stages. This device unit will send the signals to the Android monitoring unit with Bluetooth communication.

Disadvantages:

- The problems with this system is limited range as they are either Wi-Fi or Bluetooth based.
- limited range as they are either Wi-Fi or Bluetooth based afford.

8.Child Monitoring and Safety System Using Wsn and Iot Technology - P.Poonkuzhlai,R.Aarthi,Yaazhini.V.M,Yuvashri.S, Vidhyalakshmi.G

This paper presents the design and implementation of a portable IOT-based safety and health monitoring system for children through a sensor embedded health monitoring device for safety and emergency services. It is known that technological advancements are increasing at a faster pace. But the utilization of technologies in various sectors is very low. We know that people of different age groups face different difficulties.But the security for children‟s is very low. There are a lot of cases registered regarding child safety.

This proposed model may provide the perfect solution to track child health issues and monitoring that whether they are fully secured or not in their living place.Here we proposed a model to compose all IoT healthcare ideas with the temperature, tespiratory and Heart beat‟ sensing module to provide the best application for providing complete care for children.The child can be even tracked by the parents in remote place. It can be done by monitoring a child’s blood pressure to check whether it crosses the normal or acceptable level of a human body and even the location of the child can be reported if it‟s out of the school range.

Disadvantages:

- More work needed to reduce the size of the device and fastness of the device in communication wise.

- Technical difficulties, poor data quality, poor design or unfashionable design of the device are just some of the disadvantages with this system.

9.RFID-based System for School Children Transportation Safety Enhancement-Al-Lawati, Anwaar, Shaikha Al-Jahdhami, Asma Al-Belushi, Dalal Al-Adawi, Medhat Awadalla, and Dawood Al-Abri

This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during 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. The system has a developed web-based database-driven application that facilities its management and provides useful information about the children to authorized personnel. A complete prototype of the proposed system was implemented and tested to validate the system functionality. The results show that the system is promising for daily transportation safety.

Disadvantages:

- It only informs the school management but not informs the parents immediately.

10.Smart Intelligent System for Women and Child Security

A portable device which will have a pressure switch. As soon as an assailant is about to attack the person or when the person senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it.

Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim’s location will be sent to their parents/guardian cell phone numbers stored in the device while purchasing it, followed by a call. If the call is unanswered for a prolonged time, a call will be redirected to the police and the same message will be sent. Additionally, if the person crosses some area which is usually not accessed by the person then a message with the real-time location is sent to the parent/guardian's phone via conventional SMS.

Disadvantages:

- Some people may not have smartphones so they will not be able to know the information about the location of child or women.

1	*N.Senthamilarasi , N. Divya Bharathi, D. Ezhilarasi, and R. B. Sangavi. "Child safety monitoring system based on IoT." In Journal of Physics: Conference Series, vol. 1362, no. 1, p. 012012. IOP Publishing, 2019.*
2	Kashyap, Mansi, Shuchita Saxena, Shivani Agarwal, and Rohini Singh. "Review on child safety wearable devices." *International Journal of Scientific Research and Management Studies. Volume 4 Issue* 3 (2020): 60-64.
3	*Priyanka, M. Nandini, S. Murugan, K. N. H. Srinivas, T. D. S. Sarveswararao, and E. Kusuma Kumari. "Smart IOT device for child safety and tracking." International Journal of Innovative Technology and Exploring Engineering (IJITEE) 8, no. 8 (2019).*
4	*Heng, Lai Yi, and Intan Farahana Binti Kamsin. "IoT-based Child Security Monitoring System." In 3rd International Conference on Integrated Intelligent Computing Communication & Security (ICIIC 2021), pp. 467-472. Atlantis Press, 2021.*
5	*HM Sabba Fathima, 2 V. Senthil Murugan. "Smart Wearable Device for Child Safety Using IOT". Vol-6 Issue-4 2020 IJARIIE-ISSN(O)-2395-4396*
6	*Manjunatha, N., H. M. Jayashree, N. Komal, and K. Nayana. "IoT Based Smart Gadget for Child Safety and Tracking."M*
7	Soundarya, P., M. Nivetha Kumari, and J. Jayachitra. "A Smart Security for Child Safety." *Asian Journal of Applied Science and Technology (AJAST)* 2, no. 2.

8	Poonkuzhlai, P., R. Aarthi, and Yaazhini VM. "Child monitoring and safety system using WSN and IoT technology." *Annals of the Romanian Society for Cell Biology* (2021): 10839-10847.
9	*Al-Lawati, Anwaar, Shaikha Al-Jahdhami, Asma Al-Belushi, Dalal Al-Adawi, Medhat Awadalla, and Dawood Al-Abri. "RFID-based system for school children transportation safety enhancement." In 2015 IEEE 8th GCC Conference & Exhibition, pp. 1-6. IEEE, 2015.*
10	Punjabi, Sunil K., Suvarna Chaure, Ujwala Ravale, and Deepti Reddy. "Smart intelligent system for women and child security." In *2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, pp. 451-454. IEEE, 2018.