IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION

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1. INTRODUCTION

Basically, children cannot complain about abusements 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 guardains using GSM accordingly.

1.1 Project overview

Nowadays,crime rate associated with children keeps increasing due to which draws peoples attention regarding child safety.this research is conducted to propose a child security smart band utilizing IOT technology.Online questionnair and semi-structured interview are methodologies used to collect data. the online questionnair gains feedbacks by sending question electroniclly,where answers need to be submitted online .in the semi structure interview , researcher meets and asks respondents some predetermined question while other being asked are not planned in advanced. through information obtained, a smart band have been proposed to monitor the safety of children . By this ,parents know what is happening remotely and can take action if something goes wrong . the future improvements of this device will be adding functions and software to make it works like a phone such
 as messaging,gallery,Google.You Tube , meanwhile,adding more child security features so that child safey is guaranteed.

1.2 Purposed

An IOT based wearable smart band for children is proposed in this research for child security purposes.The samart band is waterpro/of,chargeeable and equipped with sensors.Heart measures puls rate and BPM . sleep quelity sensore obtains children's sleep quality cycle and positions.Altimeter detects changes in height and sense whether children are jogging or running.Blood pressure sensor used to measure blood preasure . in addition , the respiratory rate.furthermore,the temperature sensore is used to detector the emptional state,pressure and anaxiety levels can be gainned .
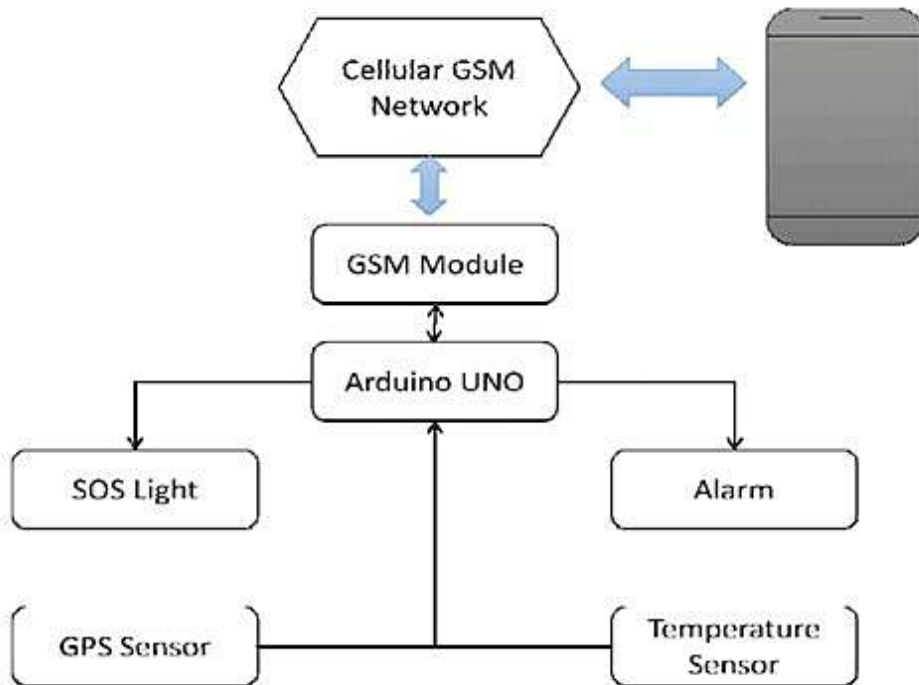
Fig. 1 System overview of the wearable device.

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2.LITERATURE SURVEY

A. RFID-based System for School Children Transportation Safety Enhancement 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.

2.1 Existing problem

Real-Time Child Abuse and Reporting System In the existing system, we use a voice recognition module in which the alert commands from the child are stored and kept for further reference. If the same child delivers the same command, it will compare with the alert command which was previously stored and sets an emergency level according to the alert command. The GSM has a SIM which is used to send an alert message or an alert call to the trusted peoples. GPS is used to track the live location and it is used when needed. The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians.

2.2 Reference

1. AkashMoodbidri, Hamid Shahnasser, "Child Safety Wearable Device", Department of Electrical and Computer Engineering San Francisco State University
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[3] Anwaar Al-Lawati, Shaikha Al-Jahdhami

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[5] Dr. R. Kamalraj, " A Hybrid Model on Child Security and Activities Monitoring System using IOT", IEEE Xplore Compliant Part Number: CFP18N67-ART•, ISBN:978-1-5386-2456-2.

[6] Pooja.K.Biradarl, Prof S.B.Jamge2," An Innovative Monitoring Application for Child Safety", DOI:10.15680/1JIRSET.2015.0409093.

[7] Prof. Sunil K Punjabi, Prof. Suvarna Chaure, "Smart Intelligent System for Women and Child Security" Department of Computer Engineering SIES Graduate School of Technology Nerul, Navi Mumbai, India.

3.IDEATION & PROPOSED SOLLUTION
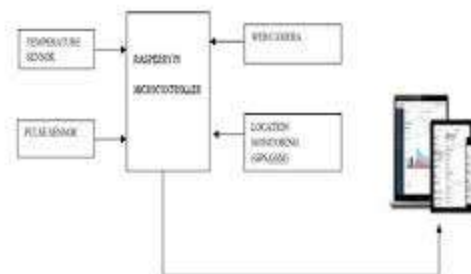
3.1 Empathy map canvas
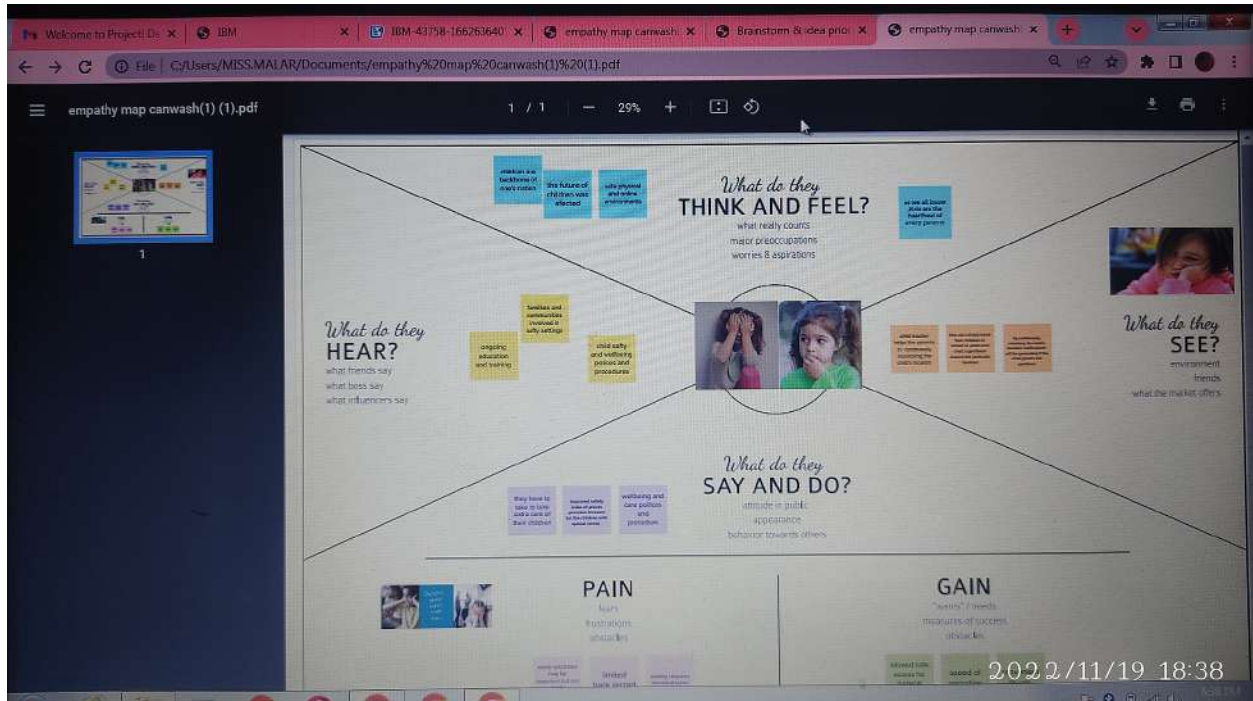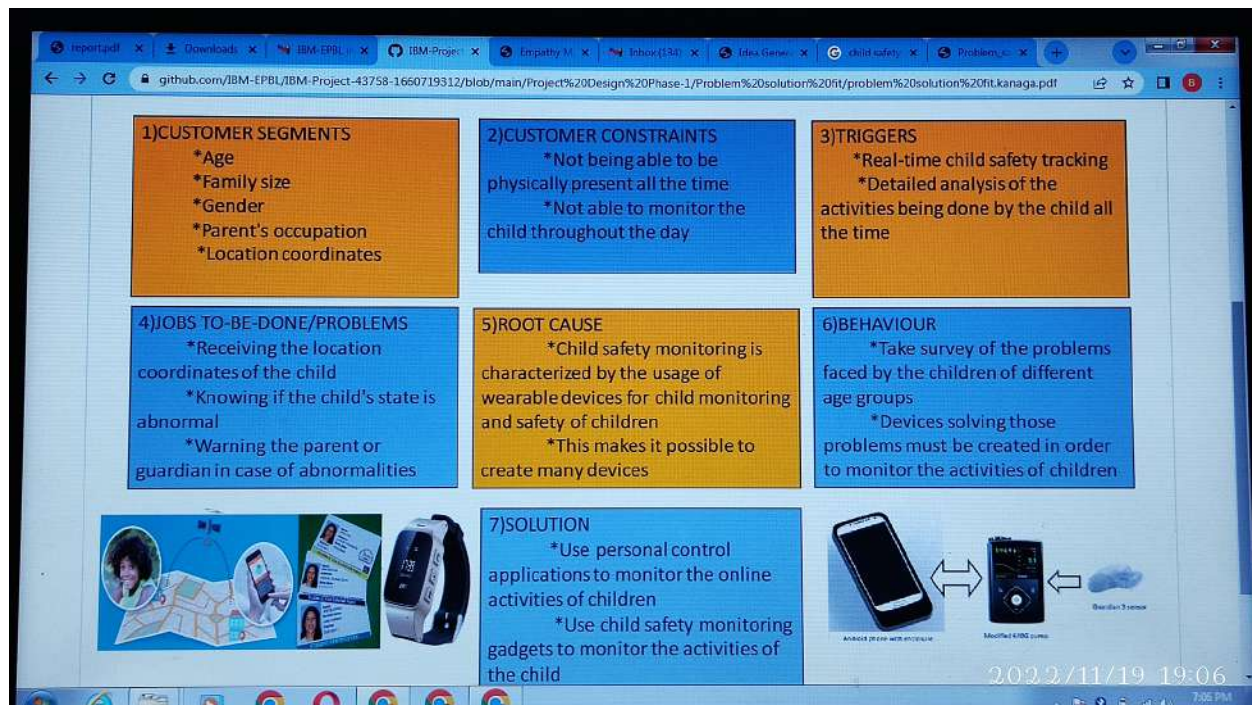
3.2 Ideation & Brainstorming
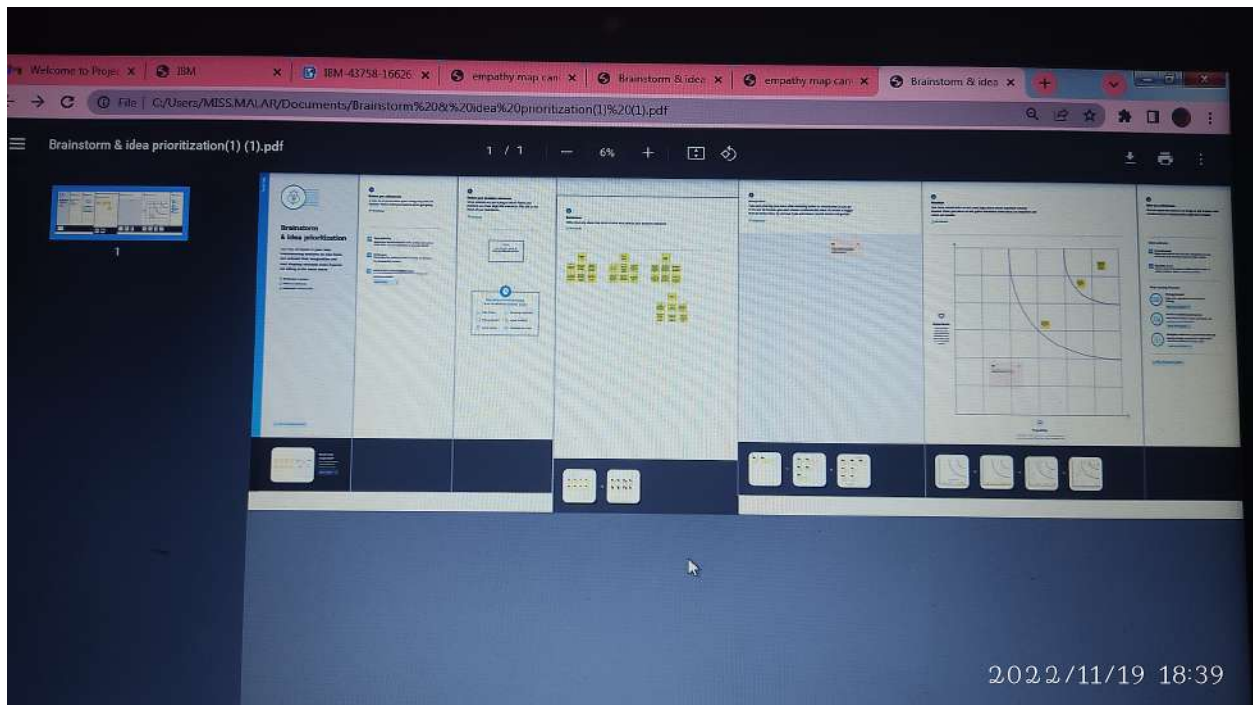
3.3 Proposed solution

Easy Availability and Affordability ⬚ Tracking of missing kids can be made easily ⬚ High Data accuracy ⬚ Guarantees peace of mind for parents ⬚ High reliability , efficiency ⬚ Short response time and high accuracy
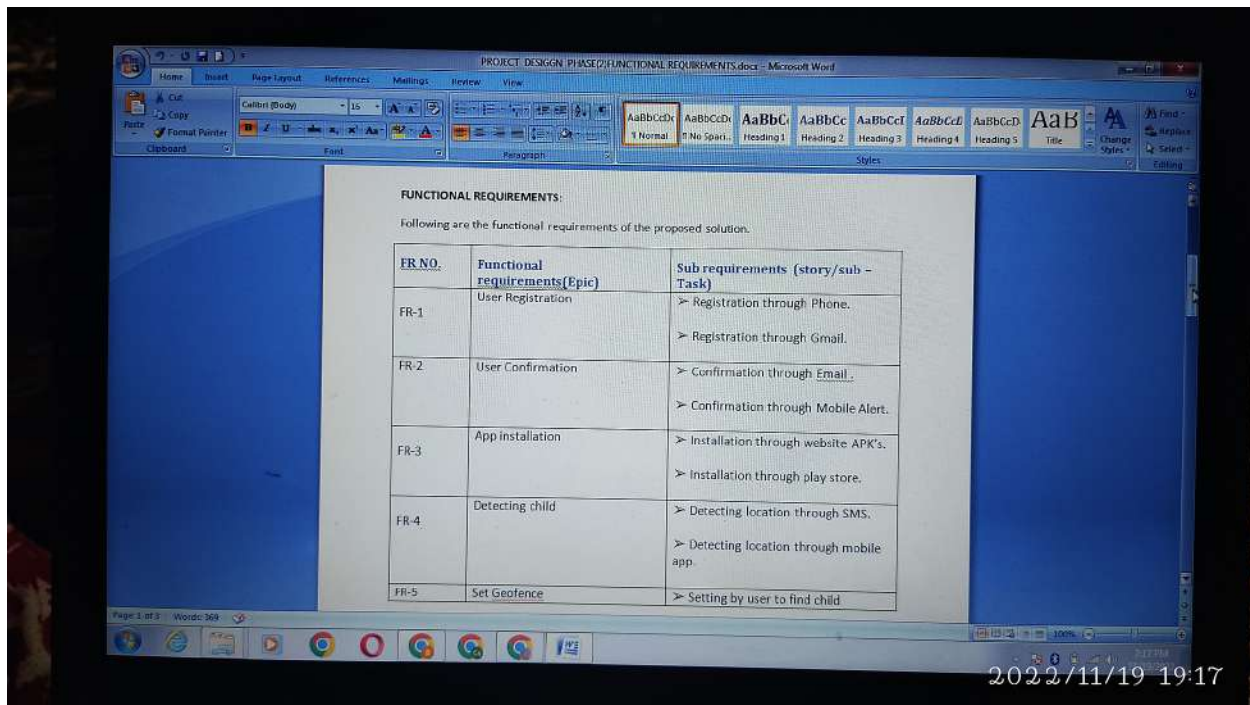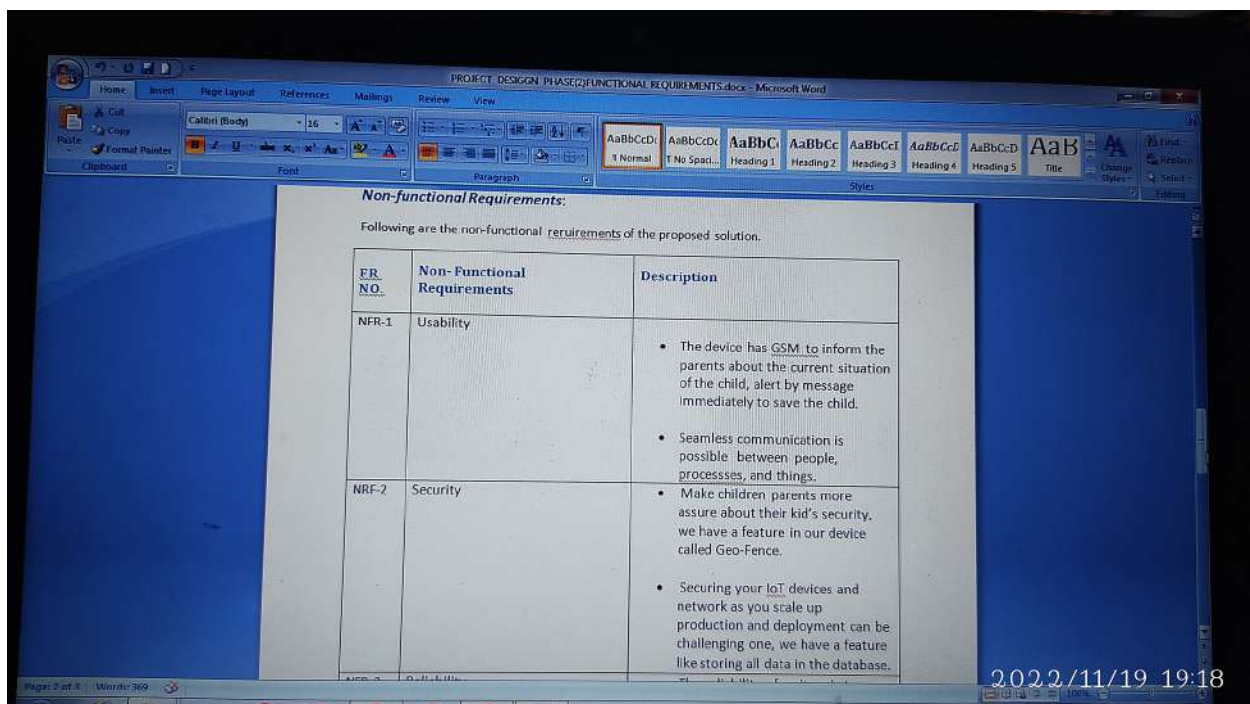

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3.4 Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional Requirement

FUNCTIONAL REQUIREMENTS:

Following are the functional requirements of the proposed solution.

FR NO.	Functional requirements(Epic)	Sub requirements (story/sub – Task)
FR-1	User Registration	➢ Registration through Phone. ➢ Registration through Gmail.
FR-2	User Confirmation	➢ Confirmation through Email. ➢ Confirmation through Mobile Alert.
FR-3	App installation	➢ Installation through website APK's. ➢ Installation through play store.
FR-4	Detecting child	➢ Detecting location through SMS. ➢ Detecting location through mobile app.
FR-5	Set Geofence	➢ Setting by user to find child

4.2 Non-Functional Requirement

Non-functional Requirements:

Following are the non-functional reruirements of the proposed solution.

FR NO.	Non- Functional Requirements	Description
NFR-1	Usability	• The device has GSM to inform the parents about the current situation of the child, alert by message immediately to save the child. • Seamless communication is possible between people, processses, and things.
NRF-2	Security	• Make children parents more assure about their kid's security. we have a feature in our device called Geo-Fence. • Securing your IoT devices and network as you scale up production and deployment can be challenging one, we have a feature like storing all data in the database.

PROJECT DESIGN

5.1 Data Flow Diagram

Shows Flow chart of the proposed system. The counter should be started for counting time. The sensors output data should be read from the child safety device. The counter time should be checked for time interval of 30minutes. For every 30minutes except serial camera, the data from GPS, temperature, touch, pulse rate data is pushed into the cloud. The monitoring parameters are displayed on webpage. The counter is reset to restart the timer. So as to post the data into the cloud for every 30minutes. The sensors data is continuously read by the controller. When the value of temperature read from the sensor crosses the threshold1, notification messages are sent. The threshold value of the temperature is considered here is 38°C. Similarly, when the touch sensor value is crocess threshold2, notification messages are sent. Threshold of the touch sensor is considered here is 100. The Pulse rate intervel is analog value from the sensor, it is converted into the beats per minute (BPM) by formulae
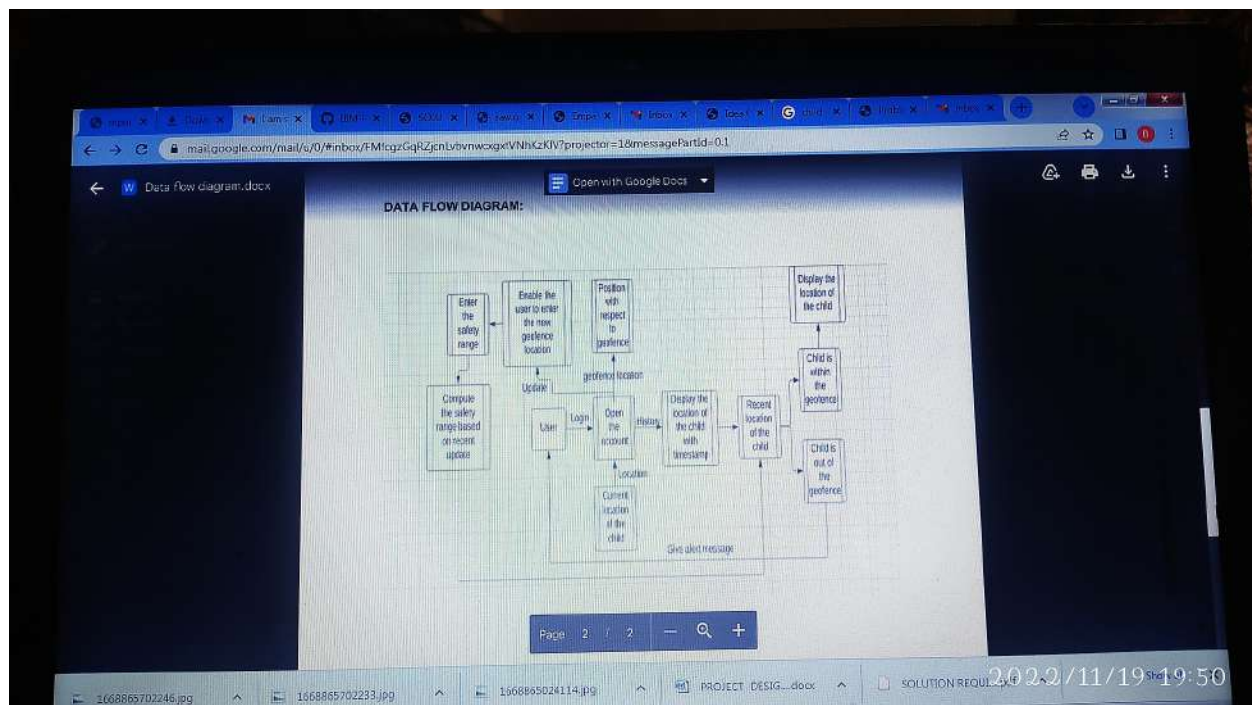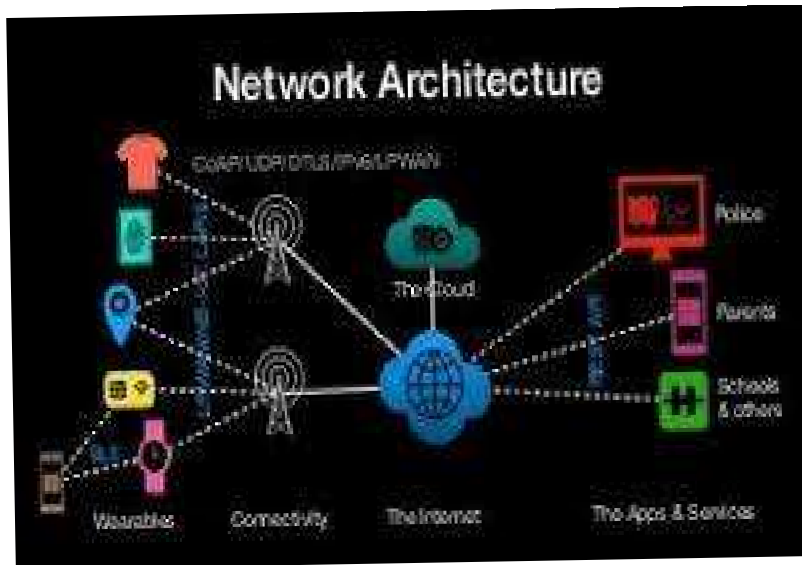

5.2 Solution & Technical Architecture

Solution architecture is an architectual description of a specific solution with many data

sources that bridges the void between industrial obstacles and technology solutions. Its aims to
● Find out the finest tech solution to decipher subsisting business crises.
● Also Outlines the composition, attributes, behaviour, and other aspects of the software to project stakeholders.
● Defines the properties, development chapter, and quick fix essentials.
● And also produce the stipulation in accord to which the solution is interpreted, controlled, and dispatched. It is comprised of many sub processes that draw the guidance from various enterprisse Architecture viewpoints


5.3 User Stories

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Most parents care about their children school safety, so we propose an idea to solve the problem. We invent the device in this project Smart tag for children. And put some sensors in it. The sensors will detect children's status then send text message. They check the children status on mobile phone. I proposed new futures from the existing system if the student has no in school compound it send the location of student to school principle or class monitor teacher. The sensors I use GPS (NEO-6M-O-001) the sensor display value on the text message. There are four status of children was displaying on text message. Four statuses are "Sleeping", "Studying", "Exercising", and "Dangerous". If the data detected by NEO-6M-O-001 is change continuously more than 3 seconds, the status will change to "Exercising". If the children don not exercise the status will be change to "Studying". According to the GPS we can know the children rout from home to school. If the children absent from school or out of school during class the status change to "Dangerous" we can track the children. When during Dangerous mode the tag send text message to their families. The three statuses are depending on speed.
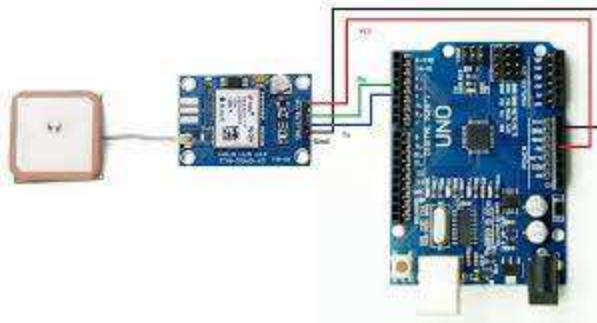
6.2 Sprint Delivery Schedule

ARDUINO UNO-R3 The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital input/output pins, 14 digital input and output pins, 6 analog inputs, a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. The ATMEGA 328P has 32kB of flash memory for storing code.
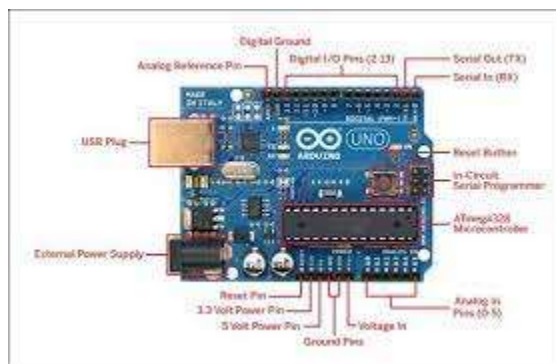
7.CODING & SOLUTION(Explain the features added in the project along with code)

7.1 feature 1

Gain knowledge of Watson IoT Platform. • Connecting IoT devices to the Watson IoT platform and exchanging the sensor data. • Gain knowledge on Cloudant DB • Gain Knowledge of geofence • Creating a Web Application through which the user interacts with the device.

7.2 Feature 2

Research methodology, a method for identifying, collecting, processing and interpreting data using some techniques, then drawing conclusions to address the problem. It is a significant section since it allows readers to evaluate overall validity and reliability of the research paper [20]. For this research, online questionnaire and semi-structured interview are employed. Online questionnaire serves 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 condition and IoT-based child security system. Besides, 50 parents nursing one or more children at most 12 years old are participating in this research. The data gathered will be used to prove the severity of current situation and the need to use IoT-based child security system.

7.3 Data bash Schema

HTML:

```html
<!DOCTYPE
html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="./css/dashboard.css">
    <title>Dashboard</title>
    <script src="./localforage.js"></script>
</head>
<body>
    <div class="wrapper">
        <div class="header">
            <span class="heading">Dashboard</span>
            <span class="right">
                <span class="username">Hello User</span>
                <span>
                    <img class="profilePic" src="https://avatars.dicebear.com/api/
height="30" width="30">
                </span>
            </span>
        </div>

        <div class="actionCenter">
            <div class="action">
                <span>Create Child Card</span>
            </div>
            <div class="action">
```

```
                          <span class="logout">Log out</span>
                    </div>
              </div>

              <div class="childCardContainer">
                    <div class="childCard">
                          <div class="childCardHeader">
                                <span>Child Name</span>
                                <span>Age 12</span>
                          </div>
                          <div class="actions">
                                <span>View</span>
                                <span>GeoFence</span>
                          </div>
                    </div>
              </div>
        </div>
        <script>
              async function main() {
                    let userData = await localforage.getItem('userData')
                    if(userData == null) {
                          window.location.href = "/login"
                    }
                    document.querySelector(".username").innerHTML = `Hello ${userData.firs
                    document.querySelector(".profilePic").src = userData.profilePic
              }
              main()
              document.querySelector(".logout").addEventListener("click", async () => {
                    await localforage.setItem('userData', null)
                    window.location.href = "/login"
              })
        </script>
  </body>
  </html>
```
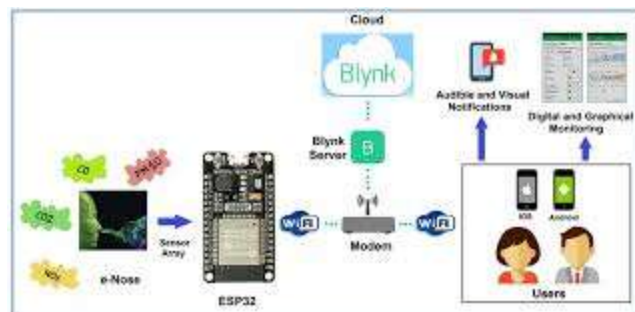
8. testing
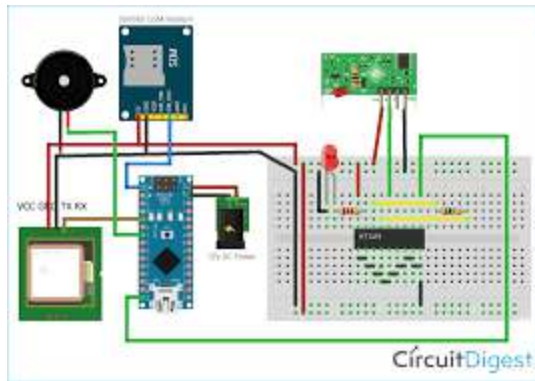
9. RESULTS

9.1 Performance Metrics

One of the module in our project is temperature sensor which is used to detect the temperature of the child as well as the surrounding temperature. If there occurs any abnormal rise or fall in temperature in the body of the child or in the surrounding it will notify the user as per the coded time delay as shown in the picture. It will show the temperature and humidity values notifies the user based on the predefined value abnormal fall or rise scenarios. Fig.9: Result 1 We also have a web camera through which we can monitor the child lively through live video streaming whenever we get notified in abnormal cases. We have an IP address for the camera fitted with the kit and we are supposed to enter that IP address in our mobile application or web application through which we can see the live video streaming of what's happening around the child as shown in the picture. we can monitor the child 24/7 in real time through the help of this live streaming which makes parents feel that they are beside their children ensuring children's safety.

10. ADVANTAGES &DISADVANTAGES

Advantages

The ability to locate and track your child in real time is all made possible with IoT-enabled technology. They are many other benefits that IoT-enabled child tracks include; **Keeps track of children in case of abduction**. Allows children more freedom while being watched.

disadvantages

The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians. The disadvantage of this project are, i. The child could not produce the exact alert command during a panic condition.

11.CONCLUSION

The word Future resembles the word Children. As Dr. A.P.J Abdul Kalam's words "Youngsters are the future pillars of one's nation", today's children are tomorrow's youngsters, preserving their dreams and life for a better future is necessary. Therefore, each and every parent should take care of their own children, without letting them to fall into the dark world of abusements, which entirely ruin them physically, mentally and emotionally destroying our future. Hence, considering the importance of our future, our project makes it easy for parents to track their children and to visually monitor them on regular basis, which makes them ensure the safety of their children and reduces the rate of incidents of child abuse.

2.FUTURE SCOPE1

 In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS, GSM, and Raspberry Pi. This system requires network connectivity, satellite communication, and high-speed data connection when we use web camera and GPS to lively monitor. It is difficult to monitor when there occurs any hindrance to satellite communication or any network issue. There also occurs time delay in video streaming through the server. Hence in the future, these issues can be overcome by using Zigbee concept or accessing the system without internet and using high-speed server transmission.

13.APPENIX

Source code

```html
<!DOCTYPE
html>
                <html lang="en" style="height: 100%; margin: 0;">
                    <head>
                        <meta charset="UTF-8" />
                        <meta name="description" content="The Home Page after Logged In" />
                        <meta name="viewport" content="width=device-width, initial-scale=1.0"
                        <title>IOT Based Safety Gadget for Child Safety Monitoring and Notifi
                <script src="./localforage.js"></script>
                        <script>
                            if (window.location.hostname !== "localhost") {
                                if (location.protocol !== "https:") {
                                    location.replace(
                                        `https:${location.href.substring(
                                            location.protocol.length
                                        )}`
                                    )
                                }
                            }

                            async function check() {
                        let data = localforage.getItem("userData")
                        if (data == null) {
                            window.location.href = "/login"
                        }
                    }
```

```html
        check()
        </script>
</head>
<body
      style="
              height: 100%;
              margin: 0;
              font-weight: 300;
              font-family: -apple-system, BlinkMacSystemFont, 'Segoe UI', Ro
                      Oxygen, Ubuntu, Cantarell, 'Open Sans', 'Helvetica Neue
                      sans-serif;
      "
>
      <div
            class="wrapper"
            style="
                    height: 90%;
                    display: flex;
                    flex-direction: column;
                    align-items: center;
                    justify-content: center;
            text-align: center;
                    "
      >
            <div
                  class="details"
                  style="
                          display: flex;
                          flex-direction: column;
                          align-items: center;
                          gap: 20px;
                          padding: 1rem;
                          border-radius: 5px;
                          box-shadow: 0 0 8px 0px #44444444;
                  max-width: 80%;
                          "
            >
                  <h1 class="name" style="margin: 0"></h1>
                  <div
                          class="imageContainer"
                          style="padding: 10px; height: 10rem; width: 10rem
                  >
```

```html
                                <img class="image" alt="profile picture" />
                            </div>
                            <h2 class="email" style="margin: 0"></h2>

                    <a style="text-decoration: none;text-align: center;font-size: 1.2r
        Dashboard ↗</a>
                        </div>
                    </div>
                    <script>
                        async function main() {
                    let name = document.querySelector(".name")
                    let image = document.querySelector(".image")
                    let email = document.querySelector(".email")
                    let userData = await localforage.getItem("userData")
                    if(userData == null) {
                        window.location.href = "/login"
                    }
                    name.innerHTML = `Welcome ${userData.firstName} ${userData.lastNam
                    image.src = userData.profilePic
                    email.innerHTML = `Your email is: <a style="text-decoration: none;
        href="mailto:${userData.email}">${userData.email}</a>`
                    }
                    main()
                     </script>
            </body>
        </html>
```

Githup & project demo link