CHILD SAFETY WEARABLE DEVICE WITH LOCATION TRACKING IOT SYSTEM

MINOR PROJECT-1 REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this Minor project-1 report entitled **"CHILD SAFETY WEARABLE DEVICE WITH LOCATION TRACKING IOT SYSTEM"** is the bonafide work of **"SRIKANTH . K (21UEEC0116), SURYA.P (21UEEC0245), DURGA SRINIVAS PRASAD .S(21UEEC0298)"** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

The project aims to develop a **Child Safety Wearable Device** that leverages the power of the Internet of Things (IoT) to ensure the safety of children. The device uses an **Arduino Uno**, a **GPS module**, and a **SIM800L** module to track the location of a child in real-time. The system also incorporates a **geofencing** concept to alert parents or guardians when a child moves beyond a predefined boundary.

The Child Safety Wearable Device is a compact, wearable gadget that can be easily attached to a child's clothing or accessories. The heart of the device is the Arduino Uno, a microcontroller board based on the ATmega328P. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, and a power jack.The device also includes a GPS module for location tracking and a SIM800L module for communication. The GPS module receives signals from multiple satellites to accurately determine the device's current location. This location data is then sent to a server via the SIM800L module, which supports quad-band GSM/GPRS networks.

The primary function of the Child Safety Wearable Device is real-time location tracking. The GPS module continuously receives satellite signals and calculates the device's current location. This location data is then transmitted to the parent's mobile via the SIM800L module. Parents or guardians can view the child's location in real-time on a map. In addition to real-time location tracking, the device also provides a geofencing feature. A geofence is a virtual boundary set up around a geographical location. In the context of the Child Safety Wearable Device, a geofence can be set up around a child's school, home, or any other location.When the child moves beyond the geofence, the device triggers an alert. This alert is sent as an SMS to a predefined phone number, typically the phone number of a parent or guardian. The alert message includes the current location of the child, allowing the parent or guardian to take immediate action.

The Child Safety Wearable Device is a powerful tool for ensuring the safety of children. By leveraging the capabilities of Arduino Uno, GPS, SIM800L, and geofencing, the device provides real-time location tracking and alerts when a child moves beyond a predefined boundary. This project represents a significant advancement in child safety technology and has the potential to provide peace of mind to parents and guardians worldwide.

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 A COMPREHENSIVE OVERVIEW

In today's fast-paced world, ensuring the safety and well-being of children has become a top priority for parents. With the advent of technology, innovative solutions have emerged to address these concerns effectively. One such solution is the child safety wearable device equipped with a location tracking system. Unlike traditional GPS trackers, this device is engineered with a specific aim: to send a message with GPS location only when the child ventures beyond a certain range predetermined by caregivers.

1.2 HOW IT WORKS

The wearable device communicates with a central system via wireless technology (such as Bluetooth, Wi-Fi, or cellular networks).
When the child moves out of a predefined safe zone or encounters an emergency, the device sends alerts to the parent's smartphone.
Parents can view the child's location, receive notifications, and take necessary actions.

1.3 WHY THIS DEVICE IS REQUIRED

Safety Concerns: In today's world, parents and caregivers are increasingly concerned about the safety of their children, especially when they are out of sight. The device provides an added layer of security by allowing caregivers to track their child's location and receive alerts if they wander beyond a designated area.

Prevention of Accidents: Children are naturally curious and may wander off without realizing the potential dangers around them. With the device, caregivers can set boundaries and receive notifications

if their child strays beyond these limits, helping to prevent accidents or incidents.

Peace of Mind: Knowing that they can receive immediate alerts if their child moves out of the safe zone provides parents and caregivers with peace of mind. They can go about their daily activities with less worry, knowing they will be promptly notified if their child's safety is compromised.

Independence for Children: While ensuring safety, the device also promotes a sense of independence for children. They can explore within the defined boundaries with the knowledge that their caregivers are aware of their location and will be notified if they go too far.

Figure 1.1: CHILD SAFETY

Emergency Situations: In the event of an emergency, such as getting lost or encountering a dangerous situation, the device allows children to quickly send their precise location to their caregivers, enabling swift assistance and intervention.

Parental Oversight: Caregivers can maintain a level of oversight without being overly intrusive. By setting boundaries and receiving alerts only when necessary, they can strike a balance between allowing their child to explore and ensuring their safety.

Versatility: The device can be useful in various scenarios, such as crowded public places, amusement parks, or during outdoor activities like hiking or camping. It offers flexibility and adaptability to different environments and situations.

Figure 1.2: CHILD ABDUCTION

1.4 ATTRIBUTES

Focused Purpose: Unlike conventional GPS trackers that provide continuous tracking, the primary function of this child safety wearable device is to alert caregivers when the child moves beyond a predefined perimeter.

Targeted Range Alerting: The device employs sophisticated geofencing technology to establish a virtual boundary around the child's designated safe zone. When the child crosses this boundary, the device promptly triggers a message containing the GPS coordinates, enabling caregivers to take immediate action.

Seamless Integration: The wearable device seamlessly integrates with the child's daily routine, offering unobtrusive monitoring without disrupting their activities or causing discomfort.

Minimalist Design: Designed with simplicity and functionality in mind, the device boasts a minimalist design that is lightweight, compact, and comfortable for children to wear throughout the day.

User-Friendly Interface: Caregivers can easily configure and customize the device settings through an intuitive interface, allowing them to define the desired safe zone and set notification preferences effortlessly.

Reliable Communication: Equipped with robust communication capabilities, the device ensures reli-

able transmission of location updates to caregivers, even in areas with limited network coverage.

1.5 IN WHAT, IT OVERCOMES OTHER DEVICES

1. Enhanced Peace of Mind: By providing timely alerts when the child strays beyond the predetermined range, the device offers caregivers enhanced peace of mind, enabling them to respond promptly to potential safety concerns.

2. Privacy and Security: Upholding the highest standards of privacy and security, the device employs encryption protocols to safeguard sensitive data, ensuring that location information remains confidential and accessible only to authorized users.

3. Cost-Effective Solution: Compared to comprehensive GPS tracking solutions, this targeted range alerting device offers a cost-effective solution for families seeking essential safety monitoring without the complexity or expense of continuous tracking services.

4. Parental Control and Monitoring: Caregivers have full control over the device's functionality and monitoring capabilities, allowing them to track their child's movements responsibly while respecting their privacy and autonomy.

5. Seamless Integration with Mobile Devices: The device seamlessly integrates with caregivers' smartphones, enabling them to receive instant notifications and access real-time location updates through dedicated mobile applications.

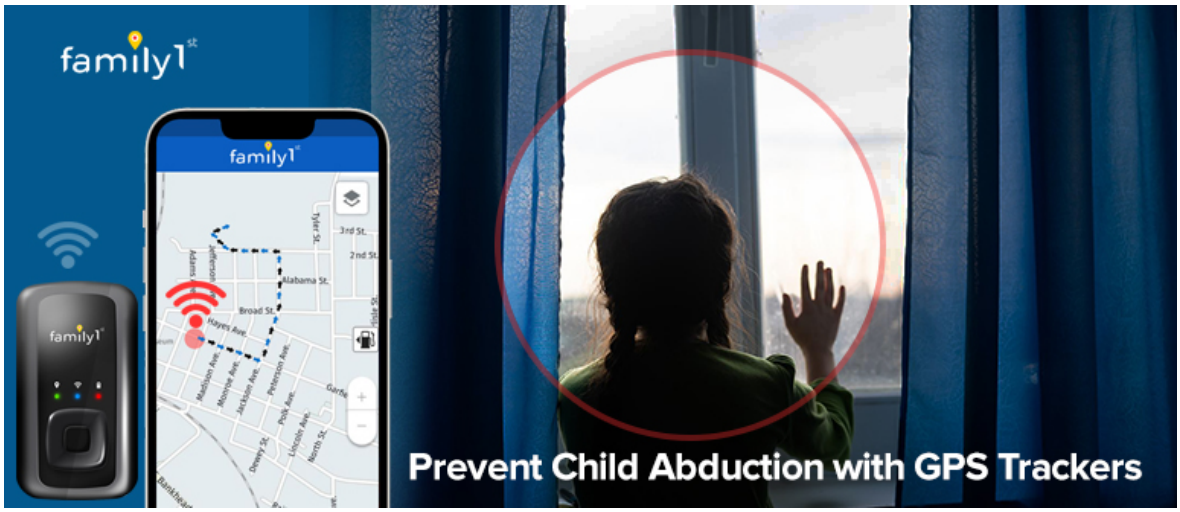


Figure 1.3: CHILD TRACKING

CHAPTER 2

COMPONENTS REQUIRED

2.1 ARDUINO UNO

The **Arduino Uno** is a popular microcontroller board developed by **Arduino.cc**. It serves as an excellent platform for learning embedded programming due to its affordability and flexibility. The board is based on the **Atmega328** microcontroller and operates at **5V**. It features **14 digital input/output pins**, **6** of which support **PWM** (Pulse Width Modulation) output, and **6 analog input pins**. The **Arduino Uno** can be powered via a **DC Power Jack** or a **USB Port**. It supports communication protocols such as **UART**, **SPI**, and **I2C**. The **Arduino IDE** is used for writing, compiling, and uploading code to the board. Its memory includes **32 KB of flash memory**, **2 KB of SRAM**, and **1 KB of EEPROM**. Overall, the **Arduino Uno** is a versatile tool for electronics enthusiasts and professionals alike! .

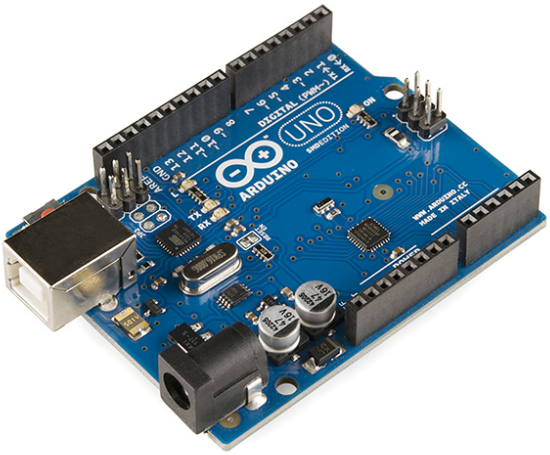


Figure 2.1: ARDUINO UNO

2.2 SIM800L GSM Module

The SIM800L GSM module enables GSM/GPRS communication in compact devices, supporting SMS, voice calls, and data transmission. Its small size and low power consumption make it ideal for IoT projects. With standard UART interface, it integrates seamlessly with Arduino and Raspberry Pi. Supporting TCP/IP, HTTP, and FTP protocols, it facilitates versatile internet data exchange. Compatible across frequencies and SIM card types, it suits various regions and networks. Easy installation with an onboard SIM card holder and reliable firmware enhances usability. Widely used in remote monitoring, security systems, and asset tracking due to its cellular connectivity. Overall, the SIM800L module is a valuable addition for enabling remote communication in diverse applications.

Figure 2.2: GSM MODULE

2.3 NEO6M GPS Module

The NEO-6M GPS module provides accurate global positioning data for various applications with its compact size and low power consumption. Utilizing the MediaTek MT3333 chipset, it ensures fast time-to-first-fix and high sensitivity for reliable satellite signal acquisition. Supporting GPS, GLONASS, and Galileo systems, it offers enhanced accuracy and coverage. Its serial interface facilitates easy integration with microcontrollers like Arduino and Raspberry Pi. Offering data such as latitude, longitude, altitude, speed, and time, it enables sophisticated location-based applications. Widely used in drones, handheld GPS devices, and vehicle tracking systems. Its affordability, reliabil-

ity, and versatility make it popular in navigation, transportation, and outdoor recreation industries. Overall, the NEO-6M GPS module is essential for precise positioning in electronic devices and applications.

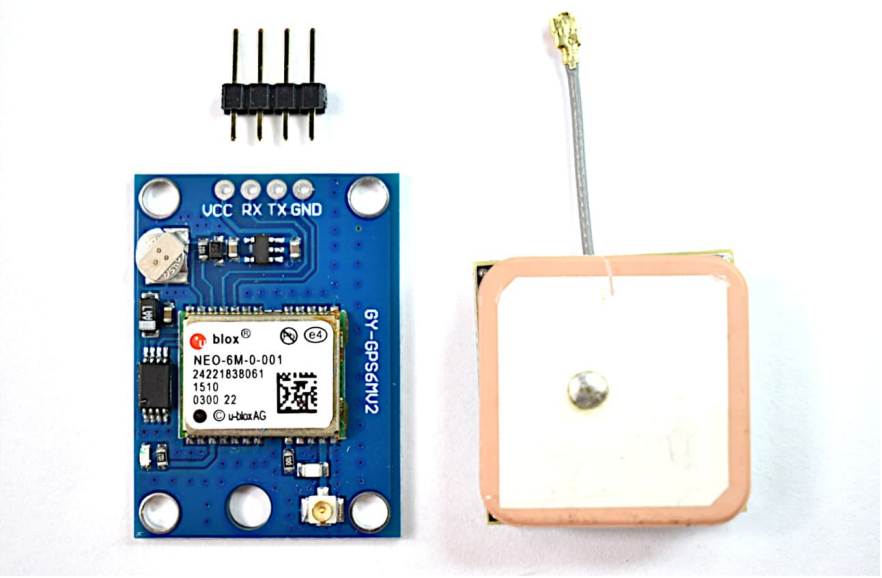


Figure 2.3: GPS MODULE

2.4 JUMPER WIRES

Jumper wires are flexible connectors used in electronics to create quick, temporary electrical connections between components on breadboards or modules. They come in various lengths, colors, and connector types, facilitating easy adjustments to circuit layouts without soldering. Ideal for rapid prototyping and experimentation, they minimize component damage and simplify troubleshooting. With metal pins at each end, they allow for swift insertion and removal.

Figure 2.4: JUMPER WIRES

2.5 BATTERY 3.7v 2000mAh

The 3.7V 2000mAh lithium-ion battery is a compact and efficient power source for portable electronics. With its high energy density, it offers long-lasting performance in devices like smartphones and wearables. Its nominal voltage of 3.7V ensures compatibility with various circuits, while the 2000mAh capacity provides ample power for extended use. These batteries feature low self-discharge rates and high efficiency, ensuring optimal performance over multiple charge cycles. Their compact size and lightweight design make them easy to integrate into portable devices without compromising on power. Overall, the 3.7V 2000mAh lithium-ion battery provides a reliable and convenient power solution for a range of electronic applications.

Figure 2.5: BATTERY 3.7v 2000mAh

CHAPTER 3

WORKING

1. **System Workflow**:

   - **Location Tracking**:
     - The **GPS NEO-6M** module continuously reads the child's location (latitude and longitude).
     - The Arduino processes this data.
     - The **SIM800L** module sends the location data to the parent's smartphone via SMS or GPRS.
   - **Geofencing**:
     - Geofencing involves defining safe zones (e.g., home, school, playground) as virtual boundaries.
     - When the child exits a geofenced area, the system triggers an event.
     - The Arduino checks the child's location against predefined geofences.
     - If the child crosses a boundary, an alert is generated. The boundary is set by the radius .
     - The maximum radius is upto 500m or 0.5km .
   - **Alerts and Notifications**:
     - The system sends real-time alerts to the parent's smartphone:
     - **Exiting a Geofence**: Alerts the parent if the child leaves the safe area.
   - The parent receives SMS notifications.

2. **Parental Control**:

   - Parents can monitor the child's location using by receiving SMS updates.
   - They can set geofences, adjust alert thresholds, and customize settings.

3. **Implementation Steps**

- **Hardware Setup**:
  - Connect the **GPS NEO-6M** and **SIM800L** modules to the Arduino Uno.
    //GSM Module RX pin to Arduino 3
    //GSM Module TX pin to Arduino 2
    //GPS Module RX pin to Arduino 9
    //GPS Module TX pin to Arduino 8

- **Programming Logic**: Write an Arduino sketch to:
  - Read GPS data and extract latitude and longitude.
  - Set up communication with the SIM800L module.
  - Implement geofencing logic (compare coordinates with predefined safe zones).
  - Send SMS alerts to the parent's phone.

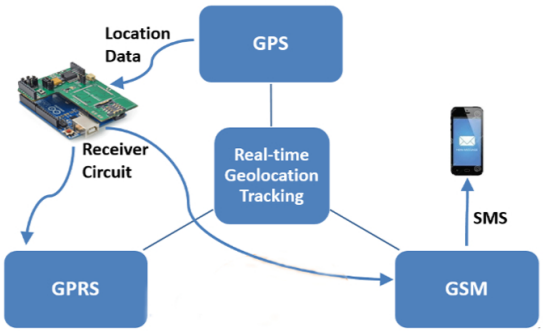


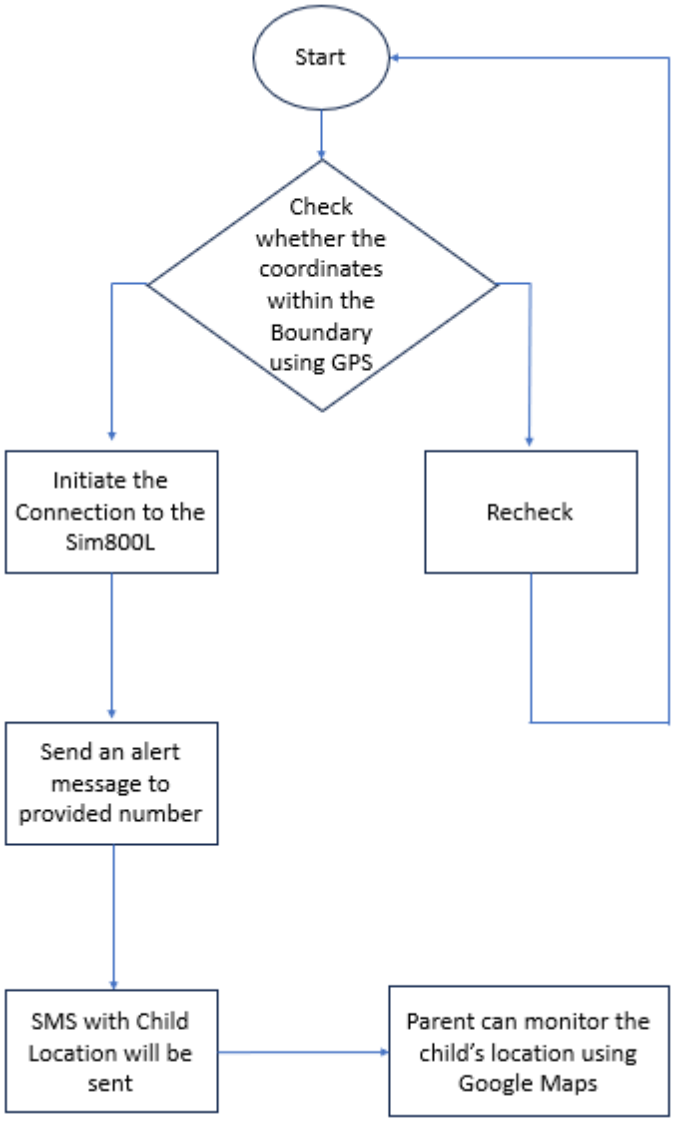
Figure 3.1: WORKING

4. **Safety Considerations**:

- **Battery Life**: Optimize power usage to ensure the wearable device lasts throughout the day.
- **Privacy**: Ensure data privacy and secure communication between the child's device and the parent's smartphone.
- **Robustness**: Design the wearable to withstand physical activities and environmental conditions.

CHAPTER 4

FLOW CHART



CHAPTER 5

HOW TO GET COORDINATES

1. **Open Google Maps**: Open your web browser and go to https://maps.google.com/Google Maps.
2. **Search for Your Location**:
   - In the search bar, type the name of your current location (address, city, or landmark).
   - Click the search icon or press Enter.
3. **Find Your Latitude and Longitude**:
   - Once the map displays your location, right-click (or tap and hold) on the desired point.
   - A pop-up window will appear.
   - Look for the latitude and longitude coordinates in decimal format at the top of the pop-up.
   - To copy the coordinates automatically, left-click on the latitude and longitude.
4. **Coordinate Formats**:
   - Google Maps provides coordinates in decimal degrees (DD) format.
   - Ensure your coordinates follow this format: `latitude, longitude`.
   - Correct format example: `41.40338, 2.17403`.
   - Incorrect format example: `41,40338, 2,17403`.

Remember to list your latitude coordinates before longitude coordinates, and ensure that the latitude falls between -90 and 90, and the longitude between -180 and 180. You now have the precise coordinates for your present area!

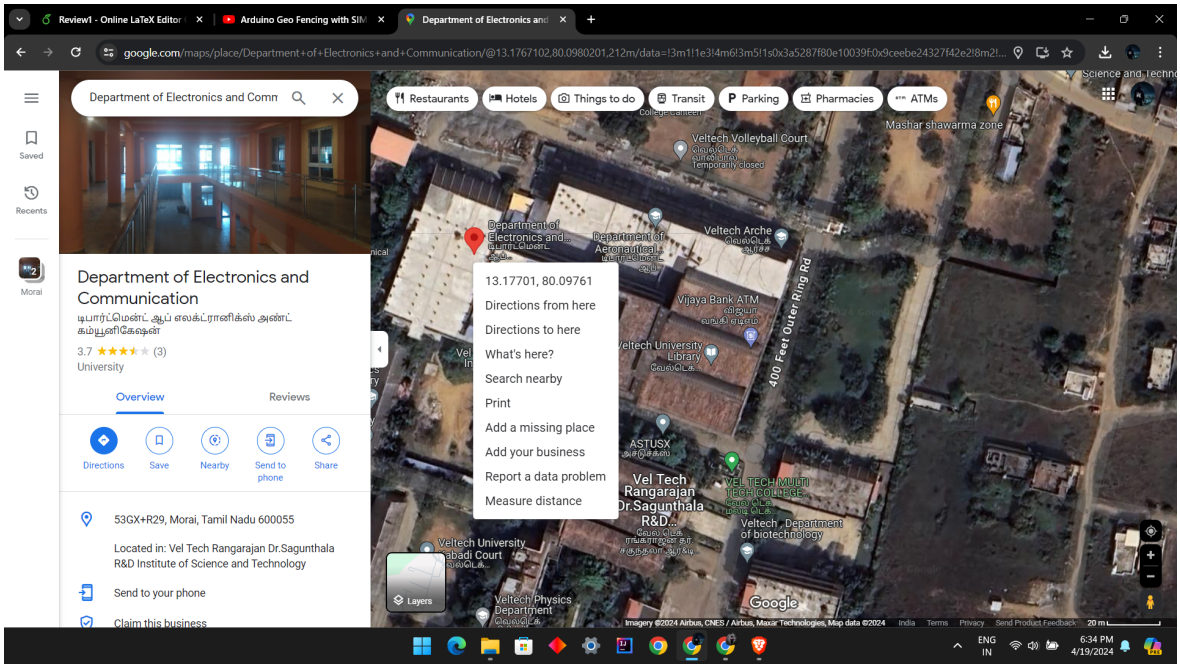


Figure 5.1: COORDINATES

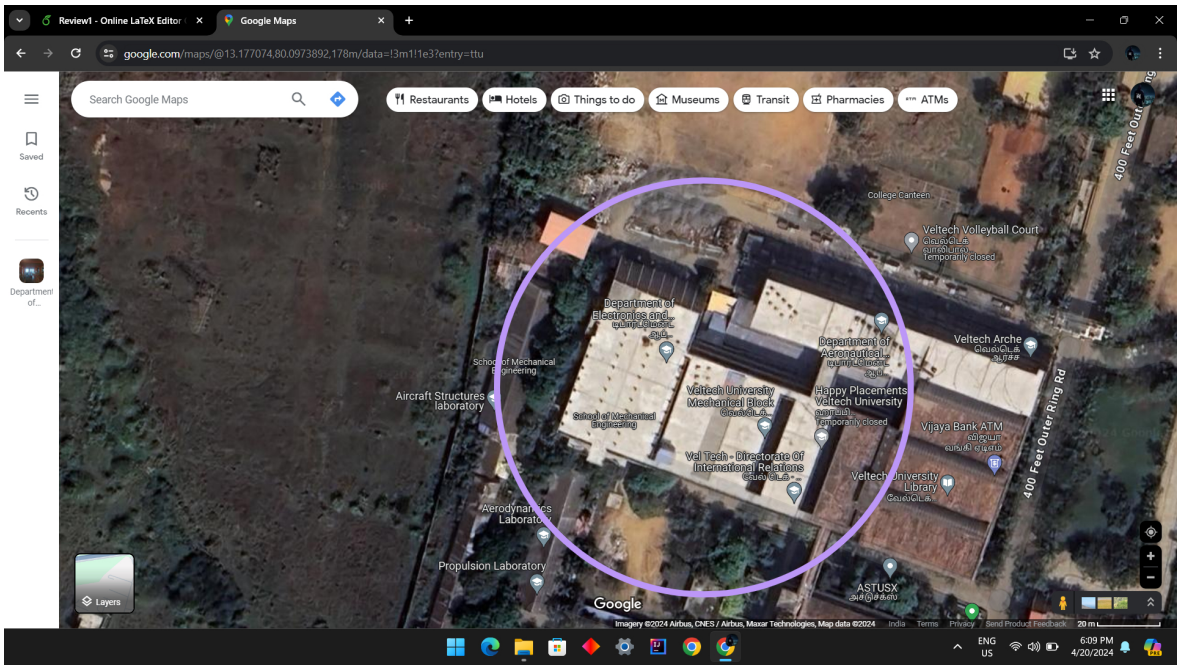


Figure 5.2: GEO-FENCING

CHAPTER 6

ARDUINO CODE

```
#include <SoftwareSerial.h>

#include <AltSoftSerial.h>
#include <TinyGPS++.h>

//-------------------------------------------------------------------------
//enter your personal phone number to receive sms alerts.
//phone number must start with country code.
const String PHONE = "+91 PARENT MOBILE NUMBER ";
//-------------------------------------------------------------------------
//GSM Module RX pin to Arduino 3
//GSM Module TX pin to Arduino 2
#define rxPin 2
#define txPin 3
SoftwareSerial sim800(rxPin,txPin);
//-------------------------------------------------------------------------
//GPS Module RX pin to Arduino 9
//GPS Module TX pin to Arduino 8
AltSoftSerial neogps;
TinyGPSPlus gps;
//-------------------------------------------------------------------------
// Size of the geo fence (in meters)
const float maxDistance = 30;

//-------------------------------------------------------------------------
float initialLatitude = 13.191747;
```

```
float initialLongitude = 80.105434;

float latitude, longitude;
//------------------------------------------------------------------


void getGps(float& latitude, float& longitude);


/*****************************************************
 * setup() function
 *****************************************************/
void setup()
{
  //------------------------------------------------------------------
  //Serial.println("Arduino serial initialize");
  Serial.begin(9600);
  //------------------------------------------------------------------
  //Serial.println("SIM800L serial initialize");
  sim800.begin(9600);
  //------------------------------------------------------------------
  //Serial.println("NEO6M serial initialize");
  neogps.begin(9600);
  //------------------------------------------------------------------
  pinMode(BUZZER, OUTPUT);
  //------------------------------------------------------------------
  sim800.println("AT"); //Check GSM Module
  delay(1000);
  sim800.println("ATE1"); //ON
  delay(1000);
  sim800.println("AT+CPIN?"); //Check SIM ready
  delay(1000);
  sim800.println("AT+CMGF=1"); //SMS text mode
  delay(1000);
  sim800.println("AT+CNMI=1,1,0,0,0");
  delay(1000);
  //AT +CNMI = 2,1,0,0,0 - AT +CNMI = 2,2,0,0,0 (both are same)
  //------------------------------------------------------------------
```

```
  delay(20000);
  buzzer_timer = millis();
}




/*****************************************************
 * loop() function
 *****************************************************/
void loop()
{
  //--------------------------------------------------------------------
  getGps(latitude, longitude);
  //--------------------------------------------------------------------
  float distance = getDistance(latitude, longitude,initialLatitude,
initialLongitude);
  //--------------------------------------------------------------------
  Serial.print("Latitude= "); Serial.println(latitude, 6);
  Serial.print("Lngitude= "); Serial.println(longitude, 6);
  Serial.print("initialLatitude= "); Serial.println(initialLatitude, 6);
  Serial.print("initialLngitude= "); Serial.println(initialLongitude, 6);
  Serial.print("current Distance= "); Serial.println(distance);
  //--------------------------------------------------------------------
  /*****************************************************
* getDistance() function
*****************************************************/

// Calculate distance between two points
float getDistance(float flat1, float flon1, float flat2, float flon2) {

  // Variables
  float dist_calc=0;
  float dist_calc2=0;
  float diflat=0;
  float diflon=0;
```

```
  // Calculations
  diflat  = radians(flat2-flat1);
  flat1 = radians(flat1);
  flat2 = radians(flat2);
  diflon = radians((flon2)-(flon1));

  dist_calc = (sin(diflat/2.0)*sin(diflat/2.0));
  dist_calc2 = cos(flat1);
  dist_calc2*=cos(flat2);
  dist_calc2*=sin(diflon/2.0);
  dist_calc2*=sin(diflon/2.0);
  dist_calc +=dist_calc2;

  dist_calc=(2*atan2(sqrt(dist_calc),sqrt(1.0-dist_calc)));

  dist_calc*=6371000.0; //Converting to meters

  return dist_calc;
}



/*****************************************************
 * getGps() Function
*****************************************************/
void getGps(float& latitude, float& longitude)
{
  // Can take up to 60 seconds
  boolean newData = false;
  for (unsigned long start = millis(); millis() - start < 2000;){
    while (neogps.available()){
      if (gps.encode(neogps.read())){
        newData = true;
        break;
      }
    }
  }

  if (newData) //If newData is true
```

```
  {
    latitude = gps.location.lat();
    longitude = gps.location.lng();
    newData = false;
  }
  else {
    Serial.println("No GPS data is available");
    latitude = 0;
    longitude = 0;
  }
}

/*******************************************************
* sendAlert() function
*******************************************************/
void sendAlert()
{
  //return;
  String sms_data;
  sms_data = "Alert! The object is outside the fense.\r";
  sms_data += "http://maps.google.com/maps?q=loc:";
  sms_data += String(latitude) + "," + String(longitude);

  //return;
  sim800.print("AT+CMGF=1\r");
  delay(1000);
  sim800.print("AT+CMGS=\""+PHONE+"\"\r");
  delay(1000);
  sim800.print(sms_data);
  delay(100);
  sim800.write(0x1A); //ascii code for ctrl-26 //sim800.println((char)26);
  delay(1000);
  Serial.println("SMS Sent Successfully.");

}
```

CHAPTER 7

OUTPUT

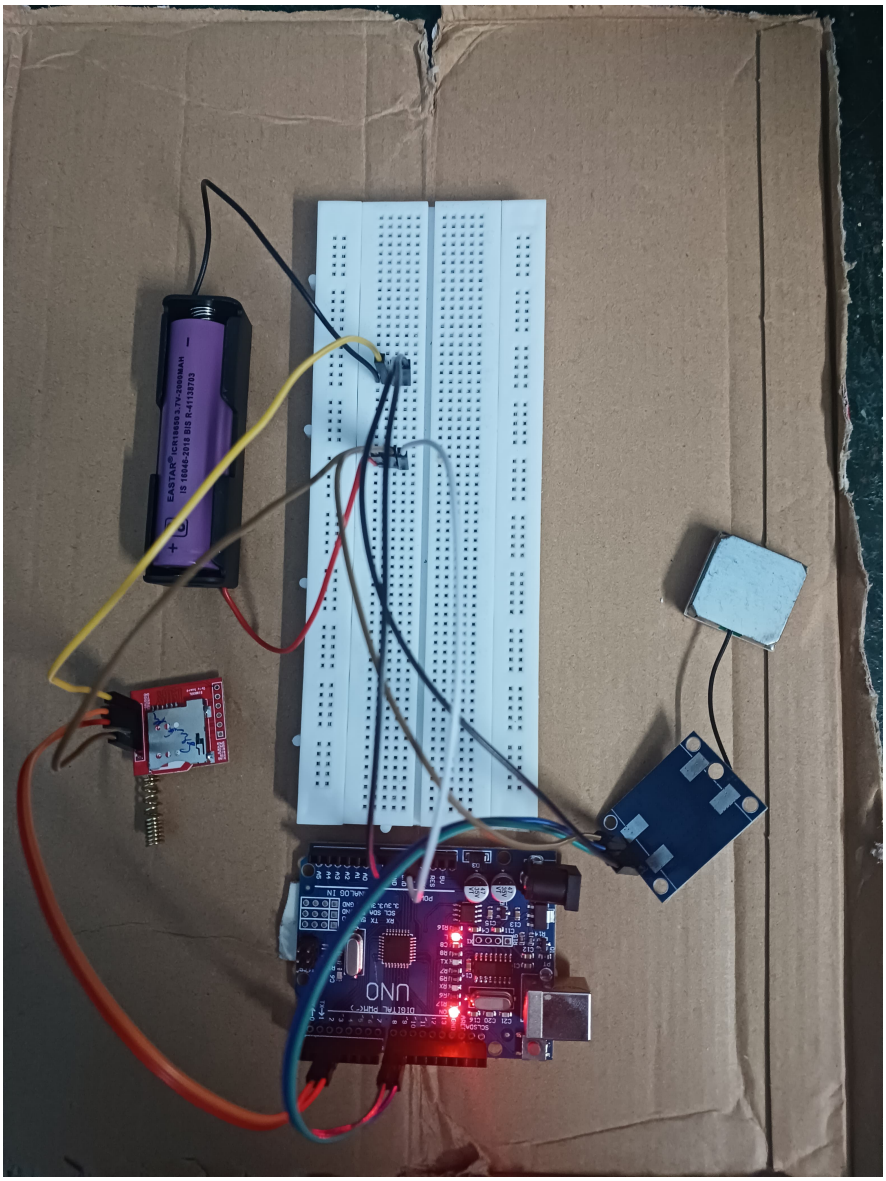


Figure 7.1: CIRCUIT

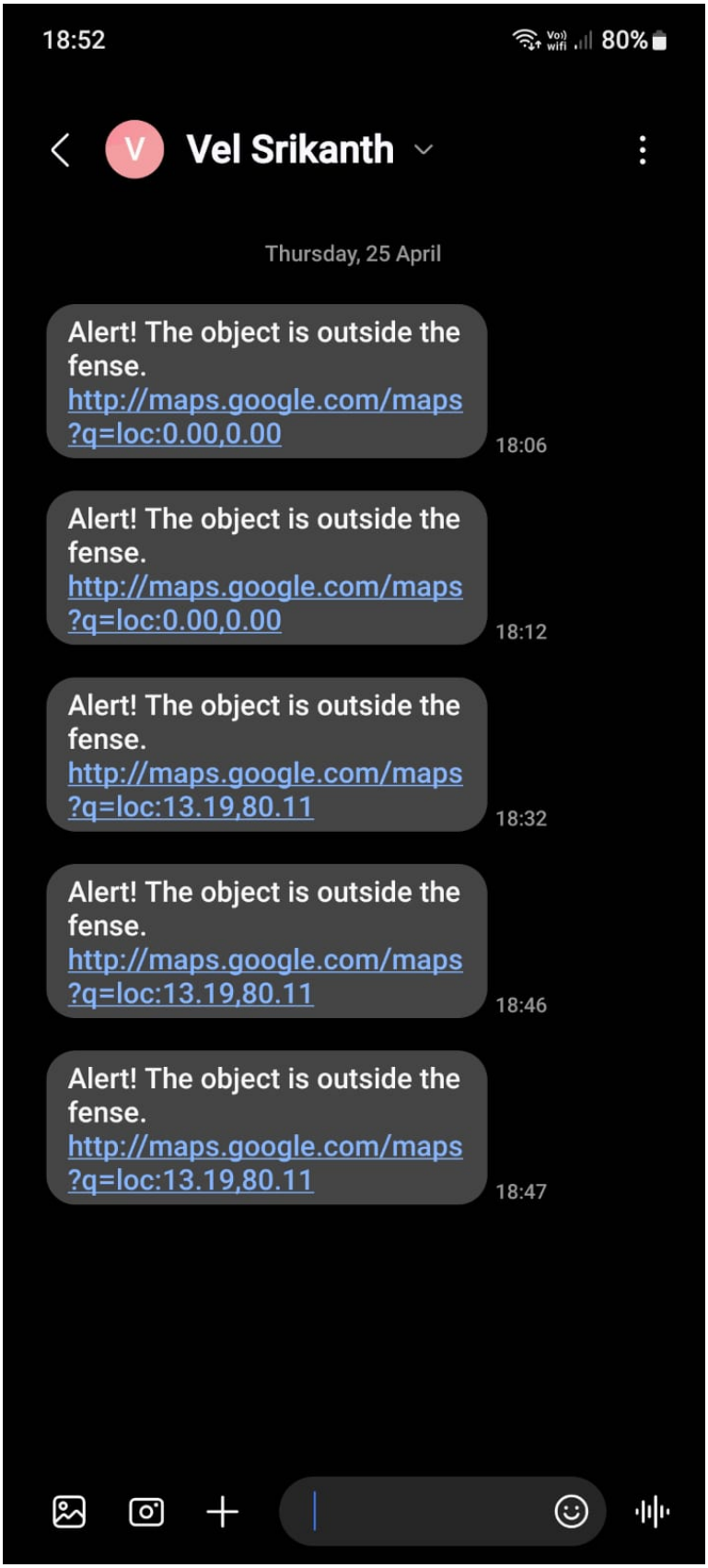


Figure 7.2: OUTPUT MESSAGE WITH LOCATION

CHAPTER 8

LITERTAURE SURVEY

8.1 OVERVIEW

The literature survey on child safety wearable devices with location tracking systems provides a comprehensive examination of the current state of research and development in this field. These devices are designed with the specific aim of sending a message containing GPS location when a child exceeds a predetermined range, offering caregivers timely alerts and peace of mind. The overview highlights key themes and findings from scholarly investigations into the purpose, technology, usability, privacy concerns, societal implications, and future directions of child safety wearables.

8.2 LITERATURE SURVEY DETAILS

Title: Child Safety Wearable and Visually Impaired Assistive Device with Location Tracking System Using IoT

1: This paper discusses a smart wearable system for children and visually impaired individuals. The wearable uses GPS, GSM, Wi-Fi, and Arduino technologies to create a location tracking system. It also includes a heartbeat and temperature sensor to monitor the health of children. The system sends alerts via SMS and Email in case of emergencies.

LINK: http://philstat.org/special$_issue/index.php/MSEA/article/download$/214/210

Title: A Study on Child Safety Wearable Devices

2: This study focuses on a wearable device that can be used with any cell phone and doesn't require a tech-savvy individual to operate. The device alerts parents when the child is in unfavorable conditions like fire, harmful gases. It uses SMS as the mode of communication between the child's wearable and the parent using GSM mobile communication.

LINK: https://ijcrt.org/papers/IJCRT1802415.pdf

Title: Design and Implementation of Child Safety Using Arduino

3: This study suggests a safety monitoring system that uses Android smartphones to increase children's safety. The system uses GPS and GSM modules to continuously track the child's surroundings and send parents real-time updates to their mobile devices.
LINK: https://www.jetir.org/papers/JETIR2303292.pdf

Title: Child Safety Device with GPS Tracking and Alert Messaging
4: This paper provides an Android-based solution for parents to track their children in real-time. The device can be used by parents to track their children in real-time or for women's safety.
LINK: https://www.jetir.org/papers/JETIR2311047.pdf

Title: A Research on Child Safety Wearable Devices
5: This paper describes a safe and secured electronic system for children which comprises of an Arduino controller and sensors such as temperature LM35, flex sensor, MEMS accelerometer, pulse rate sensor, sound sensor. A buzzer, LCD, GSM, and GPS are used in this project.
LINK: https://www.ijsdr.org/papers/IJSDR1810024.pdf

Title: Literature Survey on Smart Child Safety Wearable Device Using IOT
6: This paper discusses a wearable gadget for child safety and to assist visually impaired people with a location tracking system. The device uses GPS, GSM, Wi-Fi, and Arduino technologies. It also includes a heartbeat and temperature sensor to monitor the health of children.
LINK: https://ijrar.org/papers/IJRAR1CVP006.pdf

Title: Child Safety Wearable and Visually Impaired Assistive Device with Location Tracking System Using IoT
7: This paper presents a smart wearable system for children and visually impaired individuals. The wearable uses GPS, GSM, Wi-Fi, and Arduino technologies to create a location tracking system. It also includes a heartbeat and temperature sensor to monitor the health of children.
LINK: http://philstat.org/special$_issue/index.php/MSEA/article/download/214/210$

Title: Survey on Child Safety Wearable Device Using IoT Sensors and ...
8: This survey discusses a wearable device that uses GSM mobile communication to track the location of the child in real-time.
LINK: https://ijisrt.com/assets/upload/files/IJISRT20FEB557.pdf

Title: Child Safety Device With GPS Tracking and Alert Messaging
9: This paper proposes a model for child safety through smartphones that provides the option to track the location of their children. In case of emergency, children can send a quick message and their current location via Short Message services.

LINK: https://www.jetir.org/papers/JETIR2311047.pdf

Title: A survey on children tracking system based on wearable localization ...
10: This survey provides a comprehensive overview of the evolutionary tracking system. It describes essential concepts and studies on Radio Frequency Identification (RFID), Bluetooth, Wireless Fidelity (Wi-Fi), Global System for Mobile Communication (GSM), Global Positioning System (GPS), and ZigBee wireless technologies.
LINK: https://pubs.aip.org/aip/acp/article/2804/1/020003/2910260/A-survey-on-children-tracking-system-based-on

Title: "Literature Survey on Smart Child Safety Wearable Device Using IOT" by NS Kavitha, Ashish Neya M, Kirthika T, Nithin Dhanish W
11. This paper discusses the use of IoT and sensors in creating wearable devices for child safety. The device operates in two modes - adult and child, and provides real-time location and well-being of women and children.
LINK: https://ijrar.org/papers/IJRAR1CVP006.pdf

Title: "Child Safety Wearable and Visually Impaired Assistive Device with Location Tracking System Using IoT" by Dr.A.Vasantharaj, T.Thanusri, N.M.Yamuna, K.Elakkiya
12. This paper discusses a smart wearable system for children and visually impaired individuals. The wearable uses GPS, GSM, Wi-Fi, and Arduino technologies for safety and location tracking.
LINK: http://philstat.org/special$_issue/index.php/MSEA/article/download$/214/210

Title: "Survey on Child Safety Wearable Device Using IoT Sensors and ..."
13. This survey paper discusses the use of GSM mobile communication for real-time tracking of the child's location.
LINK: https://ijisrt.com/assets/upload/files/IJISRT20FEB557.pdf

Title: "Child Safety Device With GPS Tracking and Alert Messaging"
14. This paper proposes a model for child safety through smartphones that allows parents to track the location of their children and in case of emergency, children can send a quick message and its current location via Short Message services.
LINK: https://www.jetir.org/papers/JETIR2311047.pdf

CHAPTER 9

CONCLUSION

In conclusion, the child safety wearable device, equipped with Arduino Uno, GPS NEO-6M, and GSM module SIM800L, represents a significant stride in ensuring the security and well-being of children in today's fast-paced world. By harnessing the power of IoT technology, this system offers comprehensive location tracking capabilities, allowing parents to monitor their child's movements in real-time. The seamless integration of hardware components facilitates efficient data processing and transmission, enabling prompt alerts via SMS to the parent's mobile device when the child surpasses predefined boundaries. Geofencing functionality adds an extra layer of security, triggering immediate notifications upon boundary breaches and empowering parents to take swift action. This innovative solution underscores the importance of leveraging technology to enhance child safety, providing parents with invaluable peace of mind and reassurance. As we navigate an increasingly interconnected world, such advancements play a pivotal role in safeguarding the most precious members of our society, ensuring their safety and protection wherever they may be.

CHAPTER 10

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