

CHILD SAFETY AND MONITORING SYSTEM

GE19612 -PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report titled **“CHILD SAFETY AND MONITORING SYSTEM”** is the bonafide work of **" RAMACHENDRA.E (201001086), SHANANTH AAKASH.D (201001098), VIJAY.R (201001119), YUVARAAJ.B (201001125)"** who carried out the project work under my supervision.

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This project report is submitted for GE19612 - PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP held on

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

The Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer is an innovative and cost-effective solution for monitoring a child's movement and detecting their presence near an exit. The system uses three infrared (IR) sensors placed near the exits of a home to detect a child's presence and movement. When the sensors detect movement, the system sends a signal to a GSM module, which sends a notification to the parent's mobile phone. If the child continues towards the door, a buzzer sounds to alert the parent.

The system provides an additional layer of safety for children and can be easily installed in any home. It is designed to be cost-effective and user-friendly, making it accessible to a wide range of users. While the system has some limitations and potential disadvantages, such as false alarms and dependence on cellular coverage, it has significant potential for future development and integration with other smart devices to create a more comprehensive home security system. Overall, the Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer is an effective and affordable solution for parents or guardians who want to ensure their child's safety.

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Child Safety and Monitoring System using 3 IR sensors, GSM and a buzzer is a project designed to alert parents when their child attempts to leave the home unattended. The system uses infrared (IR) sensors placed at the door to detect the movement of the child. The sensors are connected to a microcontroller that processes the data and triggers a buzzer to sound an alarm and send an SMS to the parent's mobile if the child approaches an exit. Upon receiving the alert, parents can take immediate action to ensure the child's safety.

1.2 PURPOSE

The purpose of the project is to provide an additional layer of safety for children by alerting parents when a child is attempting to leave the home unattended. This system can be particularly useful in households with young children who may not fully understand the dangers of leaving the home alone and could accidentally wander out of the house.

The system aims to prevent situations such as children wandering out of the house unnoticed, getting lost, or encountering potential dangers outside the home. By detecting a child's presence near an exit and sounding an alarm, sending the message the system provides parents with a timely notification, allowing them to quickly take appropriate action to ensure the child's safety.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

One potential problem is that it may not be foolproof. The system relies on the child being detected by the IR sensors when they are near an exit. However, there may be situations where the child is not detected by the sensors, such as if they are moving too quickly or if the sensors are obstructed. In these situations, the alarm may not sound, SMS also could not send, and the child could still leave the home unattended. Another potential problem is that the system relies on the parent being present to hear the alarm and take action. If the parent is not at home or is in a different part of the house, they may not hear the alarm, and the child could still leave the home unattended. Additionally, the system may require regular maintenance to ensure the IR sensors function correctly. If the sensors become dirty or malfunction, they may not detect the child's presence, and the alarm may not sound. Finally, some children may find the alarm scary or unsettling, which could lead to unintended consequences, such as the child becoming anxious or upset.

2.2 REFERENCES

1. AkashMoodbidri, Hamid Shahnasser, "Child Safety Wearable Device", Department of Electrical and Computer Engineering San Francisco State University.
2. Smart Intelligent System for Women and Child Security" Department of Computer Engineering SIES Graduate School of Technology Nerul, Navi Mumbai, India.
3. RFID-based System for School Children Transportation Safety Enhancement ", Proceedings of the 8th IEEE GCC Conference and Exhibition, Muscat,

Oman, 1-4 February 2015.

4. 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.
5. Pooja.K.Biradar¹, Prof S.B.Jamge²," An Innovative Monitoring Application for Child Safety", DOI:10.15680/IJRSET.2015.0409093.
6. 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.
7. Sarifah Putri Raflesia, Firdaus, Dinda Lestarini, "An Integrated Child Safety using Geo fencing Information on Mobile Devices", INTERNATIONAL CONFERENCE ON ELECTRICAL ENGINEERING AND COMPUTER SCIENCE (ICECOS) 2018.

2.3 PROBLEM STATEMENT DEFINITION

To detect whether a child gets out of the home without parents' guidelines using IOT and to alert parents via message by deploying IOT based child safety and monitoring system. Child safety is a significant concern for parents especially in environments where potential dangers can arise. There is a need for a reliable and efficient system that can monitor and alert parents about potential risks involving children.

I am A house wife	I am trying to Find a way to monitor my child while working in home	But It's hard to monitor my child while working at home	Because My work from home schedule made careless in child monitoring	Which makes me feel Feel irritating and frustrated on child monitoring
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Problem Statements(PS)	I AM (Consumer)	I am trying to	But	Because	Which makes me feel
PS-1	House wife	Find a way to monitor my child while working in home	It's hard to monitor my child while working at home	My work from home schedule made careless in child monitoring	Feel irritating and frustrated on child monitoring
PS-2	House wife	Find a way to Alert while going out	Its hard	Its takes my effort	unexcepted
PS-3	House wife	Find out any monitoring system for my child	Its hard to gathering information	I don't have enough contacts	Disappointment

3. IDEATION & PROPOSED SOLUTION

We have analyzed different systems and proposed phases of our developed management system.

3.1 PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1	Problem Statement (Problem to be solved)	Child safety is a significant concern for parents, especially in environments where potential dangers can arise. There is a need for a reliable and efficient system that can monitor and alert parents about potential risks involving children.
2	Idea / Solution description	The Child Safety and Monitoring System is a comprehensive solution Designed to ensure the safety and security of children in various environments. By utilizing three IR sensors, a buzzer, and a GSM module, the system provides real-time monitoring and immediate alerts to parents when potential dangers are detected.
3	Novelty / Uniqueness	The system is designed to be user-friendly, making it easy for parents to configure settings such as phone numbers for alerts or customize alert messages. This simplicity of configuration enhances the usability and accessibility of the system.
4	Social Impact / customer Satisfaction	The primary social impact of this system is the enhanced safety and security it provides for children. By promptly detecting and alerting parents about potential dangers or incidents, the system enables quick response and intervention, reducing the risk of accidents, injuries, or other harmful situations.
5	Business Model (Revenue Model)	The primary revenue stream can come from selling the Child Safety and Monitoring System as a packaged solution to caregivers, parents, schools, childcare centers, and other relevant entities. The system can be offered as a ready-to-use kit that includes the IR sensors, buzzer, GSM module, microcontroller, and necessary components.
6	Scalability of the Solution	The system's hardware components, including the IR sensors, buzzer, and GSM module, should be readily available in the market and easily scalable in terms of production and supply. It is crucial to ensure a consistent and reliable supply chain to meet the growing demand for the system.

3.2 PROBLEM-SOLUTION FIT

Problem-Solution fit canvas 2.0			AMALTAMA		
Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Who is your customer? i.e. working parents of 0-3 yrs. kids	6. CUSTOMER CONSTRAINTS CC What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network coverage, available devices.	5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they take the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital networking	Explore AS, differentiate	
	Educational institutions, including schools and day care centers. Municipalities or local authorities. Event organizers and amusement park operators.	Customers may have varying levels of technical expertise. The cost of the system should be within their budget. Customer concerns regarding privacy and data security need to be addressed.	Some companies offer pre-built child safety systems. Some smart home security systems can be adapted. There are mobile applications available that utilize the sensors present in smartphones.		
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS J&P Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different ideas.	9. PROBLEM ROOT CAUSE RC What is the real reason that the problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.	7. BEHAVIOUR BE What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customer's spend free time on volunteering work (i.e. Greenpeace)	Focus on J&P, tap into BE, understand RC	
	The primary job of the system is to monitor the safety of a child. The system should notify parents immediately when a movement of a child is detected in exit. The system should be designed to be user-friendly and accessible.	External factors such as sunlight, reflections, or other infrared sources might interfere with the sensors, causing false readings. The system may not be receiving sufficient power, leading to malfunctions and a failure to trigger alarms or send notifications. The GSM module or network connectivity may be unreliable, preventing the system from sending notifications.	The buzzer sound serves as a warning signal. This notification can be in the form of an SMS (text message). The system employs power management techniques to optimize energy consumption and ensure efficient use of its battery or power source.		
Define CS, fit into CL	3. TRIGGERS TR What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.	10. YOUR SOLUTION SL What kind of solution suits Customer segments the best? Adapt your solution to fit Customer behaviour, use Triggers, Channels & Emotions for marketing and communication.	8.1 ONLINE CHANNELS CH What kind of actions do customers take online? Extract online channels from box #7 Behaviour.	Explore AS, differentiate	
	The IR sensors detect the presence of a child when it crosses the door. If a child moves beyond those boundaries, it triggers the system to respond.	Ensure proper calibration of the IR sensors to minimize false alarms and optimize accuracy. Test and verify the buzzer's proper wiring and connection to ensure it functions correctly. Verify the GSM module's proper installation and configuration. <small>If you are working on an existing business, evolve down your current solution first. Fit it to the market, and evolve how much it fits reality. If you are working on a new business proposition, then keep it blank until you fit it to the market and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</small>	Create a dedicated website for your Child Safety and Monitoring System. The website should showcase the features, benefits, and functionality of the system.		
	4. EMOTIONS: BEFORE / AFTER EM How do customers feel when they face a problem or a job and afterwards? i.e. lost, nervous & confident, in control - use it in your communication strategy & design.		8.2 OFFLINE CHANNELS CH What kind of actions do customers take offline? Extract offline channels from box #7 Behaviour and use them for customer development.		
	Parents experience peace of mind, as they can monitor their children. Using the system enhances parents' confidence in ensuring their child's well-being.		Install local alarms or sirens that can be activated by the system independently of the GSM network.		

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Motion Sensors	The system should have motion sensors installed to detect any unusual movements or activity in the house.
FR-2	Alerts and Notifications	The system should be able to send alerts and notifications to parents or guardians in case of any potential safety concerns or emergencies.
FR-3	Data Privacy	The system should comply with data privacy laws and ensure that the child's data is secure and not accessible to unauthorized parties.

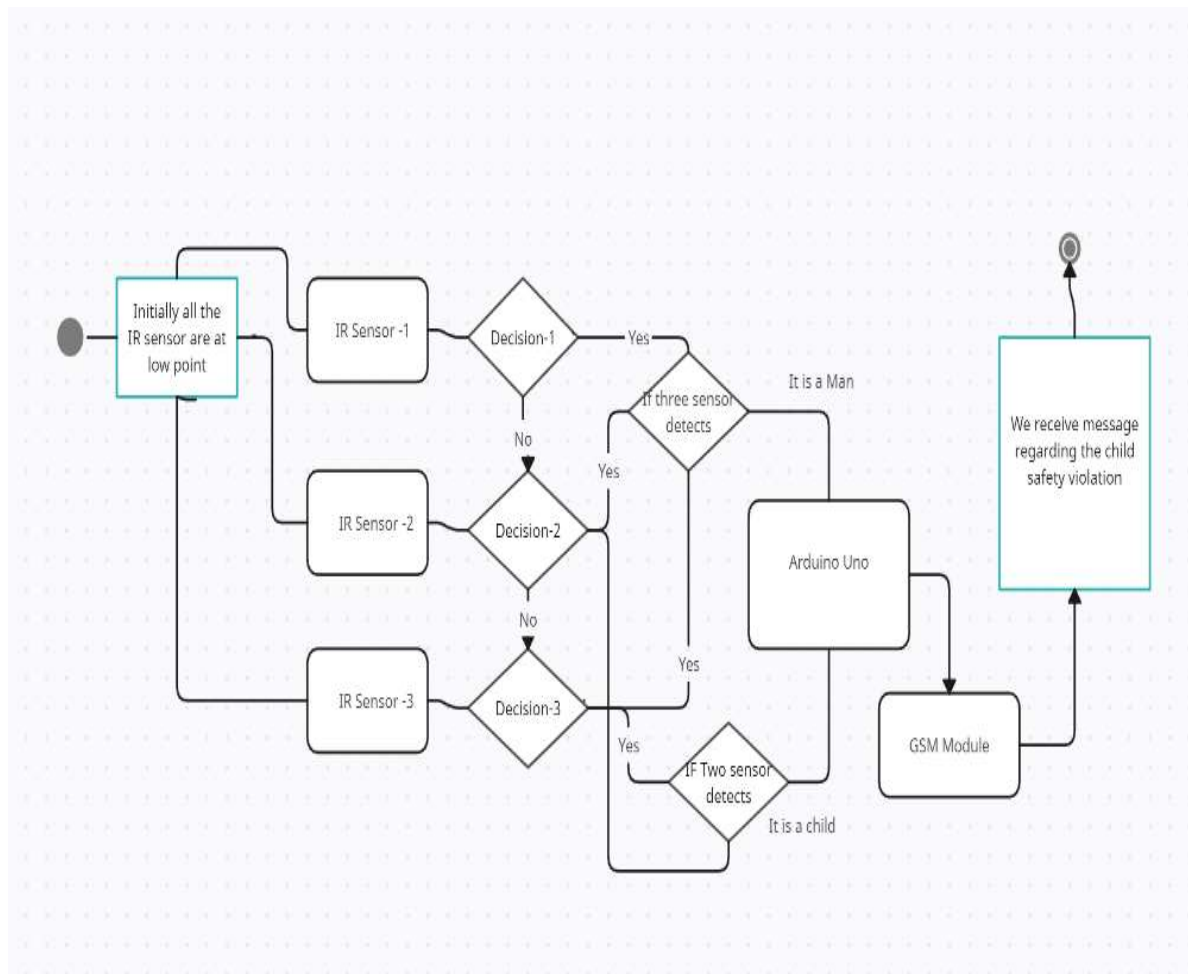
4.2 NON-FUNCTIONAL REQUIREMENTS

Following are the Non-functional requirements of the proposed solution:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The system should be easy to use and operate, with clear and intuitive user interfaces.
NFR-2	Security	The system should be secure, with appropriate measures in place to prevent unauthorized access, hacking, or data breaches.
NFR-3	Reliability	The system should be reliable and operate without failure, ensuring that parents or guardians receive timely alerts and notifications in case of any potential safety concerns or emergencies.
NFR-4	Performance	The system should perform well, with minimal latency or lag in sending alerts or notifications.
NFR-5	Availability	Available anytime. Free installation. Will repair anytime in case of malfunctioning.
NFR-6	Scalability	The system should be scalable, allowing parents or guardians to add additional sensors or devices as needed without impacting system performance.

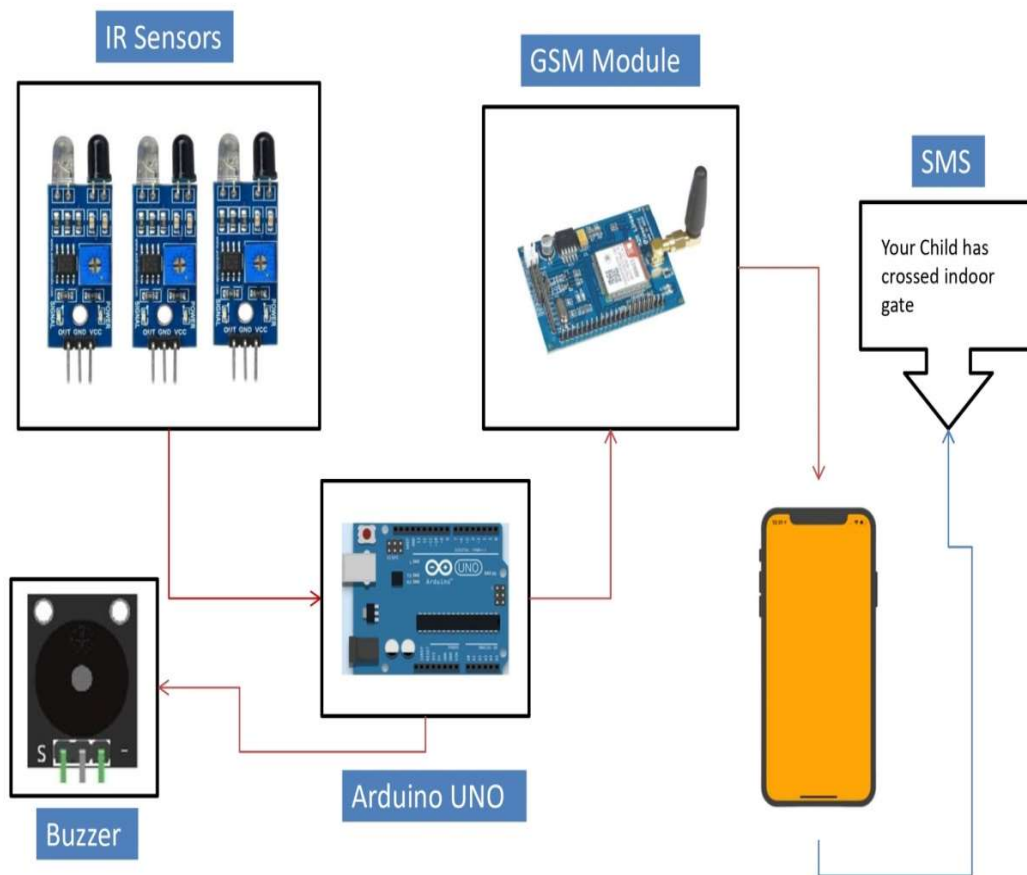
5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

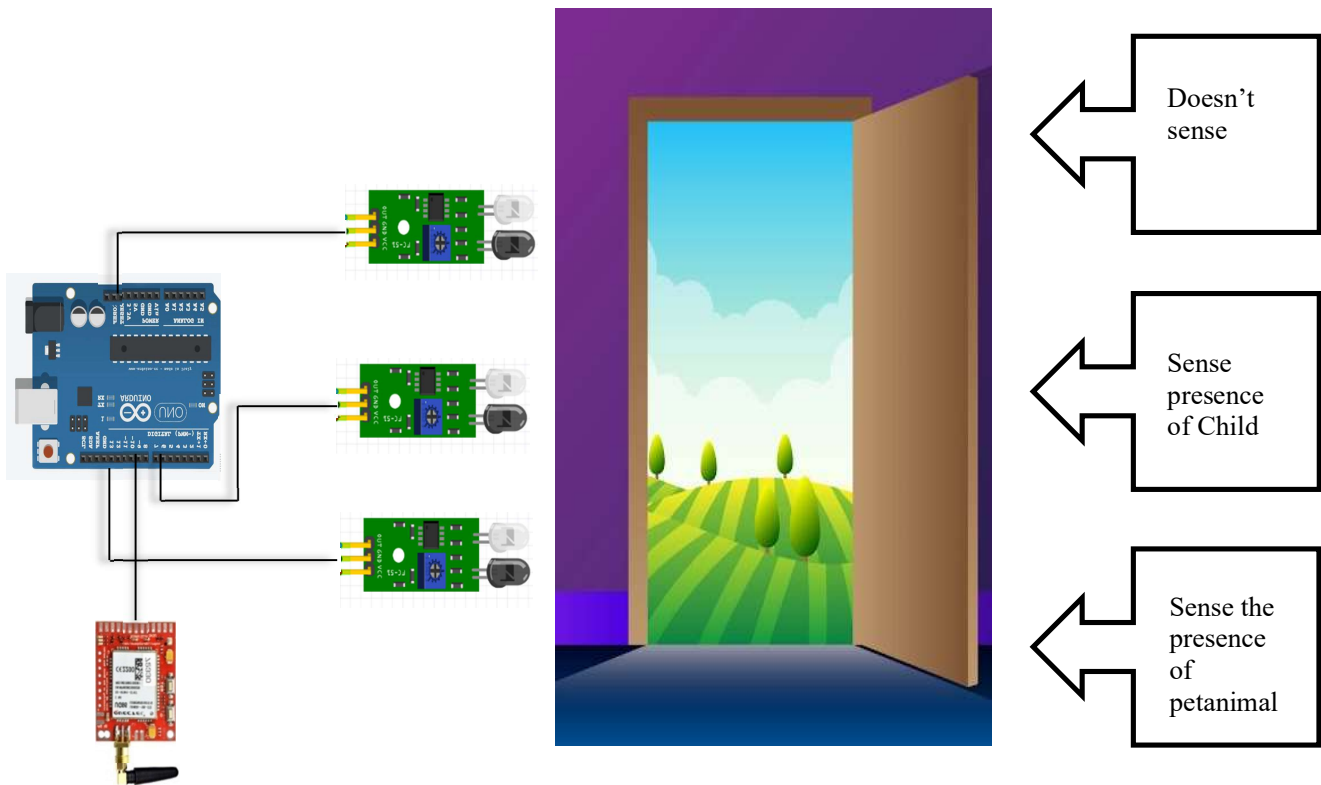


5.2 SOLUTION & TECHNICAL ARCHITECTURE

ARCHITECTURE DIAGRAM



TECHNICAL ARCHITECTURE:



5.3 USER STORIES

A user story is the smallest unit of work in an agile framework. It's an end goal, not a feature, expressed from the software user's perspective.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Technician	Installation	USN-1	As a technician, I can install the product effectively.	I can assess the working of the product.	High	Sprint-1
Customer (Data Types)	Data Viewing	USN-1	As a user, I can monitor the child.	Data from the hardware.	High	Sprint-1
Authority	They can get the buzzer sound and message notification	USN-2	As a user, I can detect motion of the child.	Data from the hardware.	High	Sprint-1
Manager	It should notify when the child crosses the exit	USN-3	As a user, I can Receive real-time alerts	Data from the hardware.	High	Sprint-1
Administrator	Data Access and modification	USN-1	As an administrator, I can access any information related to the product and modify the same.	Authorised persons only.	High	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my Password or by entering phone number and confirming by otp	2	High
Sprint-1		USN-2	As a user, I can register for the application through E-mail or phone number	1	Medium
Sprint-1	Confirmation	USN-3	As a user, I will receive confirmation email or otp once I have registered for the application	1	Medium

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date	Story Points(Completed as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	6	6 Days	24 JAN 2023	29 JAN 2023	20	29 JAN 2023
Sprint-2	4	Days	31 FEB 2023	05 FEB 2023		05 FEB 2023
Sprint-3	5	Days	07 MAR 2023	12 MAR 2023		12 MAR 2023
Sprint-4	5	Days	14 APR 2023	19 APR 2023		19 APR 2023

Velocity:

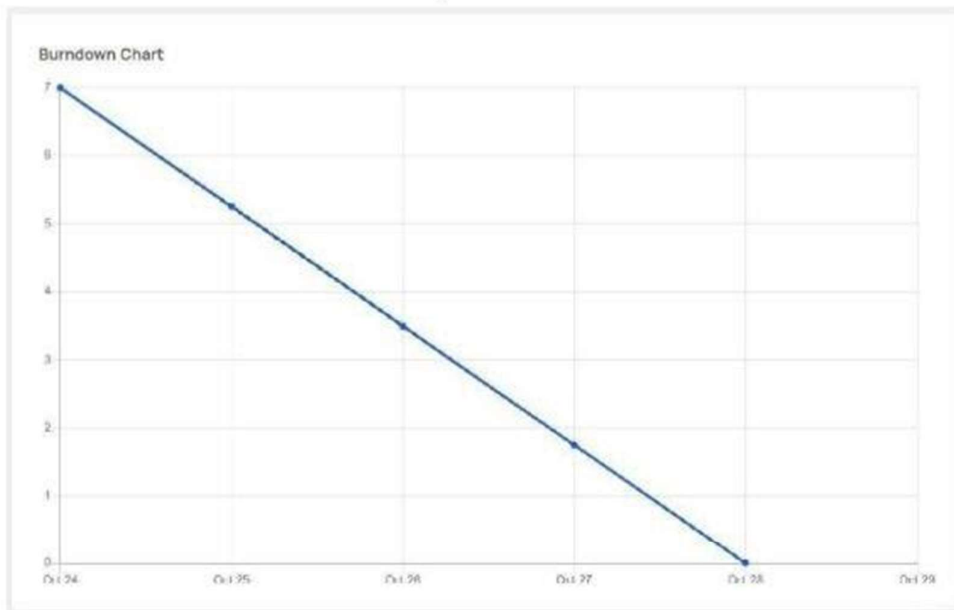
Imagine we have a 10-day sprint duration and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{\text{sprint duration}}{\text{Velocity}} = \frac{20}{10} = 2$$

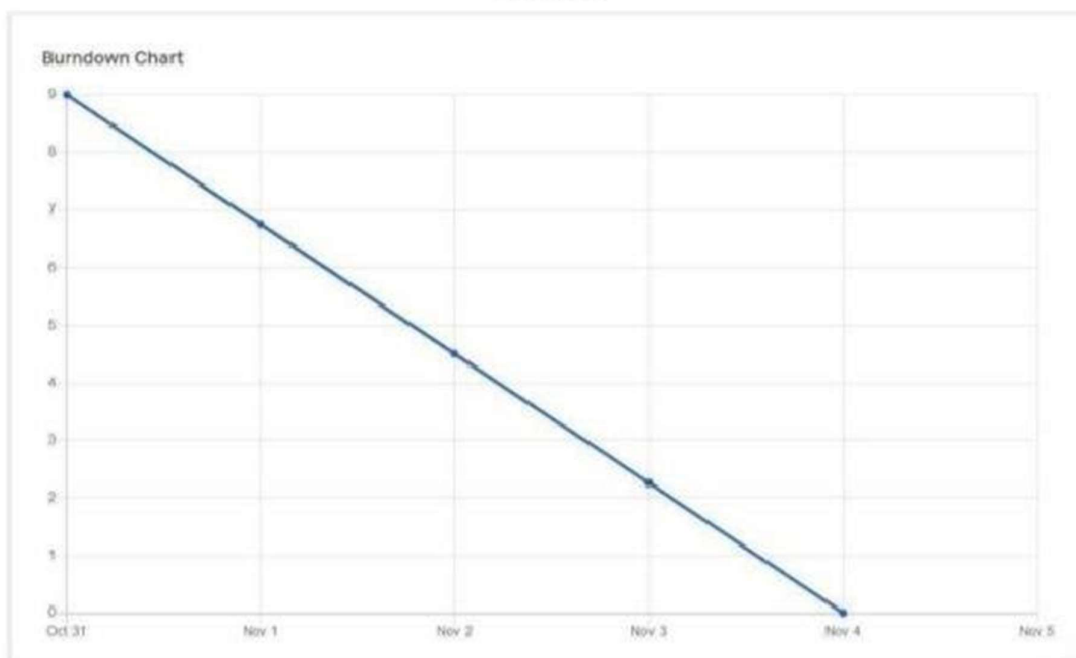
$$AV = 20/6 = 3.33$$

Burndown Chart:

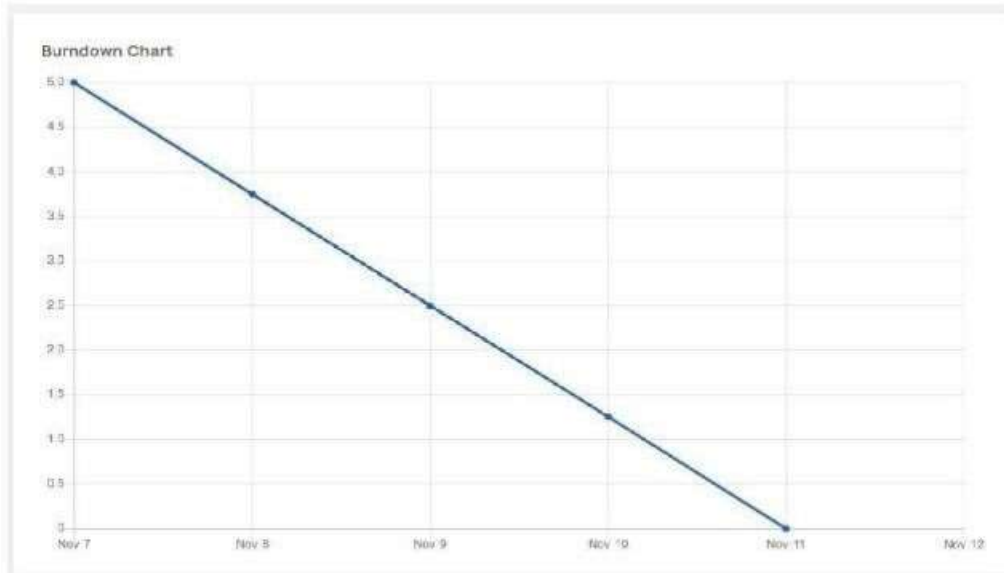
Sprint - 1



Sprint - 2



Sprint - 3



Sprint - 4 Project Tool: JIRA



7. CODING & SOLUTIONING

7.1 FEATURE1 – ARDUINO UNO

Infrared sensor – senses the motion of the child.

```
#define irPin1 2 // Set the pin number for the first IR sensor
#define irPin2 3 // Set the pin number for the second IR sensor
#define irPin3 4 // Set the pin number for the third IR sensor
#define buzzerPin 9
#include <SoftwareSerial.h>
SoftwareSerial mySerial(7, 8);
int irValue1; // Declare the variable to store the value of the first IR sensor
int irValue2; // Declare the variable to store the value of the second IR sensor
int irValue3; // Declare the variable to store the value of the third IR sensor
void setup()
{
  pinMode(irPin1, INPUT);
  pinMode(irPin2, INPUT);
  pinMode(irPin3, INPUT);
  pinMode(buzzerPin, OUTPUT);
  Serial.begin(9600); // Initialize serial communication
  mySerial.begin(9600);
  delay(1000);
}
void loop()
{
  irValue1 = digitalRead(irPin1); // Read the analog value from the first IR sensor
  irValue2 = digitalRead(irPin2); // Read the analog value from the second IR sensor
  irValue3 = digitalRead(irPin3); // Read the analog value from the third IR sensor
```

```

int detectedCount1 = 0;
int detectedCount2 = 0;
int detectedCount3 = 0; // Initialize the count of detected sensors to 0
digitalWrite(buzzerPin, LOW);
// Check each sensor value and increment the detected count if it is above a certain
threshold
if (irValue1 == LOW)
{
    detectedCount1=1;
    Serial.println(irValue1);
}
if (irValue2 == LOW)
{
    detectedCount2=1;
    Serial.println(irValue2);
}
if (irValue3 == LOW)
{
    detectedCount3=1;
    Serial.println(irValue3);
}
// Determine the classification based on the number of detected sensors
if (detectedCount1==1&&detectedCount2==1&&detectedCount3==1 )
{
    Serial.println("Adult"); // If 2 or more sensors detect something, classify as
"child"
}
else if (detectedCount1==1&&detectedCount2==1&&detectedCount3!=1)
{

```



```

    Serial.println("Child");
    digitalWrite(buzzerPin, HIGH); // If only 1 sensor detects something, classify as
    "unknown"
}
else if(detectedCount1==1&&detectedCount2!=1&&detectedCount3!=1)
{
    Serial.println("Unknown");
    digitalWrite(buzzerPin, HIGH); // If no sensors detect anything, classify as
    "adult"
}
if (detectedCount1==1&&detectedCount2==1&&detectedCount3==1 )
{
    Serial.println("Adult");
    SendMessage("Adult");}
else if (detectedCount1==1&&detectedCount2==1&&detectedCount3!=1 ) {
    Serial.println("child");
    SendMessage("child is going out");}
else if (detectedCount1==1&&detectedCount2!=1&&detectedCount3!=1 ) {
    Serial.println("Unknown");
    SendMessage("Unknown");}
delay(700); // Wait for half a second before reading again
}

void SendMessage(String message)
{
    mySerial.println("AT+CMGF=1");
    delay(1000);
    mySerial.println("AT+CMGS=\"+919025311758\\r\"");
    delay(1000);
    mySerial.println(message);
}

```

```
delay(100);  
mySerial.println((char)26);  
delay(1000);  
}
```

8. TESTING

8.1 TEST CASE

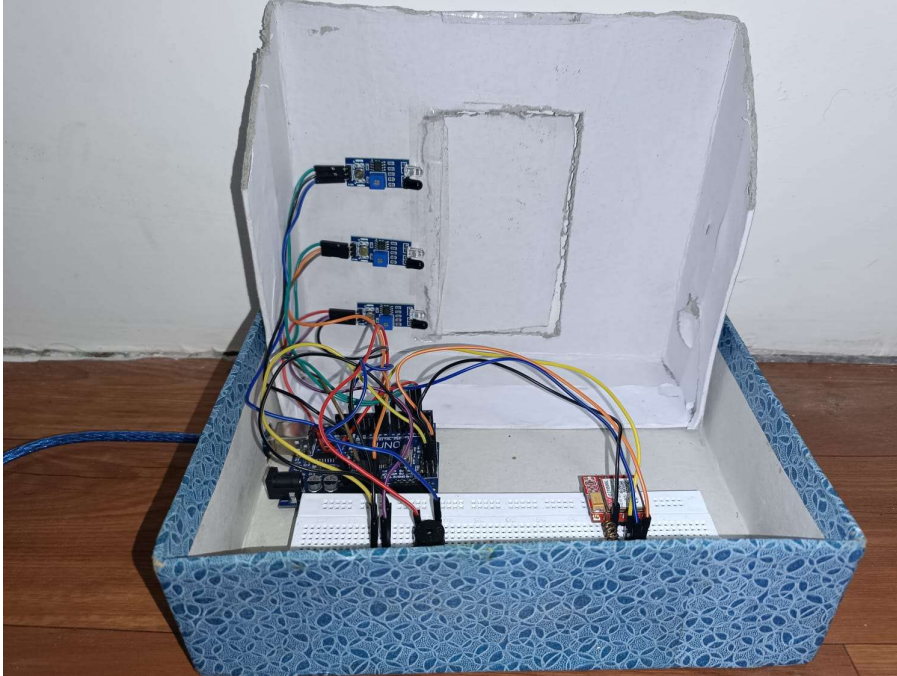
Features to be tested	Test Description
Login to the system	This tests the login interface of the system.
Adding a Recipe to database	This test is conducted to verify if a recipe is successfully added to the database. This will check if the recipe is added to its header table and also check if the recipe details are added to the recipe details table.
Adding an Ingredient to database	This tests checks if new ingredient is added correctly to the database with the specified details.
Adding a Vendor to the database	This test checks if the newly added vendor is correctly added to the database with the specified details.
Checking the threshold levels	This test is conducted to verify if the ingredients that are below the threshold levels are listed by the function when called by the user. The verification is done by referring to the database.
Updating the sales for the day	This test is conducted to test the sales update in the database. The test checks if the database is updated with the correct ingredient values based on the sales data input to the system.
Updating the order reception to database	This test is conducted to test the correct updating of the database after receiving the order from the vendor.
Create Orders	This test is conducted to check the order creation capability of the system. The list of ingredients that is generated for order must comply with the set conditions of threshold levels

8.2 USER ACCEPTANCE TESTING

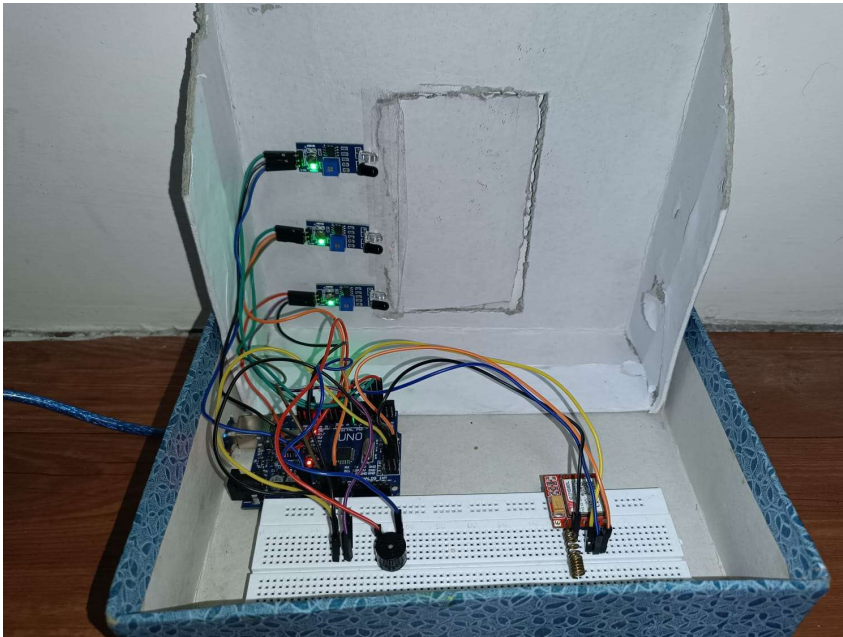
1. Verify the working of the IR sensor
2. Verify the working of the GSM module
3. Verify whether the users receive notifications in case of accidents.
4. Verify the working of the buzzer installed.

9. RESULTS

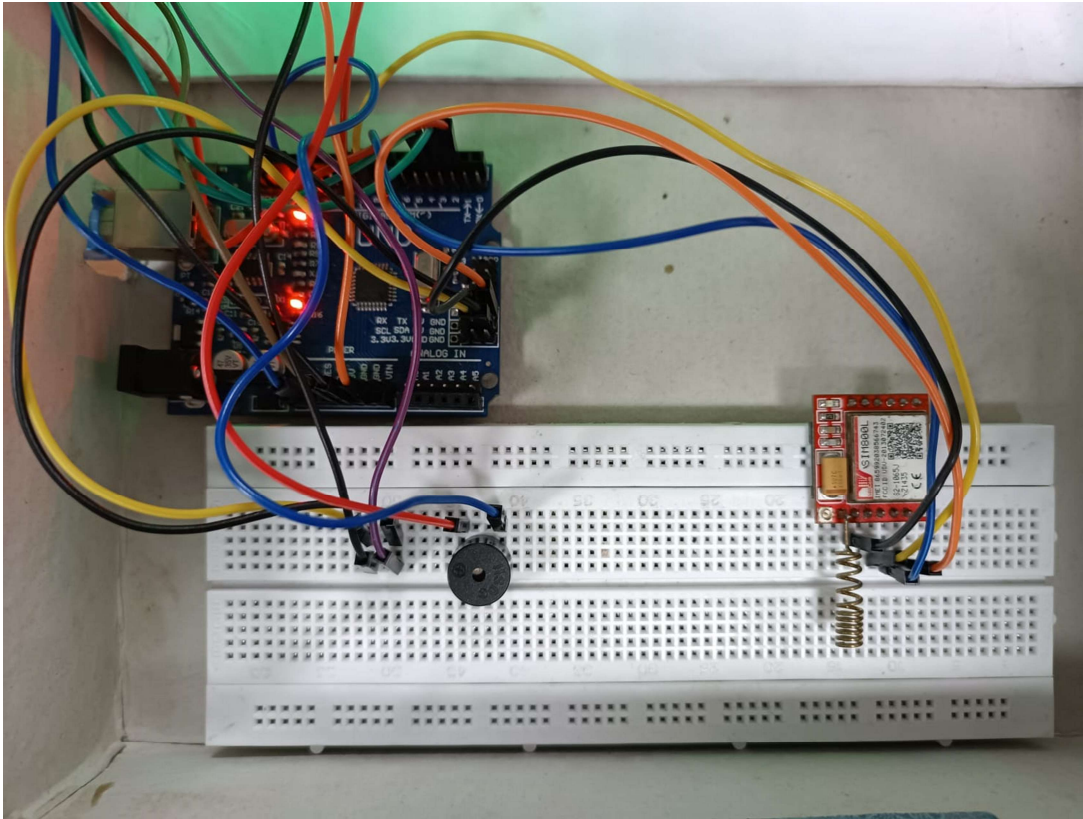
MODEL OF CHILD SAFTY SYSTEM



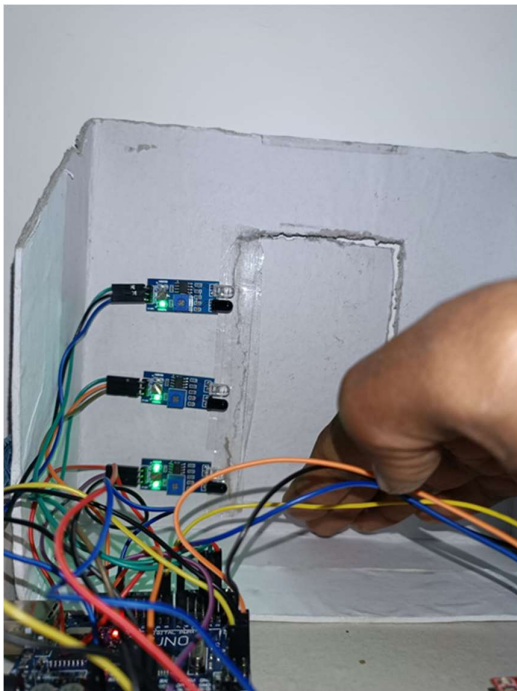
MODEL OF CHILD SAFTY SYSTEM IN ON STATE



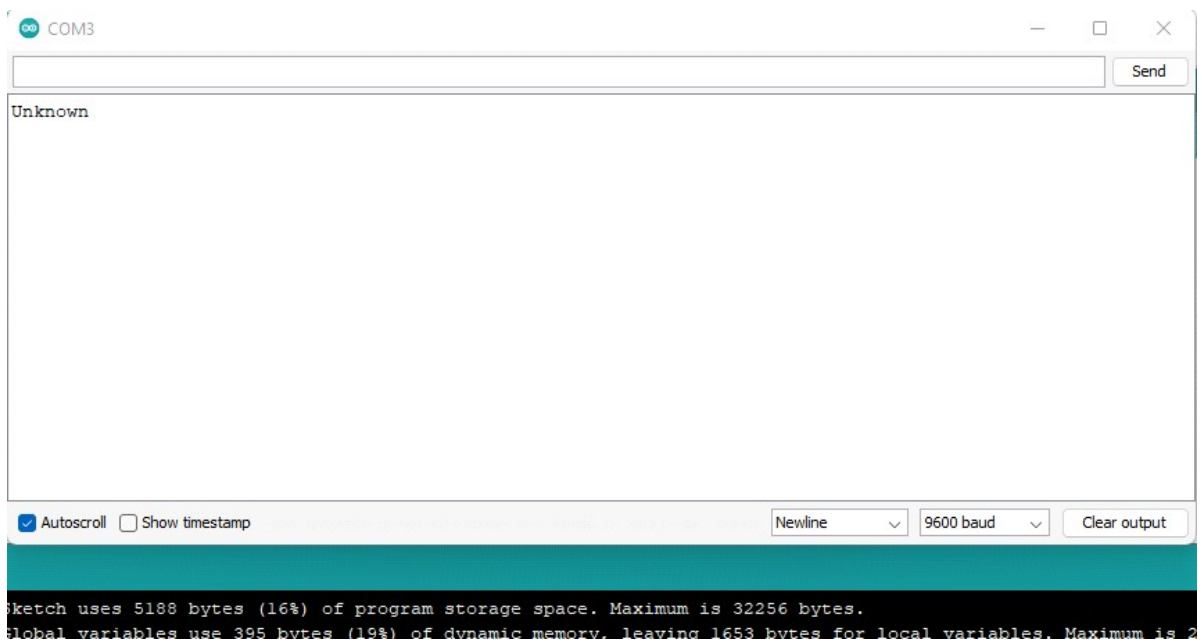
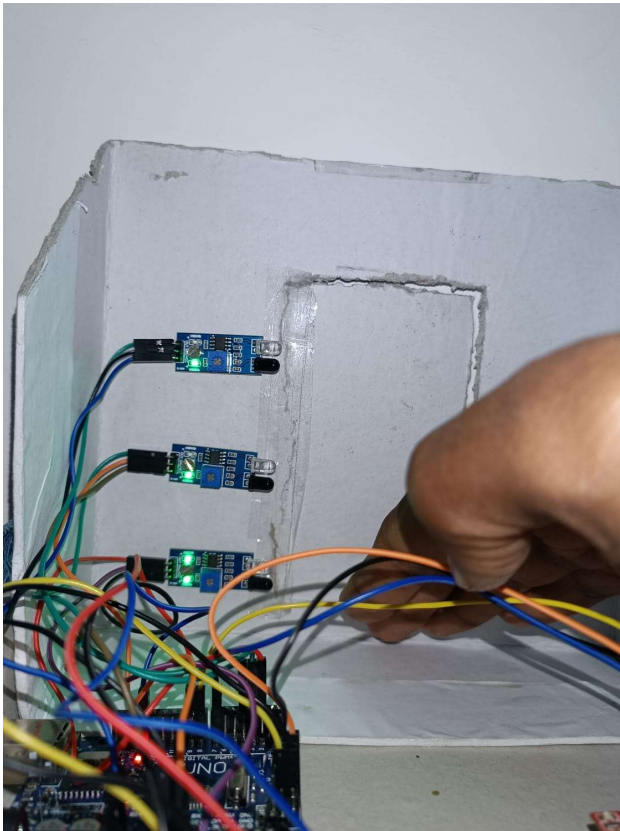
ARDUINO AND GSM MODULE



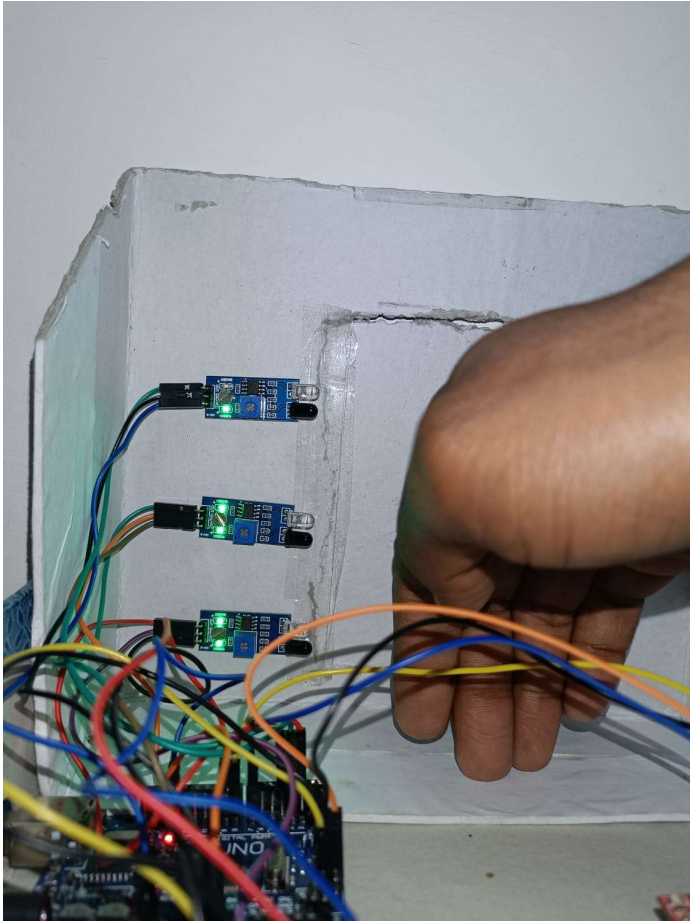
IR DETECTION SUCCESSFULLY



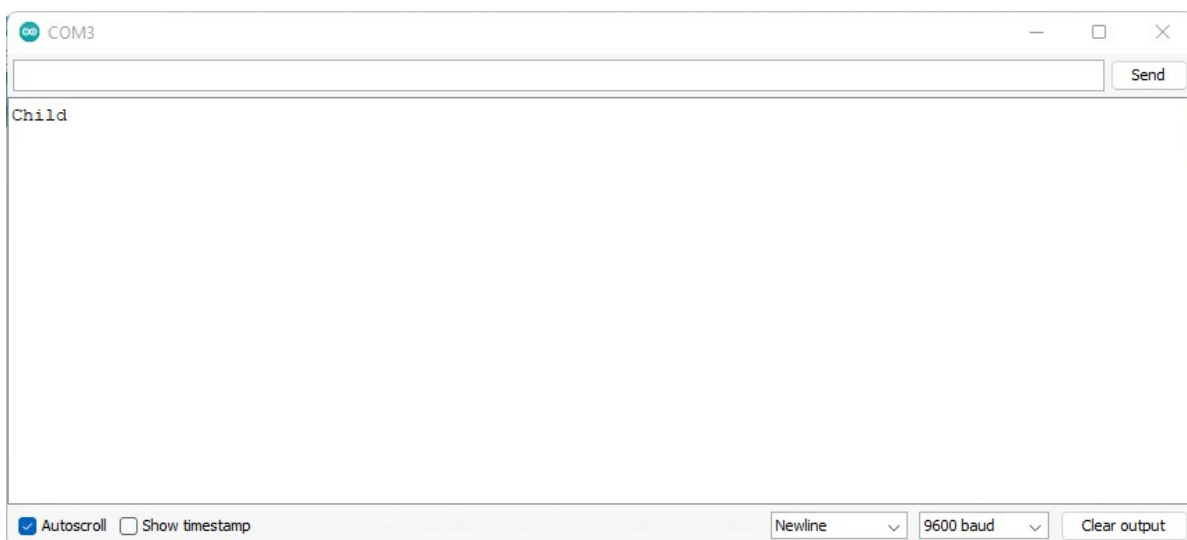
WHEN ONE SENSOR DETECTS



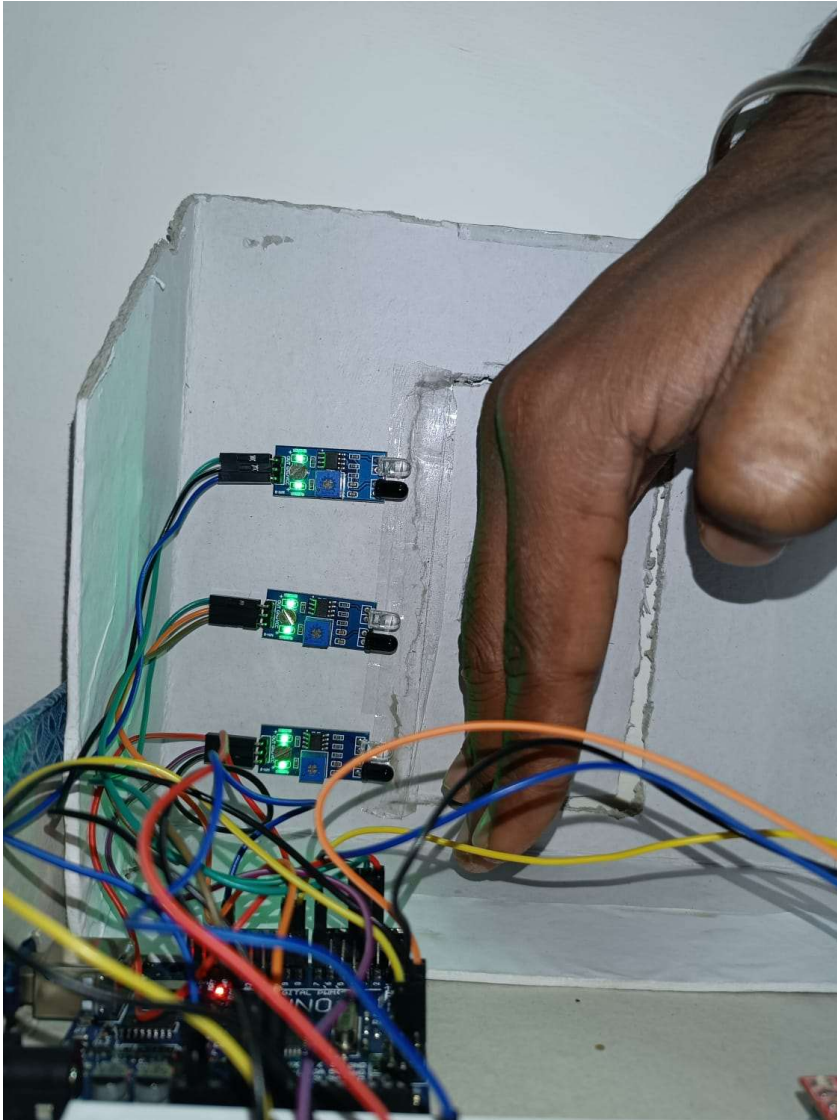
WHEN TWO SENSOR DETECTS



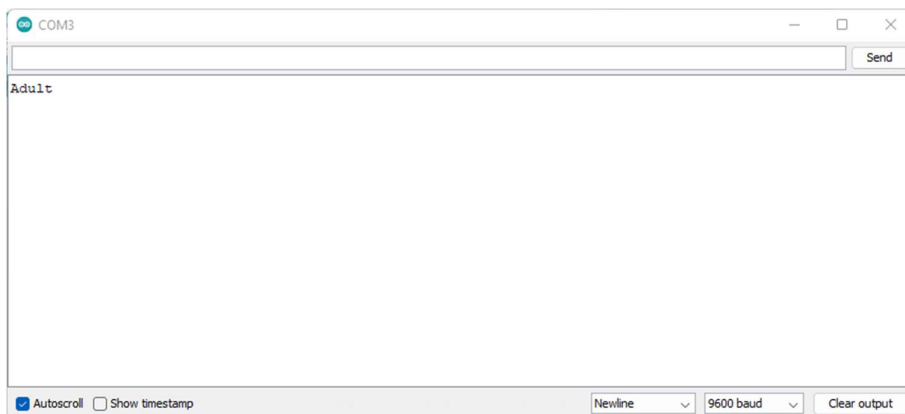
OUTPUT SHOWS CHILD IS GOING OUT

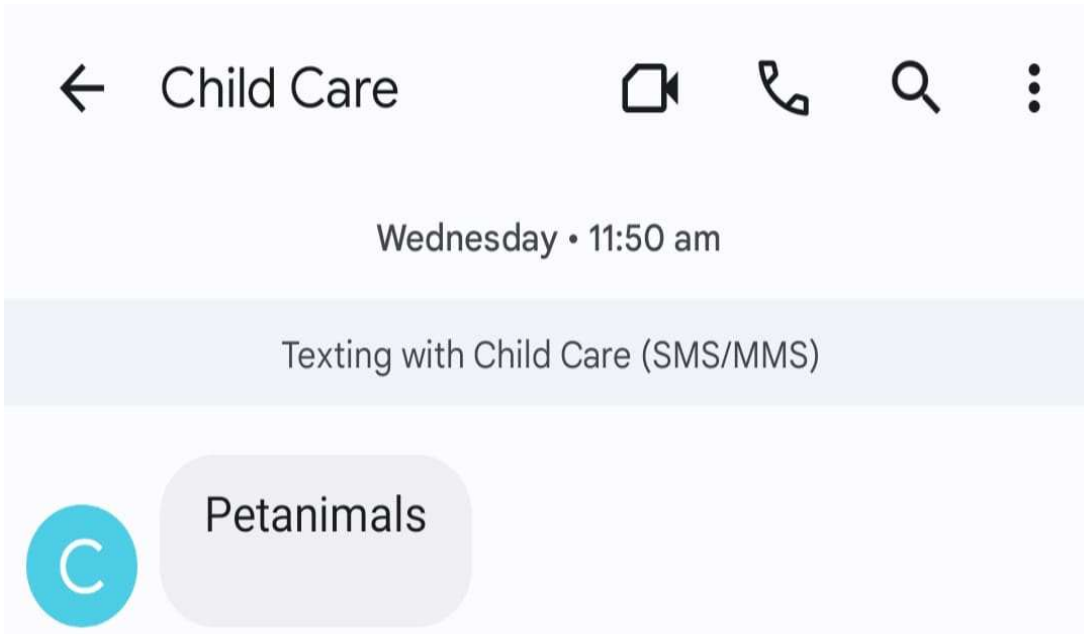


WHEN THREE SENSOR DETECTS



OUTPUT SHOWS ADULT IS DETECTED





UPDATESTOCKDET



10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Increased safety: The primary advantage of the system is that it provides an additional layer of safety for children. By detecting a child's presence near an exit and sounding an alarm, the system can alert parents to take appropriate action to ensure the child's safety.
- Real-time notifications: The system uses GSM technology to send real-time notifications to parents if the child is detected near an exit. This allows them to quickly take appropriate action to ensure the child's safety.
- Customizable alerts: The system can be programmed to sound different alerts for different types of situations, such as if the child is detected near a dangerous area, or if they are detected attempting to leave the home during a specific time of day.
- Easy to install and operate: The system is relatively easy to install and operate, with no complex wiring or installation required. This makes it a convenient option for parents or guardians who want to ensure their child's safety without the need for professional installation.
- Cost-effective: The system is cost-effective compared to other child monitoring and safety systems. It uses readily available components such as IR sensors, a buzzer, and a GSM module, making it an affordable option for many households.

DISADVANTAGES:

- False alarms: The system may produce false alarms if the sensors detect movement or presence near an exit but not necessarily a child. This can be triggered by pets, moving objects, or even gusts of wind, leading to unnecessary alarm activation and inconvenience.
- Dependence on cellular coverage: The system relies on cellular coverage to send notifications to parents or guardians. In areas with weak or no cellular coverage, the system may not work effectively or at all.
- Limited range: The range of the IR sensors used in the system is limited, meaning that it may not detect a child's presence if they are far from the sensors. This can be a problem in larger homes or outdoor areas where the child may move beyond the sensors' range.
- Vulnerability to tampering: The system may be vulnerable to tampering, especially by older children who are aware of its functionality. They may attempt to deactivate or bypass the system, compromising the child's safety.
- Limited functionality: The system is primarily designed to detect a child's presence near an exit and sound an alarm. It may not provide other features such as video surveillance, two-way communication, or child tracking that other child monitoring systems may offer.

11. CONCLUSION

In conclusion, the Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer to detect a child going out of the home or not is an innovative and cost-effective solution for parents or guardians who want to ensure their child's safety. The system is designed to detect a child's presence near an exit and send real-time notifications to parents or guardians via GSM technology, providing an additional layer of safety for the child.

However, the system does have limitations and potential disadvantages such as false alarms, dependence on cellular coverage, limited range, vulnerability to tampering, and limited functionality. These factors should be taken into account when considering the system's effectiveness and suitability for a particular situation.

Overall, the Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer is a useful tool for parents or guardians to monitor their child's movement and provide an additional layer of safety, but it should not be relied on as the sole means of ensuring a child's safety. It should be used in conjunction with other safety measures such as adult supervision, childproofing, and communication to create a comprehensive safety plan for the child.

12. FUTURE SCOPE

The Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer has significant potential for future development and expansion. Here are some potential future scopes of the system:

Integration with other devices: The system could be integrated with other smart devices in the home, such as smart locks or security cameras, to create a more comprehensive and interconnected home security system.

Improved accuracy: Future iterations of the system could incorporate more advanced technology, such as machine learning algorithms, to improve the accuracy of the sensors and reduce false alarms.

Increased range: The range of the IR sensors used in the system could be increased to cover larger areas, such as outdoor spaces or multiple floors in a home.

Mobile application: A mobile application could be developed to provide parents or guardians with real-time updates and notifications on their child's location and movement, as well as other safety features.

Wearable devices: The system could be integrated with wearable devices, such as smartwatches or GPS trackers, to provide more comprehensive and accurate monitoring of a child's movements and location.

Overall, the Child Safety and Monitoring System using 3 IR sensors, GSM, and a buzzer has significant potential for future development and expansion, and with further innovation and integration with other technologies, it could become an even more effective tool for ensuring the safety of children.

13. APPENDIX

SOURCE CODES:

Arduino Uno

```
#define irPin1 2 // Set the pin number for the first IR sensor
#define irPin2 3 // Set the pin number for the second IR sensor
#define irPin3 4 // Set the pin number for the third IR sensor
#define buzzerPin 9
#include <SoftwareSerial.h>
SoftwareSerial mySerial(7, 8);
int irValue1; // Declare the variable to store the value of the first IR sensor
int irValue2; // Declare the variable to store the value of the second IR sensor
int irValue3; // Declare the variable to store the value of the third IR sensor
void setup()
{
  pinMode(irPin1, INPUT);
  pinMode(irPin2, INPUT);
  pinMode(irPin3, INPUT);
  pinMode(buzzerPin, OUTPUT);
  Serial.begin(9600); // Initialize serial communication
  mySerial.begin(9600);
  delay(1000);
}
void loop()
{
  irValue1 = digitalRead(irPin1); // Read the analog value from the first IR sensor
  irValue2 = digitalRead(irPin2); // Read the analog value from the second IR sensor
  irValue3 = digitalRead(irPin3); // Read the analog value from the third IR sensor
```

```

int detectedCount1 = 0;
int detectedCount2 = 0;
int detectedCount3 = 0; // Initialize the count of detected sensors to 0
digitalWrite(buzzerPin, LOW);
// Check each sensor value and increment the detected count if it is above a certain
threshold
if (irValue1 == LOW)
{
    detectedCount1=1;
    Serial.println(irValue1);
}
if (irValue2 == LOW)
{
    detectedCount2=1;
    Serial.println(irValue2);
}
if (irValue3 == LOW)
{
    detectedCount3=1;
    Serial.println(irValue3);
}
// Determine the classification based on the number of detected sensors
if (detectedCount1==1&&detectedCount2==1&&detectedCount3==1 )
{
    Serial.println("Adult"); // If 2 or more sensors detect something, classify as
"child"
}
else if (detectedCount1==1&&detectedCount2==1&&detectedCount3!=1)
{

```



```

    Serial.println("Child");
    digitalWrite(buzzerPin, HIGH); // If only 1 sensor detects something, classify as
    "unknown"
}
else if(detectedCount1==1&&detectedCount2!=1&&detectedCount3!=1)
{
    Serial.println("Unknown");
    digitalWrite(buzzerPin, HIGH); // If no sensors detect anything, classify as
    "adult"
}
if (detectedCount1==1&&detectedCount2==1&&detectedCount3==1 )
{
    Serial.println("Adult");
    SendMessage("Adult");}
else if (detectedCount1==1&&detectedCount2==1&&detectedCount3!=1 )
{
    Serial.println("child");
    SendMessage("child is going out");}
else if (detectedCount1==1&&detectedCount2!=1&&detectedCount3!=1 ) {
    Serial.println("Unknown");
    SendMessage("Unknown");}
delay(700); // Wait for half a second before reading again
}

void SendMessage(String message)
{
    mySerial.println("AT+CMGF=1");
    delay(1000);
    mySerial.println("AT+CMGS=\"+919025311758\\r\"");
    delay(1000);

```

```
mySerial.println(message);  
delay(100);  
mySerial.println((char)26);  
delay(1000);  
}
```

GITHUB LINK:

<https://github.com/vijayr10042002/Child-safety-monitoring-system.git>