PROJECT REPORT

PROJECT TITLE :

IoT Based Safety Gadget for Child Safety Monitoring and Notification

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11.FUTURE SCOPE

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1. INTRODUCTION

1.A. PROJECT OVERVIEW

Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.

1.B. PURPOSE

It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured. By this, parents know what is happening remotely and can take actions if something goes wrong. It provides parents with the real-time location to monitor the child. It makes parents to make monitor their child from their workplace . Parents can be relax and calm by using this device.

2. LITERATURE SURVEY

2.A. EXISTING PROBLEM

Parents need to ensure safety of their children but in real time they need to get towork and need to worry about their child whether he/she is safe or not . So to ensure safety they need to monitor & to notify their child what he/she is doing and to know whether they are in safe atmosphere or not to ensure the safety of the child.

2.B. References

• A. Jatti, M. Kannan, R. M. Alisha, P. Vijayalakshmi and S. Sinha, "Design and development of an IOT based wearable device for the safety and security of women and girl children," 2016 IEEE International Conference on Recent Trends inElectronics, Information & Communication Technology (RTEICT), Bangalore, 2016, pp. 1108-1112.

• David Hanes, Gonzalo, Patrick Grosetete, Robert, Barton, Jerome Henry "IoT Fundamental and Networking Technologies, Protocols".

2.C. Problem Statement Definition

The objective of this project is to safeguard the child from threads. Now a days the safety measures of children has been reduced in huge number.
Thus, the violence against children increasing day by day.
Our project mainly focus on sensing the children's Temperature and Heartbeat. By monitoring the activities the state of thechild is analyzed. By using GSM, if child reaches the critical state then the latitude and longitude of that particular location is sent as an alert message to the parents.

3. IDEATION PHASE

3. A. EMPATHY MAP
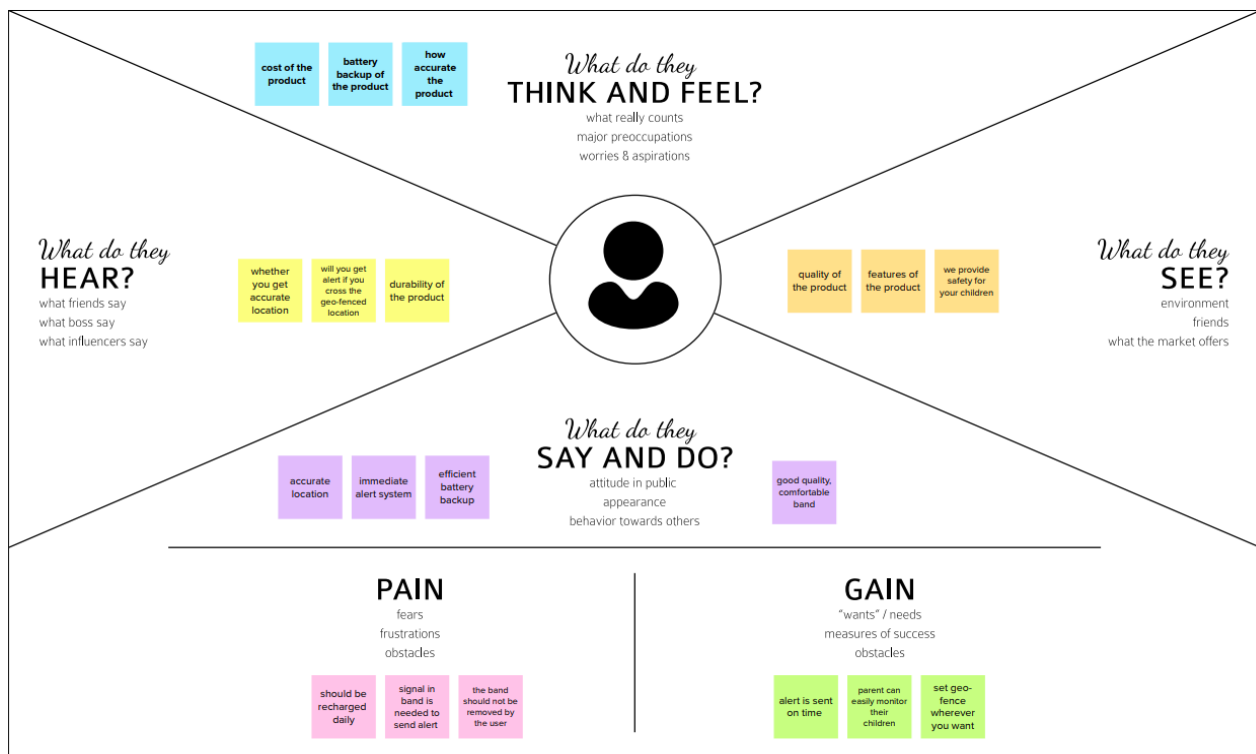
3.B. IDEATION

Step-1: Team Gathering, Collaboration and Select the Problem Statement

IoT or the internet of things is characterized as a forthcoming innovation that empowers us to create worldwide networked machines and also the devices that can be helped for exchanging of communication. As we all know that the real-time application has been increasing day by day, the smart connection also had increased. Rapid population growth, led to the increase in global life expectancy and the advance of technology, paving the pathway for the creation of age-friendly environments. This had led to the necessity in designing new products for infants protection.

Infants or toddlers need parents' attention 24×7. In this present era, the cases regarding missing children have been increasing day by day, which was the main motivation that comes for the safety of little children. However, the parents cannot continuously monitor their babies' conditions either in normal or abnormal situations. Still, certain incidents like infant attacks have been reported, it is necessary to protect the baby.

Step-2: Brainstorm, Idea Listing and Grouping

TEAM LEADER : SAMEERA N

Child and women safety is a challenging problem nowadays due to antisocial elements inthe society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the safety among children and women.

Smart phones are playing major role for ensuring the safety, where some mobile based applications provide alert systems.During the emergency, mobile apps alert the control room ofnearby police station or caretakersof children.

The literature shows that location tracking devices are available in the market, but itdoesnot provide the complete solution to the problem.

The solution to this problem is to designan IoT device, which senses the child's locationand environment and during emergency, it should send the alert to the parents automatically.

TEAM MEMBER 1 : MYTHILI T

The children are too young to take care of themselves. We cannot monitor the children at all times in school, play area, and outside place. In this paper, we discuss the concept of child safety device based on Internet of things.

The aim of this device is to provide safety to the child by allowing the parent to locate thechild and view their surroundings.

TEAM MEMBER 2 : YOGESHWARI V

Crimes on children keep increasing despite actions have been taken by the government. Revealedby , the overall percentage of child abasements worldwide is about 80% nowadays,out of which74% are girls and the remaining are boys. For every 40 seconds, a child is gone missing in the world. Due to that, parents are worried for their children and perhaps, a hard challenge for themto guarantee safety of their children when they are out.

To cope with the issue, the system is proposed with these objectives:

Enable tracking of the child's location and capturing of data remotely such as temperature,pulse, respiratory rate, quality of sleep and many more.

To show the child's actual data with reference values.

Enable sending of notification if the child is out of location or when the devicerealizes abnormal conditions/situations

TEAM MEMBER 3 : SOWMIYA S

Develop a prototype of IoT wearable smart band connected to parents' mobile apps so that theycan monitor the actual condition of children at anytime and anyplace. Besides, unlikeexisting smart band, which is less focusing on child security aspect, the proposed system emphasizes in getting as much data as possible so that actual situation can be identified. , the information indicating children's status, along with reference values will be sent to parents' devices with theapp installed. If children's actual data is not within the range of reference value, alert notification and some suggestions will be sent to parents' devices. Also, when children leavegeofences, notification will be sent to parents' device.

Step-3: Idea Prioritization

The section mainly discussed about significant of the research and why this study needs to be carried out. The child security system benefits parents as well as children. Since it aids in locating children, monitoring child's condition and security status instantly at anyplace and any time, parents who often tied up in work or neglect their children are gaining advantages from it. Through the proposed system, immediate actions can be taken forthwith in case the child is threatened. Thus, child security is guaranteed, crime rate related to children is reduced and eventually, parents can rest assured. In fact, reduction of crime rate brings aboutlong-term positive effects such as improving country's reputation and quality of life, increasing community security, safety, and cohesion as well as generating economic benefitsfor individuals, committee and taxpayers. Besides, the proposed system makes ample use of IoT, proving IoT is evolving which can be included in multiple areas comprising the child security field.

Throughout the research, it is clearly explained the IoT concept, child safety issues and the need of using child security system. Some previous studies have been included for designingthe IoT-based child security smart band. It assists parents to monitor their children remotely.In case situations happen, notifications will be sent to parents so that actions can be taken.

Through this, child safety can be ensured and crime rate will be reduced. However, the proposed device is not robust enough and does not contain sufficient functions to operate like a mobile phone. Hence, the future enchantments will be adding more features, software,applications, hardware to make the proposed system capable of working more intelligently, meanwhile guarantee the safety of children

4. PROJECT DESIGN PHASE – I

4. A. PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	When someone near the child this device alerts the parents whereas the parents in other distanced place.
2.	Idea / Solution description	The aim of this device is to provide safety to the child by allowing the parent to locate the child and view their surroundings. This device can be used to monitor the temperature and motion of the child. The other features of the device are emergency light and alarm buzzer which are activated when the ultrasonic sensor sense something near child. After automatically send the SMS to parents and call also received to the parents .
3.	Novelty / Uniqueness	The enchantments will be adding more features, software, applications, hardware to make the proposed system.
4.	Social Impact / Customer Satisfaction	The feedbacks of parents and children were highly promising. Results showed that 86.4% of the parents are satisfied with the time controller, around 91.1% of the children are satisfied with the proposed interface and 100% of the children are satisfied with the multiple sessions of the time allowed and video algorithm
5.	Business Model (Revenue Model)	Iot based risk monitoring device for child is done through smart device i.e., smart watch Through this device the respected parameters are monitored by the connected person.
6.	Scalability of the Solution	It can be given up to 4 out of 5.

4. B. PROBLEM SOLUTION FIT

1. CUSTOMER SEGMENT(S) `CS`
Who is your customer?
working parents who are not able to safe their child
(0-5) willing to use these .

6. CUSTOMER CONSTRAINTS `CC`
What constraints prevent your customers from taking action or limit their choices
of solution? i.e., spending power, budget, no cash, network connection, available devices.
For predictive analytics to make the most impact on child protection practice and outcomes, it must embrace established criteria of validity, equity, reliability, and usefulness.

5. AVAILABLE SOLUTIONS `AS`
Which solutions are available to the customers when they face 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
The most important reason for monitoring each child's development is to determine whether a child's is on track. Looking for developmental milestones is important to understanding each child's development and behaviour.

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 sides.
Parents can't able to save their child from their workplace and Over parenting tends to deprive children of bad and negative experiences, which are crucial to a child's emotional growth.
One form of overparenting is excessive monitoring

9. PROBLEM ROOT CAUSE `RC`
What is the real reason that this problem exists? What is the back It's exactly what it sounds like—an exercise to determine the root cause for a failure or issue, so that the solution is based on the true problem, not just addressing the symptoms.

7. BEHAVIOUR `BE`
What does your customer do to address the problem and get the job done?
The parents can monitor their child from their workplace when children have frequent emotional outbursts, it can be a sign that they haven't yet developed the skills they need to cope with feelings like frustration, anxiety and anger. Handling big emotions in a healthy, mature way requires a variety of skills, including.

3. TRIGGERS `T`
What triggers customers to act?
i.e., seeing their neighbour installing solar panels, reading about a more efficient solution in the news.
It's not the situation or the feeling that's the problem; it's how kids think about these things and what they say to themselves that causes problems and child (0-2) years didn't know about anything this will trigger

4. EMOTIONS: BEFORE / AFTER `E`
How do customers feel when they face a problem or a job and afterwards? i.e., lost, insecure > confident, in control - use it in your communication strategy & design.
BEFORE: Divergent thinking is a style of thinking that generates a range of alternative solutions or ideas to a problem that has multiple answers.
AFTER: Feeling protective of your child is often manifested in the form of 'motherly' instincts. The feeling of protecting and wanting the best for your children is the ultimate parenting goal

10. YOUR SOLUTION `S`
If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.
• The most important reason for monitoring each child's activities is to determine whether a child's activities is on track. Using ultrasonic sensor sense something near child and activate piezo buzz and SMS and dialing function to parents will be done immediately.

8.CHANNELS of BEHAVIOUR `C`
8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7
8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.
Understanding how children perceive and interact with the point of sale has been the focus of various studies in the past decade. It is well
documented that children have preferences in terms of shopping destinations .For working parents necessarily needed one.

4. C. SOLUTION ARCHITECTURE:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions.
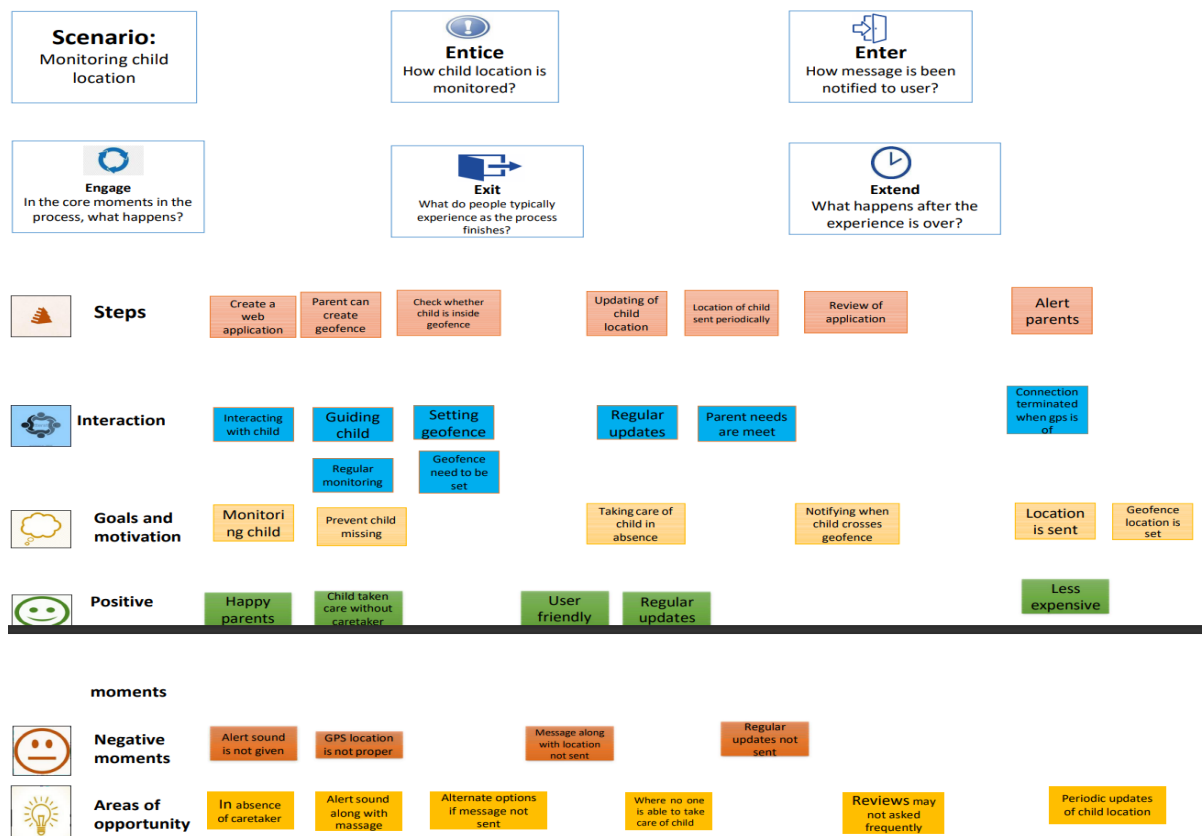
Its goals are to:

• Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the softwareto project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered

5. PROJECT DESIGN PHASE – II

5.A . CUSTOMER JOURNEY

| | Scenario: Monitoring child location | Entice How child location is monitored? | Enter How message is been notified to user? |
| | Engage In the core moments in the process, what happens? | Exit What do people typically experience as the process finishes? | Extend What happens after the experience is over? |

Steps: Create a web application | Parent can create geofence | Check whether child is inside geofence | Updating of child location | Location of child sent periodically | Review of application | Alert parents

Interaction: Interacting with child | Guiding child | Setting geofence | Regular updates | Parent needs are meet | Connection terminated when gps is of
Regular monitoring | Geofence need to be set

Goals and motivation: Monitoring child | Prevent child missing | Taking care of child in absence | Notifying when child crosses geofence | Location is sent | Geofence location is set

Positive: Happy parents | Child taken care without caretaker | User friendly | Regular updates | Less expensive

moments

Negative moments: Alert sound is not given | GPS location is not proper | Message along with location not sent | Regular updates not sent

Areas of opportunity: In absence of caretaker | Alert sound along with massage | Alternate options if message not sent | Where no one is able to take care of child | Reviews may not asked frequently | Periodic updates of child location

5.A. FUNCTIONAL REQUIREMENTS

SI No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)

1.	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
2.	User Confirmation	Confirmation via Email Confirmation via OTP
3.	Authentication	Only the authorized person for that product will know Ensures security
4.	User Interface	The Inventor Able to see the location of children when they are out of geofence will also track the exact information about the children
5.	Notification	Notified through mobile and mail

NON- FUNCTIONAL REQUIREMENTS

SI No.	Non-Functional Requirement	Description
1.	Usability	Accessed through Mobile App Showing location (latitude and longitude) of child and also other measures to ensure safety like notification. Portable and comfortable to use.
2.	Security	Database security and ensuring the safety of the product while in use.
3.	Reliability	Once logged in, the webpage is available until logging out of the app, and a comfortable platform or creates a good environment for users to use.
4.	Performance	Each page must load within 4 seconds and database needs to be updated every few seconds and a notification must be sent immediately if seen a change in the child's location.
5.	Availability	The data must be available whenever needed and the product should be able to use at any time.

5. C. DATA FLOW DIAGRAM :
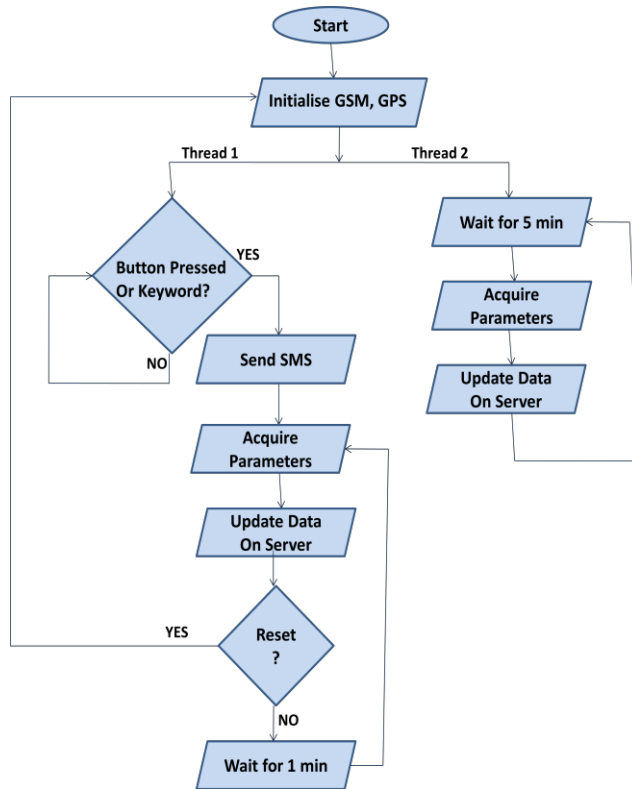
5.D. TECHNOLOGY ARCHITECTURE :

User Type	Functional Requirement (Epic)	User Story Number	User Story /	Acceptance criteria
Customer(Parents Mobile user)	Registration	USN-1 (FATHER)	I can access the location of my children using the credentials provided as a Father.	I can access my account /dashboard and receive confirmation email & click confirm
		USN-2 (MOTHER)	I can access the location of my children using the credentials provided as a Mother.	I can access my account /dashboard and receive confirmation email & click confirm

		USN-3 (GUARDIAN)	I too can monitor the children's activities using safety gadget monitoring system.	I can access my account /dashboard and receive confirmation email & clickconfirm
	Login	USN-4 (if required)	Same function to be performed as in previous cases.	Same function to be performed as in previouscases.
	Dashboard	USN-5 (if required)	Same function to be performed as in previous cases.	Same function to be performed as in previous cases.

6. PROJECT PLANNING PHASE :

6.A. MILESTONE AND ACTIVITIES :

1. Prerequisites
- IBM Cloud Services
- Software

2. Project Objectives

- Creating Abstract
- Brainstorming

3. Create And Configure IBM Cloud Services
- Creating IBM Watson IoT Platform and Device
- Creating Node- Red Service
- Creating Database in Cloudant DB

4. Ideation Phase
- Creating a Literature Survey on The Selected Project & Information Gathering
- Preparing an Empathy Map
- Ideating

5. Project Design Phase -1
- Proposing a Solution
- Preparing a Solution Fit

6. Project Design Phase -2
- Creating a Customer Journey map
- Analyzing Functional Requirements
- Creating Data Flow Diagram
*Creating Technology Architecture

7. Project planning Phase
*Preparing Milestones & Activity List
*Creating Sprint Delivery Plan

8. Project Development Phase

- Developing an IoT device using IBM Watson IOT python and node red services

- Making sure all the requirements are met
- Product is tested
- Quality of the product is checked
- The project is now ready for use

6. B. SPRINT DELIVERY PLAN :

Sprint-1	Confirmation Email	USN-2	As a user, I will receive a confirmation email once I have registered	4	High

			for the application		
Sprint-1	Authentication	USN-3	As a user, I can registerfor the application through Gmail and mobile app.	4	Medium
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High
Sprint-1	Dashboard	USN-1	As a user, I need to be able to view the functions that I can perform	4	High
Sprint-2	Notification	USN-1	As a user, I should be able to notify my parent	10	High

			and guardian in emergency situations		
Sprint-2	Store data	USN-2	As a user, I need to continuously store my location data into the database.	10	Medium
Sprint-3	Communication	USN-1,3	I should be able to communicate with my parents	6	Low
Sprint-3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	7	Medium

Sprint-3	Node RED-Cloudant DB communication	USN-1,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB	7	High
Sprint-4	User – WebUI interface	USN-1,4	The Web UI should get inputs from the user	6	High
Sprint-4	Geofencing	USN-1,3,4	The geofencing of the child should be done based on the geographical coordinates	7	High

7. CODING :

7.A. PHYTHON SCRIPT :

```
import tkinter as tkimport mysql.connectorfromtkint erimport *

defsubmitact():

user = Username.get()passw=pass word.get()

print(f"Thenameenteredbyyouis{user}{passw}") logintodb(user,passw)

deflogintodb(user,passw):

# If password is enetered by the#user
if passw:

db=mysql.connector.connect(host="localhost",



cursor=db.cursor()



user = user,password
= passw,db="College")
```

7.B. Code for IN Area Location:

```
import json import

wiotp.sdk.device

import time myConfig

={
```

```python
        "identity":{

        "orgId": "rdegyk",


"typeId":"safetygad",

"deviceId":"gad1"

        },

        "auth":{

        "token":"gyg06jzil(!lTGsKxV"

        } } client =

        wiotp.sdk.device.DeviceClient(config=myConfig,

        logHandlers=None) client.connect() while True:

        name="locater"

        #in area location

        latitude=13.145997614532394

        longitude=80.0619303452179

        myData={'name':name, 'lat':latitude, 'lon':longitude}

        client.publishEvent(eventId="status", msgFormat="json",

        data=myData, qos=0, onPublish=None)

        print("Data published to IBM Iot platform: ",myData)

        time.sleep(2)
```

7.C. Code for OUT Area Location:

```python
import json import

wiotp.sdk.device

import time myConfig

={

 "identity":{

 "orgId": "rdegyk",

 "typeId":"safetygad",

 "deviceId":"gad1"

 },

 "auth":{

 "token":"gyg06jzil(!lTGsKxV"

 } } client =

wiotp.sdk.device.DeviceClient(config=myConfig,

logHandlers=None) client.connect() while True:

name="locater"

#out area location

 latitude=13.15412
```

```
longitude=80.05729

myData={'name':name, 'lat':latitude, 'lon':longitude}

client.publishEvent(eventId="status", msgFormat="json",

data=myData, qos=0, onPublish=None)

print("Data published to IBM Iot platform: ",myData)

time.sleep(2)

client.disconnect()
```

7.D. GEO-FENCE :

A geofence is a virtual perimeter for a real-world geographic area. A geofence could be dynamically generated (as in a radius around a point location) or match a predefined set of boundaries (such as school zones or neighborhood boundaries).The use of a geofence is called geofencing, and one example of use involves a location-aware device of a location-based service (LBS) user entering exiting a geofence. This activity could trigger an alert to the device's user as well asmessaging to the geofence operator. This info, which could contain the location of the device, could be sent to a mobile telephone or an email account.

8. RESULTS

Performance Metrics

It is being used as it allows the correct sample of respondents to be selected due to which becomes convenient to obtain results. Besides, the results offered are affordable and usable. Since the respondents are properly chosen, the results tend to be more accurate, precise and reliable.

9. ADVANTAGES & DISADVANTAGES

9.A. ADVANTAGES

In our system, we provide an environment where this problem can be resolved in an efficient manner. It makes parents to easily monitor their children in real time just like staying beside them as well as focusing on their own career without any manual intervention.

9.B. DISADVANTAGES

It can be easily removed or damaged while playing and by any intruders.This requires internet connectivity to get monitored and to notify alert messages to parents.

10. 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.

11. FUTURE SCOPE

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.

12. GIT HUB LINK

[IBM-EPBL/IBM-Project-45925-1668234830: IoT Based Safety Gadget for Child Safety Monitoring & Notification (github.com)](github.com)

13. PROJECT DEMO VIDEO LINK

https://drive.google.com/file/d/1H63xHmZwXe90bPYQiF6IJ7RTwmQU MfRI/view?usp=drivesdk