# IBM NALAIYATHIRAN

## PROJECT REPORT

### IoT Based Safety Gadget For Child Safety Monitoring and Notification

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|---|---|
| Team ID | PNT2022TMID05117 |
| Project Name | Project – IOT-Based SafetyGadget for ChildSafety Monitoring and Notification |
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# 1. INTRODUCTION

## a. PROJECT OVERVIEW

The main concept is to create a app that used to check the location of the child as a safety system. This concept focuses on finding the child and continuously update the current location to the parent or caretaker.

The IBM cloud, Node-red and IBM Watson are used to create the web-application which is to be used in IoT child safety monitoring gadget.

## b. PURPOSE

Parents can simply leave their children in park, school or somewhere else, child tracker application helps the parent to continuously monitor thechild's location.

Notifications will be sent to the caretaker's mobile, according to the particular geofence around the child.

# 2. LITERATURE SURVEY

## a. EXISTINGPROBLEM

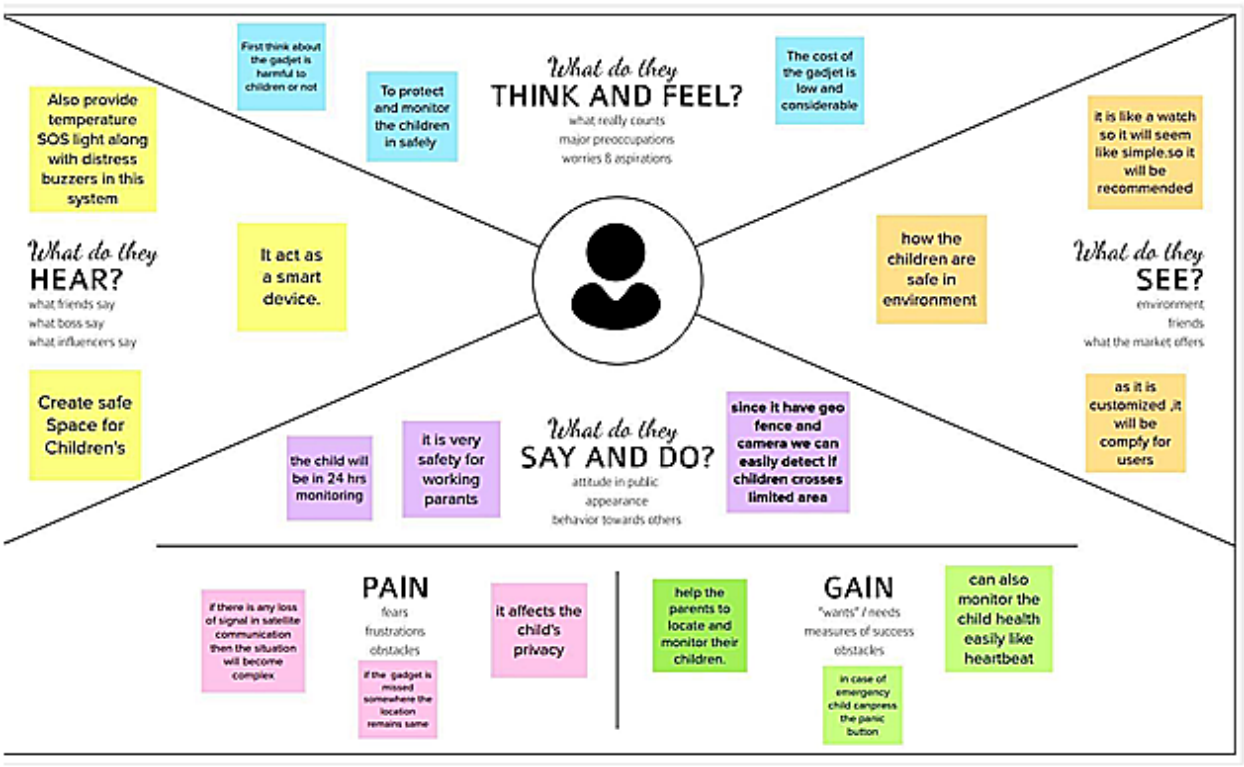
i. If the child may be in an area where there is no network or move away from the network coverage area, there is a difficulties to identifying and track the location of the child.

ii. The wearable device may be removed by someone who tries to kidnap the child.

iii. If it was removed or missed by the child, the identification and tracking are worthless then we proposed the method of sensing the body temperature of child to identify whether it is with the child or not.

# **3.** IDEATION & PROPOSED SOLUTION

## **a. EMPATHYMAPCANVAS**



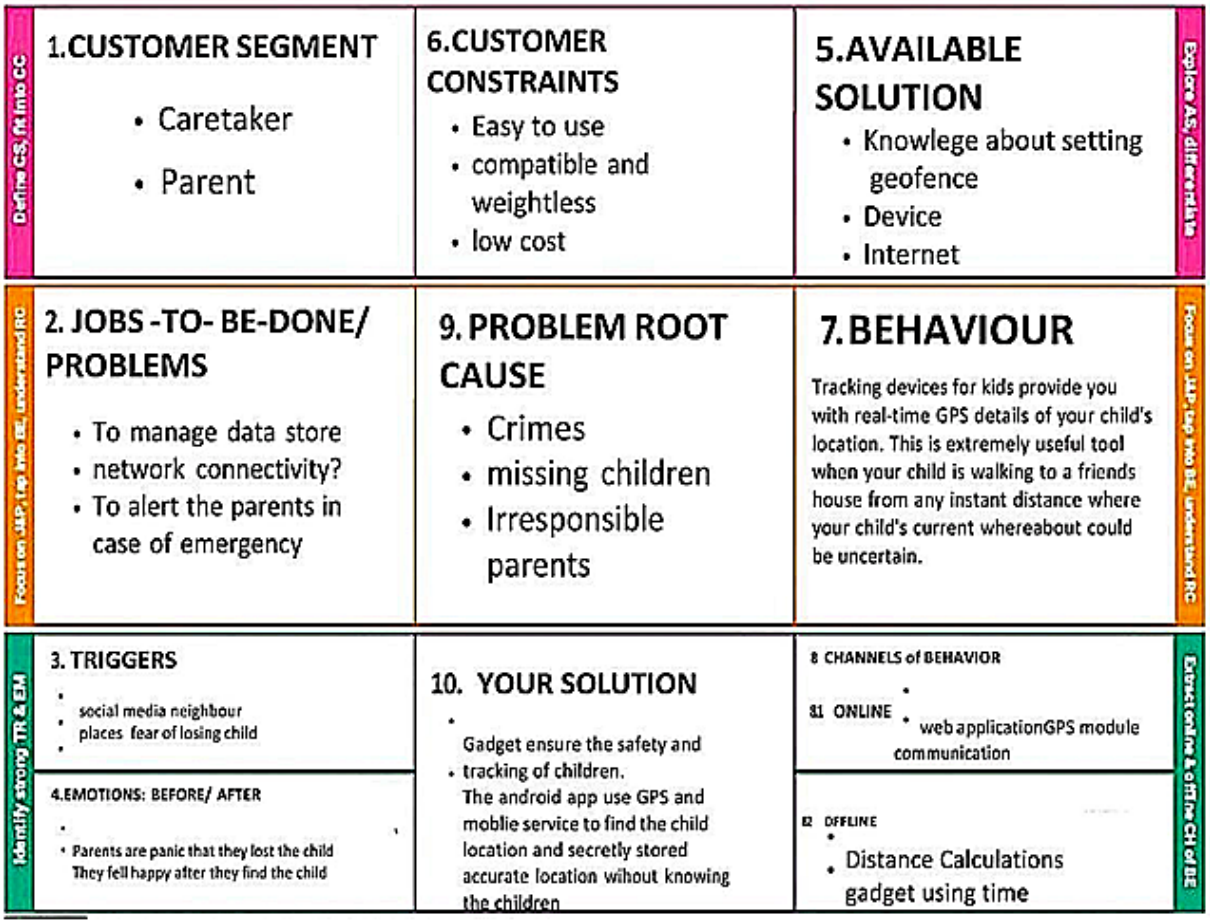
# b. PROPOSED SOLUTION

**Proposed Solution Template:**

Project team shall fill the following information in proposed solution template.

| S.No. | Parameter | Description |
|---|---|---|
| 1. | Problem Statement (Problem to be solved) | Basically, children cannot complain about abusement which they face in their daily life to their parents. They can't even realize what actually happens to them at their age. It is also difficult for parents to identify their children are being abused.<br>Since to prevent children before being attacked. Child goes missing in this world.<br>To protect them in school , outside the house, when crossing road and respective environment . |
| 2. | Idea / Solution description | In this system, the collected values from every sensor like temperature sensor, pulse rate detection sensor, metal detection sensor, and the location value from GPS are used to detect the status of the child and alerts the respective guardians using GSM accordingly.<br>This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during daily transportation from and to school. The system consists of two main units, a bus unit, and a school unit. The bus unit the system is used to detect when a child boards or leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert message accordingly the aim of this work is to develop a wearable device for the safety and protection of women and girls.<br>This objective is achieved by the analysis of physiological signals in conjunction with body position. The physiological signals that are analyzed are galvanic skin resistance and body temperature. Body position is determined by acquiring raw accelerometer data from a triple axis accelerometer.<br>A portable device which will have a pressure switch. As soon as an assailant is about to |

## C. PROBLEM SOLUTION FIT



# 4.REQUIREMENT ANALYSIS

## a. FUNCTIONAL REQUIREMENT

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|---|---|---|
| FR-1 | User Registration | Registration through Form<br>Registration through Gmail |
| FR-2 | User Confirmation | Confirmation via Email<br>Confirmation via OTP |
| FR-3 | Notification | Notified via Mobile App |
| FR-4 | User Interface | Mobile App- MIT App Inventor<br>Able to see location of children when they are out of geofence |

## b. NON-FUNCTIONAL REQUIREMENT

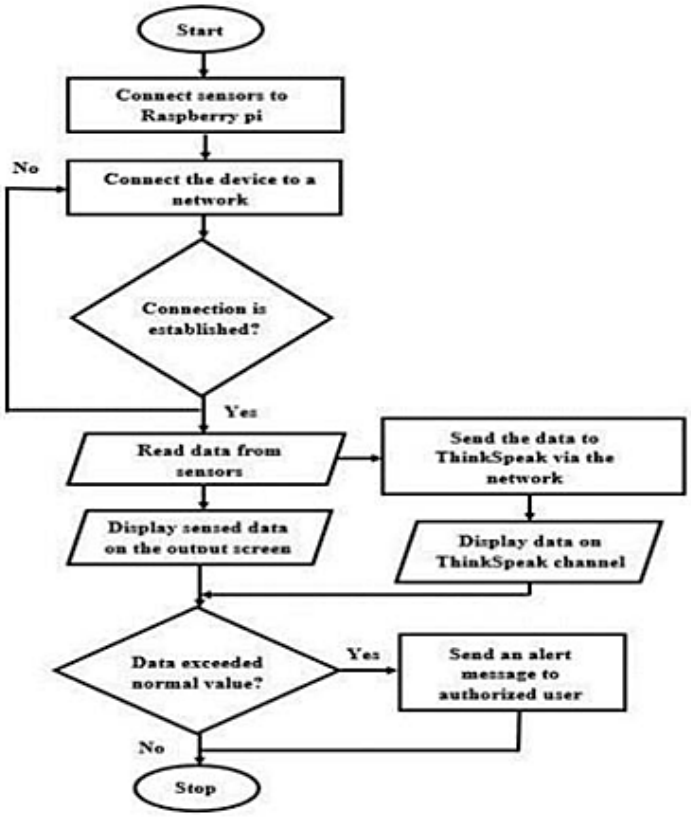
**Non-functional Requirements:**

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

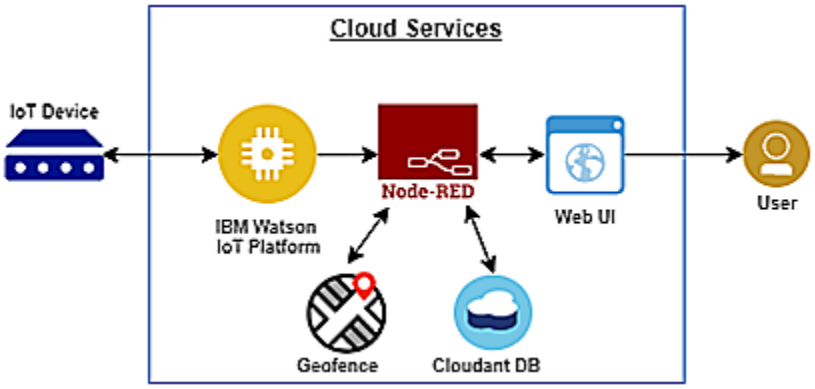
| FR No. | Non-Functional Requirement | Description |
|---|---|---|
| NFR-1 | **Usability** | Accessed through Mobile App<br>Showing location (latitude and longitude) of child |
| NFR-2 | **Security** | Database security must meet HIPAA requirements |
| NFR-3 | **Reliability and Availability** | Once logged in ,webpage is available until logging out of the app |
| NFR-4 | **Performance** | Each page must load within 2 seconds |
| NFR-6 | **Scalability** | The process must finish within 3 hours so data is available by 8 a.m. local time after an overnight update |

# 5. PROJECT DESIGN

## a. DATA FLOW DIAGRAMS




## b. SOLUTION & TECHNICAL ARCHITECTURE



## C. USER STORIES

| USER STORY NUMBER | USER STORY / TASK | ACCEPTANCE CRITERIA | PRIORITY |
|---|---|---|---|
| USN-1 | Tousetheproductwhenthe child needs safety | Parents can access the device with lock | HIGH |
| USN-2 | Notification willbeprovidedwhen child is in trouble. | Child cannot access the device as there is a lock | HIGH |
| USN-3 | To safe guard the child when in danger using GPS they can track their location. | Lock AccessOnly by parents. | LOW |
| USN-4 | During Emergency there will be an alarm | Lock AccessOnly by concerned persons. | MEDIUM |
| USN-5 | When child is missing parents will be notified | Lock AccessOnly by Users. | HIGH |

# 6. CODING & SOLUTIONING

## a. FEATURE - 1

i. HTML

ii. JAVASCRIPT

iii. CSS

iv. PYTHON

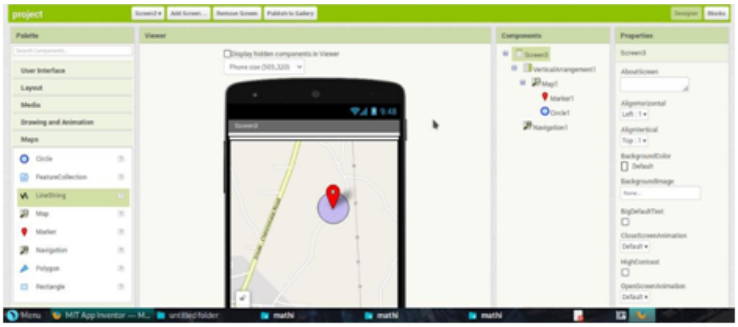
## b. FEATURE - 2

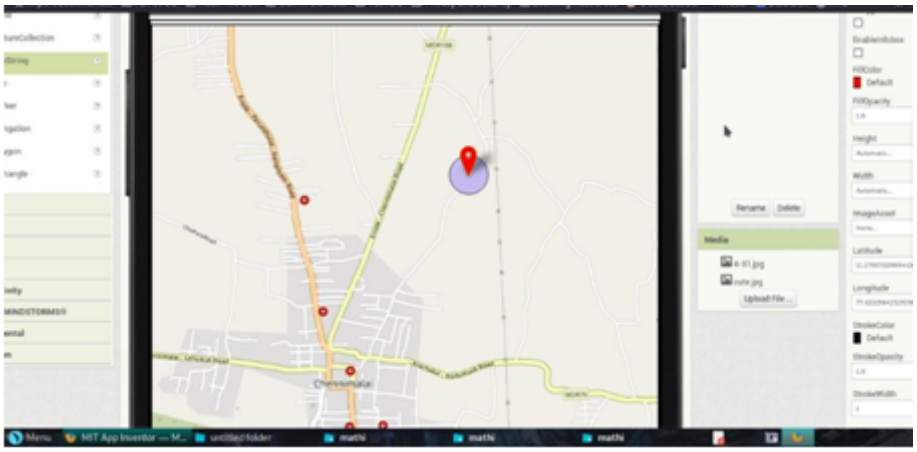
| S.NO | COMPONENT | DESCRIPTION | TECHNOLOGY |
|---|---|---|---|
| 01 | User Interface | The communication protocol being used in the proposed solution might act as an interface the way like wifi,bluetooth | MITAPP |
| 02 | Application logic | The data to be collected and send to the authenticator via GSM providing the GPS coordinates to easily located access andmonitorthechild | IBM Watson STTservice, python etc |
| 03 | Database | Date to be segregated and secured in the form of relation DBMS | MySQL |

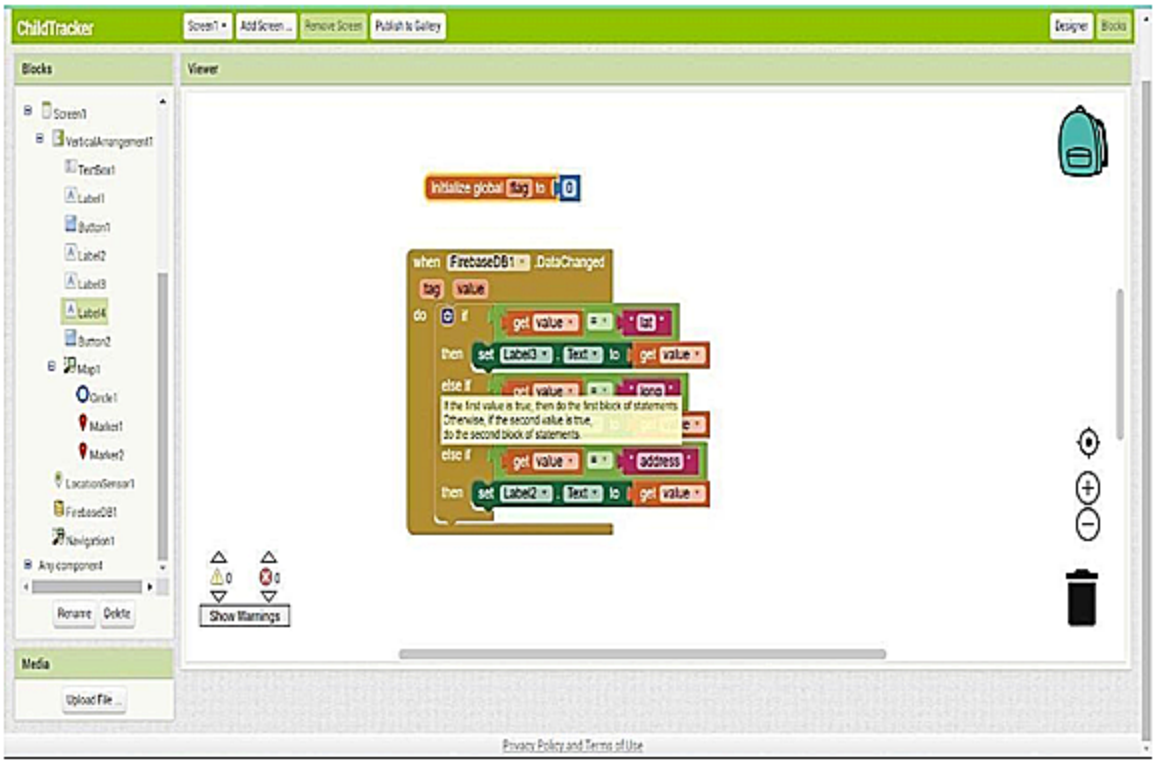
| | | | |
|---|---|---|---|
| 04 | CloudDatabase | IBM | IBMCloudant |
| 05 | Filestorage | Filestoragerequirements | IBM block stor-age or other storage service or local file sys-tem |
| 06 | ExternalAPI-1 | To access the children lo-cation | GPS Locationmonitoringetc |
| 07 | Infrastructure | Application deployment on local system/ cloud lo-calserverconfiguration | Cloud foundry |

# 7. TESTING

## a. USER ACCEPTANCE TESTING






ChildTracker
Screen1
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Viewer
Screen1
VerticalArrangement1
TextBox1
Label1
Button1
Label2
Label3
Label4
Button2
Map1
Circle1
Marker1
Marker2
LocationSensor1
FirebaseDB1
Navigation1
Any component
Rename
Delete
Media
Upload File ...
Initialize global flag to 0
when FirebaseDB1 .DataChanged
tag value
do if get value = lat
then set Label3 . Text to get value
else if get value = long
If the first value is true, then do the first block of statements.
Otherwise, if the second value is true,
do the second block of statements.
else if get value = address
then set Label2 . Text to get value
Show Warnings
Privacy Policy and Terms of Use

# 8. ADVANTAGES & DISADVANTAGES

### ADVANTAGES:

1. Provide safety to the child by allowing their parent to locate.
2. This application can be used to monitor the temperature and motion of the child.
3. Child safety can be ensured and crime rate against the child can be reduced.
4. It can be used to analyze the dynamic environment of the child and alerting system.

#### DISADVANTAGES:

1. Technical difficulties.
2. High cost and difficult to implement.
3. Poor data quality.
4. Design quality.

# 9. CONCLUSION

This concept demonstrates IoT based gadget for child safety monitoring and notifications is helping the parent to locate and monitor their children. If any abnormal values are read by the sensor then an SMS is sent to the parents mobile. It assists parents to monitor their children remotely. The project aims to create a system that allows the parents to keep track their children when they are out of their sight. This is done by using the IBM cloud, Node-red and IBM Watson which is used to create and store the informations of the project.The child will wear GPS enabled device which is connected to the parent's smart phone where the child safety web-application is installed.

# 10. FUTURE SCOPE

In this web-application if any abnormalities are read by the sensor an MMS indicating an image or video captured by the serial camera which is to be included with emergency and safety system for accurate surveillance of the child's surroundings. The future scope of the work is to implement the IoT device which ensures the complete solution for child safety problems.

For this project using the GSM technologies is beneficial as the cellular range is vast and since all the communication between wearable device and the parent is taking place via SMS, therefore no internet connectivity is required. But, still the GSM module possess the added advantage of using GPRS which enables the board to use the internet if required. Whereas for camera module which supports video streaming but due to the constraint of trying to use only SMS, therefore more number of connections will be taking place.

# 11. APPENDIX

- **GitHub Repository:**
  - https://github.com/IBM-EPBL/IBM-Project-4785-1658740212.git
- **Demo Video Link:**
  - https://drive.google.com/file/d/1Pkk3VhoBYviuCJU-9BaN80SMcLBwAUxG/view?usp=drivesdk