PROJECT REPORT DOCUMENT

CONTEXT

TEAM ID: PNT2022TMID45386

Child safety and tracking is a major concern as the more number of crimes on children are reported. The children are too young to take care of theselves.we cannot monitor the children at all times in school , plat area , and outside.Sometimes parents indifferencely leave their child in school or parks somewhere. According to this critical situation we would able to find the child with the help of IoT (Internet of Things). This device helps the child when they cross geofence area the notifications will be sent to their parents or caretakers.

1.2 PURPOSE

Internet of Things (IoT) plays a major role in every day to day life.Iot devices are smart devices,which are able to take decisions by sensing the environment around the devices. IoT brings advanced elements in the social **,** economic impact of users.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

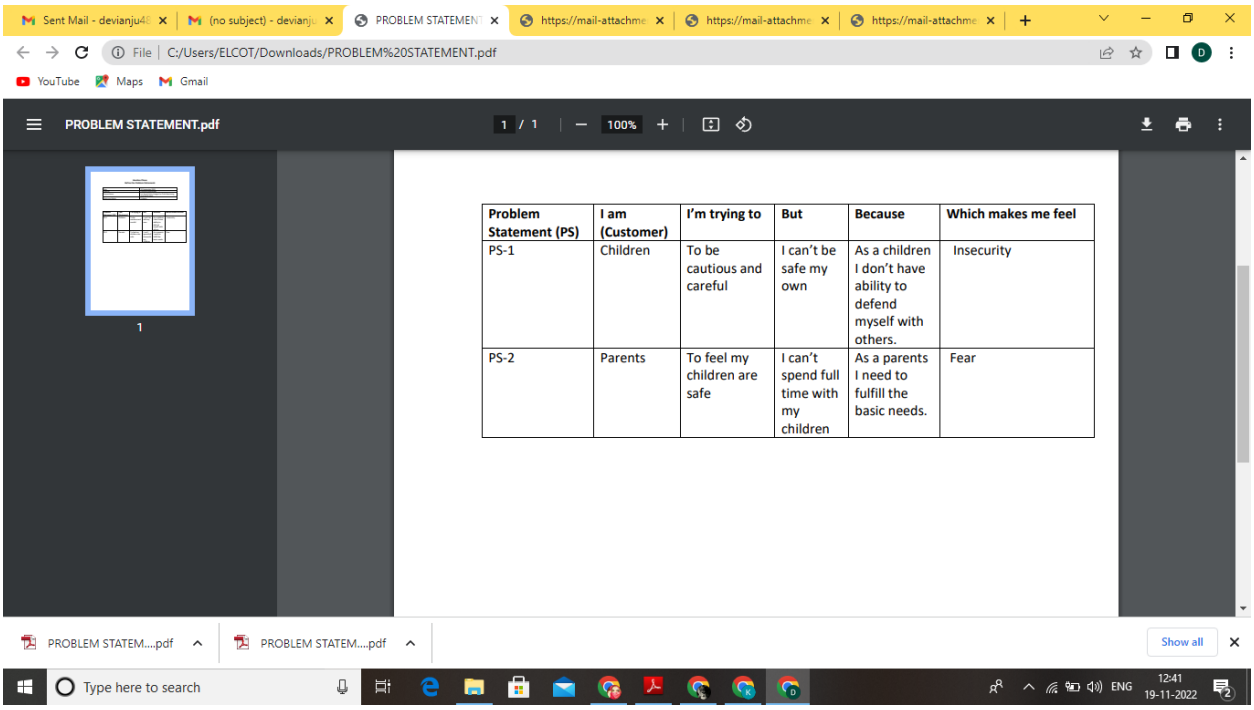
M. Madhuri, A. Q. Gill and H. U. Khan [1]-" The proposed integrated digital technology architecture such as the Salesforce cloud, Mobile Application and GPS can be easily used for tracking a missing child in an event. This work is a first steps towards the development of a working software for a Smart Child Tracker ".A. Srinivasan, S. Abirami, N. Divya, R. Akshya and B. S. Sreeja [2]-" This paper has focused mainly on the autonomous operation of the safety system. Combined usage of three different vitals has increased the accuracy of detecting the abnormal situation. Usage of machine learning has improved the accuracy and made the system intelligent".B. Ranjeeth, B. S. Reddy, Y. M. K. Reddy, S. Suchitra and B. Pavithra, [3]" This IoT based device brings a revolutionary change in the current problems regarding child safety issues. Child safety is the most common problem in the world. By this project, the child missing and kidnap issues can be brought down and help the society".M. Benisha et al., [4]-" The planned mechanism provides a better methodology to view & track the location of the children in terms of latitude and longitude which can additionally track using Google maps It is used by the Arduino module to overcome GSM by using IT to better Communication and heartbeat sensor and MEMS accelerator is also added. If an accident happens, message with location sends instantly to the registered contacts and also to the nearest police stations "

2.2 REFERENCES

[1] M. Madhuri, A. Q. Gill and H. U. Khan, "IoT-Enabled Smart Child Safety Digital System Architecture," 2020 IEEE 14th International Conference on Semantic Computing (ICSC), 2020, pp.

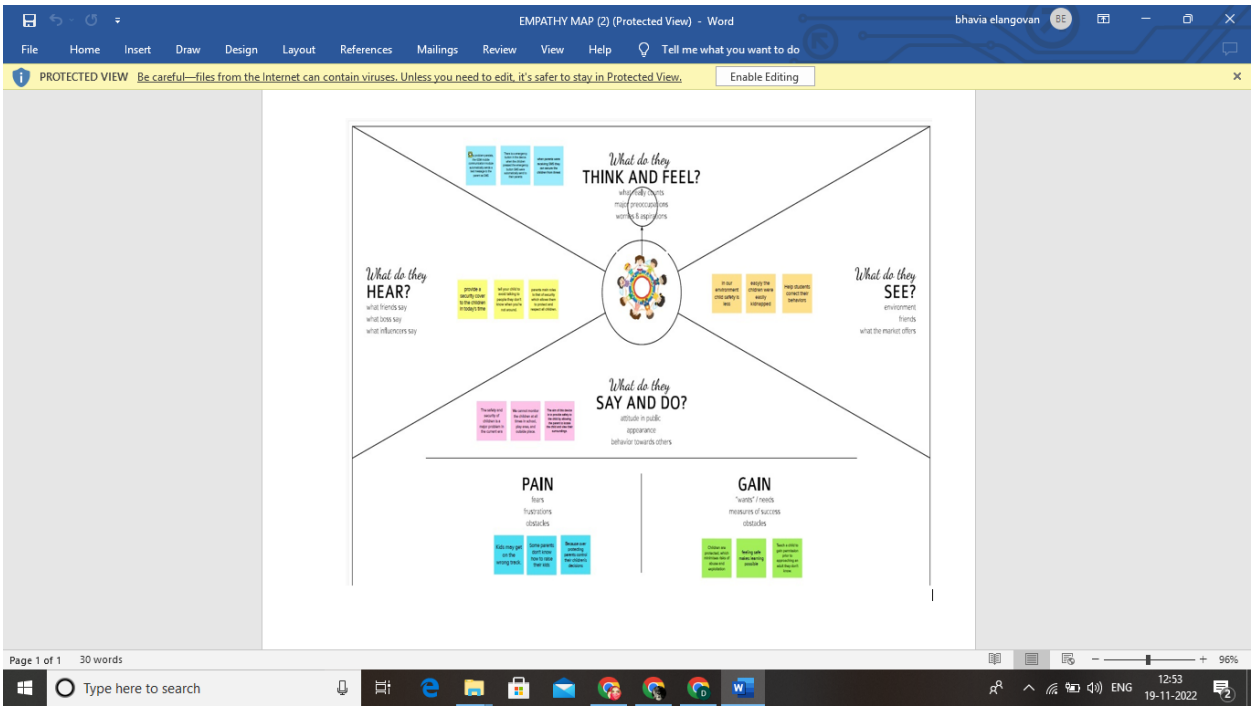
166-169, doi: 10.1109/ICSC.2020.00033.[2] A. Srinivasan, S. Abirami, N. Divya, R. Akshya and B. S. Sreeja, "Intelligent Child Safety System using Machine Learning in IoT Devices," 2020 5th International Conference on Computing, Communication and Security (ICCCS), 2020, pp. 1-6, doi: 10.1109/ICCCS49678.2020.9277136.[3] B. Ranjeeth, B. S. Reddy, Y. M. K. Reddy, S. Suchitra and B. Pavithra, "Smart Child Safety Wearable Device," 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), 2020, pp. 116-120, doi: 10.1109/ICESC48915.2020.9156001.[4] M. Benisha et al., "Design of Wearable Device for Child Safety," 2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV), 2021, pp. 1076-1080, doi: 10.1109/ICICV50876.2021.9388592

2.3 PROBLEM STATEMENT DEFINITION

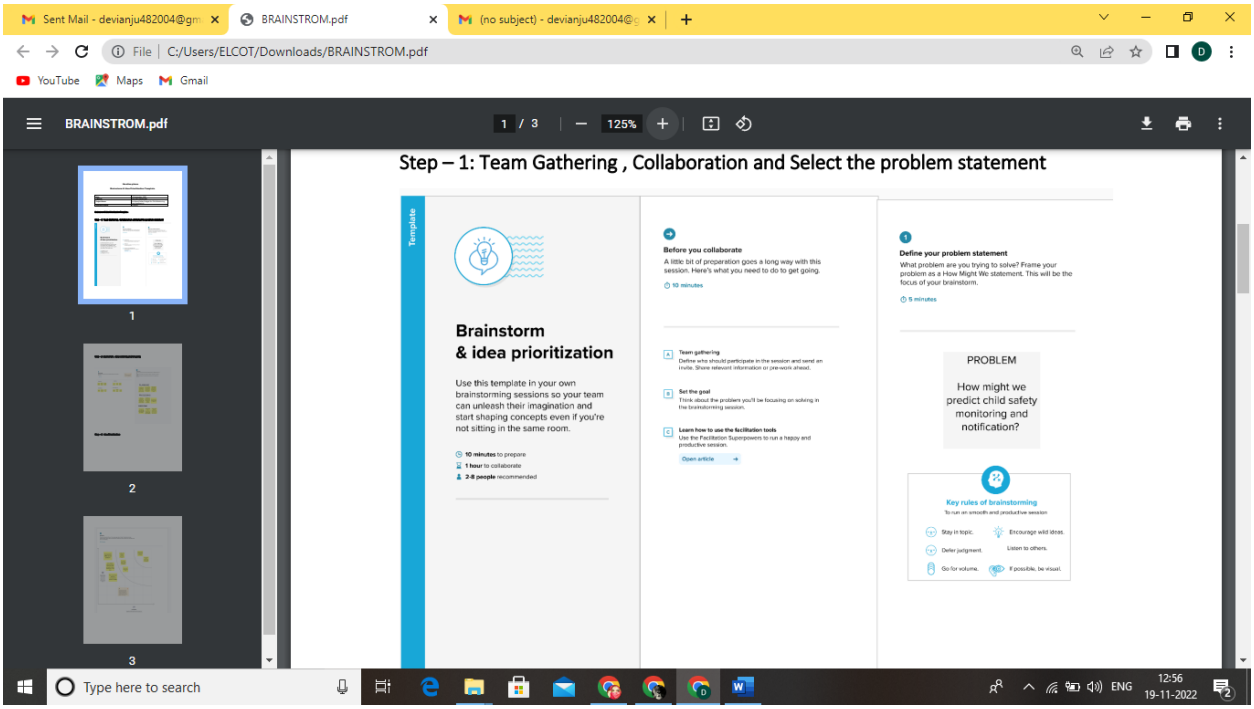


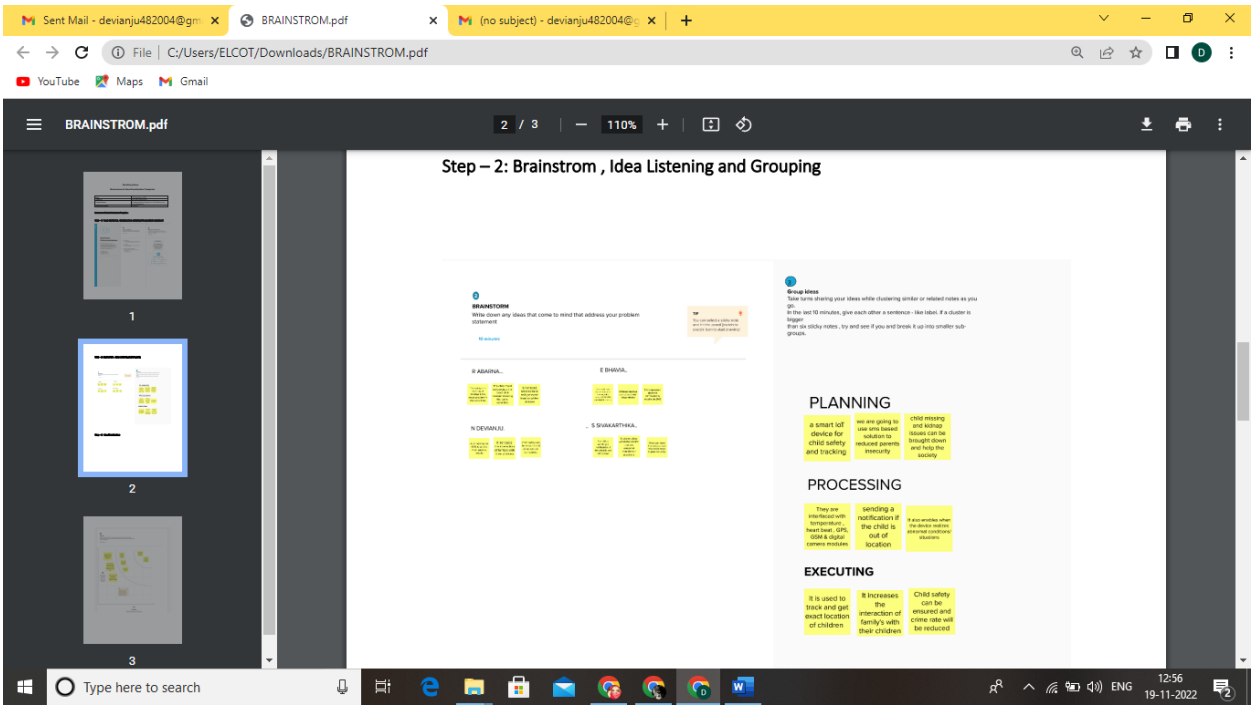
3. IDEATION & PROPOSED SOLUTION

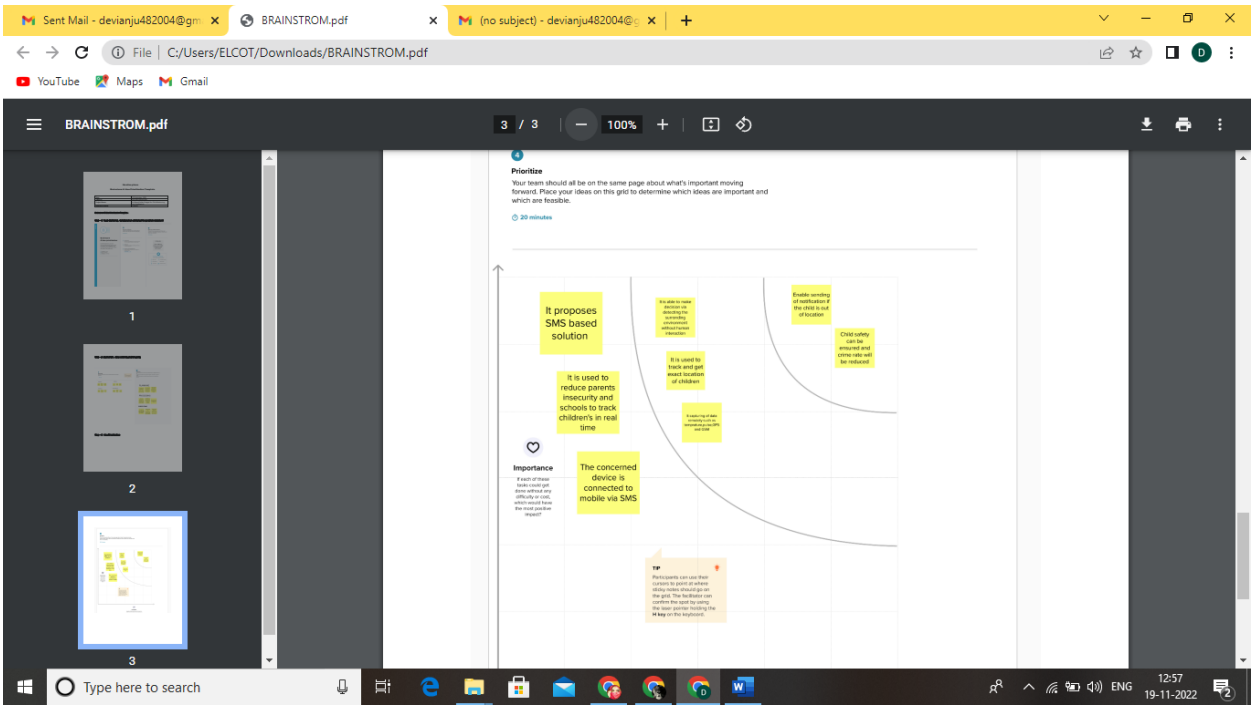
3.1 EMPATHY MAP CANVAS



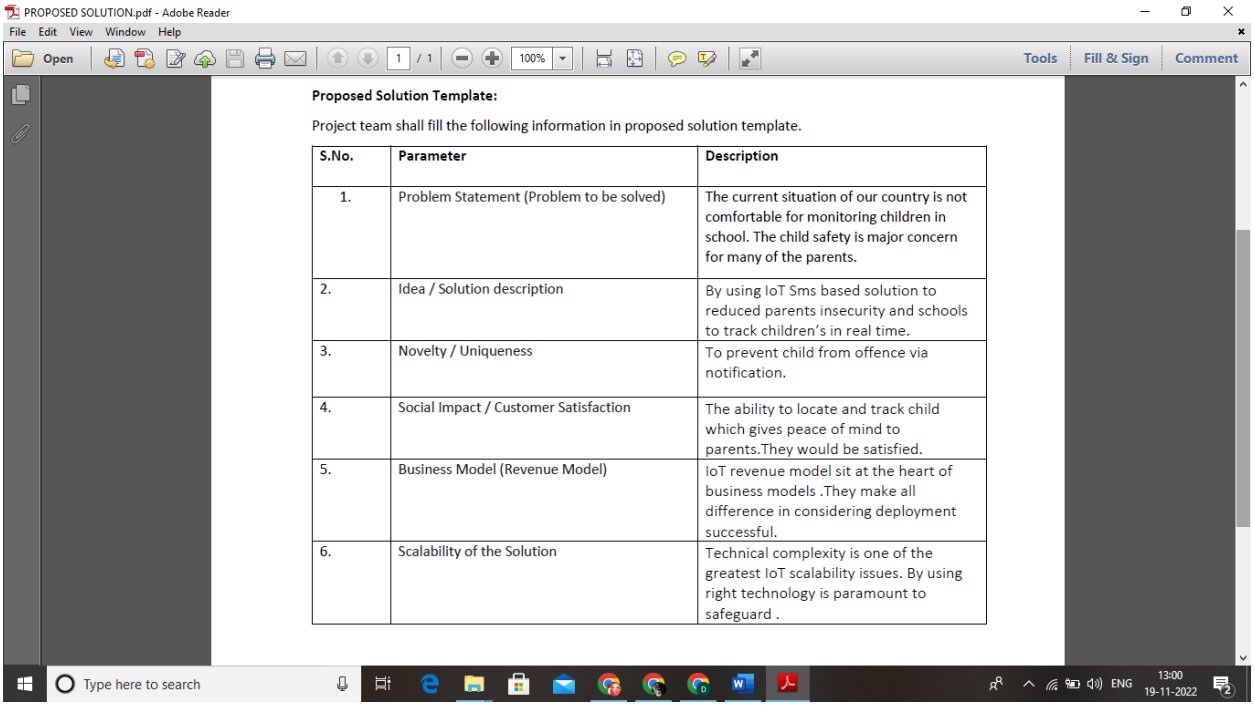
3.2 IDEATION & BRAINSTORMING







3.3 PROPOSED SOLUTION



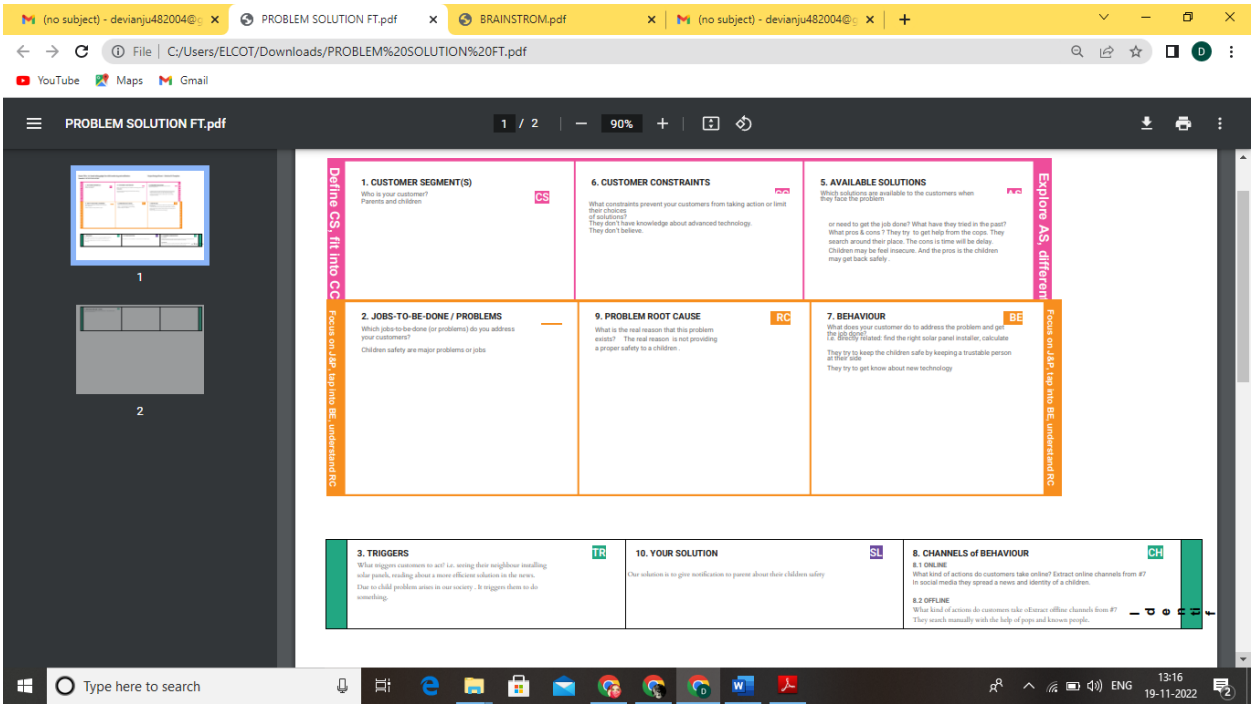
PROPOSED SOLUTION.pdf - Adobe Reader

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)	The current situation of our country is not comfortable for monitoring children in school. The child safety is major concern for many of the parents.
2.	Idea / Solution description	By using IoT Sms based solution to reduced parents insecurity and schools to track children's in real time.
3.	Novelty / Uniqueness	To prevent child from offence via notification.
4.	Social Impact / Customer Satisfaction	The ability to locate and track child which gives peace of mind to parents.They would be satisfied.
5.	Business Model (Revenue Model)	IoT revenue model sit at the heart of business models .They make all difference in considering deployment successful.
6.	Scalability of the Solution	Technical complexity is one of the greatest IoT scalability issues. By using right technology is paramount to safeguard .

3.4 PROBLEM SOLUTION FIT



PROBLEM SOLUTION FT.pdf

1. CUSTOMER SEGMENT(S) — CS
Who is your customer?
Parents and children

6. CUSTOMER CONSTRAINTS — CC
What constraints prevent your customers from taking action or limit their choices
IT solutions
They don't have knowledge about advanced technology.
They don't believe.

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 ? They try to get help from the cops. They search around their place. The cons is time will be delay. Children may be feel insecure. And the pros is the children may get back safely .

Define CS, fit into CC

2. JOBS-TO-BE-DONE / PROBLEMS — J&P
Which jobs-to-be-done (or problems) do you address your customers?
Children safety are major problems or jobs

9. PROBLEM ROOT CAUSE — RC
What is the real reason that this problem exists? The real reason is not providing a proper safety to a children .

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

They try to keep the children safe by keeping a trustable person at their side.
They try to get know about new technology

Focus on J&P, tap into BE, understand RC

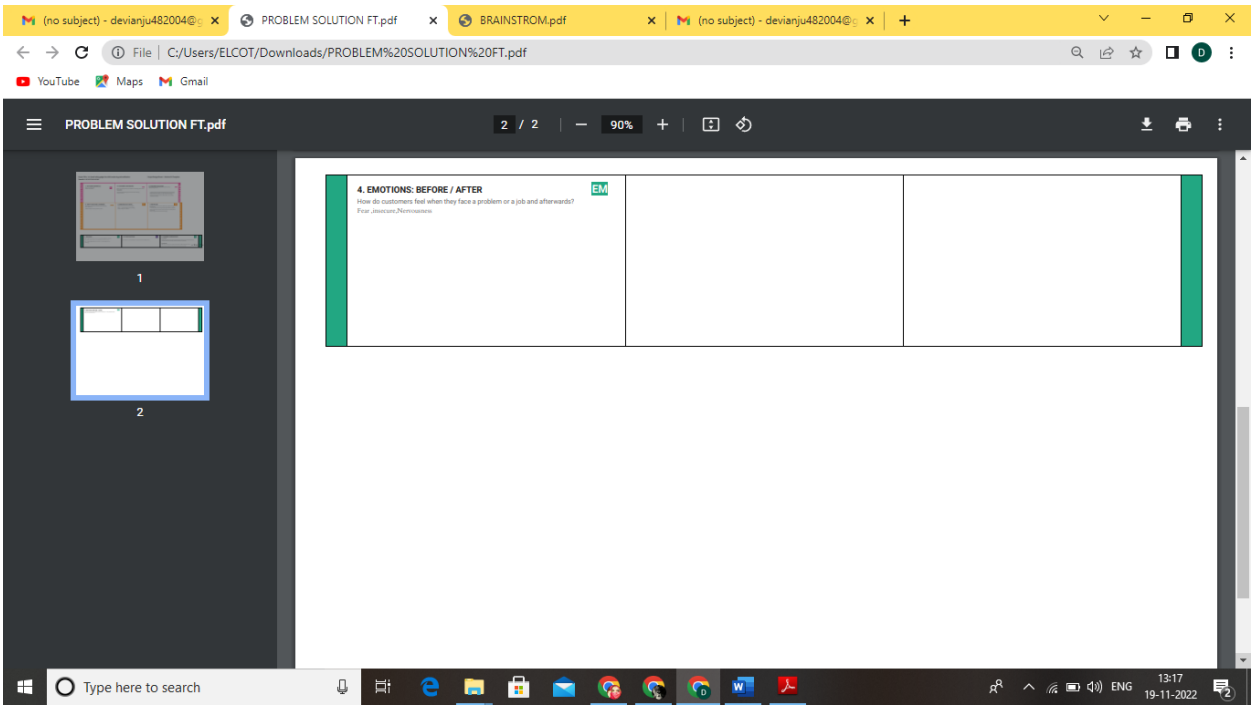
Explore AS, differen

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.
Due to child problem arises in our society . It triggers them to do something.

10. YOUR SOLUTION — SL
Our solution is to give notification to parent about their children safety

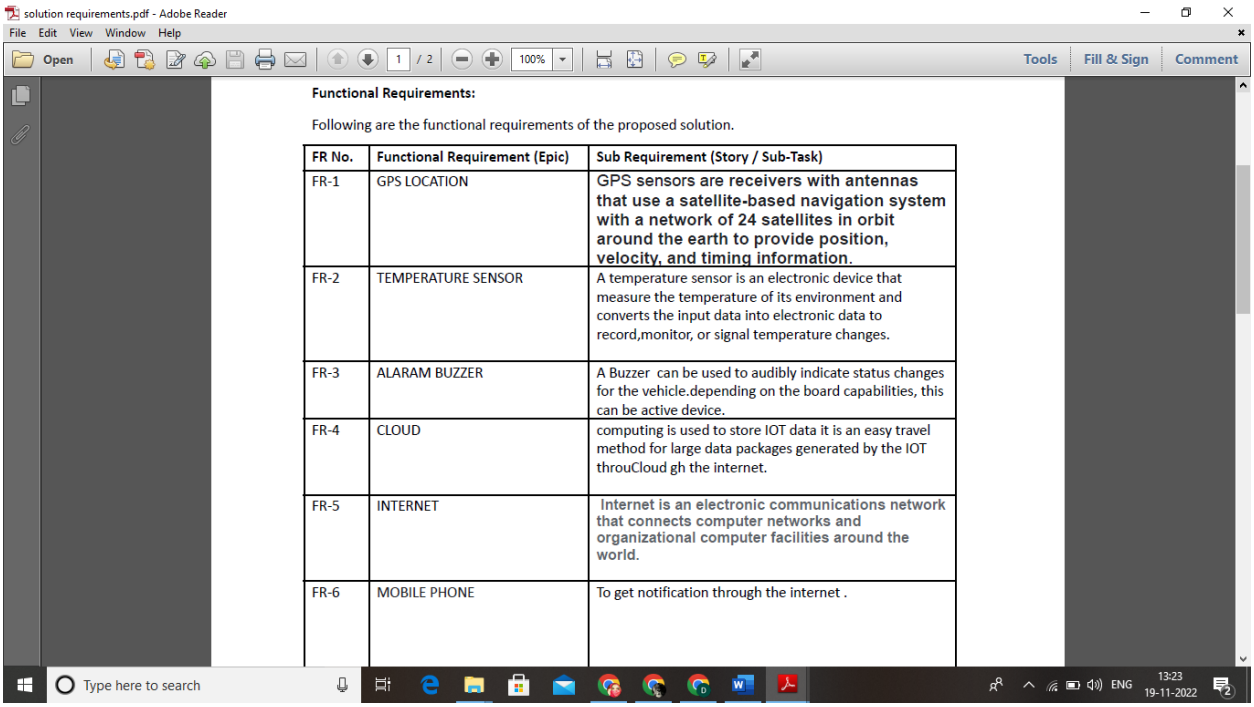
8. CHANNELS of BEHAVIOUR — CH
8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7
In social media they spread a news and identity of a children.

8.2 OFFLINE
What kind of actions do customers take oExtract offline channels from #7
They search manually with the help of pops and known people.



4.REQUIREMENTS ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

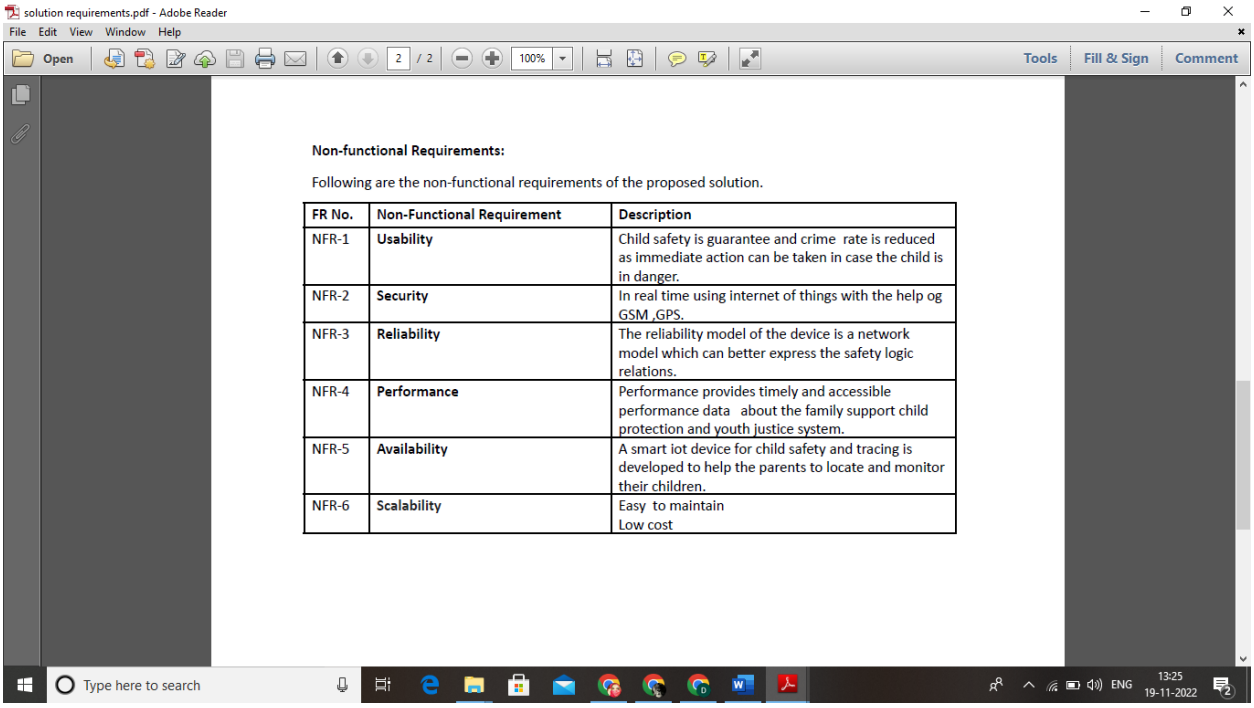


Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	GPS LOCATION	GPS sensors are receivers with antennas that use a satellite-based navigation system with a network of 24 satellites in orbit around the earth to provide position, velocity, and timing information.
FR-2	TEMPERATURE SENSOR	A temperature sensor is an electronic device that measure the temperature of its environment and converts the input data into electronic data to record,monitor, or signal temperature changes.
FR-3	ALARAM BUZZER	A Buzzer can be used to audibly indicate status changes for the vehicle.depending on the board capabilities, this can be active device.
FR-4	CLOUD	computing is used to store IOT data it is an easy travel method for large data packages generated by the IOT throuCloud gh the internet.
FR-5	INTERNET	Internet is an electronic communications network that connects computer networks and organizational computer facilities around the world.
FR-6	MOBILE PHONE	To get notification through the internet .

4.2 NON FUNCTIONAL REQUIREMENTS



solution requirements.pdf - Adobe Reader

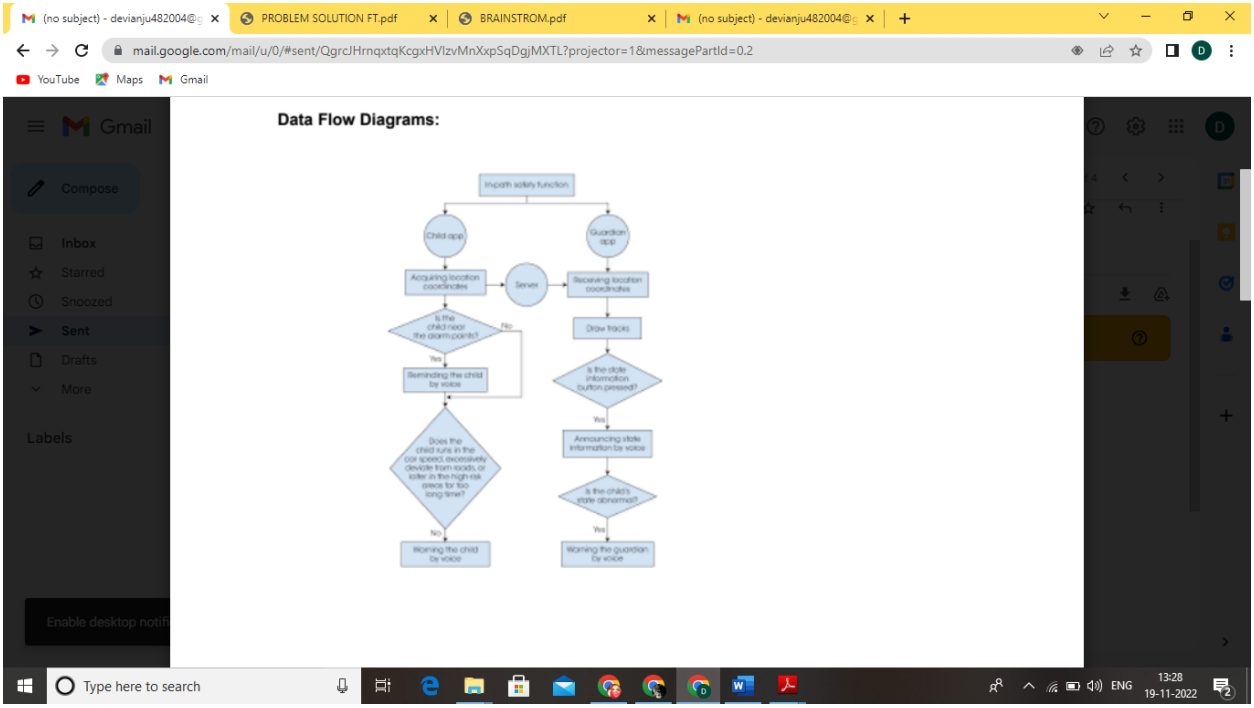
Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Child safety is guarantee and crime rate is reduced as immediate action can be taken in case the child is in danger.
NFR-2	**Security**	In real time using internet of things with the help og GSM ,GPS.
NFR-3	**Reliability**	The reliability model of the device is a network model which can better express the safety logic relations.
NFR-4	**Performance**	Performance provides timely and accessible performance data about the family support child protection and youth justice system.
NFR-5	**Availability**	A smart iot device for child safety and tracing is developed to help the parents to locate and monitor their children.
NFR-6	**Scalability**	Easy to maintain Low cost

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

(no subject) - devianju482004@ | PROBLEM SOLUTION FT.pdf | BRAINSTROM.pdf | (no subject) - devianju482004@

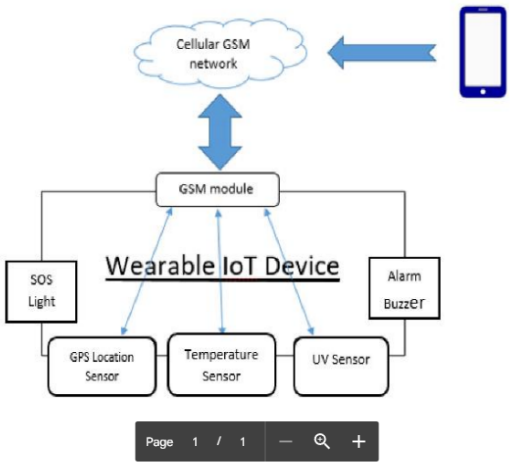
mail.google.com/mail/u/0/#sent/QgrcJHrnqxtqKcgxHVlzvMnXxpSqDgjMXTL?projector=1&messagePartId=0.8

YouTube Maps Gmail

SOLUTION ARCHITECTURE.pdf

Solution Architecture:

Open with Google Docs



Page 1 / 1

Type here to search

ENG 13:32 19-11-2022

(no subject) - devianju482004@ | PROBLEM SOLUTION FT.pdf | BRAINSTROM.pdf | (no subject) - devianju482004@

mail.google.com/mail/u/0/#sent/QgrcJHrnqxtqKcgxHVlzvMnXxpSqDgjMXTL?projector=1&messagePartId=0.7

YouTube Maps Gmail

Technology stack.pdf

Open with Google Docs

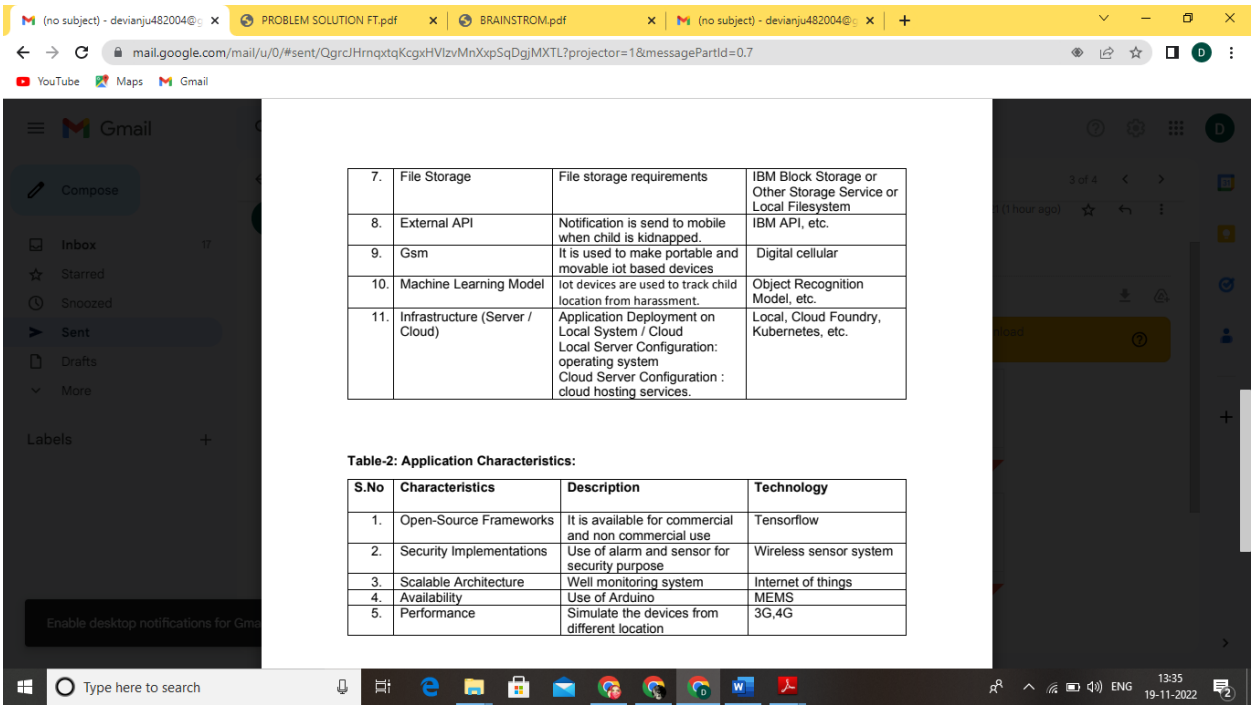
Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Data is collected by sensor Devices. Eg. Web UI ,Mobile app	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	sensor	Temperature sensor	MEMS sensor
3.	Arduino	Iot cloud applications	IBM Watson STT service
4.	Gps	To transmit data remotely and connect to other system and sensor.	IBM Watson Assistant
5.	Database	Python , Natural language processing.	MySQL, NoSQL, etc.
6.	Cloud Database	Analysis Database Service on Cloud	IBM DB2, IBM Cloudant etc.

Page 1 / 2

Type here to search

ENG 13:34 19-11-2022

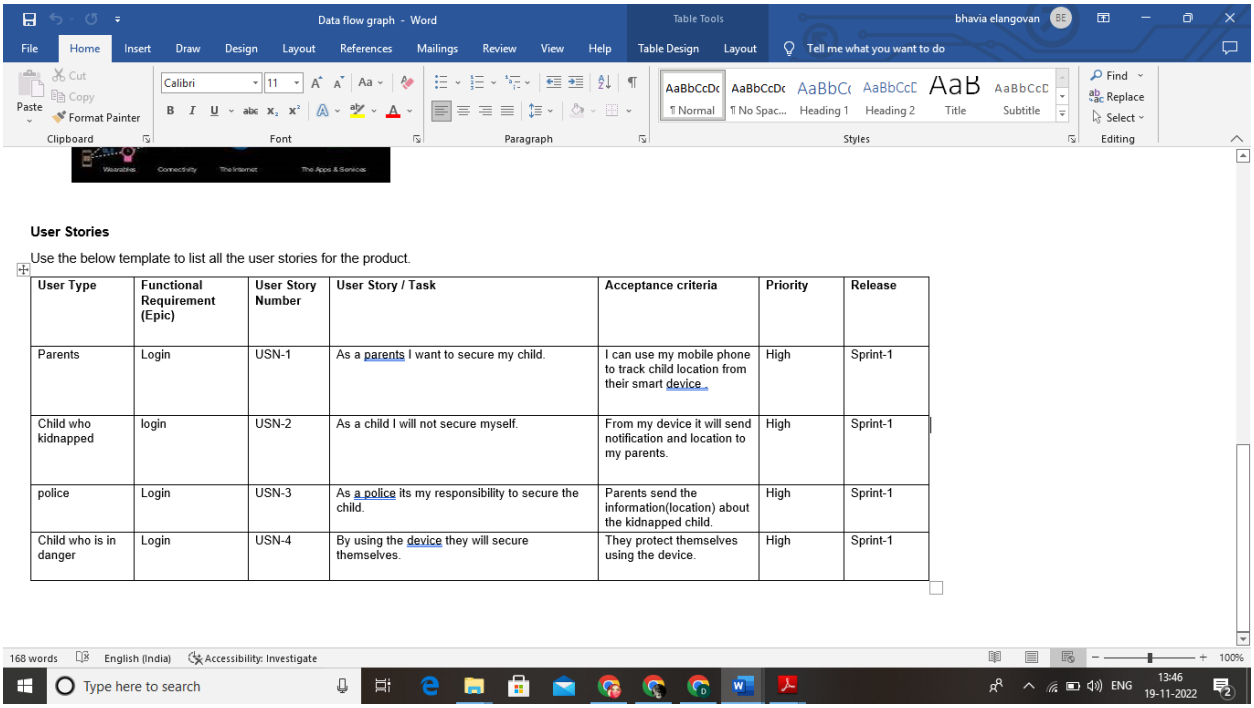


7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API	Notification is send to mobile when child is kidnapped.	IBM API, etc.
9.	Gsm	It is used to make portable and movable iot based devices	Digital cellular
10.	Machine Learning Model	Iot devices are used to track child location from harassment.	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: operating system Cloud Server Configuration : cloud hosting services.	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	It is available for commercial and non commercial use	Tensorflow
2.	Security Implementations	Use of alarm and sensor for security purpose	Wireless sensor system
3.	Scalable Architecture	Well monitoring system	Internet of things
4.	Availability	Use of Arduino	MEMS
5.	Performance	Simulate the devices from different location	3G,4G

5.3 USER STORIES



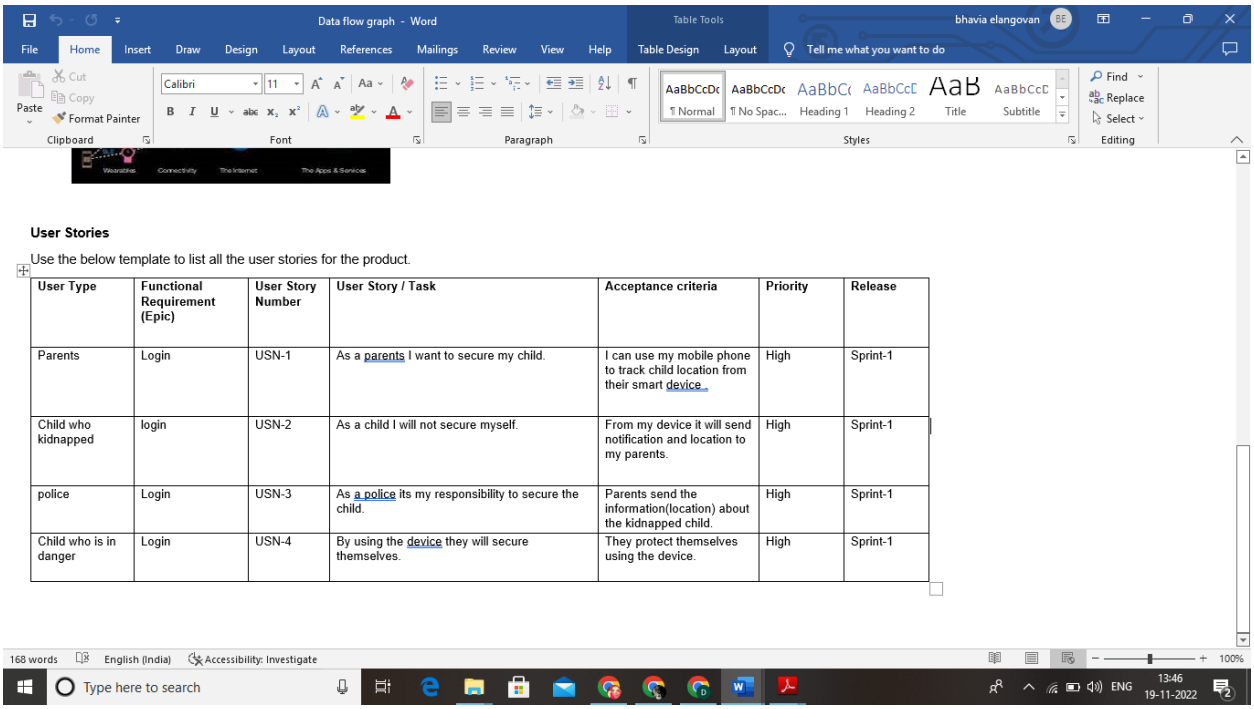
User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Parents	Login	USN-1	As a parents I want to secure my child.	I can use my mobile phone to track child location from their smart device.	High	Sprint-1
Child who kidnapped	login	USN-2	As a child I will not secure myself.	From my device it will send notification and location to my parents.	High	Sprint-1
police	Login	USN-3	As a police its my responsibility to secure the child.	Parents send the information(location) about the kidnapped child.	High	Sprint-1
Child who is in danger	Login	USN-4	By using the device they will secure themselves.	They protect themselves using the device.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

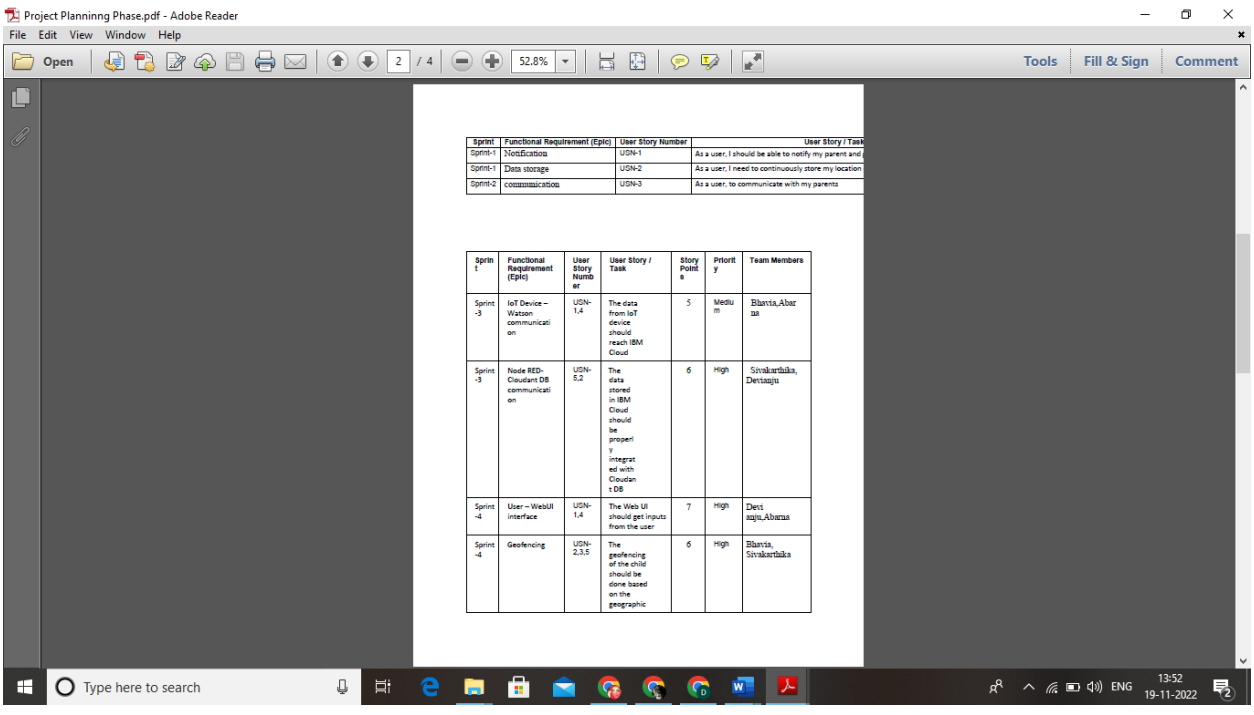
6.1 SPRINT PLANNING & ESTIMATION



User Stories

Use the below template to list all the user stories for the product.

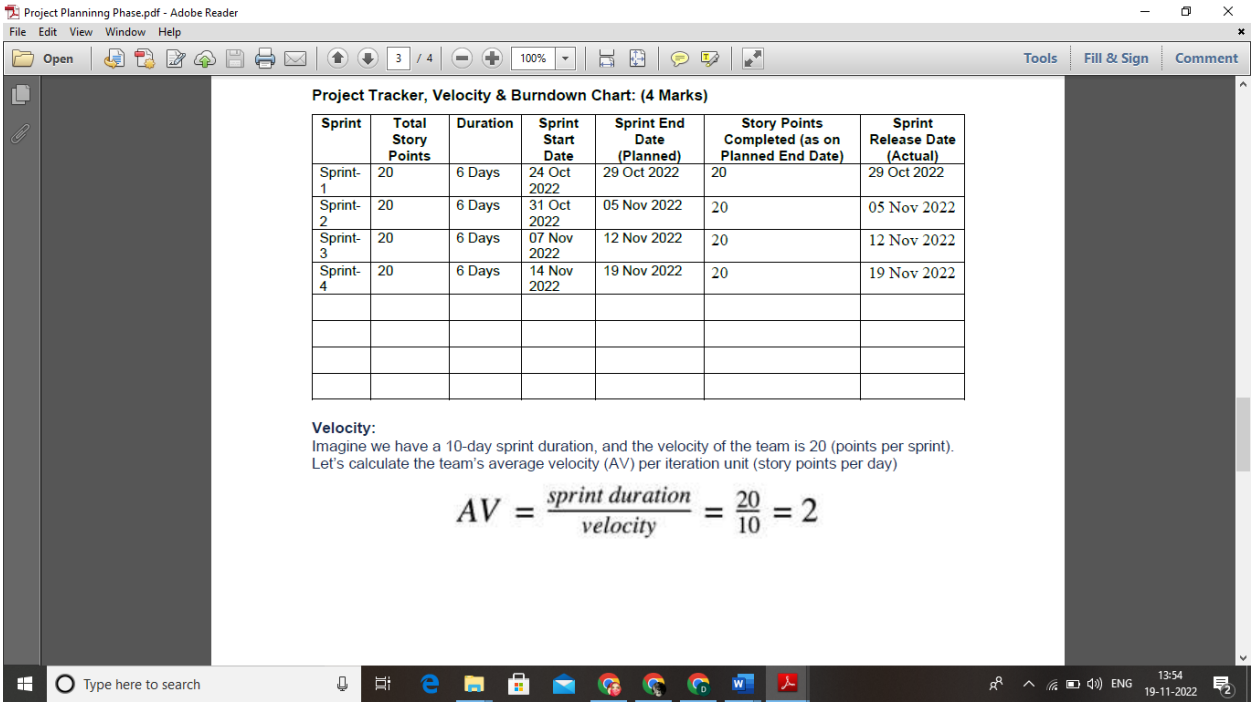
User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Parents	Login	USN-1	As a parents I want to secure my child.	I can use my mobile phone to track child location from their smart device .	High	Sprint-1
Child who kidnapped	login	USN-2	As a child I will not secure myself.	From my device it will send notification and location to my parents.	High	Sprint-1
police	Login	USN-3	As a police its my responsibility to secure the child.	Parents send the information(location) about the kidnapped child.	High	Sprint-1
Child who is in danger	Login	USN-4	By using the device they will secure themselves.	They protect themselves using the device.	High	Sprint-1



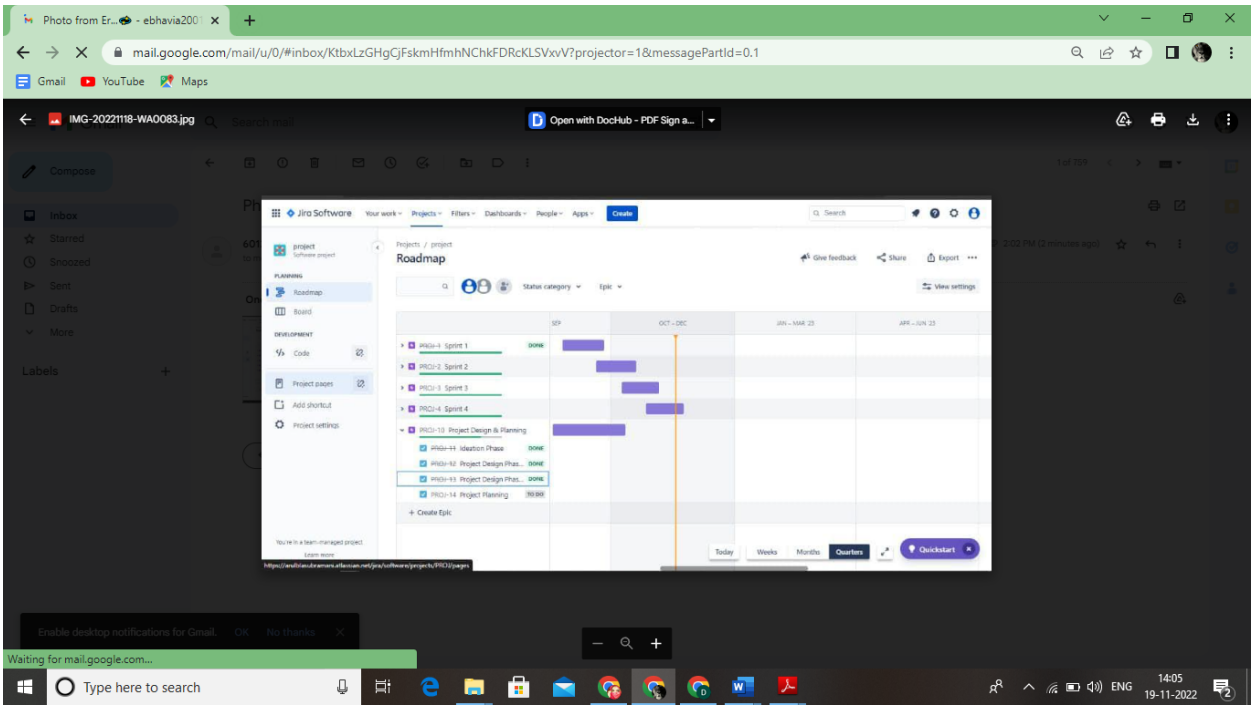
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task
Sprint-1	Notification	USN-1	As a user, I should be able to notify my parent and
Sprint-1	Data storage	USN-2	As a user, I need to continuously store my location
Sprint-2	communication	USN-3	As a user, to communicate with my parents

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint -3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	5	Medium	Bhavia,Abarna
Sprint -3	Node RED-Cloudant DB communication	USN-5,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB	6	High	Sivakarthika, Devisaju
Sprint -4	User – WebUI interface	USN-1,4	The Web UI should get inputs from the user	7	High	Devi saju,Abarna
Sprint -4	Geofencing	USN-2,3,5	The geofencing of the child should be done based on the geographic	6	High	Bhavia, Sivakarthika

6.2 SPRINT DELIVERY SCHEDULE



6.3 REPORTS FROM JIRA



7. CODING & SOLUTIONS

7.1 FEATURES 1

Alert notification

package com.example.geofence;

```
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.location.Location;
import android.os.CountDownTimer;
import android.util.Log;
import android.widget.Toast;
import com.google.android.gms.location.Geofence;
import com.google.android.gms.location.GeofencingEvent;

import java.util.List;
import android.os.Handler;

public class GeofenceBroadcastReceiver extends BroadcastReceiver {

private static final String TAG = "GeofenceBroadcastReceiv";

@Override
public void onReceive(Context context, Intent intent) {
// TODO: This method is called when the BroadcastReceiver is receiving //
an Intent broadcast
//.
/*Toast.makeText(context, "GEOFENCE_ENTERED", Toast.LENGTH_SHORT).show();

final Toast mToastToShow;
int toastDurationInMilliSeconds = 1200000;
mToastToShow = Toast.makeText(context, "GEOFENCE_EXITED", Toast.LENGTH_LONG);

// Set the countdown to display the toast
CountDownTimer toastCountDown;
toastCountDown = new CountDownTimer(toastDurationInMilliSeconds, 100000) {
public void onTick(long millisUntilFinished) {
mToastToShow.show();
}
public void onFinish() {
mToastToShow.cancel();
}
};

// Show the toast and starts the countdown
```

```
mToastToShow.show();
toastCountDown.start();*/

NotificationHelper notificationHelper = new NotificationHelper(context);
notificationHelper.sendHighPriorityNotification("GEOFENCE_TRANSITION_ENTER", "",
MapsActivity.class);

GeofencingEvent geofencingEvent = GeofencingEvent.fromIntent(intent);

if (geofencingEvent.hasError()) {
Log.d(TAG, "onReceive: Error receiving geofence event...");
return;
}

List<Geofence> geofenceList = geofencingEvent.getTriggeringGeofences();
for (Geofence geofence: geofenceList) {
Log.d(TAG, "onReceive: " + geofence.getRequestId());
}
// Location location = geofencingEvent.getTriggeringLocation();
int transitionType = geofencingEvent.getGeofenceTransition();

switch (transitionType) {
case Geofence.GEOFENCE_TRANSITION_ENTER:
notificationHelper.sendHighPriorityNotification("Entered the Location", "",
MapsActivity.class);
break;

case Geofence.GEOFENCE_TRANSITION_EXIT:

notificationHelper.sendHighPriorityNotification("Exited the Location ", "",
MapsActivity.class);
break;
}

}
}
```


7.2 FEATURES 2

Geofence code

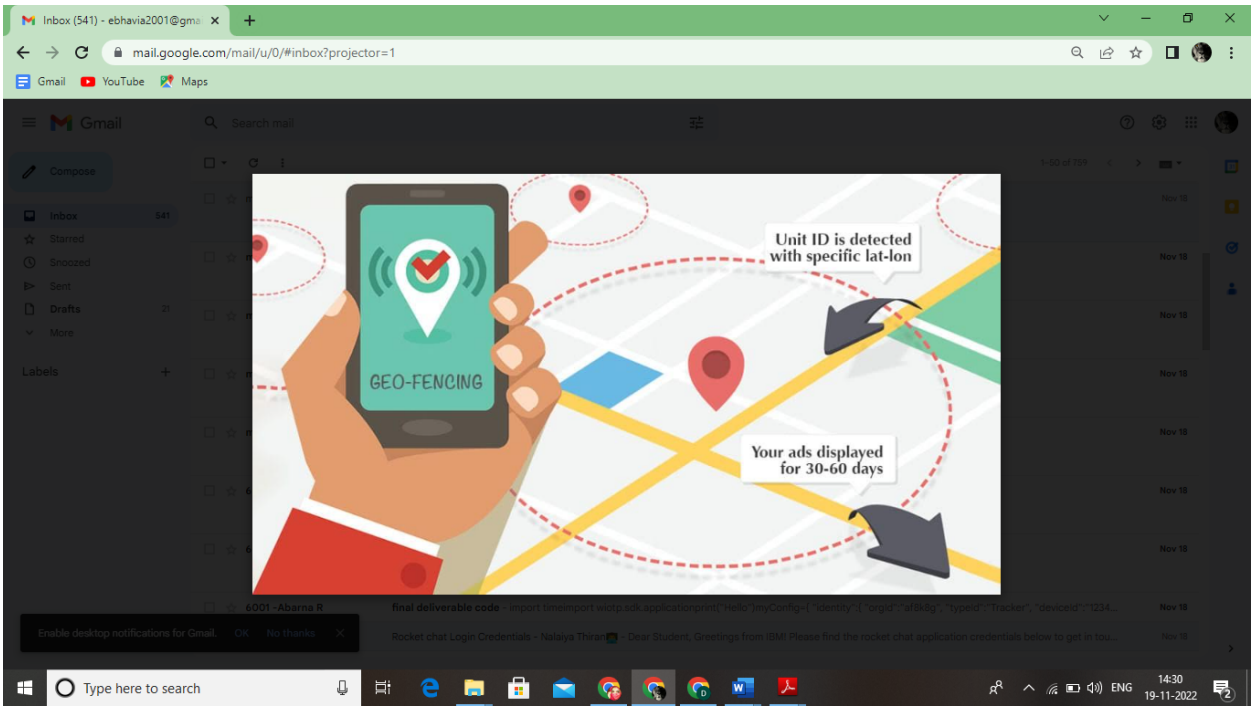
```
Package com.example.geofence;

import android.app.PendingIntent;
```

```
import android.content.Context;
import android.content.ContextWrapper;
import android.content.Intent;
import android.widget.Toast;

import com.google.android.gms.common.api.ApiException;
import com.google.android.gms.location.Geofence;
import com.google.android.gms.location.GeofenceStatusCodes;
import com.google.android.gms.location.GeofencingRequest;
import com.google.android.gms.maps.model.LatLng;

public class GeofenceHelper extends ContextWrapper {
private static final String TAG = "GeofenceHelper";
PendingIntent pendingIntent;

public GeofenceHelper(Context base) {
super(base);
}

public GeofencingRequest getGeofencingRequest(Geofence geofence) {
return new GeofencingRequest.Builder()
.addGeofence(geofence)
.setInitialTrigger(GeofencingRequest.INITIAL_TRIGGER_ENTE
R) .build();
}

public Geofence getGeofence(String ID, LatLng latLng, float radius, int
transitionTypes) {
return new Geofence.Builder()
.setCircularRegion(latLng.latitude, latLng.longitude, radius)
.setRequestId(ID)
.setTransitionTypes(transitionTypes)
.setLoiteringDelay(5000)
.setExpirationDuration(Geofence.NEVER_EXPIRE)
.build();
}

public PendingIntent getPendingIntent() {
if (pendingIntent != null) {
return pendingIntent;
}
```

```
Intent intent = new Intent(this, GeofenceBroadcastReceiver.class);
pendingIntent = PendingIntent.getBroadcast(this, 2607, intent,
PendingIntent.FLAG_IMMUTABLE);

return pendingIntent;
}
public String getErrorString(Exception e) {
if (e instanceof ApiException) {

ApiException apiException = (ApiException) e;
switch (apiException.getStatusCode()) {
case GeofenceStatusCodes

.GEOFENCE_NOT_AVAILABLE:
return "GEOFENCE_NOT_AVAILABLE"; case
GeofenceStatusCodes
.GEOFENCE_TOO_MANY_GEOFENCES: return
"GEOFENCE_TOO_MANY_GEOFENCES"; case
GeofenceStatusCodes
.GEOFENCE_TOO_MANY_PENDING_INTENTS: return
"GEOFENCE_TOO_MANY_PENDING_INTENTS"; }
}
return e.getLocalizedMessage();
}
}
```

8. TESTING

8.1 TEST CASES



.

8.2 USER ACCEPTANCE TESTING

User acceptance testing (UAT) checks whether a product is the right one for the end users.Alpha testing is the initial testing .Beta testing second type of acceptance testing. Main purpose is the validate the product.

9.RESULTS

9.1 PERFORMANCE METRICS

By using the IoT the child will be safe from the risky factors. The crime case will we be reduced . parents will feel better for rescuing their children.

10.ADVANTAGES & DISADVATAGES

ADVANTAGES:

- Keep track of children in cases of abduction
- Give peace of mind to parents
- Notification will send to parents

DISADVANTAGES:

- **The cost in time**

11. CONCLUSION

This IoT devices for child safety monitoring and notification helping parents to locate and monitor their children.Hence, considering the importance of our future our projects is 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.

12. FUTURE SCOPE

In our system we automatically monitor the child in real time using Internet of Things. The future scope of the work is to implement the Iot device which ensures the complete solution for child safety problems.

13.APPENDIX

SOURCE CODE: IBM

GITHUB & PROJECT DEMO LINK

Github: https://github.com/IBM-EPBL/IBM-Project-30333-1660144161.git

project demo link:
https://drive.google.com/file/d/1C3WDhA9yb3STIpHH0MiQQo8337cyKB7o/view?usp=drivesdk