MAHENDRA ENGINEERING COLLEGE FOR WOMEN

IoT Based Safety Gadget for Child Safety Monitoring & Notification

TEAM ID : PNT2022TMID30411

TEAM MEMBER : VIMALA K (TEAM LEADER)
SNEHA A
PRIYADHARSHINI M
VINOTHINI D

INDUSTRIAL MENTOR : MANIMEGALAI

FACULTY MENTOR : S V RAJESWARI

INTRODUCTION

Child safety is a challenging problem nowadays due to antisocial Elements in the society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the Safety among children. Smart Gadget major role for ensuring the Safety, where some mobile based applications provide alert systems. During the emergency, Application alert the control room of nearby Police station or caretakers of children. The literature shows that Location tracking devices are available in the market, but it does not Provide the complete solution to the problem. The solution to this problem is to design an IoT device, which senses the child's location And environment and during emergency, it should send the alert to the Parents automatically.

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.

PURPOSE

IoT Based Safety Gadget for Child Safety Monitoring & Notification Plays a key role in providing better care for the lost children until they Reconvene with the parents.
presentera,mostofthewearableDevicestodayaredesignedbasedonthelocation,activitytemperature, Pressure, etc of the child and in form the parents via GPS.
Therefore it Is intended to use voice call as the way of communication between the Parent mobile and child' s wearable device.
The system operates on the Microcontroller board and the functions of sending and receiving Notifications ,calls, voice messages
.• Now-a- daysattacksonchildrenareincreasingatanunprecedentedrateandthevictims areindangerousconditions,whereitheyarenotallowedtocontactthefamilymemb ers.
• The key idea plannedinthisresearchworkisanadvancedtechnologythatoffers"S mart Child Safety" for thechildren.
• Therefore,theawareness of this method is to send an SMS from children's wear to their parent or guardian.
• Intheprevailingstructure,thereisnomonitoringmethodforchild,itshouldcreate many problems for them and the no protectionmechanism to protect the child from the misbehavior.
• Inaddition,thereisnoawaredeviceforthechild'sprotection;itmustbecompleted by handonly.
• Thus,theplannedmethodwillbehighlyeffectivewhencomparedtotheotherexis ting techniques in helping thevictims.
• Moreover,itdoesn'tneedanymanualoperation.Thispaperrecommendsanewfan gled technology for child protection by using GSM so that the children will not feel abandoned while facing such socialproblems.
• TheproblemsoverawedhereusingArduinoUNO,GSM,sensors,MEMS,temperat ure and panic button by usingIOT.
• Insuchcase,HeartbeatSensortrackthebestrateforchildrenandsendstheemerge ncy message by using the GSM to savecontacts.
• Such method is actually suppove for children in today'sworld.
• Hence,thisprovidesasecuritytothechildrenand securesthe feeling ofparent.

Keyword:

Arduino UNO; wearable device; IOT; GSM; GPS

Advantages:

• Stayingconnected,
• Data accuracy,
• Efficiency.

Disadvantages:

• High cost but once it isimplemented the expenses can be reduced.

Intelligent Child Safety System using Machine Learning in IoT Devices

Author :

• Childsafetyandtracking isofmostimportanceaschildrenarethemostvulnerable
• Withincreasingcrimeratessuchaschildkidnaping,childtrafficking,childabus eandso on such as child kidnaping, child trafficking, child abuse and so on the need for an advanced smart security system has become annecessity.
• With this motivation, a self-alerting“INTELLIGENT CHILD SAFETY SYSTEM USINGMACHINELEARNINGINIOTDEVICES”isdevelopedtoaidparentsto monitorandtracktheirchildreninrealtimeasanalternatetostaybesidethem.
• Thissystemisintendedasaneverydaywearabledeviceonthechild,intheformo fa wrist band, hand glove, arm band or a belt
. • Thesystemisdesignedtocontinuouslymonitorthelocationandbodyvitalsofchildren. This electronic system comprises of an Arduino controller, a Raspberry-Pi and sensors to detect the changes in parameters such as temperature, BVP (Blood Volume Pulse) and GSR (Galvanic Skin Response).
• ThesystemalsousesaGSMandGPSmodule.DecisionTreeClassifierAlgorithm is used to detect any distress situation with sensor values asinputs.
• ThelocationofthevictimistracedusingtheGPSmoduleandissenttotheregistere d contact numbers as a text message using a GSMmodule.
• Theworkliesintheautonomousdecisionmakingprocesswithincreasedaccuracy. Keywords: Child safety, GPS, GSM, Sensors, Arduino, Raspberry-Pi, Decision Tree Classifier,AutonomousDecision,IntelligentChildSafetySystemusingMachineLearn ingin IoTDevices.

Advantage:

• According to the child mental and physical condition, when kids are in danger automaticallythemessagenotificationwillbesenttotheparents(registernu mber).
• Distance is not a barrier to track a child location - (GPSTracker).

Disadvantage:

• Decision Tree Classifier Algorithm is a complexstructure.
• Cost is toohigh

IoT Based Safety Gadget for Child Safety Monitoring and Notification

Authors:

(H.M. Sabaa Fathima)

• This project discusses the concept of a smart wearable device for littlechildren
• The major pros of this wearable over other wearable is that it can be used in any cellphoneanddoesn'tnecessarilyrequireanexpensivesmartphoneandnotaveryt ech savvy individual tooperate.
• Thepurposeofthisdeviceisto help theparentstolocatetheirchild with ease.
• Atthemomenttherearemanywearablesin themarketwhichhelptrackthedailyactivity ofchildrenandalsohelp findthechildusingWi-FiandBluetooth servicespresentonthe device.
• ButWi- Fi(WirelessFidelity)andBluetoothappeartobeanunreliablemediumof communication between the parent andchild.
• Therefore, the focus of this project is to have an SMS text enabled communication mediumbetweenthechild'swearableandtheparentastheenvironmentforGSMmo bile communication.
• TheparentcansendatextasSMSwithspecifickeywordssuchas“LOCATION”, “TEMPERATURE”, “SOS”, “BUZZ”, etc., to the wearabledevice
. • Thedevicewillreplaybackwithatextcontainingtherealtimeaccuratelocationo fthe child and will also provide the surrounding temperature, so that the parents can keep track if the temperature not suitable for the child.
• The secondary measure implemented was using a bright SOS Light and distress alarm buzzerpresentonthewearabledevicewhichcanbeactivatedbytheparentsviaSMSte xt to display the SOS signal brightly and sound an alarm which a bystander can instantly reactforthechild'ssafetytilltheparentsarriveortheycouldcontacttheparentsand help locatethem.
• Hencethisprojectaimsatprovidingparentswithasenseofsecurityfortheir child intoday'stime.

Keywords :

Children, Arduino, Safety, Wearable.

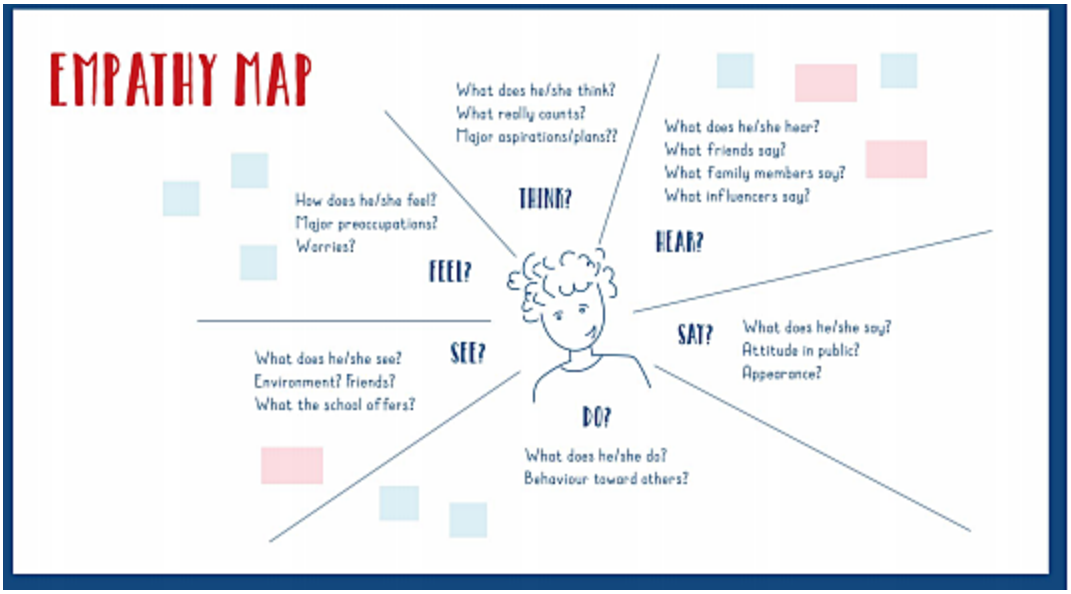
Advantages:

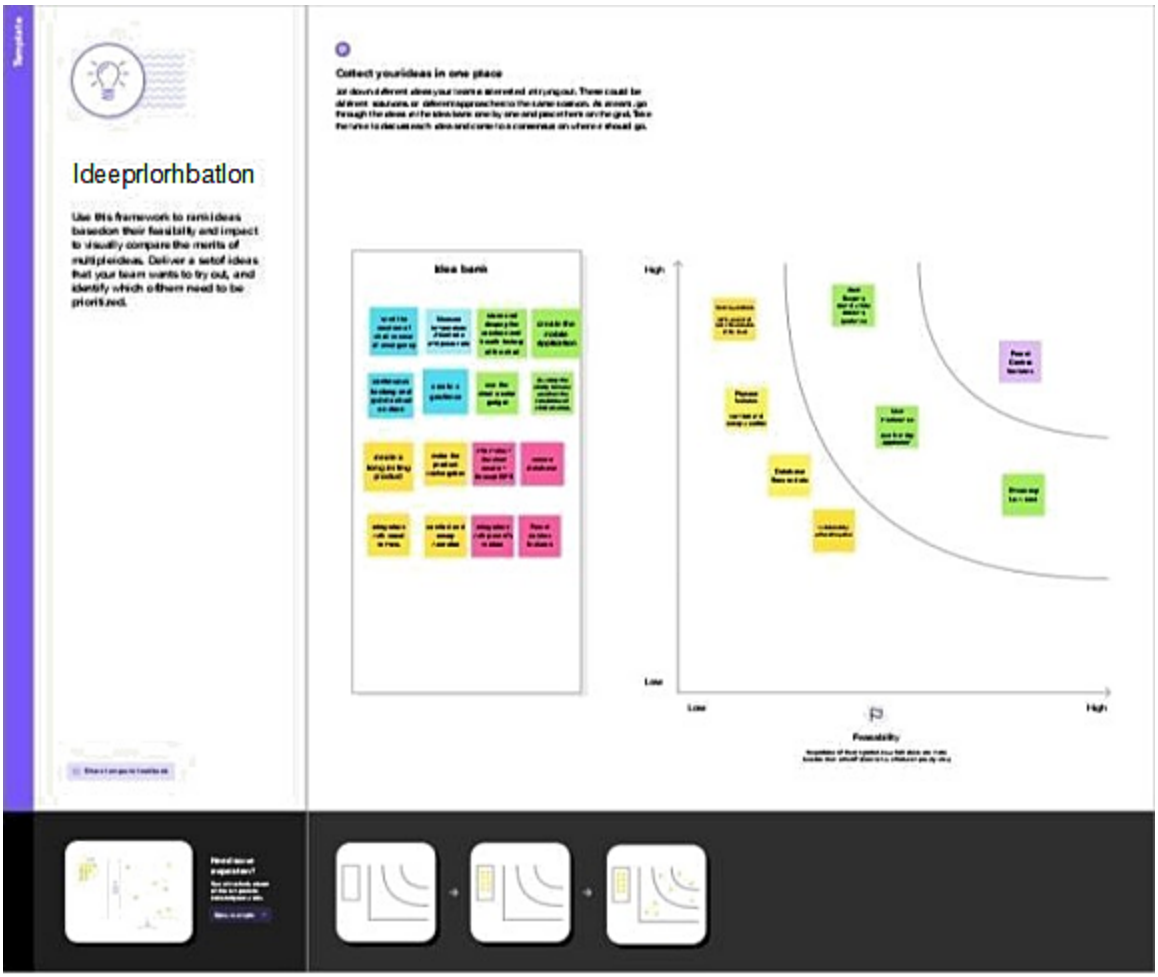
• The ability to locate and track your child in real time is all made possible with IoT-enabledtechnology.TheyaremanyotherbenefitsthatIoT- enabledchildtracksinclude; Keeps track of children in case ofabduction.

Disadvantages:

• The child could not produce the exact alert command during a paniccondcondition.

• The command.


EMPATHY MAP
What does he/she think?
What really counts?
Major aspirations/plans??
THINK?
What does he/she hear?
What friends say?
What family members say?
What influencers say?
HEAR?
How does he/she feel?
Major preoccupations?
Worries?
FEEL?
SAY?
What does he/she say?
Attitude in public?
Appearance?
SEE?
What does he/she see?
Environment? friends?
What the school offers?
DO?
What does he/she do?
Behaviour toward others?


Ideeprlorhbatlon
Use this framework to rank ideas based on their feasibility and impact to visually compare the merits of multiple ideas. Deliver a set of ideas that your team wants to try out, and identify which others need to be prioritized.
Collect your ideas in one place
Idea bank
High
Low
Low
High
Feasibility

Solution archkectur5 iB B COfTlplex prooese -

Wkh many Bub-prooesass - that brldgesthe gap

befiveen business. problems and technology

B@lMtIons. ItB go8ts are to:

Find the beat.tech BOlutlon to solve existing busII18BB FobteFFiB.

1. Describe the structure, characteristiCB, behavior, and other aspects of the8oftwareto projectBtakeholderB.

Define featureB, development phases,.and BOtutbn requlremehts.

Povide specifications acoording to which.the solution is derined, managed, and detUered. solu0on

Reposed solution Tamplast:

Solution archkectur5 iB B COfTlplex prooese - Wkh many Bub-prooesass - that brldgesthe gap befiveen business. problems and technology B@lMtIons. ItB go8ts are to:

Find the beat.tech BOlutlon to solve existing busII18BB FobteFFiB.

1. Describe the structure, characteristiCB, behavior, and other aspects of the8oftwareto projectBtakeholderB.

Define featureB, development phases,.and BOtutbn requlremehts.

Povide specifications acoording to which.the solution is derined, managed, and detUered. solu0on

Reposed solution Tamplast:

		Oescrlptlon
1.	Problem Statement (Prob|em to be solved)	Chifd"safetyIsthdforemostcommonbsue e"mergIngaroundtheworld,Parentsterrify to send thelr kids to schoob located at longer distances due to the behaviour of unéxpectedstra@ers,Forevery40seocirid s, a child IS mlsstng In thfs world which Is a majordrawbackofthesocletY.Parentsare responsible for taklng care of thelr own childrenasthechildrenareImmatureabout what happens to them. Nowadays, dueto economic condltfon and alms to hue on thelrchlfd's futureandcareer.parercsare fork to trave for mod. Hence, It "becomes difficult for them to cllng on to thelr ch"I |dren all the tlme, ThfS problem mustberectifiedasthesafetyofchlorenIs

		veryImportam,
2.	idea / Solution descrlptfon	The”Ideaof.thepropasal”Istodesignand fmplemeM the "Chlld Safety Wearable Devlce' for the safety of the children. According to thls proposal, parents can mo”nItor.thesecurityéftheirchfldreriatany

watnh

FR No.	Functlonal Requirement (Epic)	Sub Requirement (Story / Sub-task)
FR-1	Register phone number	
FR-2		1. NbnltoringtheIIvelocationof the chlldbyGPStracker. 2. CheckwhetherthechlldIswithi nthe llmited area ornot.
FR-3		1. Whenthechlldisoutoftherange. 2. When the child Is reachlng and leaving theschool. 3. SuddenchangesInthehealtho fthe child.
FR-4	Alarm rlng and sending message	1. WhenthepanicbuttoniSON. 2. WhenthechildIskidnappedor 3. Whenthesenseddataexcee dthe threshold value.
FR-5	Privacy and encryption	2. End to end encryption where

Non Functional Requi rements:

NFR No.	Non-functional Requirement	Description
NFR-1	Usability	The system shall be usable wlthin few
NFR-2	Sec urity	Thesystemandsenseddatacanbeaccess ed only by the parents not by the strangers.
NFR-3	Maintal nablllty	The system shall be malntaindble whenever lailMre occurs.
NFR-4	Accuracy	ThesystemShallgivetheaccurateresultfor different factors uslng senslng material. ASa messages.
NFR-5	Reliabl lity	Thetimingofthenotiflcatlondirectlyaffects how the effectivity of the system iS
NFR-6	Performance	Thesystemiscosteffectivecomparlng to the features Itprovldes.

	Functional Requirement{Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Spr int -1	Regi stratian	LISN-1	As a user, I can register for the application ay eMeringmyemail,andpassword,a nd confirmingmypassword.		High	Anandakrishn an
Spr int -1	Conf ir m ation Em ail	USN-2	Asauser,Iwillreceiveaconfirmationemail once I have regi stered for the application		High	Anaridakrish na n
Sprin t-1	Authentication		As a user, I can regi ster for the application through Gmail and mobil e app.		Medi um	A0andakrishnan
Spr int -1	Login	USN-4	As a user, I can log i nto the application by entering email & password		High	Dinesh babu
Spr int -1	Dashboard	USN−5	As a user, I need to be able to view the functions that I can perform		High	Dinesh babu
Sprin t-2	N otifi cation	USN-1	Asauser,Ishouldbeabletonotifymyparent and guardi an in emergency situations	1 0	High	Bar ichith
Sprin t-2	Store data	USN-2	As a user, I need to continuously store my location data into the database.	1 0	Medi um	Bar ichith
5print-5	Communication	USN-3,1	I shoul d be able to communicate with my parents			Gurusheth

	Functional Requirement(Epic)	User Story Number	User Story / Task			**Team Members**
Sprint-3	IoT Device — Watson communicate on	UHN-1,4	The data from IoT device should reach IBM Cloud		Medium	Gurusheth and AnaMadishna
5print-3	Node RED-Cloudant DB communication	UHN-5,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB		High	Dinesh Babu and barichith
5print-4	u ser — WebUl i nterface	USN-1,4	The Web UI should get inputs from the user		High	Gurusheth and AnaMadishna
5print-4	Geofenci ng	USN-2,3,d	The geofenci ng of the chil d shoul d be done based on the geographical coordinates		High	Dinesh Babu, barichith ,Guru sheth. Anandakris hn an

AV=

sprint,d.ur..ation

= -20 -1 x = 2

Velocity:

Imaginewehavea10-daysprintduration.andthevetocity oftheteamis20(p0intspersprint).Let'scalculatetheteam'saveragevelocity(AV)per iteration unit (story points per day)

MILESTONES AND ACTIVITY LISTS

TEAM ID : PNT 2022 TMID 30411

IOT Based Safety Gadget For Child Safety Monitoring &Notifi cation

¥. Prefequletles

7 IBM Cloud Services

a. **ProjectOb}ectIves**

7 Abstract

F Brainstorming

b. Create And Conflgure IBM Cloud3arvlcee

FCrealeI
BIyIWats
onlotPlatf
ormAndD
evice F
Create
Node•
RedServi
ce

T Create A Database In Clodanf DB

40evelop The Python scrlpt

7 Develop A Python Script

1. **Develop** A Web **Appllcatlon Uelng Noda•R ED9ervloe.**

T Develop The Web Application Using Node•RED

2. IdeatIonPhaee

FLiteratureSurv9yOnTheSelect
edProject&InformationGatherl
n9 T Prepare EmpathyMap
7 Ideation

3. Project 0'seIgn
Phaee•¥F
Propocsd
Solution7Prep
areSalutionFit

Solution Architecture

4. Project Design
Phase -2
Customerjourn
ey

Functional Requirement
} D
a
t
a

F
l
o
w

D
i

a

g

r

a

m

T

e

c

h

n

o

l

o

g

y

A

r

c

h

i

t

e

M

u

r

e

8.Project planning Phase

FY

ep

are

Mile

sto

nes

&

AMi

vity

Li st

Spri

nt

Deli

ver

y Pl

an

10.Project Development Phase

Qoje

ct

Deve

lopm

ent-

Deliv

ery

Of

Spri

nt-1

FYuj

ectD

evelu

pmen

t-

Deliv

eryOf

Sprin

t-2

Quje

ct

Deve

lopm

ent-

Deliv

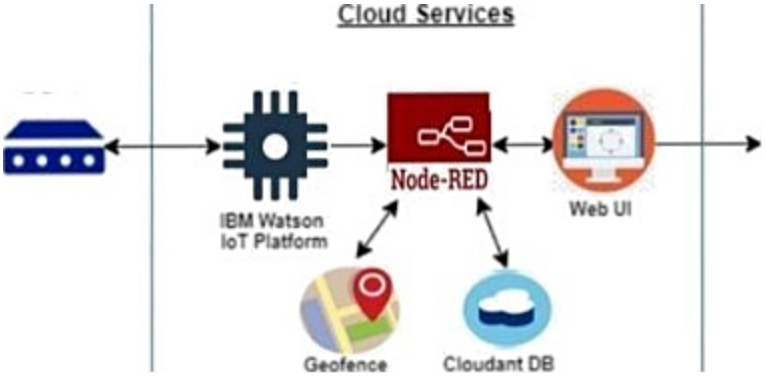
ery

OfSp

rint-3

,” Project Development-Delivery OfSprint-4

TECHNICAL ARCHITECTURE



FINAL CODE

PYTHON CODE:

```
import wiotp.sdk.device
im
p
or
"token": "1234567890"



client =
wiotp.sdk.device.DeviceClient(config=myConfi
g, logHandlers=None)
client.connect()

myData=('name’:name, 'lat':latitude,
```

"lon’:longitude}
client.publishEvent(eventId="status",
msgFormat=”json”, data=m qos=0,
onPublish= None)
print(”Published data Successfully: %s",
myData)
time.sleep(5)
client.disconnect()

ADDING GEOFENCE:

```
package
com.exa
mple.geo
fence;
import
android.a
pp.Pendi
ngIntent;
import
android.c
ontent.C
ontext;
import
android.content.
ContextWrappe
r; 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.Geof
enceStatusCodes, import
com.google.android.gms.location.Geof
encingRequest; import
com.google.android.gms.maps.model.
LatLng;
public class GeofenceHelper extends ContextWrapper

privatestaticfinalStringTAG="Geofe
nceHelper";
PendingIntentpendingIntent;
public

Geofence

HeIper(Co

ntext

base)

super(bas

e);

public GeofencingRequest
getGeofencingRequest(Geofence gec

return new GeofencingRequest.Builder()
.addGeofence(geofence)
.setInitialTrigger(GeofencingRequest.INITIAL_TRIGGER_E
NTER)
.build();

publicGeofencegetGeofence(StringID,LatLnglat
Lng,floatradi‹ transitionTypes)
```

```
return new Geofence.Builder()
.setCircularRegion(latLng.latitude, IatLng.longitude, radius)
.setRequestld(ID)
.setTransitionTypes(transitionTypes)
.setLoiteringDeIay(5000)
.setExpirationDuration(Geofence.NEVER EXPIRE)


 .build();

 public

 PendingIntent

 getPendinglnte

 nt() if

 (pendinglntent

 ! -null)

 return pendingtntent;

 Intentintent-
 newIntent(this,GeofenceBroadcastRecei
 ver.clas. pendingtntent -
 PendinglIntent.get Broadcast(tnis. 2607,
 intent,
 PendingIntent.FLAG_IMMUTABLE);
 return pendingTntent;
```

```
public Stfing getErrorString(Exception e)

if (e instanceof ApiExceotion)

ApiException apiException
— (ApiException) e; switch
(apiException.getStatusCo
de())

case GeotenceStatusCodes
.GE0FENCE_NOT_AVA1LABLE:
return "GEOFENCEN0T_AVAILABLE";
case GeofenceStatusCodes
.GE0FENCE_TOO_MANY_GE0FENCES:
return "GEOFENCE TOO MANY_GEOFENOES";
case GeofenceStatusCodes
.GEO FENCE_T0O_MANY_PENDtNG_INTENTS:
return "GEOFENCE TOO MANY_PENDING_INTENTS";


return e.get Localized Message();
```

ALERT NOTIFICATION:

```
package com.example.geofence;
import android.content.BroadcastReceiver,
import
android
.conten
t.Conte
xt
import
```

```
android
.conten
t.Intent;
import
android
.locatio
n.Locati
on;
import
android
.os.Cou
ntDown
Timer,
import
android
.util.Lo
g,
import android.widget.Toast;
import com.poogIe.android.qms.location.Geofence:
import
com.poogIe.android.qms.location.GeofencingEvent
import java.utiI. List,
import android.as.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
BroadcastReceiyer is receiving
// an Intent broadcast

Toast.makeText(context, "GEOFENCE
ENTERED", Toast.LENGTH SHORT)
final Toast mToastToShow; int
toastDurationlnMilliSeconds - J 200000,
mToastToShow -
Toast.makeText(context, "GEOFENCE
EXITED", Toast.LENGTHLONG);
//SetthecountdowntodisplaythetoastCountDo
wnTimertoastCountDov toastCountDown -
new
CountDownTimer(toastDurationInMi1IiSecon
ds, J0

public void onTick(long

millisUntilFinished)

mToastToShow.show();

public void

onFinish()

mToastToS

how.cancel

(),

};//ShowthetoastandstartsthecountdDown
```

```
ownmToastToShow.show(),
toastCountDown.start(),*/
NotificationHelper notificationHelper - new
NotificationHeIper(context);
notificationHelper.sendHighPriorityNotification("GEOFE
NCE TRANSITION


 MapsActivity.class);

 GeofencingEvent geofencingEvent =
 GeofencingEvent.fromInteni(intent), if
 (geofencingEveni.hasError())
 Log.d(TAG, "onReceive: Error receiving geofence event..."),
 return;


 ListgeofenceList=geofencingEveni.g
 etTriggeringGeofences(); for
 (Geofence geofence:geofenceLisi)


 Log.d(TAG, "onReceive: " + geofence.getRequestId());

 // Location Iocaiion =
 geofencingEvent.getTriggeringLocati
 on(); ini transiiionType =
 geofencingEvent.getGeofenceTransi
 tion(); swiich (transitionType)

 case Geofence.GEOFENC1TRANSlTION
 ENTER:
 notificationHelper.sendHighPriorityNolificatio
 n("EnteredtheLocation",, MapsActiviiy.class);
 break,
 case Geofence.GEOFENC1TRANSlTION EXIT.
```

```
notificationHelper.sendHighPriorityNolification("Exited the
Locaiion ", , MapsActiviiy.class),
break,
```

Result:

successfully completed.

FUTURESCOPE

This project is actually developed for parents to keep track The child where about. Nowadays, child is easier influenced by their Friends, and they might even get cheated or kidnapped by any of the Strangers. By developing this system can track child current location. The application will deal with the Android platform and is Utilized for GPS following between different mobile devices .The Application is mindful to keep track the location of the device. The parent Or child account can be edit by parents. The application will include the Route history trace where the parent track for the route their child Traversed during a certain period of time. The application in the device Will update the location of the child to the application by having the Interval time for 30 in, 1 hour and 2 hour. Parent can select the interval Time to view the current location of the child. Parent also can make call From the application if any inconvenience happens when the location not Found or track.

watnh

watnh