FINAL DELIVERABLES

Date	10 November 2022
Team ID	PNT2022TMID03073
Project Name	Project - Smart Waste Management system for Metropolitan cities

PROGRAM CODE:

```
#set GPIO direction (IN / OUT)
GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
GPIO.setup(GPIO_ECHO, GPIO.IN)
def distance():
# set Trigger to HIGH
GPIO.output(GPIO_TRIGGER, True)
# set Trigger after 0.01ms to LOW
time.sleep(0.00001)
GPIO.output(GPIO_TRIGGER, False)
StartTime = time.time()
StopTime = time.time()
# save StartTime
while GPIO.input(GPIO_ECHO) == 0:
StartTime = time.time()
# save time of arrival
while GPIO.input(GPIO_ECHO) == 1:
StopTime = time.time()
# time difference between start and arrival
TimeElapsed = StopTime – StartTime
# multiply with the sonic speed (34300 cm/s)
```

```
# and divide by 2, because there and back
distance = (TimeElapsed * 34300) / 2
return distance
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if__name__== '__main__':
try:
while True:
dist = distance()
print ("Measured Distance = %.1f cm" % dist)
percent = (100.0 - (dist * 100/40.0))
url =
"http://localhost:80/demoaddbin.php?bin_id=1&percent_filled="+str(percent)
x= urllib.urlopen(url)
print(x.read)
time.sleep(5)
# Reset by pressing CTRL + C
except KeyboardInterrupt:
print("Measurement stopped by User")
GPIO.cleanup()
```

PROGRAM CODE FOR ACCESS DATABASE:

```
package com.bin;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.app.Service;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
```

```
import android.media.RingtoneManager;
import android.net.Uri;
import android.os.AsyncTask;
import android.os.Handler;
import android.os.IBinder;
import android.support.annotation.Nullable;
import android.support.v4.app.NotificationCompat;
import android.util.Log;
import android.widget.Toast;
import org.json.JSONArray;
import org.json.JSONException;
import org.json.JSONObject;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStream;
import java.io.InputStreamReader;
import java.net.HttpURLConnection;
import java.net.URL;
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public class GetData extends Service {
String BASE_URL = "http://dustbin.000webhostapp.com/";
String POPMOVIES_BASE_URL = BASE_URL + "getresponsefrombin.php";
SharedPreferences preferences;
SharedPreferences.Editor editor;
@Override
public void onCreate() {
Toast.makeText(this, "Service Called", Toast.LENGTH_SHORT).show();
```

```
Log.d("Create:","called");
//addNotification();
super.onCreate();
}
@Override
public int onStartCommand(Intent intent, int flags, int startId){
Log.d("onStartCommand:","called");
preferences = getSharedPreferences("DustBin",MODE_PRIVATE);
final Handler handler = new Handler();
Runnable runnable = new Runnable() {
@Override
public void run() {
Log.d("handler","run();");
new DustbinTask().execute();
handler.postDelayed(this, 5000);
} };
//Start
handler.postDelayed(runnable, 1000);
return START_STICKY;
}
@Override
public void onDestroy() {
Log.d("Destroy:","called");
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super.onDestroy();
}
@Nullable
```

```
@Override
public IBinder onBind(Intent intent) {
Log.d("Bind:","called");
return null;
}
public class DustbinTask extends AsyncTask<Void, Void,Void>{
@Override
protected void onPreExecute() {
Log.d("onPreExecute","initiate");
try {
if (!new Network(GetData.this).isConnected()) {
Log.d("onPreExecute","No InternetAvailable!!");
cancel(true);
}}
catch (InterruptedException | IOException e) {
e.printStackTrace();
}
@Override
protected Void doInBackground(Void... params) {
HttpURLConnection urlConnection = null;
BufferedReader reader = null;
URL url;
String MoviesJsonStr;
try {
url = new URL(POPMOVIES_BASE_URL);
urlConnection = (HttpURLConnection) url.openConnection();
urlConnection.setRequestMethod("GET");
```

```
urlConnection.connect();
InputStream inputStream = urlConnection.getInputStream();
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StringBuilder buffer = new StringBuilder()
reader = new BufferedReader(newInputStreamReader(inputStream));
String line;
while ((line = reader.readLine()) != null) {
buffer.append(line).append("\n");
}
MoviesJsonStr = buffer.toString();
getMovieNames(MoviesJsonStr);
} catch (IOException | JSONException e1) {
e1.printStackTrace();
} finally {
if (urlConnection != null) {
urlConnection.disconnect();
} if (
reader != null) {
try {
reader.close();
} catch (final IOException ignored) {}
}} return null;
}}
private void getMovieNames(String MovieJsonStr) throws JSONException {
JSONObject MovieJson = new JSONObject(MovieJsonStr);
JSONArray movieLists = MovieJson.getJSONArray("bin_info");
for (int i = 0; i < movieLists.length(); i++) {
```

```
JSONObject jMovieDetails = movieLists.getJSONObject(i);
String name = jMovieDetails.getString("bin_id");
int id = jMovieDetails.getInt("percent_filled");
Log.d("DATA", name + " " + id);
MainActivity.percent = id;
if(id>=80){
30
addNotification(id);
}} //Log.v("Length: ", String.valueOf(movieLists.length()));
}
//Show a notification
private void addNotification(int id) {
int min, max;
int percentage = preferences.getInt("last_percent",0);
min = percentage - 5;
max = percentage + 5;
if (min > id || id > max) {
Intent intent = new Intent(this, MainActivity.class
intent.setFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
editor = preferences.edit();
editor.putInt("last_percent",id);
editor.apply();
PendingIntent pendingIntent = PendingIntent.getActivity(this, 0/*Request code*/,
intent, PendingIntent.FLAG_ONE_SHOT);
//Set sound of notification
Uri notificationSound =
RingtoneManager.getDefaultUri(RingtoneManager.TYPE_NOTIFICATION);
```

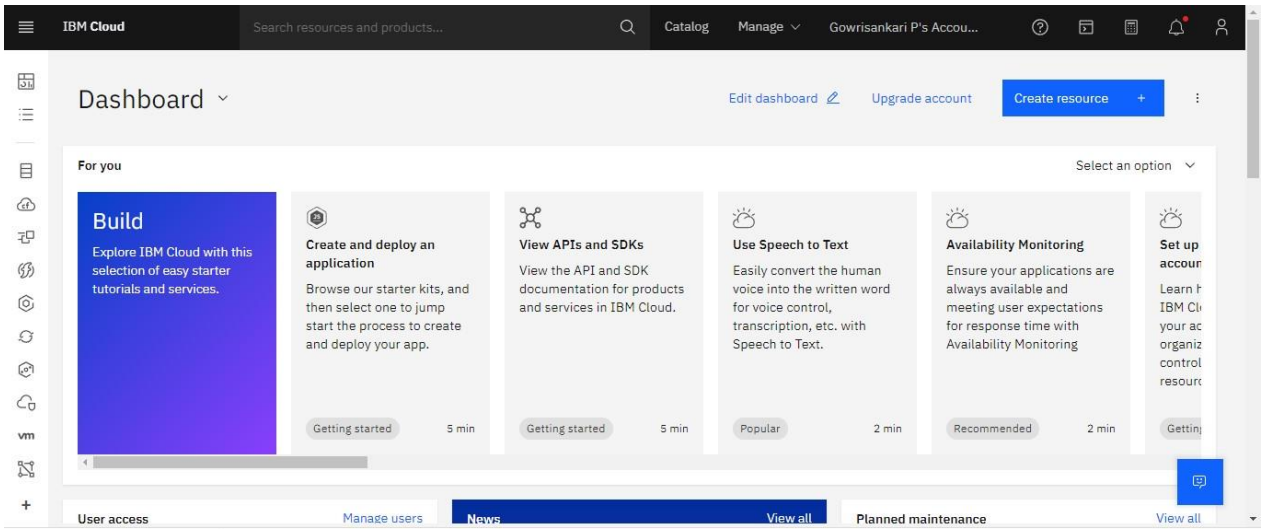
```
NotificationCompat.Builder notifiBuilder = new NotificationCompat.Builder(this)
.setSmallIcon(R.mipmap.ic_launcher
.setContentTitle(id + "% Dustbin Full")
.setContentText("Please clear your trash")
.setAutoCancel(true)
.setSound(notificationSound)
.setContentIntent(pendingIntent);
NotificationManager notificationManager = (NotificationManager)
getSystemService(Context.NOTIFICATION_SERVICE);
notificationManager.notify(999 /*ID of notification*/, notifiBuilder.build());
//stopSelf()
```

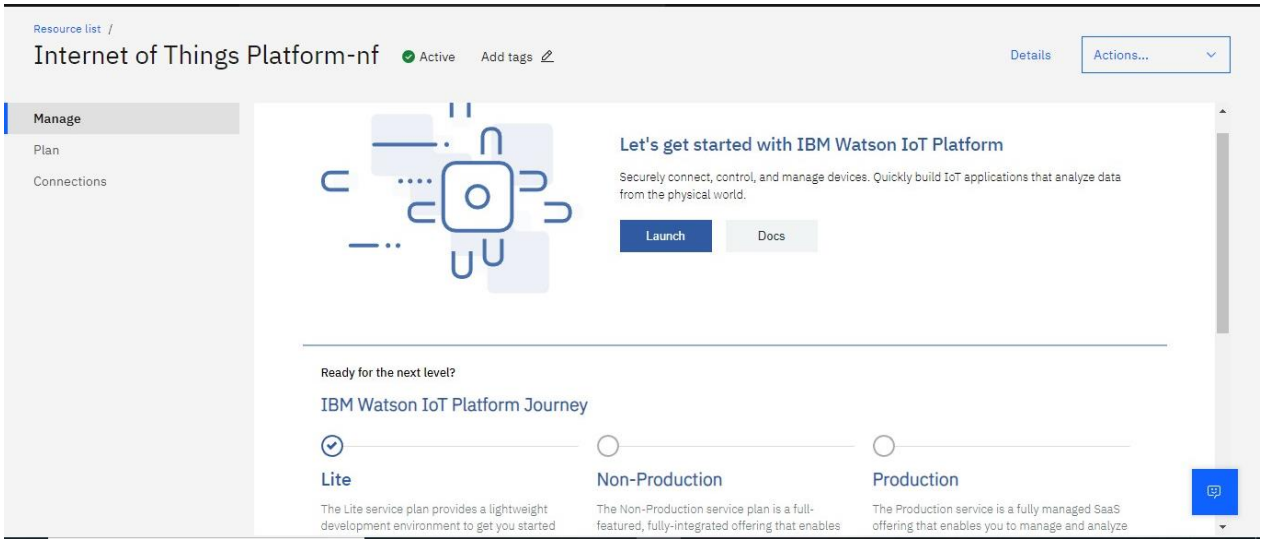
PROGRAM FOR CONNECTING APPLICATION TO INTERNET:

```
package com.bin;
import android.content.Context;
import android.net.ConnectivityManager;
import android.util.Log;
import java.io.IOException;
/**
* Created by Sylvester on 03-Mar-17.
*/
class Network {
private Context mContext;
Network(Context mContext) {
this.mContext = mContext;
}
private boolean isNetworkAvailable() {
final ConnectivityManager connectivityManager = ((ConnectivityManager)
```

```
mContext.getSystemService(Context.CONNECTIVITY_SERVICE));
return connectivityManager.getActiveNetworkInfo() != null &&
connectivityManager.getActiveNetworkInfo().isConnected();
}
boolean isConnected() throws InterruptedException, IOException
{ if (
isNetworkAvailable()) {
String command = "ping -c 1 google.com";
return (Runtime.getRuntime().exec (command).waitFor() == 0
```

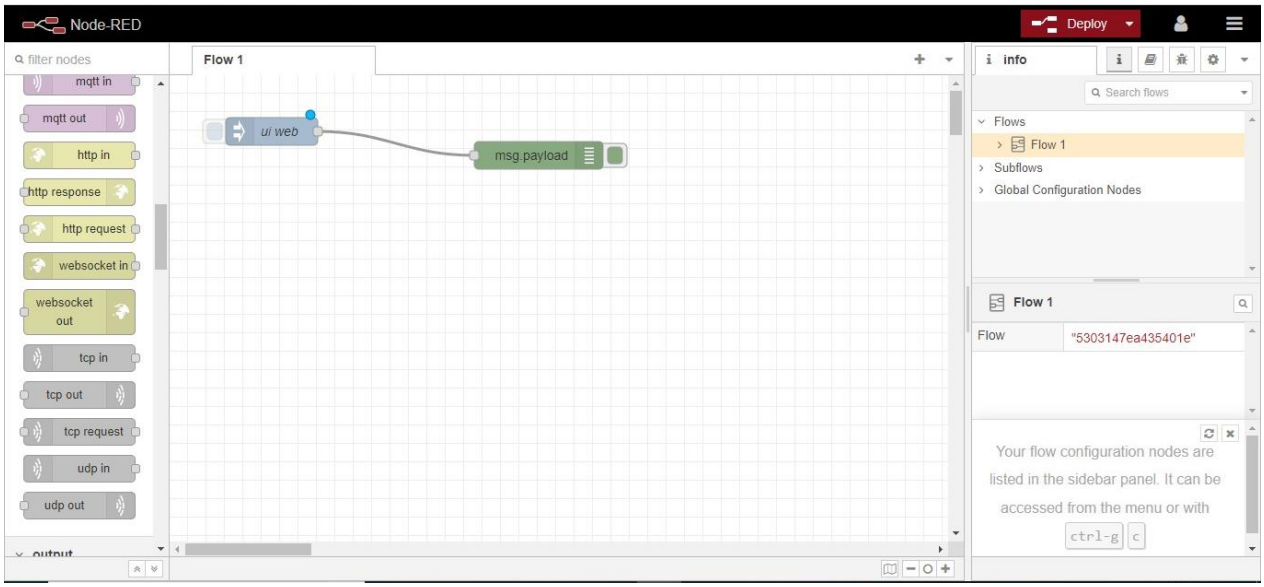
CLOUD SERVICE

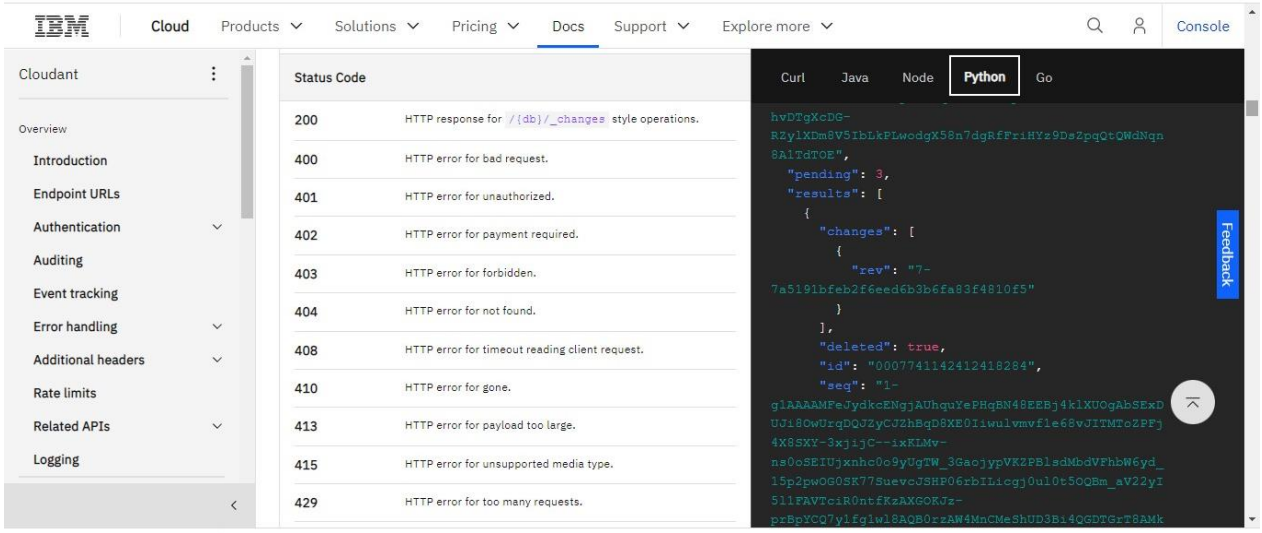




IBM WATSON IOT PLATFORM

UI Web using NODE RED





A DATABASE IN CLOUD

SOLUTIONING OF SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES