**SMART TRANSPORTATION SYSTEM**

***ABSTRACT :-***

Smart transportation offers the promises of addressing the multi-modal transportation need of society in a sustainable manner. To bring about smart city and smart transportation development, there are yet many scientific questions to be investigated. Some examples include:

→ Smart city planning

Is high-density development a solution to rapid urbanization?

→ What are the enabling technologies and urban infrastructure to enhance sustainability, accessibility, mobility, and wellbeing?

→ Technologies and Urban Infrastructure

→ How would autonomous vehicles modify fundamental traffic flow properties, and impact infrastructure design and urban form?

→ How would electric vehicles interface with the smart grid in terms of energy distribution and storage?

Smart Sensing

→ What are the sensing strategies for collecting stationary and mobile sources of multi-modal traffic data and how are these data integrated and interpreted? →What are the computing strategies for centralized and distributed data transmission, processing, interfacing, analysis, sharing, dissemination, and storage, in the context of big data arena?

→ Smart Travel Behavior

→How would accurate, reliable and timely multi-modal traffic information affect travelers’ decision- making processes?

→ How would future technologies, such as autonomous self-driving vehicles, electric vehicles, multi-modal traffic information, massive and robust traffic control affect activity and mobility patterns?

→smart performance

→How to develop a cost-effective but highly resilient multi-modal transportation system in response to increasingly frequent and serious natural and manmade disruptions?

→ How would the above smart developments help to maintain safe, healthy, rapid, reliable, comfortable, convenient, affordable, equitable, and environmentally compatible mobility of mankind?

***PROBLEM STATEMENT*** :-

Traffic congestion is a main problem with foremost cities. In India the traffic lights are founded on timing system i.e. whether the vehicles are present or not the timing will remain constant which makes people to wait unnecessarily for longer time. The key characteristic of the traffic in cities particularly for developing the geographies is that even if the geographies are explicitly mentioned/marked on the roads it doesn’t move through the lanes (Vivek Tyagi, et al., 2012). In Emergency cases (VIP’s) the signals are precise manually, which is a hard-hitting task and can’t be executed successfully. Due to this man power is required in large amount and is a waste of time .

***Problem Working Process :-***

→ Integrating GPS Module with NodeMCU using Arduino Programming

→ Connecting NodeMCU with IBM Cloud using Arduino Programming

→ Creating a Node-RED UI which displays location using Node-RED Programming.

***COMPONENTS :-***

***Hardware:-***

→ Node MCU

→ GPS Module

***Software:-***

→ Arduino IDE

→ IBM Cloud

→ MIT App Inventor 2

***Programming Code :-***

#include <ESP8266WiFi.h>

#include <PubSubClient.h>

#include <TinyGPS++.h>

#include <SoftwareSerial.h>

//-------- Customise these values -----------

const char\* ssid = "SRK";

const char\* password = "rachana22";

TinyGPSPlus gps; // The TinyGPS++ object

SoftwareSerial ss(D4,D5); // The serial connection to the GPS device

void PublishData(float la, float ln);

#define ORG "mf3koe"

#define DEVICE\_TYPE "NodeMCU"

#define DEVICE\_ID "9876"

#define TOKEN "987654321"

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char topic[] = "iot-2/evt/sensordata/fmt/json";

char authMethod[] = "use-token-auth";

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE\_TYPE ":" DEVICE\_ID;

WiFiClient wifiClient;

PubSubClient client(server, 1883,wifiClient);

float latitude , longitude;

int year , month , date, hour , minute , second;

void setup()

{

Serial.begin(115200);

Serial.println();

ss.begin(9600);

Serial.print("Connecting to ");

Serial.print(ssid);

WiFi.begin(ssid, password); //trying to connect to the network

while (WiFi.status() != WL\_CONNECTED) {

delay(500);

Serial.print(".");

}

Serial.println("");

Serial.print("WiFi connected, IP address: ");

Serial.println(WiFi.localIP());

}

void loop()

{

while (ss.available() > 0)

if (gps.encode(ss.read()))

{

if (gps.location.isValid())

{

latitude = gps.location.lat();

longitude = gps.location.lng();

Serial.println(latitude);

Serial.println(longitude);

}

if (gps.date.isValid())

{

date = gps.date.day();

month = gps.date.month();

year = gps.date.year();

Serial.print(date);

Serial.print(“/”);

Serial.print(month);

Serial.print(“/”);

Serial.println(year);

}

if (gps.time.isValid())

{

hour = gps.time.hour();

minute = gps.time.minute();

second = gps.time.second();

minute = (minute + 30);

if (minute > 59)

{

minute = minute - 60;

hour = hour + 1;

}

hour = (hour + 5) ;

if (hour > 23)

hour = hour - 24;

Serial.print(hour);

Serial.print(":");

Serial.print(minute);

Serial.print(":");

Serial.println(second);

}

PublishData(latitude,longitude,hour,minute);

delay(1000);

}

}

void PublishData(float la, float ln , int hr ,int mi)

{

if (!!!client.connected()) {

Serial.print("Reconnecting client to ");

Serial.println(server);

while (!!!client.connect(clientId, authMethod, token)) {

Serial.print(".");

delay(500);

}

Serial.println();

}

String payload = "{\"d\":{\"latitude\":";

payload += la;

payload +="," "\"longitude\":";

payload += ln;

payload +="," "\"hour\":";

payload += hr;

payload +="," "\"minute\":";

payload += mi;

payload += "}}";

Serial.print("Sending payload: ");

Serial.println(payload);

if (client.publish(topic, (char\*) payload.c\_str())) {

Serial.println("Publish ok");

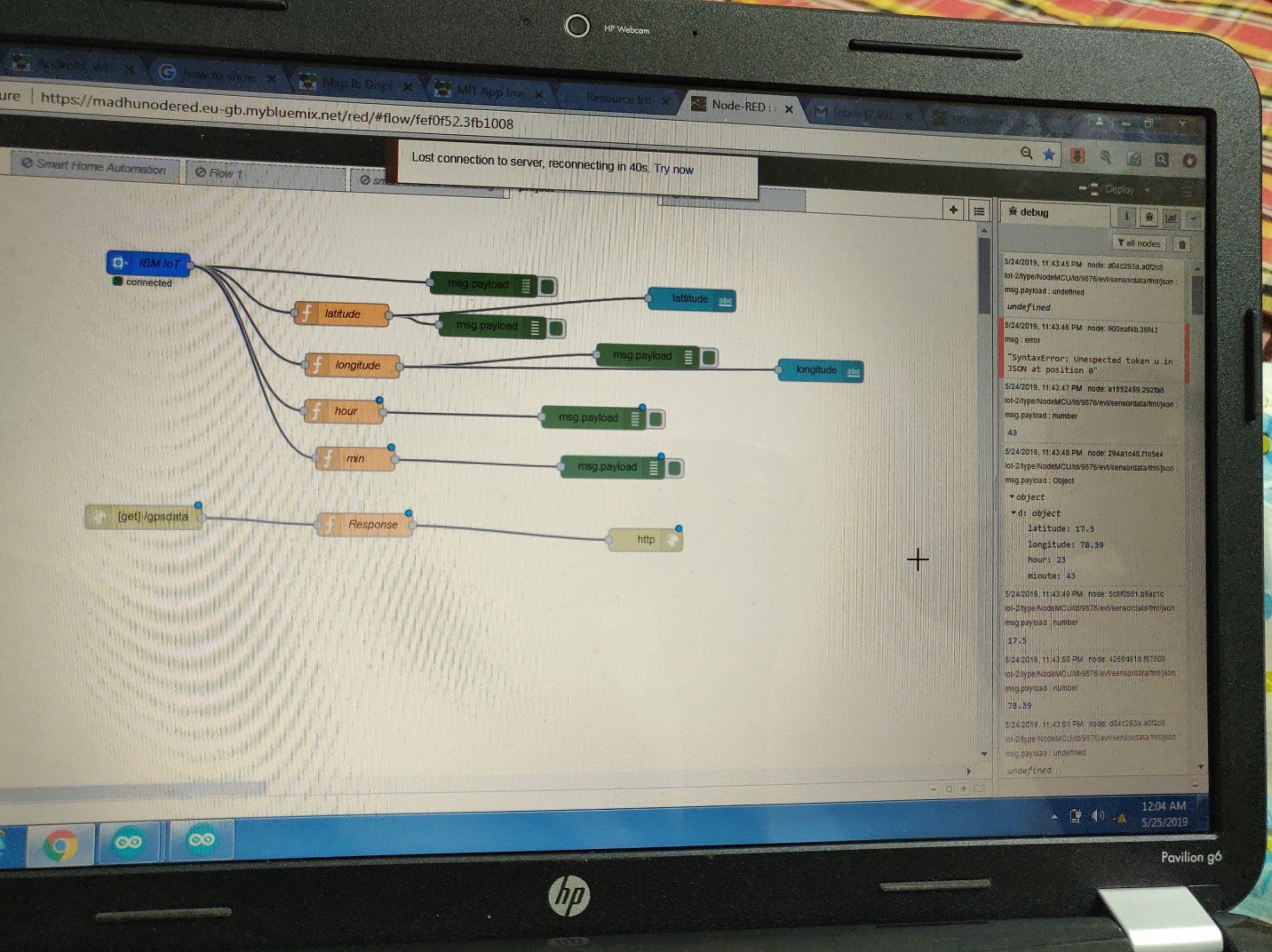
} else {

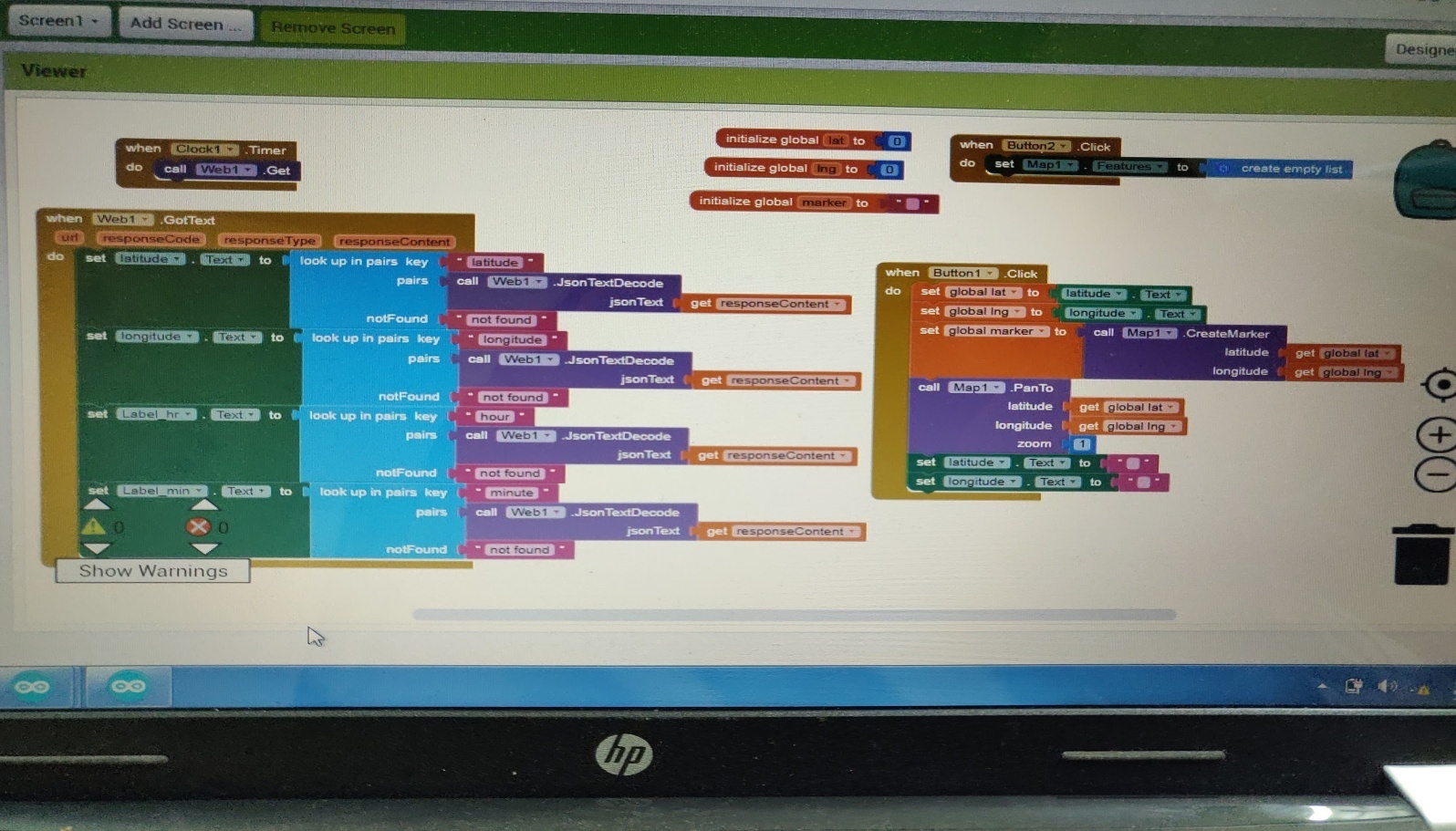
Serial.println("Publish failed");

}

}

NODE-RED FLOW



MIT APP

NODE-RED LINK:

https://madhunodered.eu-gb.mybluemix.net/red/#flow/fef0f52.3fb1008