IOT BASED INTELLIGENT TRAFFIC MANAGEMENT SYSTEM

by

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BONAFIDE CERTIFICATE

This is to certify that the Project work titled “IoT based Baby Monitoring using Arduino ” is being submitted by **Pratik S Dadwal (19BLC1008)), Ansh Shukla (19BLC1048)** for the course **ECE3502-IoT Domain Analyst**, is a record of bonafide work done under my guidance. The contents of this project work, in full or in parts, have neither been taken from any other source nor have been submitted to any other Institute or University.

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ABSTRACT

A significant amount of research work carried out on traffic management systems, but intelligent traffic monitoring is still an active research topic due to the emerging technologies such as the Internet of Things (IoT) and Artificial Intelligence (AI). The integration of these technologies will facilitate the techniques for better decision making and achieve urban growth. However, the existing traffic prediction methods mostly dedicated to highway and urban traffic management, and limited studies focused on collector roads and closed campuses. Besides, reaching out to the public, and establishing active connections to assist them in decision-making is challenging when the users are not equipped with any smart devices.

ACKNOWLEDGEMENT

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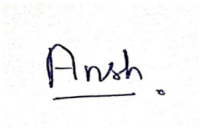
We thank our parents, family, and friends for bearing with us throughout the course of our project and for the opportunity they provided us in undergoing this course in such a prestigious institution.

PRATIK S DADWAL **ANSH SHUKLA**



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CHAPTER 1

INTRODUCTION

The sustainability and smartness of the smart city concept rely on the technologies adopted to improve the people's quality of life. The smart city governance is one significant aspect of smart city initiatives, which will facilitate the planning techniques for better decision making. One of the key elements of the smart city governance framework is the public value generated out of the smart services provided.

The government has to work on different aspects of smart city solutions such as smart health care, smart building management, smart traffic management, smart parking solutions, smart transportation, etc. to generate public value for the service they provided. The emergence of the internet of things (IoT) has evolved the concept of smart cities. In a smart city environment, the physical infrastructures of the city are equipped with smart devices, which continuously produce multidimensional data in different spaces and these data are processed to achieve intelligence for the infrastructure. Ultimately, intelligence is applied to improve the socio-economic activities of the society.

1.1 OBJECTIVE AND GOALS

The main objective of the project is to focus on Real-time traffic monitoring systems which plays a key role in the transition toward smart cities. Autonomous traffic sensing is at the heart of smart city infrastructures, wherein smart wireless sensors are used to measure traffic flow, predict congestion, and adaptively control traffic routes. Doing so effectively provides an awareness that enables more efficient use of resources and infrastructure. Our goal is to

have IOT-based traffic management which indeed will be easy to penalize traffic violators and help officials identify unauthorized drivers. Reroute the ambulance to the low congestion roads tohelp get medical care at the earliest.

1.2 APPLICATIONS

The authorities at traffic monitoring shall have to adapt new methods in intelligent monitoring of vehicles uniquely and thus overcoming complexities. In a typical running traffic, many users violate rules without any hesitation; such incidents cause trouble to other vehicles. The ever increasing flow of vehicles on the road and the number of users cannot compete with limited resources available to traffic management system in monitoring the vehicle uniquely.

To reduce traffic congestion, real-time data feeds are employed in traffic signals. Sensors installed in key locations may collect data on high-traffic crossings and areas where cars are diverted using IoT technology.

1.3 FEATURES

- Real time data collection, processing and storage in cloud
- Controlling Flow of Traffic
- Surveillance of Vehicle
- Time Conservation due to improved traffic condition

CHAPTER 2

LITERATURE REVIEW

PAPER TITLE AND AUTHORS	METHODOLOGY	INFERENCE	YEAR OF PUBLISH
Smart Traffic Management System Using Internet of Things *Sabeen Javaid*, Ali Sufian**, Saima Pervaiz**, Mehak Tanveer*** ** Department of Computer Software Engineering* *** Department of Software Engineering, University of Gujrat, Sialkot Campus, Sialkot, Pakistan*	The system is divided into three layers. A) Data Acquisition and Collection layer. B) Data Processing and Decision-making layer C)Application and Actuation layer.	• The system works in a distributed manner, it processes sensors' data at the node level & calculates cumulative density to the traffic. • it helps the users to know the congestion status at a road. •	**2018**

Intelligent Traffic Management System for Cross Section of Roads Using Computer Vision Tousif Osman, Shahreen Shahjahan Psyche, J. M. Shafi Ferdous, Hasan U. Zaman Department of Electrical and Computer Engineering North South University, Dhaka, Bangladesh	There are two major components of the system. Small embedded device to control the traffic lights and capture images from the road. Another component to process images and perform time optimization centrally.	• Fetching Images Data • Receiving and Analysis of the Image • Letting the traffic regulator know about the traffic junction status •	**2017**
IoT Based Dynamic Road Traffic Management for Smart Cities Syed Misbahuddin, A-Wadany and University, Makkah Saudi Arabia Department of Computer and Information Sciences, State University of New York at Fredonia, Fredonia NY 14063 USA	Small embedded device to control the traffic lights Using the sensors to get the data as to when the car is arriving in the opposite lane Sending this data to the cloud using wifi module esp8266 Reading the data from the thingspeak platform along with the time it is updated	Inferring the traffic flow Informing the traffic regulator about the various data collected about the daily traffic flow and at what times the traffic is high/low Determining the crossroad accident probability by inferring the data updated from the number of times the sensor pings(showing it has detected cars passing)	**2015**

[4] An Internet of Things (IoT) based Smart Traffic Management System: A Context of Bangladesh	This system uses temperature sensor, Heartbeatsensor, motion sensor and voice sensor. The microcontroller continuously reads input from sensors. Then it sends this data to the cloud by sending this data to a particular URL/IP address. The parents can monitor baby health parameters just by visiting the website or URL	This system monitors vital parameters such as body temperature, pulse rate, movement of an infant and this information is transferred to their parents.	**2018**
[5] IOT Based Smart Traffic Management System Authors : Rachana K P, Aravind R, Ranjitha M, Spoorthi Jwanita, Soumya K	This is to offer help to the visitors officers by developing an interconnection among the cars primarily based totally on cloud connection in order that the visitors may be monitored automatically. Violation and visitors offences are easily captured and fined primarily based totally at the wide variety plate of the vehicle and presently logged in user.	Number Plate Detection: Image based green time estimation:	**2021**

[6] Internet of Things-Smart Traffic Management System for Smart cities using Big Data Analytics (IEEE,2017) Author: Abida Sharif, Mudassar Khalil	In this system Every 500 meters, low-cost vehicle detection sensors are installed in the middle of the road. Internet of Things (IOT) is being used to attain publictraffic data quickly and send it for data processing.	determining individual sensor strength and adding each other sensor entry, as well as leaving vehicle information road capacity, a variety of criteria are taken into account. Every 500 meters, low-cost vehicle-detecting sensors are shown in the middle of the road.	**2017**
[7] IoT based dynamic road traffic management for smart cities (IEEE,2015) Author: Syed Misbahuddin	This study provides IoT-based traffic management solutions for smart cities, in which traffic flow can be dynamically regulated by onsite traffic cops via their smart phones, or can be monitored and controlled centrally over the Cyber Sever.	As a result, in addition to the existing traffic control systems, Makkah city requires special traffic control algorithms. However, the proposed approach is generic and can be implemented in any Metropolitan city without losing its generality.	**2015**

[8] IOT Based Network traffic prediction(IEEE,2019) Author: Ali R Abdellah	Internet of Things (IoT) is a network of interconnected devices, such as sensors and Smart gadgets with processing, sensing, and communication capabilities, as well asthe ability to transfer data to each other and a central console through the Internet.	The estimation error of a prediction approach has been evaluated using the performance functions MSE, SSE, and MAE, besides, another measure of prediction accuracy the mean absolutepercent of error.	**2019**
[9] Development of Rewarding System for Solving Traffic Congestion in Saudi Arabia Fatmah Yousef Assiri University of Jeddah, Jeddah, Saudi Arabia	the system provides recommendations for a preferred departure time in order to avoid traffic congestion. Recommended departure time is based on historical data. This system will be used to create dataset of drivers and traffic information in order to build an intelligent recommendation system	This system will be used to create dataset of drivers and traffic information in order to build an intelligent recommendation system	**2020**

[10] IoT Based Dynamic Road Traffic Management for Smart Cities yed Misbahuddin, Junaid Ahmed Zubairi, Abdulrahman Saggaf, Jihad Basuni, Sulaiman A-Wadany	This paper proposes an IoT based traffic management solutions for smart cities where traffic flow can be dynamically controlled by onsite traffic officers through their smart phones or can be centrally monitored or controlled through Internet	We have used the example of the holy city of Makkah Saudi Arabia, where the traffic behavior changes dynamically due to the continuous visitation of the pilgrims throughout the year. Therefore, Makkah city requires special traffic controlling algorithms other than the prevailing traffic control systems	**2011**

[12] Intelligent Urban Traffic Management System Based on Cloud Computing and Internet of Things Xi Yu Department of Information Technology and Business Management Dalian Neusoft Institute of Information Dalian, China Dalian High-tech Zone Innovation of Science and Technology Plan: 20113006 Liaoning Province Talents Plan of Higher School:	This paper focused on the basic framework of intelligent urban Traffic Management System Based on Cloud Computing and Internet of Things, proposed the architecture of intelligent urban Traffic Management System Based on Cloud Computing and Internet of Things.	The system fundamentally realizes the intelligent monitoring and management of urban traffic and realizes the purpose of intelligent dredge of urban traffic.	**2012**

[13]Yang bin, Zhang WeiDong, Zhang LiXin, etc. “The application framework based on based SOA,” in Computer engineering, vol. 36, 2010, pp.95-97.	Now the congestion of road has impacted on the city development seriously, and became the crux which constrained the city development. An intelligent urban traffic management system is needed urgently. In this paper an architecture of the intelligent collaborative urban traffic management system based on SOA and cloud computing is proposed.	The system fundamentally realizes the intelligent monitoring and management of urban traffic and realizes the purpose of intelligent dredge of urban traffic.	**2014**

[14]ShaoHua Yang, ChengJin, Wang Hui, etc. “The system and middleware design face to IOT,” in Computer engineering, vol. 4, 2010,pp: 84-86.	This paper will focus on the design and development of IoT based real-time monitoring framework for the city that also incorporates the use of remote sensing technology. The proposed system has an advantage over other existing methods because it is easy to design, develop and implement.	It will reduce the amount of time spent in traffic, will lower the consumption of fuel and the number of fatalities and accidents on the roads.	**2021**
[15] K. S. D. M. R. B. Patan Rizwan, "Real-Time Smart Traffic Management System for Smart Cities by Using Internet of Things and Big Data," in International Conference on Emerging Technological Trends [ICETT], Kollam, 2016.	A hybrid approach (combination of centralized and decentralized) is used to optimize traffic flow on roads and an algorithm is devised to manage various traffic situations efficiently.	• To demonstrate the effectiveness of the proposed traffic management system, an application is developed which not only optimizes the flow of traffic but also connects nearby rescue departments with a centralized server.	**2018**

[16] IOT Based Smart Traffic Management System Authors : Rachana K P, Aravind R, Ranjitha M, Spoorthi Jwanita, Soumya K	This task is to offer help to the site visitors policemen through developing an interconnection among the motors primarily based totally on cloud connection in order that the site visitors may be monitored automatically.	• In case of injuries or emergencies, nearest ambulance will acquire notification consisting of the closest clinic with all required information so the docs can take movement as required or create an alert to folks that set GPS on excessive congestion zones to deviate to a low congestion direction until truly necessary.	**2021**

[17] IoT Based Traffic Management System Mahesh Lakshminarasimhan Boise State University	• The system is supported by a circuit embedded in the vehicle, which operates using RFID with clustered systems	• The proposed architecture and working with big data analytics involving Hadoop is presented. Moreover, supervised learning methodologies are proposed that would help in determining the standard of roads, estimating overall traffic flow, calculating average speed of distinct vehicle types on a road and analyzing the travel path of a vehicle.	**2016**
[18]TRAFFIC CONTROL MANAGEMENT SYSTEM ON THE BASIS OF TRAFFIC DENSITY • May 2020	• This paper propose an IOT created traffic the board answers for savvy urban communities and toward organize with rescue vehicle driver to locate the flag status and choose the method where traffic stream can be powerfully controlled and petty criminal offenses are been recognized by on	● Here traffic light administration is planned also generated to assistance basic leadership of traffic constables. The structure be able to identify the clog dimension for each street crossing point	**2020**

[19]IOT BASED INTELLIGENT TRAFFIC MANAGEMENT SYSTEM R. Rukvitha1, P. Mary Namratha2, P. Ravi Kumar3, N. Anila Sri4 .	Here we propose an IOT based traffic management solutions for smart cities where traffic flow can be dynamically controlled. An additional time is provided based on the basis of Traffic flow which prevents traffic clogging and improves Time efficiency.	• Entire System is • Automated without any Human Intervention. This can be • done so as to reduce the human efforts and improve time • efficiency by preventing most of the traffic clogging.	**2020**

[20]IoT based smart traffic signal monitoring system using vehicles counts Senthil Kumar Janahan Veeramanickam Murugappan Arun Sahayadhas Kumar Narayanan OT Based Smart Cradle System for Baby Monitoring. *Authors-Harshad Suresh Gare1, Bhushan Kiran Shahne2, Kavita Suresh Jori3, Sweety G. Jachak4*	• As per this proposed model in this article, which will be optimized the timing interval of the traffic signal purely depends on the number of vehicles on that particular roadside.	• The input of these systems is vehicles counts on each side of the road from crossing signal. And this input will be determined on much time is to be provided.	**2018**

CHAPTER 3

DESIGN

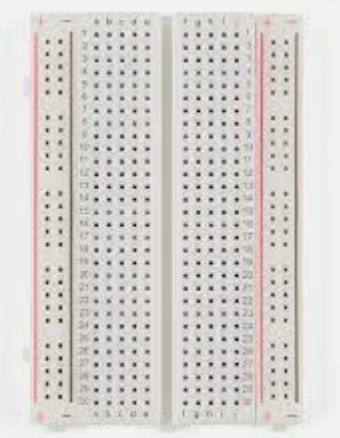
3.1 COMPONENTS USED

3.1.1 Ultra Sonic Sensor

an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal.

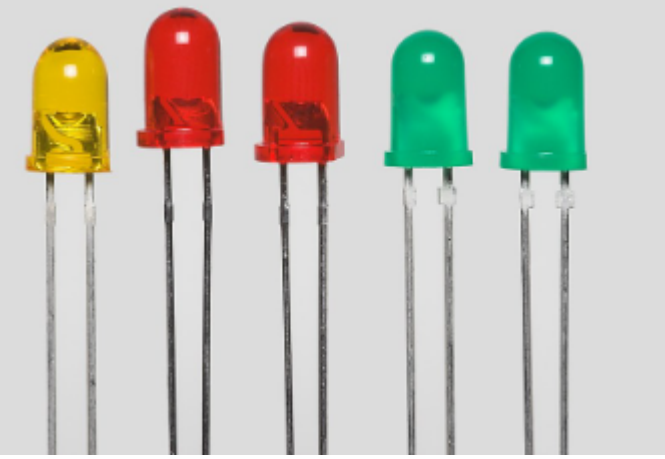
3.1.2 BreadBoard

a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).



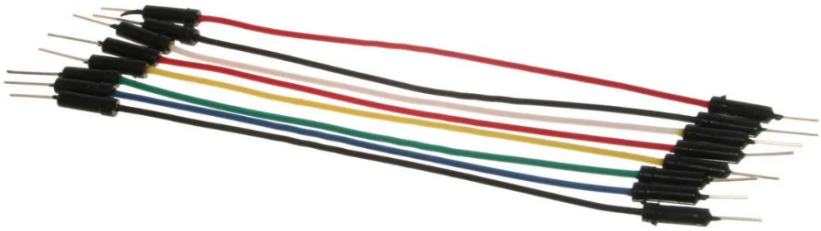
3.1.3 Led

Light-emitting diode (LED) is a widely used standard source of light in electrical equipment. It has a wide range of applications ranging from your mobile phone to large advertising billboards. They mostly find applications in devices that show the time and display different types of data.



3.1.4 Jumper Wire

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering.



3.1.5 ESP8266 Node Mcu Board

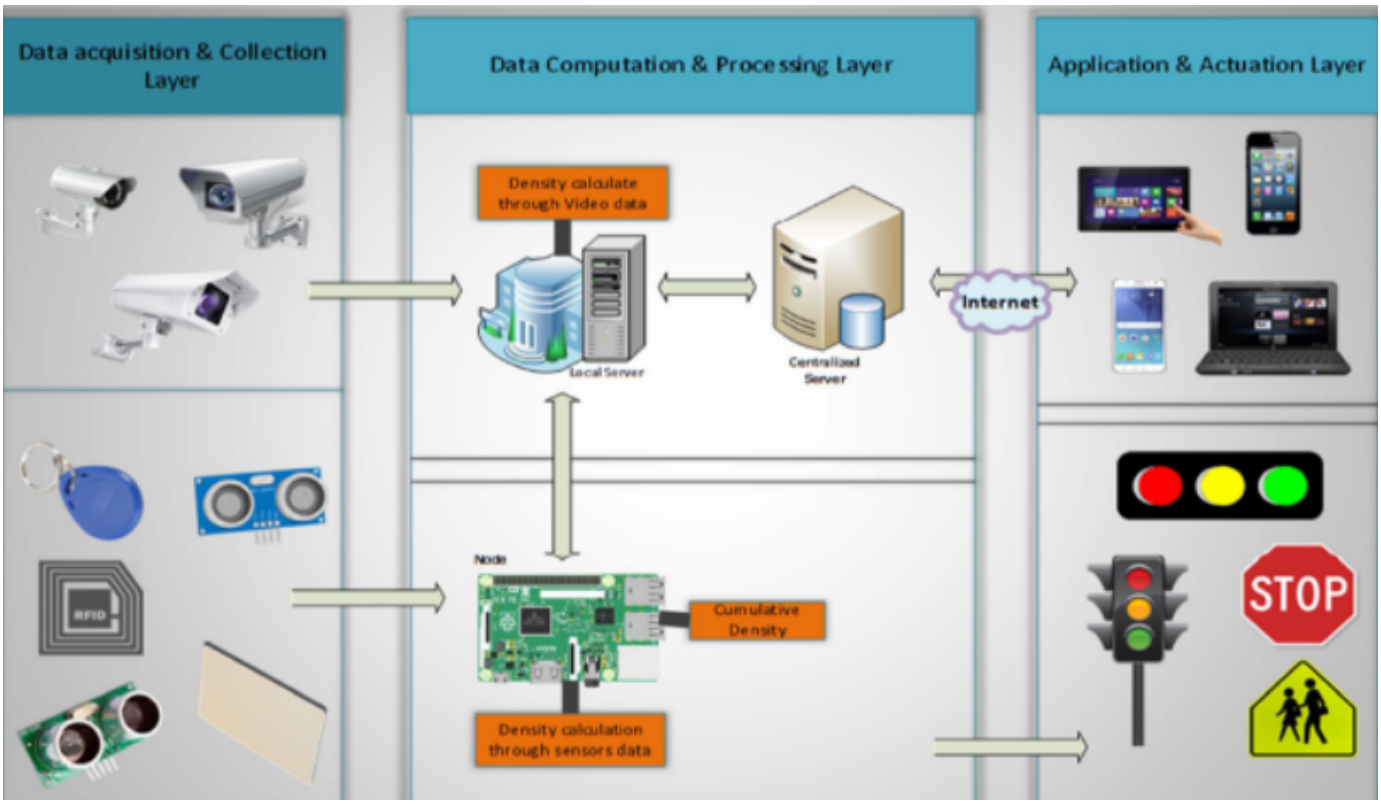
NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

3.2 PROPOSED SYSTEM

The authorities at traffic monitoring shall have to adapt new methods in intelligent monitoring of vehicles uniquely and thus overcoming complexities. In a typical running traffic, many users violate rules without any hesitation; such incidents cause trouble to other vehicles. The ever-increasing flow of vehicles on the road and the number of users cannot compete with the limited resources available to traffic management systems in monitoring the vehicle uniquely.
To reduce traffic congestion, real-time data feeds are employed in traffic signals. Sensors installed in key locations may collect data on high-traffic crossings and areas where cars are diverted using Iot technology

3.2.1 BLOCK DIAGRAM

[Fig 8:Block diagram]



3.2.2 DESIGN APPROACH

Traffic management is the organization, arrangement, guidance, and control of stationary and moving traffic, including vehicles, bicyclists, and pedestrians, through a construction zone. Proper traffic management works to create the safe, orderly, and efficient movement of persons and goods, while also aiming to protect the quality of the local environment.

1. Alerts Locals

2. Assessing the Traffic density

3. Traffic vehicle surveillance using CV applications

4. Provides cross-road Safety

5. Minimizes Traffic Delays

3.2.3 HARDWARE ANALYSIS

esp8266 board is used to communicate to the cloud which updates the dashboard status based on the presence of the vehicle and helps the traffic manager analyse the flow of traffic using the constant flow of data from the sensor hence applying IOT principle.

software:

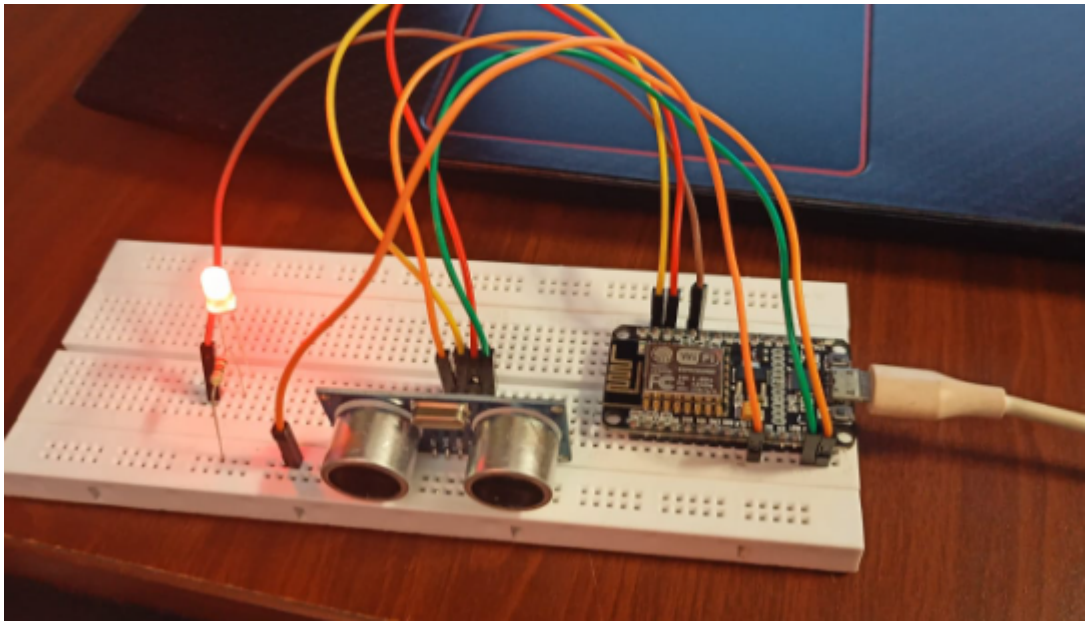
thingspeak.com channel

tinkercad(simulation)

Arduino ide

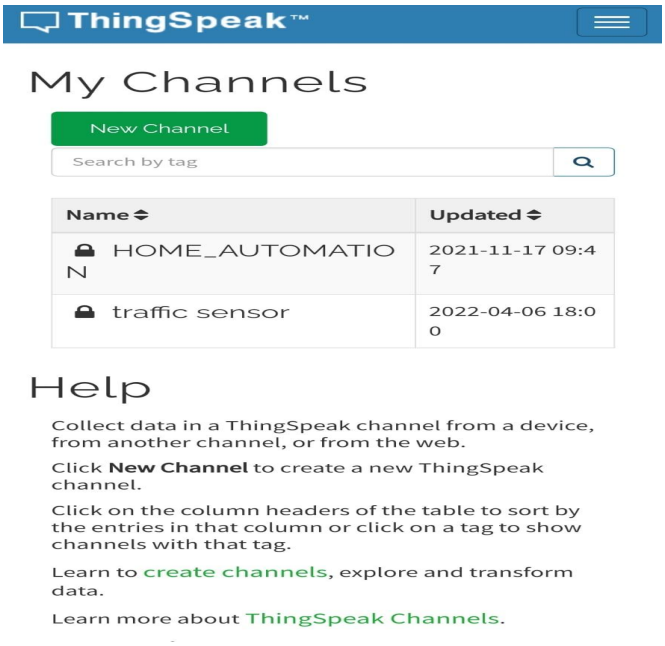
esp8266 board addons

3.2.4 EXPERIMENTAL SETUP



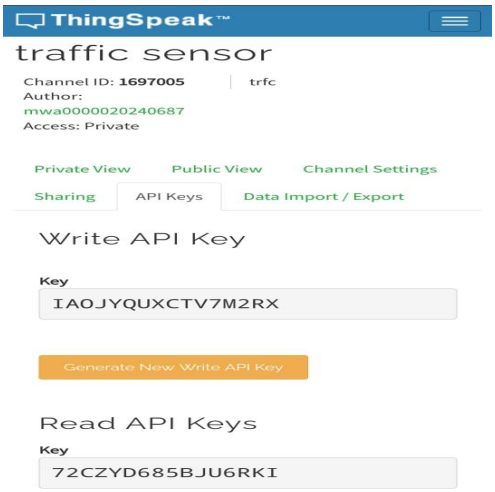
I. ThingSpeak

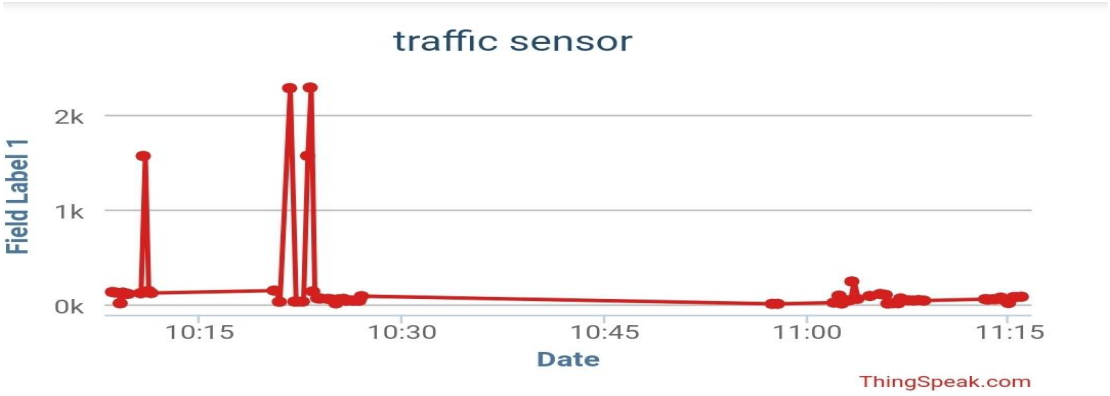
Showing new channel



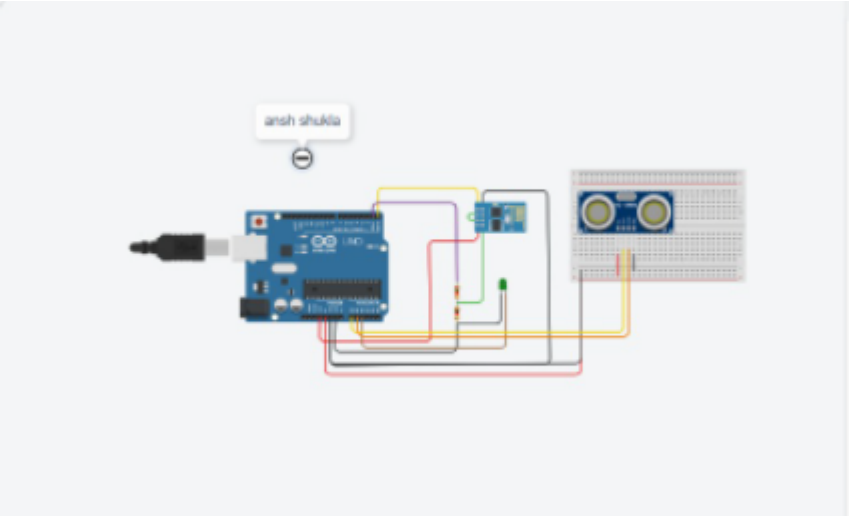
[Fig 12:Thingspeak HTTP]

With the pushover app credentials and API keys we creating this HTTP





3.3 SOFTWARE ANALYSIS



3.3.1 TRAFFIC LIGHT CODE

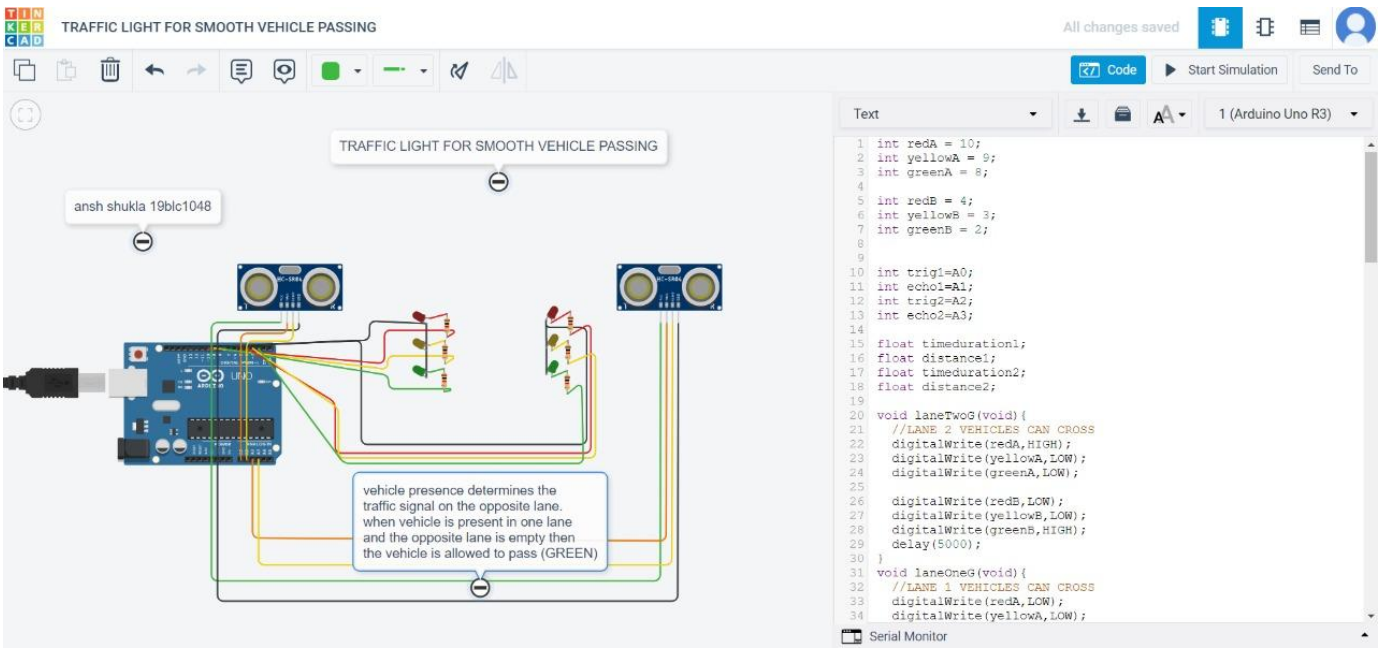
```
int redA = 10;
int yellowA = 9;
int greenA = 8;

int redB = 4;
int yellowB = 3;
int greenB = 2;


int trig1=A0;
int echo1=A1;
int trig2=A2;
int echo2=A3;

float timeduration1;
float distance1;
float timeduration2;
float distance2;

void laneTwoG(void){
  //LANE 2 VEHICLES CAN CROSS
  digitalWrite(redA,HIGH);
  digitalWrite(yellowA,LOW);
  digitalWrite(greenA,LOW);

  digitalWrite(redB,LOW);
```

```
  digitalWrite(yellowB,LOW);
  digitalWrite(greenB,HIGH);
  delay(5000);
}
void laneOneG(void){
  //LANE 1 VEHICLES CAN CROSS
  digitalWrite(redA,LOW);
  digitalWrite(yellowA,LOW);
  digitalWrite(greenA,HIGH);

  digitalWrite(redB,HIGH);
  digitalWrite(yellowB,LOW);
  digitalWrite(greenB,LOW);
  delay(5000);
}

void setup() {
pinMode (redA, OUTPUT);
pinMode (yellowA, OUTPUT);
pinMode (greenA, OUTPUT);

pinMode (redB, OUTPUT);
pinMode (yellowB, OUTPUT);
pinMode (greenB, OUTPUT);

  pinMode(trig1, OUTPUT);
  pinMode(echo1, INPUT);

  pinMode(trig2, OUTPUT);
  pinMode(echo2, INPUT);

  Serial.begin(9600);
}

void loop() {/*
  digitalWrite(trig1, LOW);
  delayMicroseconds(20);
  digitalWrite(trig1,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig1, LOW);
  timeduration1 = pulseIn(echo1 , HIGH);
  distance1=(0.034 * timeduration1/2);
  int dist1 = int(distance1);

  Serial.print("Distance1 in cm: ");
  Serial.println( dist1);
```

```
  digitalWrite(trig2, LOW);
  delayMicroseconds(20);
  digitalWrite(trig2,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig2, LOW);
  timeduration2 = pulseIn(echo2 , HIGH);
  distance2=(0.034 * timeduration2/2);
  int dist2 = int(distance2);

  Serial.print("Distance2 in cm: ");
  Serial.println( dist2);


  if(dist1>300 && dist2<300){
          laneTwoG();

          delay(5000);
  }
  else if(dist2>300 && dist1<300){
    laneOneG();

    delay(5000);
  }
*/digitalWrite(greenA, HIGH);
digitalWrite(redB, HIGH);

delay(9000);

digitalWrite(greenA, LOW);
digitalWrite(redB, LOW);

digitalWrite(yellowA, HIGH);
digitalWrite(yellowB, HIGH);
delay(1000);

digitalWrite(yellowA, LOW);
digitalWrite(yellowB, LOW);
digitalWrite(redA, HIGH);
digitalWrite(greenB, HIGH);
delay(5000);
digitalWrite(greenB, LOW);
digitalWrite(yellowB, HIGH);
delay(1000);
digitalWrite(yellowB, LOW);
digitalWrite(redB, HIGH);
delay(5000);
digitalWrite(redA, LOW);
```

```
digitalWrite(yellowA, HIGH);
delay(1000);
digitalWrite(yellowA, LOW);

}
```

CIRCUIT SCREENSHOT(SOFTWARE) :



i. ESP8266 WIFI MODELLING CODE

```
#include <ESP8266WiFi.h>

//#include <OneWire.h>

//#include <PubSubClient.h>
```

```
const char *ssid =  "realme 7";        //Your
Access Point or Personal Hotspot, cannot be
longer than 32 characters!
const char *pass =  "dc123457";    //Your
Access Point or Personal Hotspot password
const char* serverTS =
"api.thingspeak.com";
String apiKey =
"IAOJYQUXCTV7M2RX";          //Insert
your Channel API Key here
//const int pingPin = 2;          //Ultrasonic
connected to GPIO0
int TRIGGER = 5; //Pin D1 = TRIGGER
int ECHO = 4; //Pin D2 = ECHO
void setup()
{
  pinMode(0,OUTPUT);            //LED
```

```
connected to GPIO2
  Serial.begin(115200);         //Recommended
speed is 115200
  pinMode(TRIGGER,OUTPUT);
  pinMode(ECHO,INPUT);
  connectWifi();
  }
void loop()
{
  // establish variables for duration of the
ping,
  // and the distance result in inches and
centimeters:
  long duration, inches, cm;
  // The PING))) is triggered by a HIGH
pulse of 2 or more microseconds.
```

```
  // Give a short LOW pulse beforehand to
ensure a clean HIGH pulse:
  digitalWrite(TRIGGER, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIGGER, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIGGER, LOW);
  // The same pin is used to read the signal
from the PING))): a HIGH
  // pulse whose duration is the time (in
microseconds) from the sending
  // of the ping to the reception of its echo off
of an object.
  duration = pulseIn(ECHO, HIGH);
  // convert the time into a distance
  inches = microsecondsToInches(duration);
```

```
  cm =
microsecondsToCentimeters(duration);
  Serial.print(inches);
  Serial.print("in, ");
  Serial.print(cm);
  Serial.print("cm");
  Serial.println();
  delay(100);
  digitalWrite(2, HIGH);   // turn the LED on
(HIGH is the voltage level)
  delay(1000);              // wait for a second
  digitalWrite(2, LOW);    // turn the LED off
by making the voltage LOW
  delay(1000);              // wait for a second
  sendHeight(cm);
}
```

```
void connectWifi()

{

  Serial.print("Connecting to "+*ssid);

  WiFi.begin(ssid, pass);

  while (WiFi.status() !=

WL_CONNECTED) {

  delay(1000);

  Serial.print(".");

  }

  Serial.println("");

  Serial.println("Connected");

  Serial.println("");

}//end connect

long microsecondsToInches(long

microseconds)

{ // According to Parallax's datasheet for the
```

```
PING))), there are
  // 73.746 microseconds per inch (i.e. sound
travels at 1130 feet per
  // second).  This gives the distance
travelled by the ping, outbound
  // and return, so we divide by 2 to get the
distance of the obstacle.
  // See:
http://www.parallax.com/dl/docs/prod/acc/2
8015-PING-v1.3.pdf
  return microseconds / 74 / 2;
}
long microsecondsToCentimeters(long
microseconds) {
  // The speed of sound is 340 m/s or 29
microseconds per centimeter.
  // The ping travels out and back, so to find
```

```
the distance of the
  // object we take half of the distance
travelled.
  return microseconds / 29 / 2;
}


 void sendHeight(float cm)
{
  WiFiClient tclient;//not to be confused with
"client" in PubSub{}, and wclient for mqtt
   if (tclient.connect(serverTS, 80)) { // use
ip 184.106.153.149 or api.thingspeak.com
   //Serial.println("WiFi Client connected ");


   String postStr = apiKey;
   postStr += "&field1=";
```

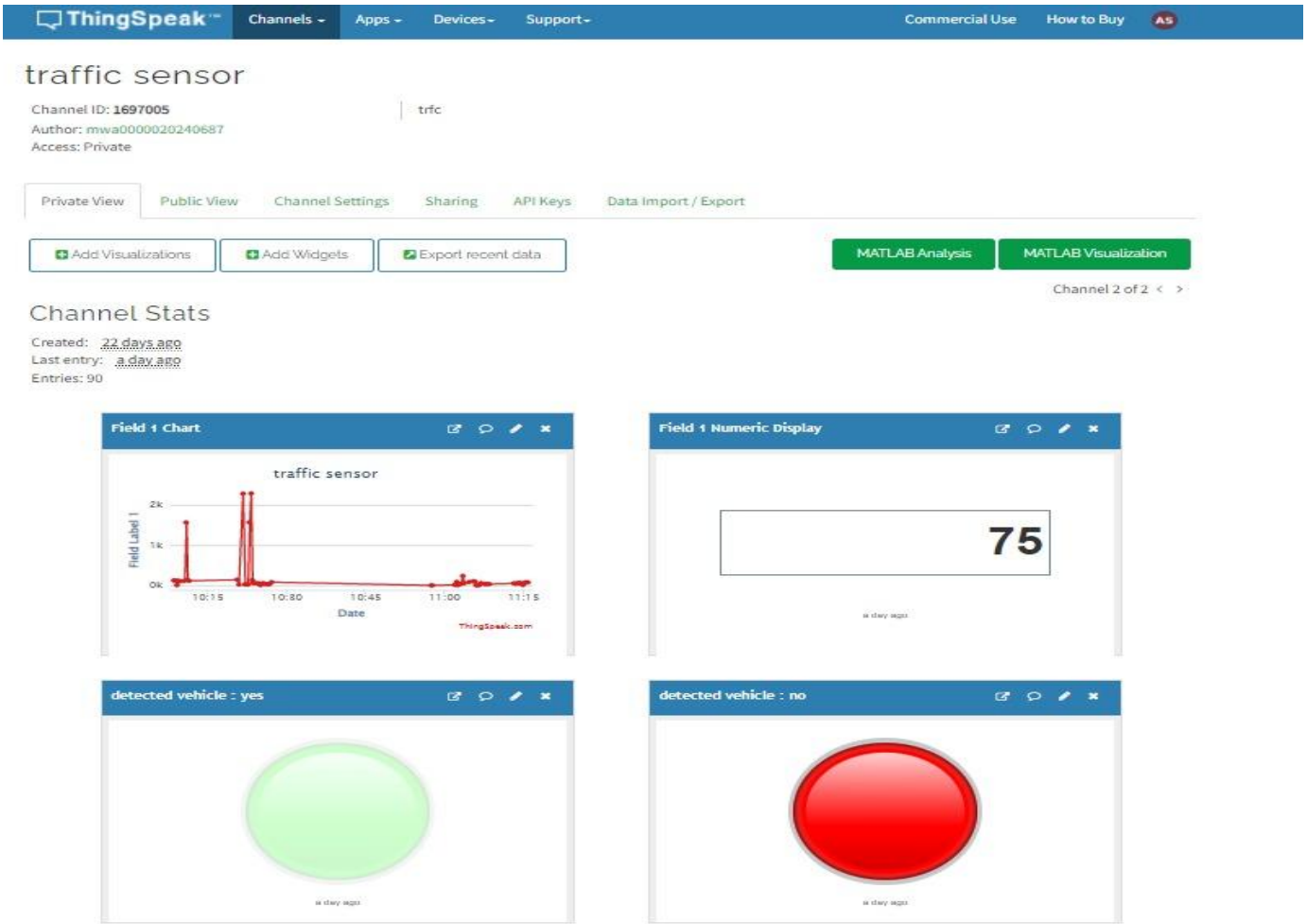
```
   postStr += String(cm);
   postStr += "\r\n\r\n";
   tclient.print("POST /update HTTP/1.1\n");
   tclient.print("Host:
api.thingspeak.com\n");
   tclient.print("Connection: close\n");
   tclient.print("X-THINGSPEAKAPIKEY: "
+ apiKey + "\n");
   tclient.print("Content-Type:
application/x-www-form-urlencoded\n");
   tclient.print("Content-Length: ");
   tclient.print(postStr.length());
   tclient.print("\n\n");
   tclient.print(postStr);
   delay(1000);
   }//end if
```

```
tclient.stop();

}//end send to ts
```

CHAPTER 4

RESULT AND ANALYSIS

Thingspeak Cloud Dashboard:



CHAPTER 5
CONCLUSION AND FUTURE ENHANCEMENT

5.1 CONCLUSION AND INFERENCE

WE HAVE IMPLEMENTED THE IOT PAPERS IN FOCUS AND FOUND VARIOUS APPLICATIONS OF IOT IN THE TRAFFIC SYSTEM MANAGEMENT USING HARDWARE AND SOFTWARE MODELS WITH THE HELP OF DATA TRANSFER TO CLOUD AND MACHINE LEARNING

5.2 FUTURE ENHANCEMENT

There are several analytical scriptures to analyze the traffic density and provide solution through predictive analytics. A mobile application is developed as user interface to explore the density of traffic at various places and provides an alternative way for managing the traffic.

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