A NOVEL SOLUTION BASED ON AUTOMATIC TRAFFIC SYSTEM

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project/internship titled **"A Novel Solution of Automatic Traffic System"**, submitted by Umme Habiba, ID No: 161-15-7119 & Fazlul Ayan Koushik, ID No: 161-15-7527 & Md. Akbar Hossain, ID No: 161-15-7531 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 05/12/2019.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr. Majidur Rahman, Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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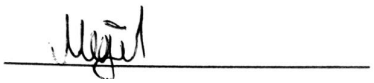

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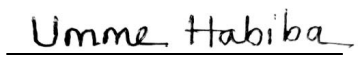

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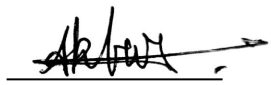

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We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

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ABSTRACT

Traffic jam is one of the biggest problem of modern civilization. It can be avoided, by controlling traffic according to rising standards of single-board computer, computational technology, platforms, software packages and APIs [12]. It becomes easier for developer to solve this problem by creating an advance system by whom we can control traffic signals and information's. We can use the crowdsourced data from google traffic congestion APIs to adjust traffic light cycle timer with a system which is adaptable to congestion. Our main concern in this system to increase the flow of vehicles in traffic congestion. Since this system is all about crowdsourced data, therefore no high sensor is needed here. This system will give the more accurate output in modern city or country. Since Bangladesh is one of the rising modern country, so that this system is compatible in Bangladesh also. It used in such modern countries like Australia, the USA, Canada etc. and the accuracy is more than 90%.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Traffic jam is one of the major problem in developed metropolitan cities, it increasing because of the amount of private vehicles, unplanned road system, not obeying traffic laws and limited Land Resources etc. It slows down the economy of any country and hampered people life. So every nation or country should concern about their traffic and should find out the right way to solve it. From time to time there have done many Attempts to pass this solution using many sensors like pneumatic tubes, automatic traffic counter/classifiers (ATCC), induction loop, Video/image processing, Wireless Sensor Networks (WSN) and etc. But these sensors have some problem those are not negligible. So that, in mixed heterogeneous traffic, cannot be solved by a single algorithm or technique. So we thought about technique which is Wisdom Web of Things. To work with this kind of algorithms or techniques, it required a huge amount of resources and data mining technique to develop this system. Some data giants company like Google, Bing have such crowdsourced data and they provide it via their APIs. Google map have different kind of sources for traffic data like hardware intensive sensors, local road sensors, personalized network availability, private monetarized network, personal digital devices, GPS and large number of cellphone users. Using this data, user speed along with road are calculated by google to generate a live traffic map. So any vehicle is not moving frequently towards, the color track changes on map. So by use this algorithm we can make a traffic light control system. That will be a dynamic traffic light control system which so much better than static.

1.2 Motivation

Nowadays traffic Jam is one of the most irritating and common problem in Bangladesh. The main cause for its population. After researching, we came to know that More than 12 millions of people live in Dhaka city. Day by day the number of people is increasing and almost most all the part of Dhaka is badly affected by huge traffic jam. Faulty traffic signaling system, overtaking tendency of drivers and narrow road spaces create pro-longed traffic congestions. It's hampered our economy, spoil out valuable time, degradation of the environment, waste of fuel, growing accidents rates, patients lose their lives in Ambulance due to traffic jam. So we decide that, we have to do something about that. If we look at our traffic light those are going on static way. IF we obey with this static signal we will suffer more than our benefit. For that reason, traffic police control the traffic. But it's too tough to control these heavy traffic congestions. That's why everyday traffic police fail and we fall in traffic jam.

So if we develop a dynamic traffic light system which can automatically detect which route fall in long traffic jam and it will give those route some extra time to free traffic. That will be interesting and we will all benefited. We know about google map, google traffic. We can make a system by using google traffic congestion APIs from Google. Which can make a better traffic light system with a better traffic flow.

1.3 Rationale of the Study

There is no doubt that there are thousands of works done on computational technology or software packages, Application Program Interfaces. But there are only a few works done on Automatic Traffic System for better traffic flow. So our work is a new approach using different algorithms and simulation to develop more efficient classifier application in the field of Automatic Traffic. We give out best effort to develop our own model.

We sort out the best algorithm in the field of Internet of things to reduce the traffic problems. This system will integrate traffic system into a single application.

1.4 Research Questions

1. Why traffic jam happens?
2. What are the main reason of traffic congestion?
3. What are the impact of traffic in our daily life?
4. How to solve this Traffic congestion problem?

1.5 Expected Output

- Improve Traffic detection system
- Reduce Traffic duration
- Improve quality of traffic flow
- Reduce communication gap

1.6 Report Layout

Chapter 1: Contains demonstration of introduction to the project with motivation, rationale of the study, research question, and expected output.

Chapter 2: Chapter two provides the discussion on what already done before. Briefly discussed about Related Works, Research Summary, Challenges and Scope of the Problem.

Chapter 3: Here have an introduction of Research Methodology and discussion about Research Subject and Instrumentation, Data Collection Procedure, Statistical Analysis, Implementation Requirements.

Chapter 4: This chapter provides a short introduction of Experimental Results and Discussion. And a brief Descriptive Analysis.

CHAPTER 2
BACKGROUND

2.1 Introduction

Here we will discuss about related works, research summary and challenges about this research. Here we will discuss about some other research paper's works, method, accuracy, problems and challenges which are related to our work.

2.2 Related Works

In previous to control traffic system in traditional way it requires some kind of sensors like **pneumatic tubes, automatic traffic counters, induction loop, WSN, Video/image processing.**

Pneumatic tube is one of the most method and it's good for little time span on low volume motor vehicle sensing. They have extra rubber hoses which lengthen covering the road and joined with the end part of data recorder and other end part of the tube is locked. When a brace of wheels hit the tube of the vehicle, the thrust of air in the squeezed tube activates the data recorder which records the event time. A brace of tubes can be dragged covering different lanes of traffic. The direction of vehicle can be proved by the data recorder through recording which tube is crossed first. It has some downside that if two more vehicle diagonally cross the tubes at a time then the route can't be decided correctly. If two cars cross the tubes closely, the system take it multi-wheels vehicles [1].

Problems

- Lack of ability to detect vehicle
- Maintenance problem
- Less effective on higher volume
- Multi-lane highways

Automatic Traffic Counting and Classification (ATCC) is able to computing motor vehicles according to their type with help of different type of technologies like video / photographic method based, infrared sensors, Pneumatic tubes etc.

Methods of Counting: There exist primarily two methods of traffic counting, manual count and automated counting. Under automated count, there are several methods, which can be sensor oriented like, road tubes, piezoelectric sensors and video / photographic method based [2, 5].

Time span and Interspace of Traffic Estimation

For predicting the flow volumes of traffic that can be prospective on the road system during certain periods, wisdom of the fact is necessary that traffic volumes considerably change at each point at a time and there are three principal cyclical differences:

- Hourly pattern
- Daily pattern
- Monthly and yearly pattern

When exploring the traffic, the most awareness thing is the directional distribution of traffic and the method which its tracing varies as it is significant to deal with tidal flow [5].

Hourly patterns- Typical hourly patterns of traffic flow, particularly in urban areas, generally show a number of distinguishable peaks. Peak in the morning followed by a lane flow until another peak in the middle of the afternoon, after which there may be a new peak in the late evening. The peak in the morning is often more sharp by reaching the peak over a short duration and immediately dropping to its lowest point [5]. The afternoon peak on the other hand is characterized by a generally wider peak. The peak is reached and dispersed over a longer period than the morning peak.

Daily patterns – Throughout the week, the volume of traffic can be changed. During the working days (Monday to Friday) traffic may not vary enough, but during weekend, the traffic volume is probably different from working days in several roads and directions [5].

Manual Method

Manual methods are use to count and classify traffic flows in the past a fixed lane or road. Number of counters are needed to count the vehicles depend on the number of lanes that the highway have on which count is to be Taken, accuracy and types of information desired. IRC recommends to store the data of each direction of travel separately [4]. It is wish to have literate counters with qualification exceptionally middle or matriculation. For going up with the accuracy and maintain precision, the work is done in alterations, with enough time given to each exact for rest as well as food and water [4].

Manual counts are generally used to take data from turning movements, determination of vehicle classification, pedestrian movements, direction of travel and vehicle occupancy [3.5].

Automatic Method:

Here are a lots of different devices and software application, which can do accurate traffic count. Automatic counts are generally used to take data for daily or seasonally variation, determination of vehicle hourly patterns and growth trends or annual traffic estimates.

Photographic Methods

Photographic technique was first used for the traffic study between “Baltimore and Washington in 1927”. **Green shield** is the one who consider as one of the beginner pioneer in traffic engineering was a sustained of Photographic methods. In 1933 he submitted the use of Photography method [5].

Study Method for Project

The selection of study method was determined to be manual with software based validation, considering the count period and amount of data that was to be generated. The count period was 24 hours at all times of day, all days of the week, Photographic Techniques have been used to capture the traffic data in real time and analyze it offsite [5].

This allows us to provide

- Accurate data
- Permanent record of Traffic Conditions
- Analysis was done in the office when the recorded video was played and performing analysis on Monitor using Annotation software.

Due to constraints in camera angle, speed of travel and night time conditions automatic methods combined with manual methods are more effective because they are not impacted by equipment limitations and conditions of the survey. With an eye to increase the efficiency of census a combination of both the methods has been used.

Categorization Schema

As per scope of the work, camera and application based count of traffic/ vehicles plying on north bound and south bound lanes of Mumbai Pune Expressway. Categorization of vehicles with the help of application, to broadly categorize into [5],

- Car
- Truck
- Bus
- Light commercial vehicle (LVC)
- Multi Axle vehicle
- Trailer

Used Equipment's in ATCC

- Hikvision cameras: camera DS-2CD4A26FWD-IZS(2.8-12mm)
- 9U Rack
- D-Link 8 Port 10/100 Mbps Ethernet Switch
- Midas Core McLTE-710 4G LTE Router
- Micro tech Sinewave UPS SEBz 900VA
- Industrial Power Supplies
- HIKVISION DS-7604NI-K1 NVR
- SIM card
- Automated vehicle counting and classification software

Problems

- have a very short life
- Lack of skill to track out parallel vehicle movement
- needs a lot of tools and sensors
- maintenance

Induction loop is an electromagnetic communication. Which uses a moving magnet or an alternating current to induce an electric current in a nearby wire. Induction loops are used for transfer and receive communication signals, or for detect the metallically objects in metal detectors. The modern uses of induction loops is to provide hearing assistance for those people who can hear [6, 11].

An inductive loop is the coil of wire which are embedded with the road's surface. To install the loop, they lay the pitch and then come back and cut a indention in the pitch with a saw. The wires are placed in the indention and sealed with a rubbery component. We can often see these big rectangular loops cut in the footpath because the component is conspicuous. The inductive loop works by detecting a change in inductance. To know the process, at first look at what inductance look like. The illustration on this page will helps.

What you see the fig 2.2.1, here is a battery, a coil of wire around a piece of iron (yellow), a light bulb, and a switch. The coil of wire is an inductor. If you ever read the principle of electromagnet working procedure, you will understand that the inductor is an electromagnet [11].

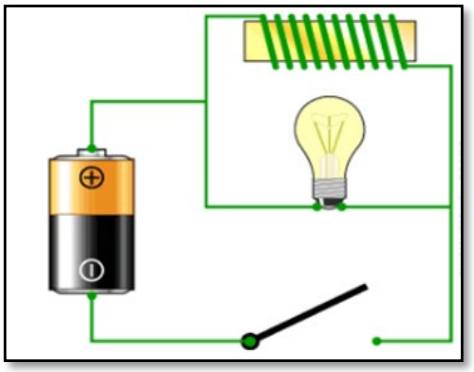

Fig 2.2.1: Inductive Circuit

If we take out the inductor from the circuit, then it will be only a flashlight. We close the switch and the bulb lights up. With the inductor in to the circuit showing in the fig 2.2.1, the acting is completely different. The bulb is only a resistor. And the wire in the coil contains much lower resistance. So what you may expext that when you turned on the switch is for the bulb to glow very dimly.

Most of the current must provide by the low-resistance path of the loop [11]. What happen when we close the switch, the bulb light up brightly and then gets dimmer. Then when we open the switch, bulb light up very brightly and then quickly goes out.

The main reason for this peculiar acting is the inductor. When the current at first start flowing in to the coil, the coil create a magnetic field. While the magnetic field is create, the coil blocks the flow of current. When the field is built, then the current can flow naturally through the wire. When the switch get is opened, the magnetic field across the coil continuously provide current flow in to the coil as long as th field break down. This flow of current lit up bulb for a period of time even the switch is open [11].

The inductor capacitance is controlled by 2 factors:

● the total number of coils

● the material by which the coils are wrapped around (the core)

Putting iron in the core of an inductor gives it much more inductance than air or any other non-magnetic core would. There are devices that can measure the inductance of a coil, and the standard unit of measure is the henry [6].

Let us consider that we take a coil of wire likely 6 feet in diameter, containing seven or eight loops of wire. Then we cut some indentions in a road and place the coil in the indentions. Then we join an inductance meter with the coil and see the value of the inductance of the coil. Now we place a vehicle over the coil and check the value of the inductance again [11]. The inductance will be bigger because the large steel is placed in the loop's magnetic field. The vehicle placed over the coil is working like a core of inductor, and its existence changes the inductance of the coil [6, 11].

The traffic light sensors uses the loops in the same way. It continuously tests the inductance of the loop in that road, and when the inductance go up, it knows that there is a car which is waiting.

Problems

- Needs road cutting for deployment.
- highly maintenance costs
- low accuracy in consecutive traffic

Wireless Sensor Networks (WSN) are highly distributed, lightweight nodes, deployed in large number no. to monitor the environment or system. The distribution based on ad-hoc manner. Sensor nodes are fitted with on board processor. The sensor nodes are consisting with these three things.

- Sensor subsystem
- Processing System
- Communication system

There have a lot of sensors of sensor network and each and every sensor have a base system or station. The Base stations are used for communicating. Every Base station eventually connected with the internet fig 2.2.2[9].

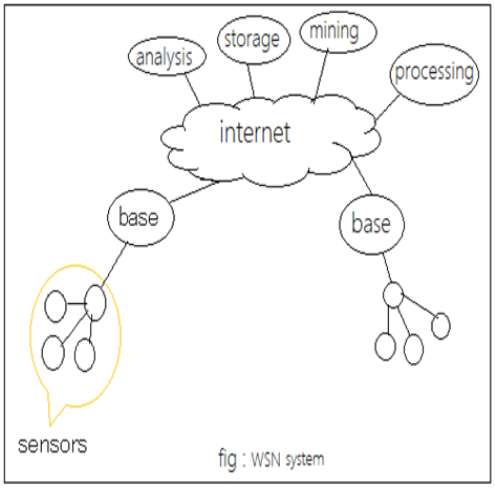

Fig 2.2.2: Wireless Sensor Network

When data goes on the internet, then these data Used for many purpose like-

- Data processing
- Data mining
- Data Storage
- Data analysis

So the sensors sense the object from the road and will transmit data to base station and the base pass the data to internet for process.

Problems

- Quality of service
- Energy efficiency

Video/image processing

There are using various kind of tactics or system for track out or detecting vehicles on road such as motion detection system, establish lasers on both sides of the road [13], etc., which is exhausting, complicated and involves large number of hardware. But this System uses image processing techniques to calculate the number of vehicles on road and estimate the viscosity. These amount of vehicles used for surveying or controlling the traffic signal. This System is actually based on two parts, one is vehicle detection using video and another one is vehicle detection using image processing [17].

Vehicle detection using Video

During Last four to five decades there are many techniques have been developed in Video Processing. there are One of them is equalize technique [14] [15], At first it takes the preceding image and after take the current image and then make differentiation between that two images and according to the difference the system gets the percentage of congestion [16]. But nowadays we are using filter craftsmanship that can give us the accuracy result more than 90% [17].

Vehicle detection using Image

Another method is image processing. Image processing is kind of technology or methods of images using mathematical functions by using any appearance of signal processing for which the input of image is. The outturn of image processing may be either an image or a set of peculiarity or parameters related to the image. Actually Image processing is used to detect substance or object but we can be use it exceptionally detect vehicles [17].

Problems

- Don’t work well in foggy weather
- It gives low accuracy on non-standardized vehicle number plates.

Predict Traffic on Google Maps for Android

Google traffic map can predict google traffic congestion. To predict they use various kind of sensors global positioning system, records of previous traffic and several factors etc. [18]. These sensors and data helped google to give a real time traffic update and by using these parameters google can predict traffic in future also. Generally, this data gives the accurate result but sometimes fall the accuracy when a recent change or patterns like crash at the site or constriction happened.

How to predict traffic on Google Maps

At first we have to open Google Map application on your Smartphone and then find the direction button and tap on it fig 2.2.3.

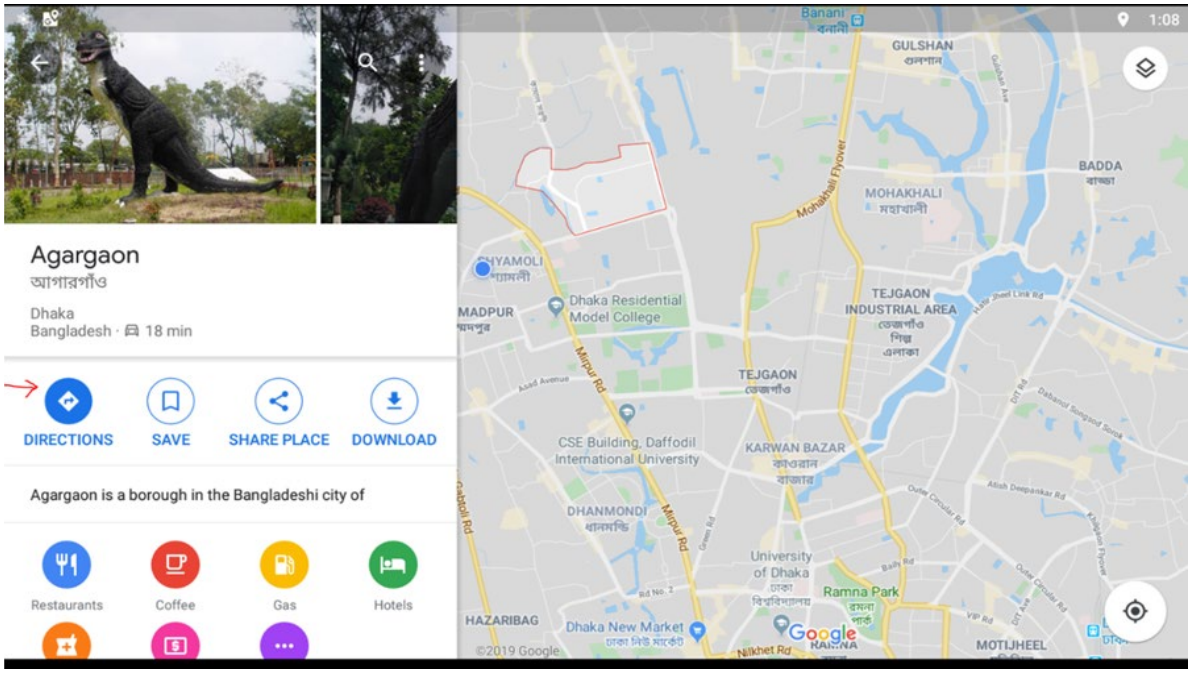

Fig 2.2.3: Google Map Direction

Then enter your location or turn on GPS and choose your destination path fig 2.2.4.

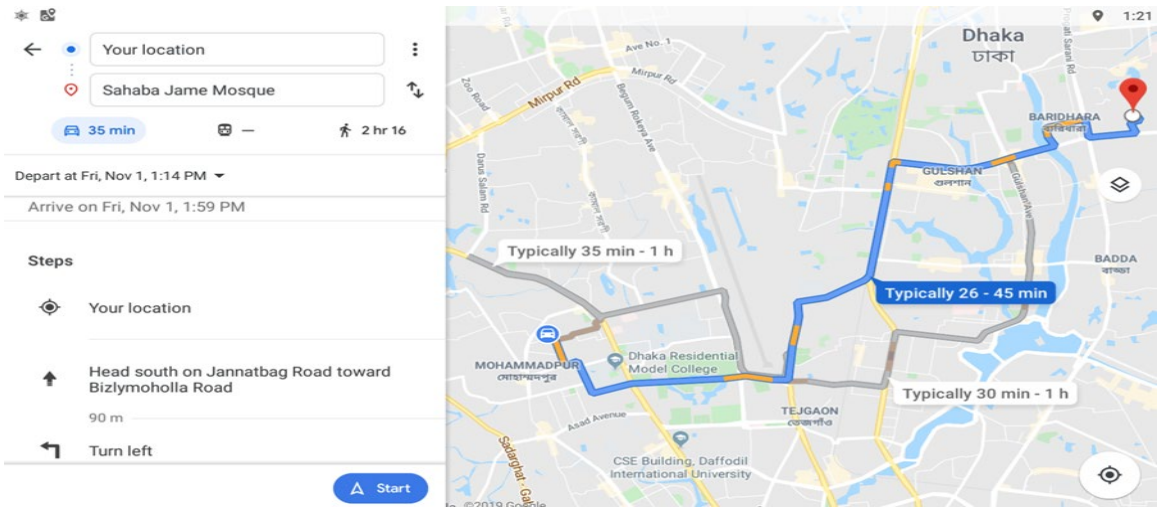

Fig 2.2.4: Enter Location on Google Map

After that you can see destination traffic weight path, somewhere blue and somewhere light red. Now tap on the three vertical dots on the top right divide corner.

Then select departure time, here I select Nov 1, 1.14 pm and the maps automatically will generate traffic prediction on this route, below here fig 2.2.5.

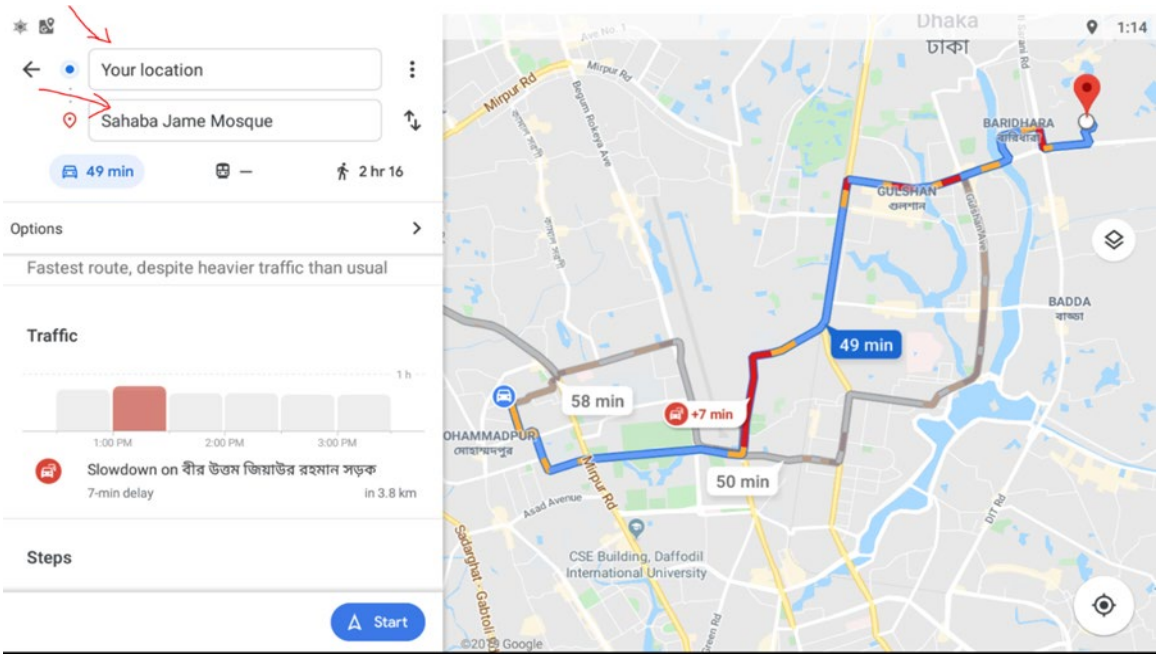

Fig 2.2.5: Google Map Traffic Prediction

Problems

- Sometimes accuracy fall down.
- Huge data storage needed.

2.3 Research Summary

The cumulative amount of vehicles on the road incision has given rise to the problems like road accidents, congestions, collision etc. To reduce this problem their many kinds of methods and techniques are used on traffic system like pneumatic tubes, Automatic traffic counters, Inductive loops, Video/image processing, wireless sensor network, google prediction on traffic and those are described above the part. Some sensors are pretty good but actually works well in short duration judge on lower volume roads. Some are given the high accuracy but it foggy weather it doesn't work properly. Some are too costly and security threats.

So after researching all this things we come to the point that, these sensors or methods all are used in previous, those have some lacking and which are not negligible at all. That's why we need a better solution to solve this problem.

2.4 Scope of the Problem

As described above every sensors or algorithm have some lacking's which are not negligible.

- Low accuracy
- Needs lot of tools
- High maintenance cost
- Lack of ability to detect vehicles

2.5 Challenges

In background study we discus about how can be solve this problem by using some sensors or algorithms. We will can be solve this problem by use any one procedure but it through to us some challenges.

- Scalability
- Security
- High maintenance

Chapter 3: Research Methodology

3.1 Introduction

In this section we are going to elaborate the workflow of our novel approach to classify Automatic Traffic System. There we will discuss about some key points like data collection, process data, system model, graph, equation, algorithms, table and description. The chapter holding clear concepts and implementation requirements of our project.

3.2 Research Subject and Instrumentation

Research subject can be called as research area that was reviewed and studied for clearing concepts. Not only for implementation but also for design model, collecting data, implement or process data. On the other section is Instrumentation that is which technology and method we used. We used windows platform, NetBeans, java swing, MySQL and with many datasets like google traffic congestion APIs and system database. Here google APIs use for collect data of google traffic map. NetBeans application use for implements all methods here to create the system. NetBeans is free application for java and R programming languages for data science.

3.3 Data Collection Procedure

Here we will provide a brief discussion about data collection procedure of our system mythology

State 1: We will collect data from google traffic congestion APIs and the raw data will store to our system database. Collecting data from google so challenging. Till now google not giving this kind of data with source but in future have chance.

State 2: So far google still not giving source of APIs and raw database, that's why we are providing some dummy data in our system database.

State 3: in this state we taking some raw data from our dummy database and use those data in our calculation, condition.

State 4: After calculating those process data, we generate a new data or result (signal timer). Then we pass the timer result to the specific road signal.

State 5: At the same time we update data to our system database for future use.

3.4 Statistical Analysis

Lane mechanism analysis

Here we showing how our system checking the current traffic level of the current road lane. Then it will check the traffic level of that road lanes by whom vehicle will go. Then check traffic level of the other road lane of that signal.

4 Way lane:

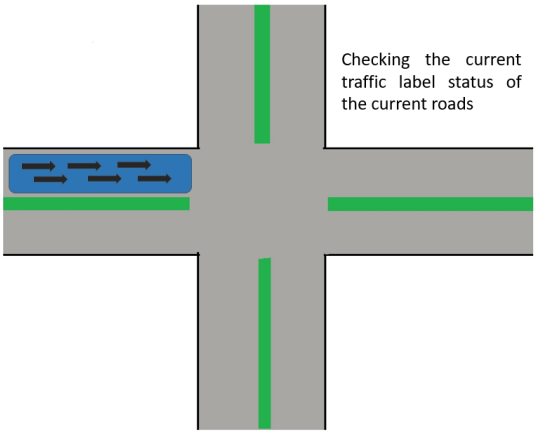

Fig 3.4.1.1: System at first check the current traffic level of the current road.

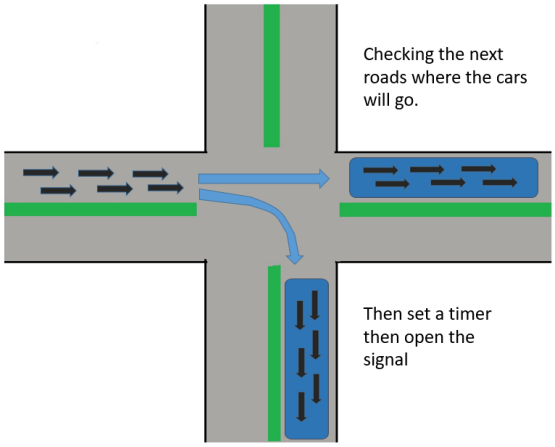

Fig 3.4.1.2: Then system check the current traffic of the road by whom the vehicles will go. Then calculate a timer.

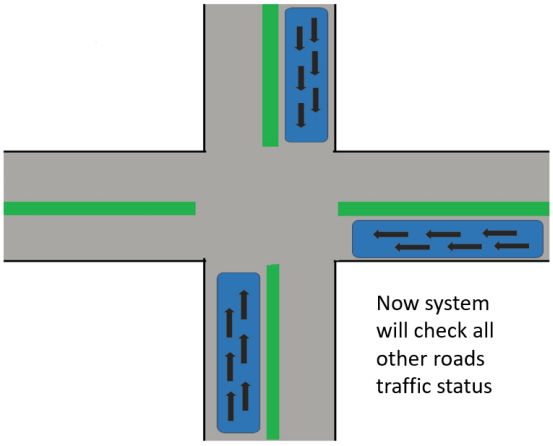

Fig 3.4.1.3: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

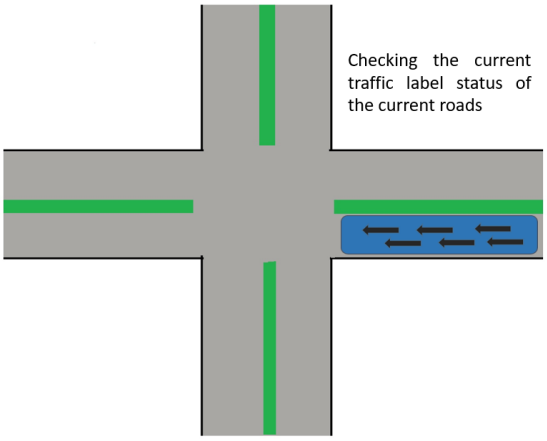

Fig 3.4.1.4: Now for the next lane, system at first check the current traffic level of the current road.

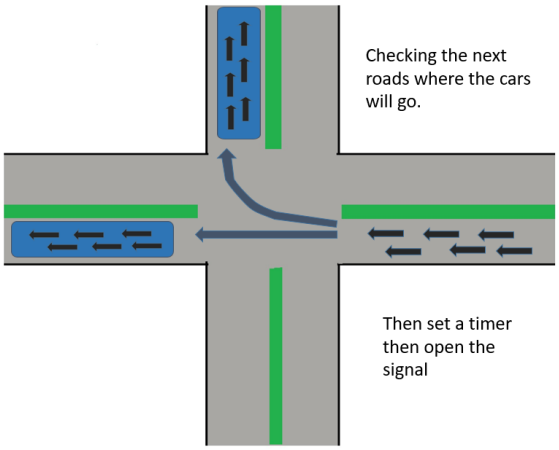

Fig 3.4.1.5: Then system check the current traffic of the road by whom the vehicles will go. Then calculate a timer.

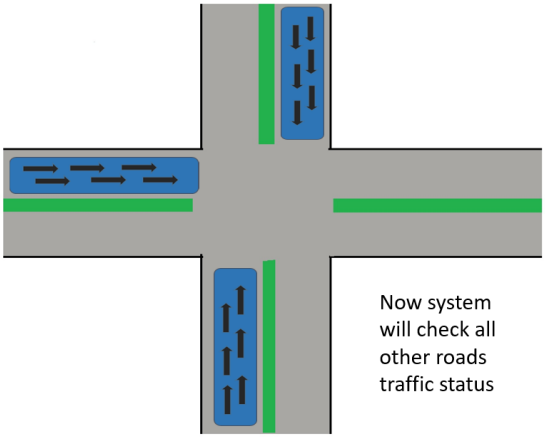

Fig 3.4.1.6: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

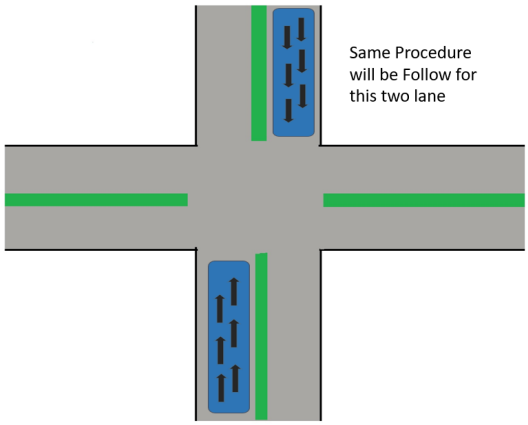

Fig 3.4.1.7: So now system use the same procedure for the other two lane to calculate timer for them.

3 Way lane:

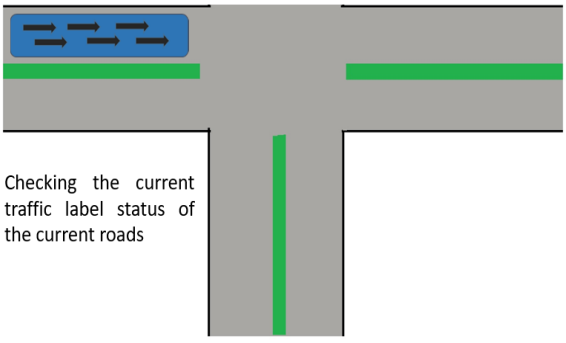

Fig 3.4.2.1: System at first check the current traffic level of the current road.

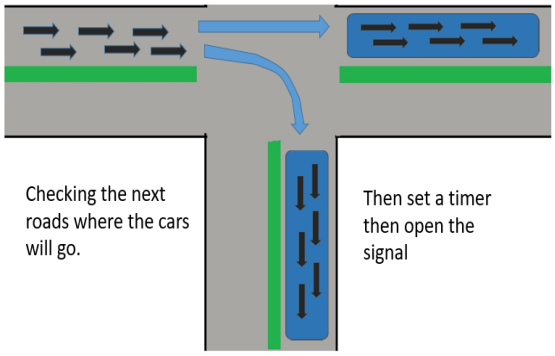

Fig 3.4.2.2: Then system checking the current traffic of the road by whom the vehicles will go. Then calculate a timer.

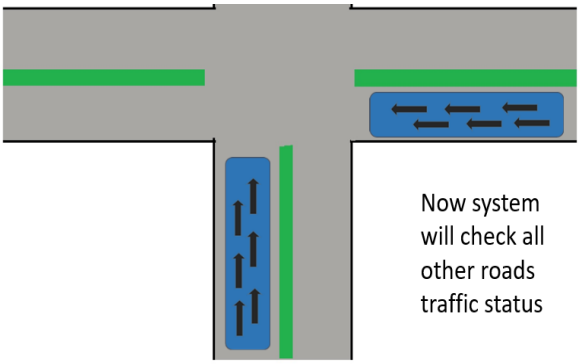

Fig 3.4.2.3: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

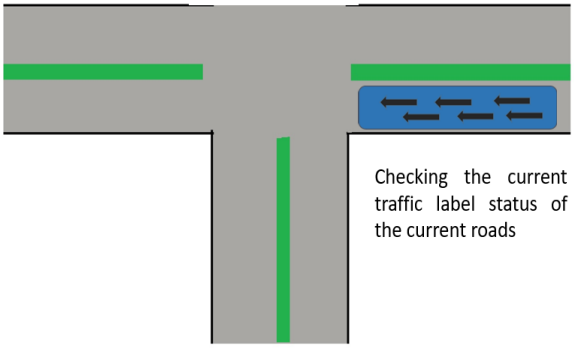

Fig 3.4.2.4: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

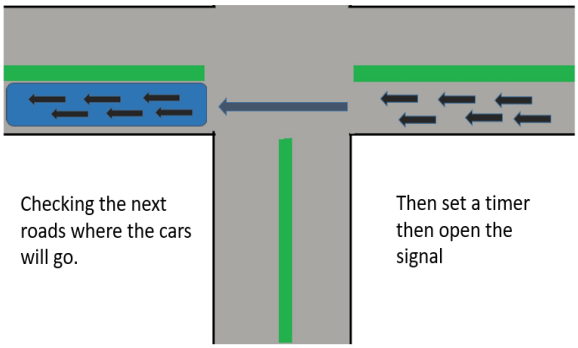

Fig 3.4.2.5: Then system check the current traffic of the road by whom the vehicles will go. Then calculate a timer.

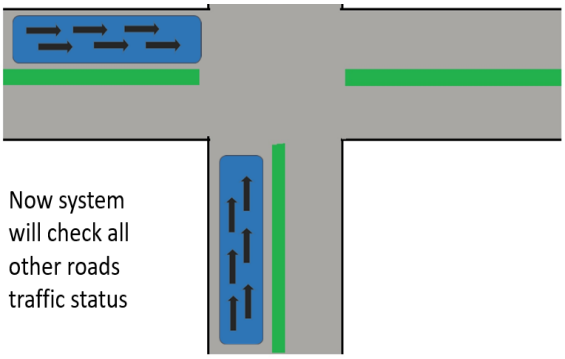

Fig 3.4.2.6: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

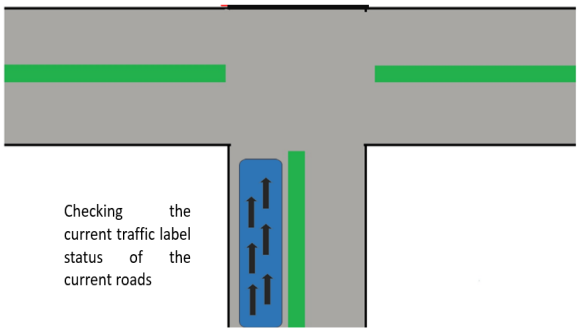

Fig 3.4.2.7: Now for the next lane, system at first check the current traffic level of the current road lane.

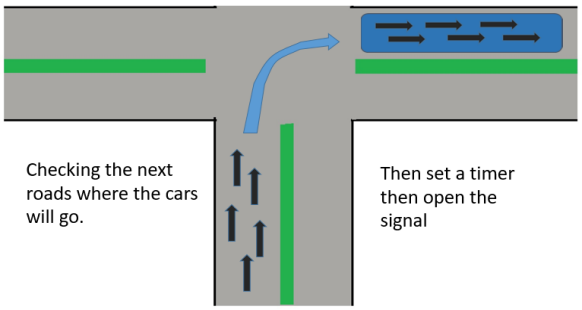

Fig 3.4.2.8: Then system checking the current traffic level of the road by whom the vehicles will go. Then calculate a timer.

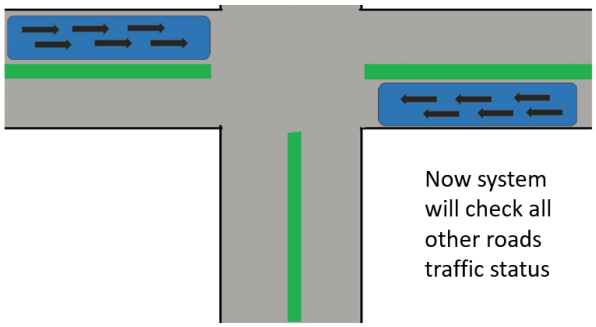

Fig 3.4.2.9: Then system check the current traffic level of all other roads of the signal. Then take the first timer and calculate a new timer.

GUI mechanism:

There are some images of the different images of frames or pages of the software. We made it user friendly and any one can easily use it. User can use it only when he is connect with the internet.

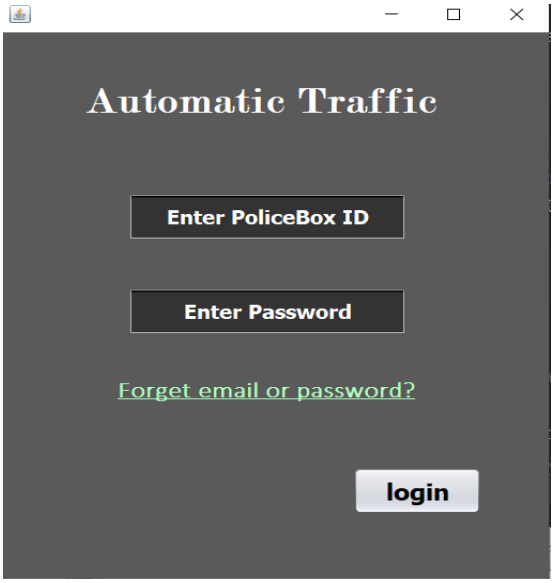

Fig 3.4.3.1: User have to enter policeBoxID and password then can login or can go forgot section

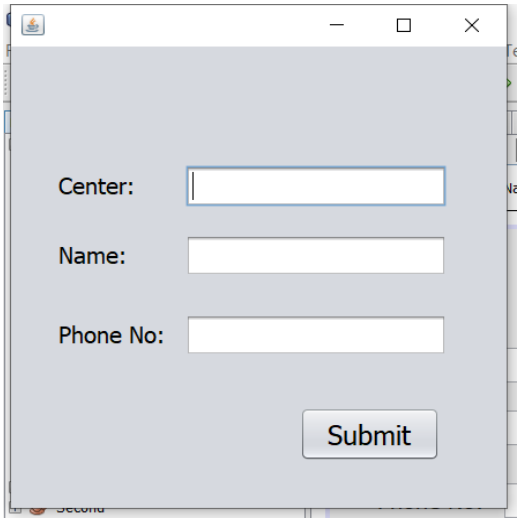

Fig 3.4.3.2: Here he has to enter police box center , his name , his phone number then submit and then he has to wait to get the recovery message.

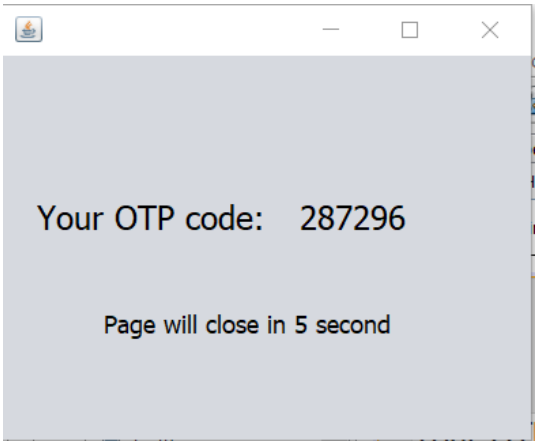

Fig 3.4.3.3: User get a OTP code only for 5 second.

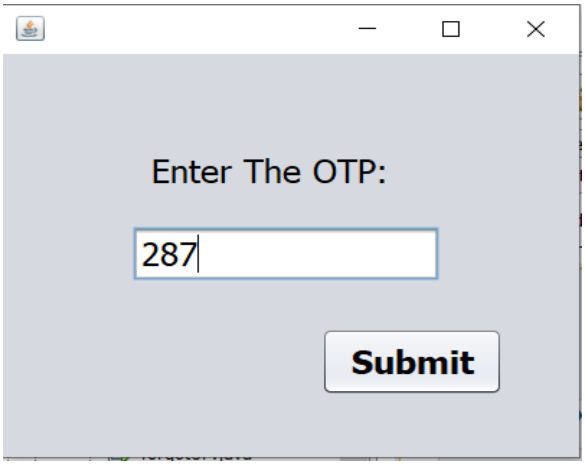

Fig 3.4.3.4: User have to enter the OTP code.

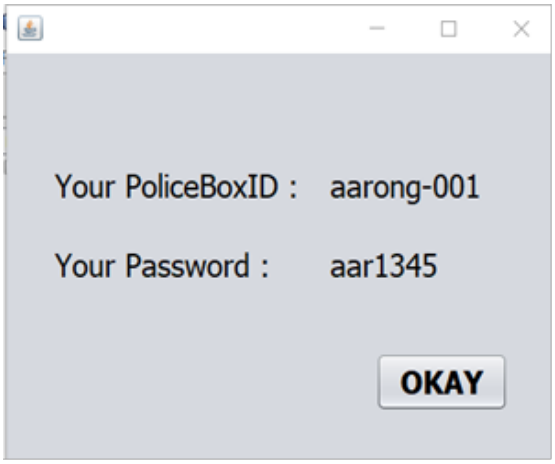

Fig 3.4.3.5: Then user get his PoliceBoxID & Password

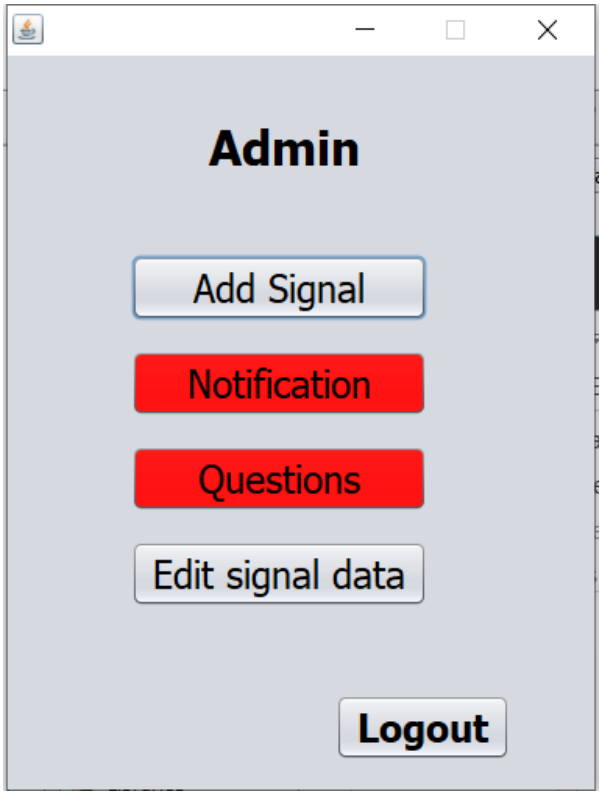

Fig 3.4.3.6: It's an admin frame.

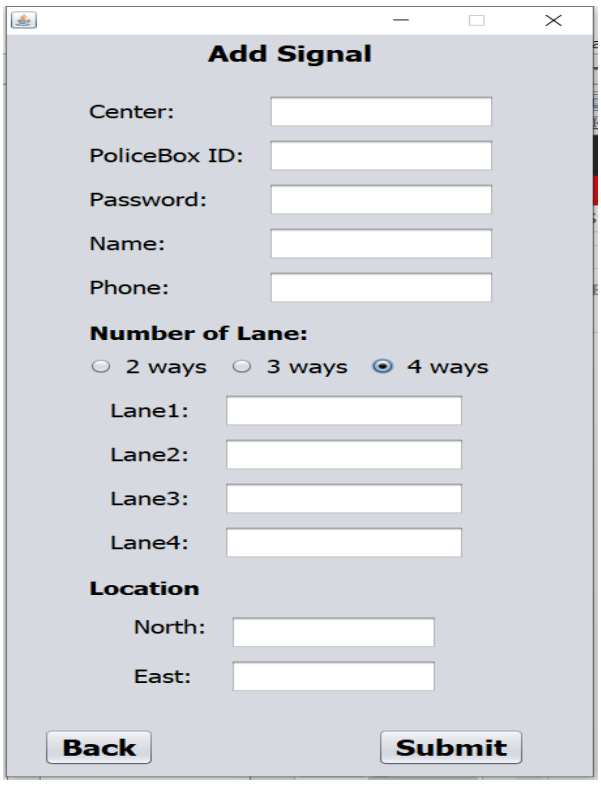

Fig 3.4.3.7: Here admin will create a account of a specific traffic signal.

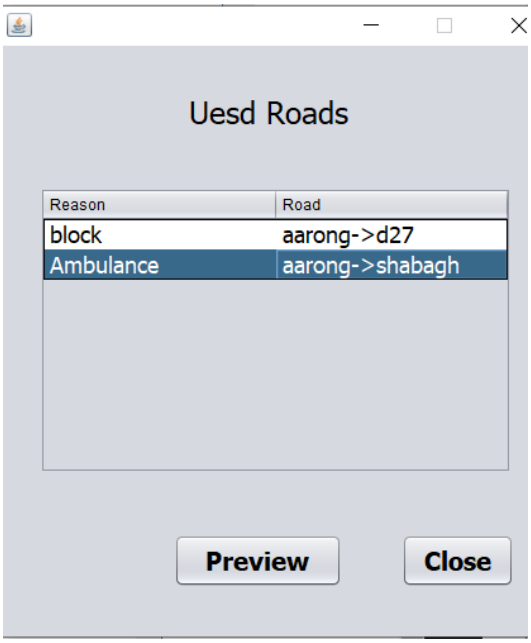

Fig 3.4.3.8: User can see the road which are in emergency or VIP or blocked.

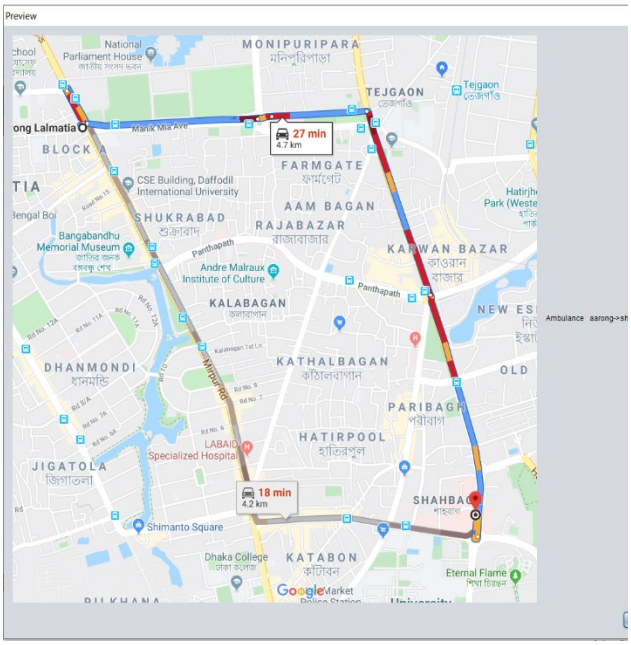

Fig 3.4.3.9: After select preview option from the notification frame, this frame will be occured.

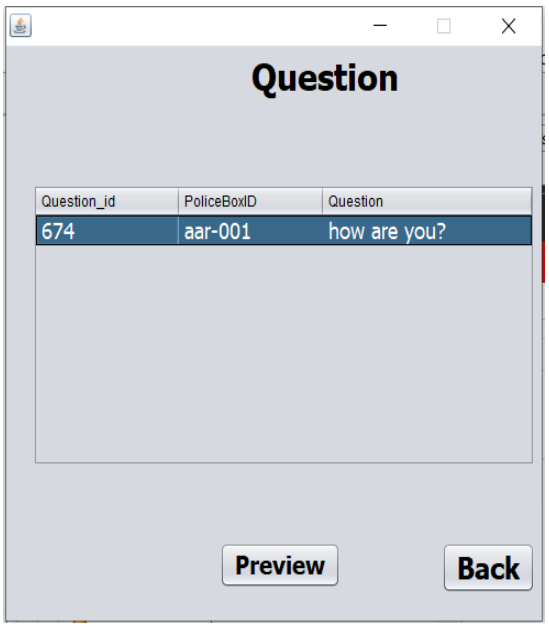

Fig 3.4.3.10: Admin can see the question, which he didn't answer yet.

Fig 3.4.3.11: After selecting preview from the question page this page will come and he can give the answer of the question.

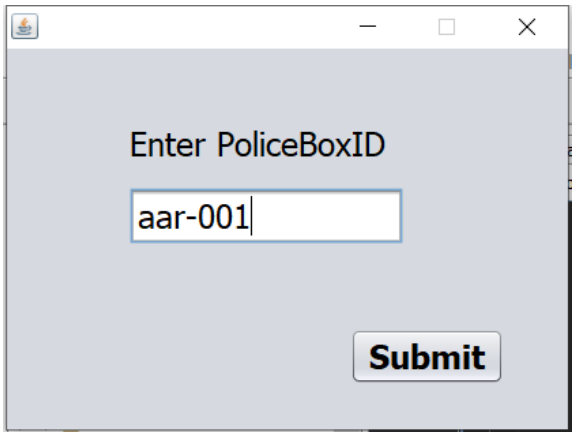

Fig 3.4.3.12: After choosing edit option admin has to give valid policeBoxID.

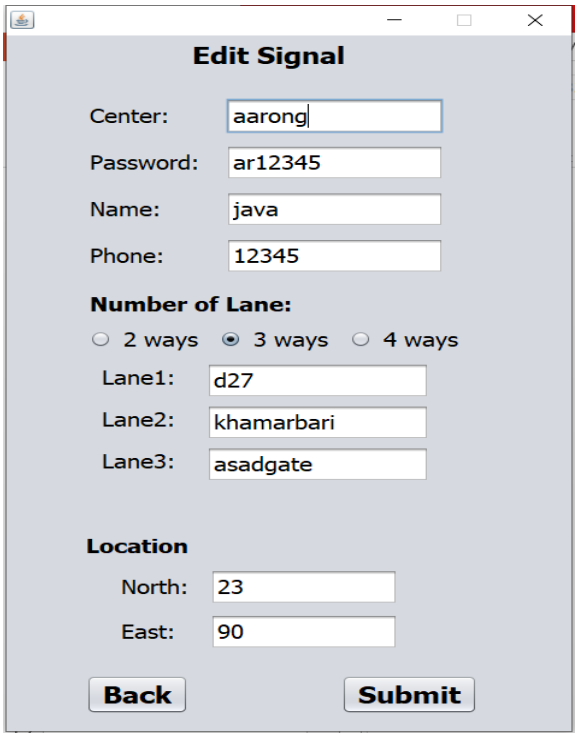

Fig 3.4.3.13: Here admin can make any changes in any data of any user.

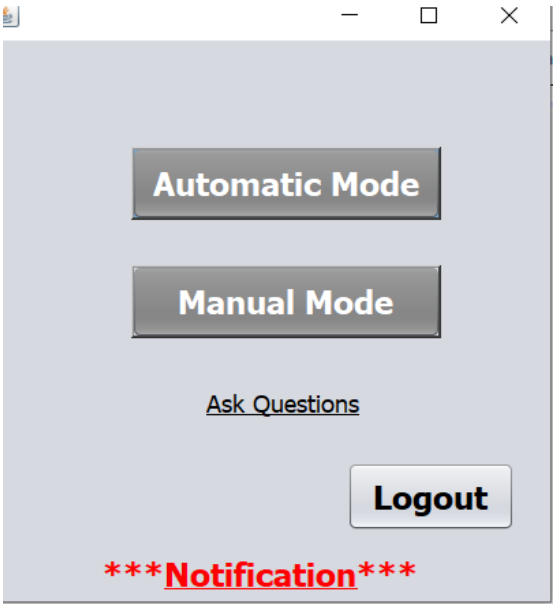

Fig 3.4.3.14: In the user mode can go to automatic mode, manual mode, can see notification table and can ask any question to headquarter.

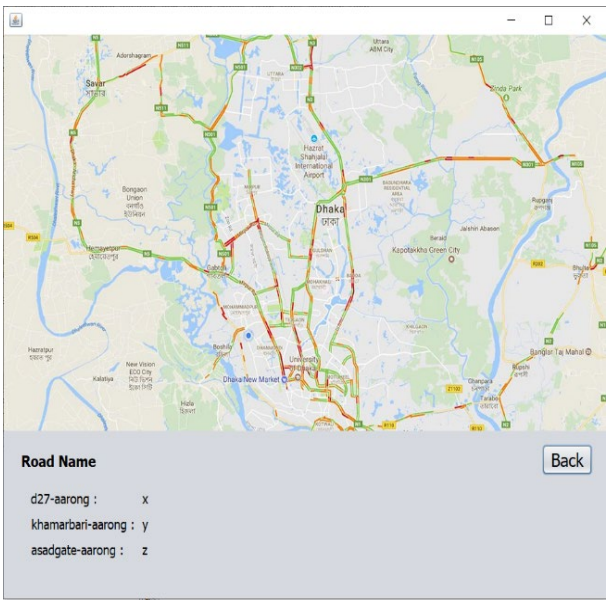

Fig 3.4.3.15: In automatic mode he can see his signal position, lane names , timer of each lane.

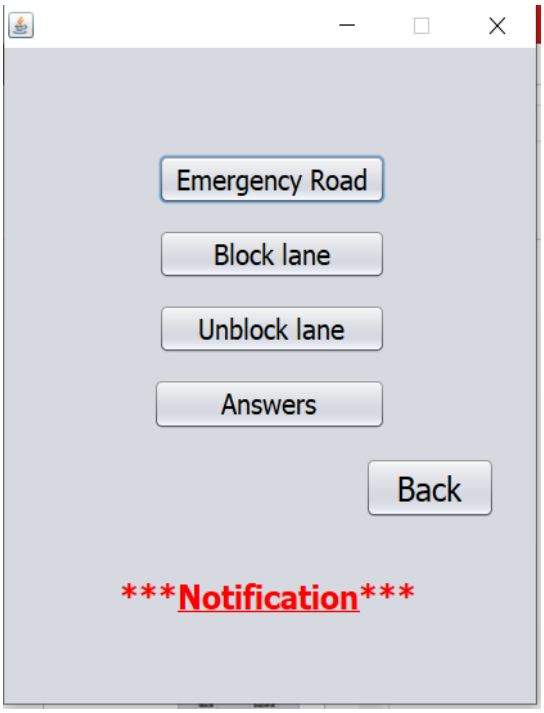

Fig 3.4.3.16: In manual mode he can choose emergency road or block lane or unblock a lane or answer or notification

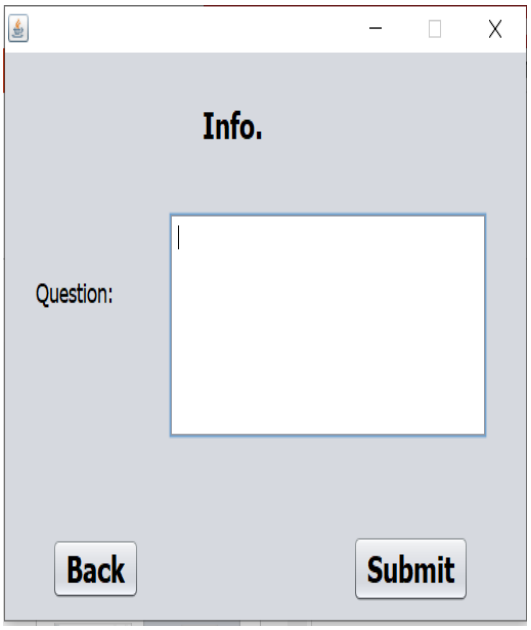

Fig 3.4.3.17: For asking question he has to type the question then submit.

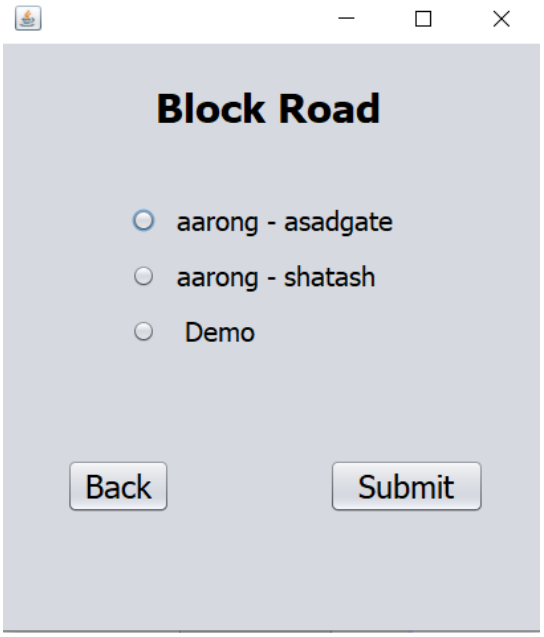

Fig 3.4.3.18: User can choose the lane he wants to block of that signal.

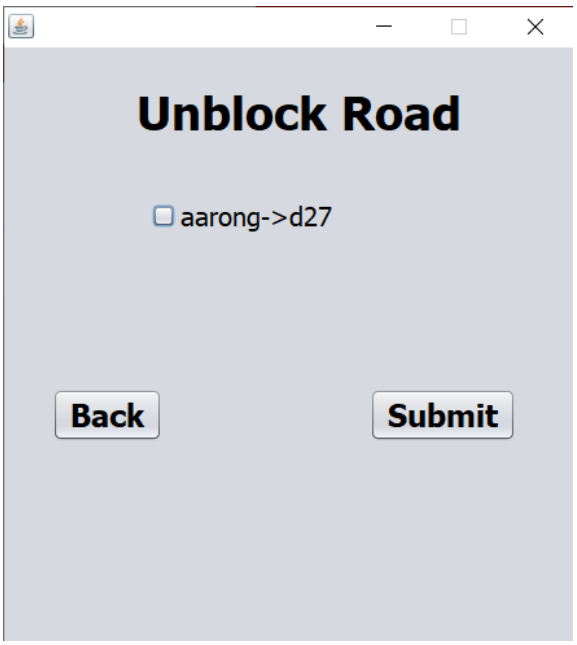

Fig 3.4.3.19: User can unblock the lane that he blocked before.

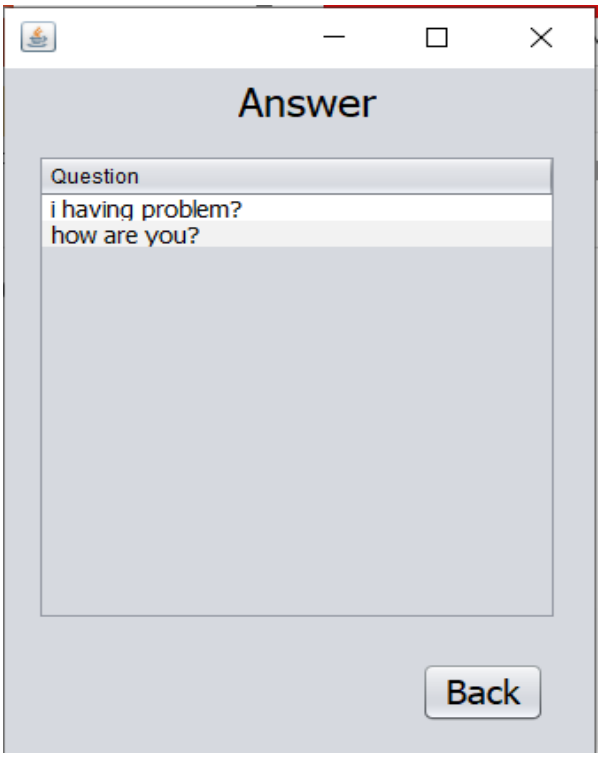

Fig 3.4.3.20: User can see the questions that he asked before.

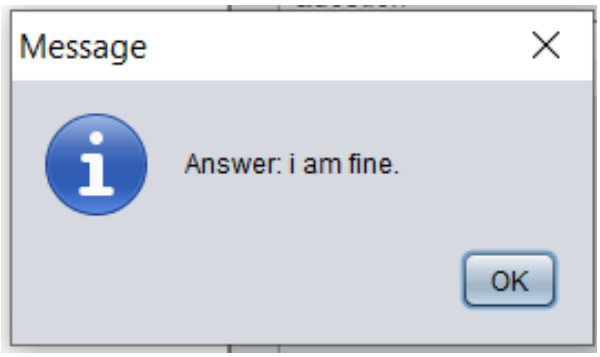

Fig 3.4.3.21: After clicking on any question, he can see the answer.

Database:

Here we take a scenario road few roads. Based on those road, we showing the database table.

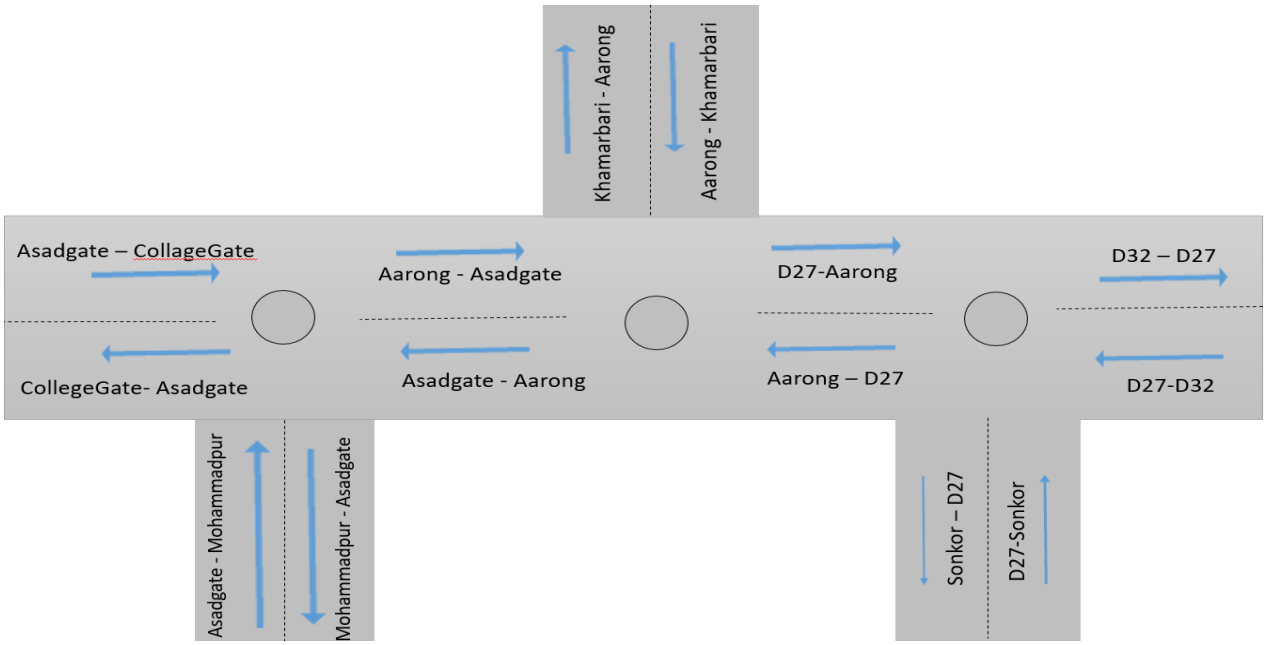

Fig 3.4.4.1: Demo Figure for Database

Table 3.4.1: Police Data Table

Policebox_id	password	user_name	Center_position	Num_of_lane	Road1	Road2	Road3	Road4	North	East
aarong-001	aar1345	jobbar	aarong	3	d27-aarong	khamarbari-aarong	asadgate-aarong		23.758274	90.374177
d27-001	d271243	akash	dhanmandi27	3	d32-d27	sonkor-d27	aarong-d27		23.756386	90.375224
aasadgate-001	Adg1234	robbani	aasadgate	3	aarong-asadgate	mohammadpur-asadgate	collegegate-asadgate		23.764164	90.370764

Table 3.4.2: Notification Table

Policebox_id	reason	Start_locatio	destination
aar-oo1	block	aarong	khamarbari
d27-001	ambulance	d-32	farmgate

Table 3.4.3: Question Table

q_id	Policebox_id	question	answer
256	d-27-001	What is the date?	5th December 2019
368	fra-001	How are you?	

Table 3.4.4: Roads Traffic Level

road_id	status
aarong->khamarbari	green
aarong->d27	red
aarong->asadgate	yellow
khamarbari->aarong	red
d27->aarong	deepRed
asadgate->aarong	red

Table 3.4.5: Roads Timer Table

road_id	timer	openClose
aarong->khamarbari	X	open
aarong->d27	Y	close
aarong->asadgate	Z	close
khamarbari->aarong	A	close
d27->aarong	B	close
asadgate->aarong	C	close

3.5 Implementation Requirements

After the proper analysis on all necessary statistical or theoretical concepts and methods, a list of requirement has been generated that must be required for such a work of Automatic Traffic System. The probable necessary things are:

Hardware/Software Requirements

- ✓ Operating System (Windows 7, 8.1, 10)
- ✓ Ram (Minimum 2 GB)

Developing Tools

- ✓ Java environment

Chapter 4: Experimental Results and Discussion

4.1 Introduction

In this section we described all the methods and algorithms of our system. Here we provided every methods process and classify them.

4.2 Descriptive Analysis

Add Signal:

```
if(!textfields.isEmpty())
        Object data = getAllDataFromTheFrame()
```

At first get all the data from the all textfield then check is any one is empty or not then send the data to the database tables (policebox_data, road_status, road_timer).

Notification:

```
If(!notificationTable.isEmpty())

        reason = getDataFromDatabase()

        if( compare( reason, “block”))

                road = getRoadNameFromDatabase()

        else if( compare( reason, “emergency”))

                road = getRoadNameFromDatabase()

        else if( compare( reason, “vip”))

                road = getRoadNameFromDatabase()

        else if( compare( reason, “ambulance”))

                road = getRoadNameFromDatabase()
```

Get all the rows from database (notification) where reason is block or emergency or vip or ambulance. Then show it to the user.

Send answer:

Var data = getAllDataFromDatabase()

if (answerColumn.isEmpty())

    Var qs = getQustionFromDatabase()

Var ans = getInputFromAdmin()

Here at first the question from question table where answer isn't given yet. Then admin enter answer for a specific question and then he send the answer to the specific row.

Edit Signal:

Var data = getDataFromDatabase(policeBoxID)

Object updatedData = getAllDataFromTheFrame()

At first get all the data for the specific signal (policeBoxID) then edit the data then send to the database (policebox_data) for the specific row.

Automatic Mode:

Var state [deepRed, red, yellow, green] = value [4,3,2,1]

currentRoadStatus = getRoadStatus (roadID)

$$\text{nextRoadsStatus} = \frac{\text{getRoadStatus(roadId)+getRoadStatus+ ……..+nth(getRoadStatus (roadId))}}{\text{nthRoads}}$$

if (compare (currentRoadStatus, nextRoadsStatus))

    roadTimer = calculation (based on roads timer)

    wrostRoadStatus = compare (all other roads of that signal)

    if (compare (currentRoad, worstRoadStatus))

        currentRoadTimer = calculate (roadTimer)

After this whole calculation the timer will update for the specific lane.

Emergency lane:

Var startLocation = getInputFromUser()

Var destination = getInputFromUser()

Var reason = getRadioButton()

Then the whole data is send to the table (notification) with reason.

Block road:

roadID = getRadioButton()

roadID is given for the every radioButton if a radio button is chose then the roadID which ig given for the radiobutton is send to the database table (notification) with reason “block”.

Unnlock road:

roadID = getDataFromDatabase()

if (roadID.Reason is block)

    radioButton = roadID

Get the raodID which are “block” for a specific lane then set then as radioButton so that user can see which roads are block then if user chose the lane and submit it then the raodId data is remove from the database table (notification).

Question:

Var question = getInputFromUser()

Here the question with policBoxID and a random digit code send to the database table (question).

See answer:

Var question = getQuestion()

If(question.isClicked)

Showans of that question

Here user can see the question he send to then admin , if he click on any question then hee can see the answer which is given by the admin.

4.3 Summary

In this paper, we provided a brief discussion of all methods, algorithms and process of automatic traffic system. We used deferent database for different purpose. We use best algorithm to reduce traffic congestion and for better traffic flow. Our main concern was to set a better system for better life.

APPENDIX

To complete the project, we faced so many problem, first one was to determine the methodological approach for our project. Because we have to give the best algorithm. Another problem was that, collection of data, it was big challenge for us. There was no dataset available still now. That's why we create our own data and developed a best fit model. But in future have the scope that we can collect data from google traffic congestion APIs. Overall Working with this kind odd data is so interesting.

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Traffic Solution

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