

# **AUTOMATED TRANSPORT MANAGEMENT SYSTEM IN DHAKA CITY**

**BY**

**MD. SAZZAD HOSSAIN**

**ID: 151-15-4992**

**MD. OMAR FARUK**

**ID: 151-15-4732**

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

Supervised by:

**Dr. Md. Ismail Jabiullah**

**Professor**

Department of COMPUTER SCIENCE AND ENGINEERING

Daffodil International University

Co-Supervised by:

**Dr. Sheak Rashed Haider Noori**

**Associate Professor and Associate Head**

Department of COMPUTER SCIENCE AND ENGINEERING

Daffodil International University



**DAFFODIL INTERNATIONAL UNIVERSITY**

**DHAKA, BANGLADESH**

**JULY 2020**

## APPROVAL

This Project/internship titled “**Automated Transport Management System in Dhaka City**”, submitted by **Md. Sazzad Hossain, ID No: 151-15-4992** and **Md. Omar Faruk, ID No: 151-15-4732** 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 July 8, 2020.

### BOARD OF EXAMINERS



**Dr. Syed Akhter Hossain**

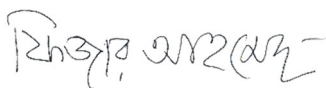
**Chairman**

**Professor and Head**

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



**Dr. Fizar Ahmed**

**Internal Examiner**

**Assistant Professor**

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



**Md. Tarek Habib**

**Internal Examiner**

**Assistant Professor**

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



**Dr. Mohammad Shorif Uddin**

**External Examiner**

**Professor**

Department of Computer Science and Engineering

Jahangirnagar University

## DECLARATION

I hereby declare that, this internship report has been done by me under the supervision of **Dr. Md. Ismail Jabiullah, Professor of Department of CSE** of Daffodil International University. I also declare that neither this report nor any part of this report has been submitted elsewhere for award of any degree or diploma.

### Supervised by:



**Dr. Md. Ismail Jabiullah**

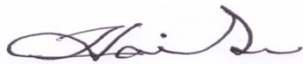
**Professor**

Department of Computer Science and Engineering

Faculty of science & Information Technology

Daffodil International University

### Co-Supervised by:



**Dr. Sheak Rashed Haider Noori**

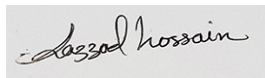
**Associate Professor and Associate Head**

Department of Computer Science and Engineering

Faculty of science & Information Technology

Daffodil International University

### **Submitted by:**



**Md. Sazzad Hossain**

ID: 151-15-4992

Department of CSE

Daffodil International University



**Md. Omar faruk**

ID: 151-15-4732

Department of CSE

Daffodil International University

## ACKNOWLEDGEMENT

First I express my heartiest thanks and gratefulness to almighty Allah for His divine blessing makes me possible to complete this internship successfully.

I fell grateful to and wish my profound my indebtedness to **Dr. Md. Ismail Jabiullah, Professor**, Department of Computer Science and Engineering of Daffodil International University, Dhaka. Deep Knowledge & keen interest of my supervisor in the field of vehicle tracking system influenced me to carry out this internship. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting them at all stage have made it possible to complete this internship.

I would like to express my heartiest gratitude to **Dr Syed Akhter Hossain, Professor and Head**, Department of CSE, for his kind help to finish my internship and also to other faculty member and the staff of CSE department of Daffodil International University.

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

Finally, I must acknowledge with due respect the constant support and patients of our parents.

## **ABSTRACT**

This project is about transport system. We want to try digitally managing the transport system through this project. We want to improve the existing transport system and adding new digital facilities. We propose a device system which can manage almost everything in transport system. It can use in public transport vehicle to manage and store data and this device can implement traffic laws and control the traffic and transport flaws. It will remove analog way billing system. It can control traffic speed. Automatically check traffic license. Control reckless bus stoppage. Manage traffic signal and laws. ATMS system cannot decrease traffic jam. ATMS system can use in all types of vehicles like public transport or private transport.

Considering the present transport system there are lot of problems are faced by the passengers and for existing transport problems the other sector also faced many new problems. And in Bangladesh traffic accident is so much common because of existing transport system flaws. Public transports and drivers are reckless because there is no perfect monitoring system available in transport system. The present transport system it is almost manual and analog which is also time consuming.

Day by day number of vehicles and transport are increasing. But traffic police are not increasing with respect to the numbers of vehicles. And the current situation it almost impossible to control the huge amount vehicles and transport with minimum number of traffic police. There are lot of things which should be checked almost every day and every time like license checking, vehicle fitness checking, vehicle papers, vehicle real time speed etc. To check these things manually transport system needs lot of manpower and that's why it is quit impossible with this existing analog system.

For this reason, this is perfect time for Bangladesh to implement a new and digital solution to manage this huge transport system. And in this project we try to find common flaws of traffic and transport system and find a suitable and best digital solution.

## **TABLE OF CONTENT**

| <b>CONTENTS</b>                | <b>PAGE</b> |
|--------------------------------|-------------|
| APPROVAL                       | i           |
| DECLARATION                    | ii          |
| ACKNOWLEDGMENT                 | iii         |
| ABSTRACT                       | iv          |
| <br><b>CHAPTER ONE</b>         |             |
| <b>INTRODUCTION</b>            | <b>1-4</b>  |
| 1.1 Introduction               | 2           |
| 1.2 Motivation                 | 2           |
| 1.3 Goals of Study             | 3           |
| 1.4 Methodology                | 3           |
| 1.5 Expected Outcomes          | 3           |
| 1.6 Origin of the Report       | 4           |
| 1.7 Organization of the Report | 4           |
| <br><b>CHAPTER TWO</b>         |             |
| <b>BACKGROUND</b>              | <b>5-8</b>  |
| 2.1 Project Overview           | 6           |
| 2.2 Related Works              | 6           |
| 2.3 Scope of the Problem       | 7           |
| 2.4 Targeted Problems          | 7           |
| 2.5 Existing Solution          | 8           |
| 2.6 Our Countries Situation    | 8           |

|                                                           |              |
|-----------------------------------------------------------|--------------|
| <b>CHAPTER THREE</b>                                      |              |
| <b>SYSTEM AND REQUIREMENT ANALYSIS</b>                    | <b>9-20</b>  |
| 3.1 Introduction                                          | 10           |
| 3.2 Architecture of Proposed System                       | 10           |
| 3.3 Description Proposed System                           | 10           |
| 3.4 Equipment for Proposed System                         | 15           |
| 3.5 Necessary Software and Language                       | 19           |
| <br><b>CHAPTER FOUR</b>                                   |              |
| <b>CODING AND TESTING</b>                                 | <b>21-28</b> |
| 4.1 Introduction                                          | 22           |
| 4.2 Algorithm                                             | 22           |
| 4.3 Background Coding                                     | 23           |
| 4.4 System Testing                                        | 26           |
| 4.5 Comparison between Expected and Actual Testing Result | 28           |
| <br><b>CHAPTER FIVE</b>                                   |              |
| <b>DESIGN AND IMPLIMENTATION</b>                          | <b>29-34</b> |
| 5.1 System Design                                         | 30           |
| 5.2 GUI Design                                            | 30           |
| 5.3 User Interface                                        | 31           |
| 5.4 System Implementation                                 | 32           |
| <br><b>CHAPTER SIX</b>                                    |              |
| <b>RESEARCH REPORT ON THIS PROJECT</b>                    | <b>35-39</b> |
| 6.1 Introduction                                          | 36           |
| 6.2 Pros and Cons of Existing System                      | 36           |
| 6.3 Effect of this Project on Our Daily Life              | 38           |
| 6.4 Pros and cons of This Project                         | 39           |

|                      |              |
|----------------------|--------------|
| <b>CHAPTER SEVEN</b> | <b>40-41</b> |
| <b>CONCLUSION</b>    |              |
| 7.1 Conclusion       | 41           |
| 7.2 Limitation       | 41           |
| 7.3 Future Thoughts  | 41           |
| <b>REFERENCES</b>    | <b>42-43</b> |

## **LIST OF FIGURES**

| <b>FIGURE NO</b> | <b>FIGURE NAME</b>                            | <b>PAGE NO</b> |
|------------------|-----------------------------------------------|----------------|
| 2.1              | Existing System Diagram                       | 6              |
| 3.1              | Architecture of ATMS System                   | 10             |
| 3.2              | Flowchart for scanning documents and saving   | 11             |
| 3.3              | Flowchart for Bus stoppage checking           | 12             |
| 3.4              | Flowchart for one door bus way billing system | 13             |
| 3.5.1            | Arduino UNO                                   | 16             |
| 3.5.2            | Node MCU                                      | 16             |
| 3.5.3            | Neo- 6m GPS Module                            | 17             |
| 3.5.4            | RC522 RFID Module                             | 17             |
| 3.5.5            | 18650 Li-on Battery                           | 18             |
| 3.5.6            | 7805 Voltage Regulator IC                     | 18             |
| 4.1              | Background Code 1                             | 23             |
| 4.2              | Background Code 2                             | 24             |
| 4.3              | Background Code 3                             | 25             |
| 4.4              | Background Code 4                             | 25             |
| 4.5              | Background Code 5                             | 26             |
| 5.1              | System Design                                 | 30             |
| 5.2              | GUI Design                                    | 31             |
| 5.3              | UI Design                                     | 31             |
| 5.4              | System Implementation (two door bus)          | 32             |
| 5.5              | System Implementation (one door bus)          | 33             |
| 5.6              | System Implementation (bus stoppage)          | 34             |

## **LIST OF TABLES**

| <b>TABLE NO</b> | <b>TABLE NAME</b>                                | <b>PAGE NO</b> |
|-----------------|--------------------------------------------------|----------------|
| 4.1             | Documents and License Validation                 | 27             |
| 4.2             | RFID card reading and data collection            | 27             |
| 4.3             | Location tracking                                | 28             |
| 4.4             | Indicator Signal                                 | 28             |
| 6.1             | Statistics of year wise no of vehicle            | 37             |
| 6.2             | Report of Year wise road accidents and causality | 38             |

## **CHAPTER ONE**

### **INTRODUCTION**

## **1.1 Introduction**

The transportation needs of major cities will present significant challenges for policy makers as the unpredictable shift in Population dynamics in response to need for employment, housing and sustenance continues. With a rise in demand for transportation come congestion and other problems.

Since the liberation of the country, the development of infrastructure within the country has progressed at a rapid pace, and today there is a wide variety of modes of transport by land, water and air. However, there is significant progress still to be made to ensure uniform access to all available transport. In contrast to practice in other nations, Bangladesh has four ministries responsible for transportation within country. They have specific responsibilities. These are - Road safety – Ministry of Road Transport and Bridges, Civil aviation – Ministry of Civil Aviation and Tourism, Maritime transport – Ministry of Shipping (Bangladesh) Rail transport – Ministry of Railways (Bangladesh). The Ministry of Road Transport and Bridges contains two Divisions: Road Transport and Highways Division and Bridges Division.

Transport sector is an important part of a society. Most of the development of society lies in this sector. If this sector works smoothly development of our society will be smooth also. Our country is a developing country. For a developing country it is important to have a great transport system otherwise development can be hampered and delayed due to bad transport system. Transport system plays a big rule in a country. Almost every sector in a country depends on transport system. When our developing country is try to develop in almost every side but only the side witch most important to develop first is lies behind. So, through this project, we try to find out problems of Transport system and come up with a digital solution to make the transport sector better and easier to everyone.

## **1.2 Motivation**

The idea of this project was come to us naturally. In our everyday life we became a victim of our existing transport management system. Too much Traffic jam kills our precious time and also we lost lot of money. There is no systematic transport fare existing in this system so almost every day we have to bargain with public transport stuffs. The analog way billing system is the most problematic here. It causes the unexpected bus fare rise but the way billing

Contain full of wrong information and also too much time consuming. Traffic rules are violated and these lots of vehicles are important to control without any system but only traffic police. That's why there are lots traffic accidents happened. We came up with an idea which is systematic and digital which they have to follow to control everything and make an easier system to everyone.

### **1.3 Goals of the study**

First we have to set some goals to make this report. And I'll follow this goals or objective till the end of this report. In this way, I think this report will complete perfectly.

#### **1.3.1 Primary objective**

1. Analyze the existing System
2. Determine Problems
3. Looking for existing solution
4. Analyze some other countries system

#### **1.3.2 Secondary Objective**

1. Set target important problems
2. Analyze our countries situation
3. Find and set solution

### **1.4 Methodology**

For the purpose of the study, data and information have been collected from both primary and secondary sources. The relevant information collected from primary sources is collected in informal way. Most of the information has been collected from internet sources like "Wikipedia", "Google Search", "YouTube" other Websites and search engine. We also do surveys to find Information and to analyze the Study. We have been doing surveying with different types of perspective to better understand the situation and find a proper solution.

### **1.5 Expected Outcome**

From this study we expect to find a digital solution for the important problems that we are facing every day in our life which is caused our life difficult. The problems we have set to come up solution we expect to determine a better solution and remove all the problems.

## **1.6 Origin of the Report**

The origin of this report is Daffodil International University project group “Non Zero” which consists of two members. This report is for final defense to describe our project elaborately.

## **1.7 Organization of the Report**

We have organized this report in 7 chapters including this chapter and describe elaborately about the study. And the remaining chapters are given below:

## **CHAPTER TWO**

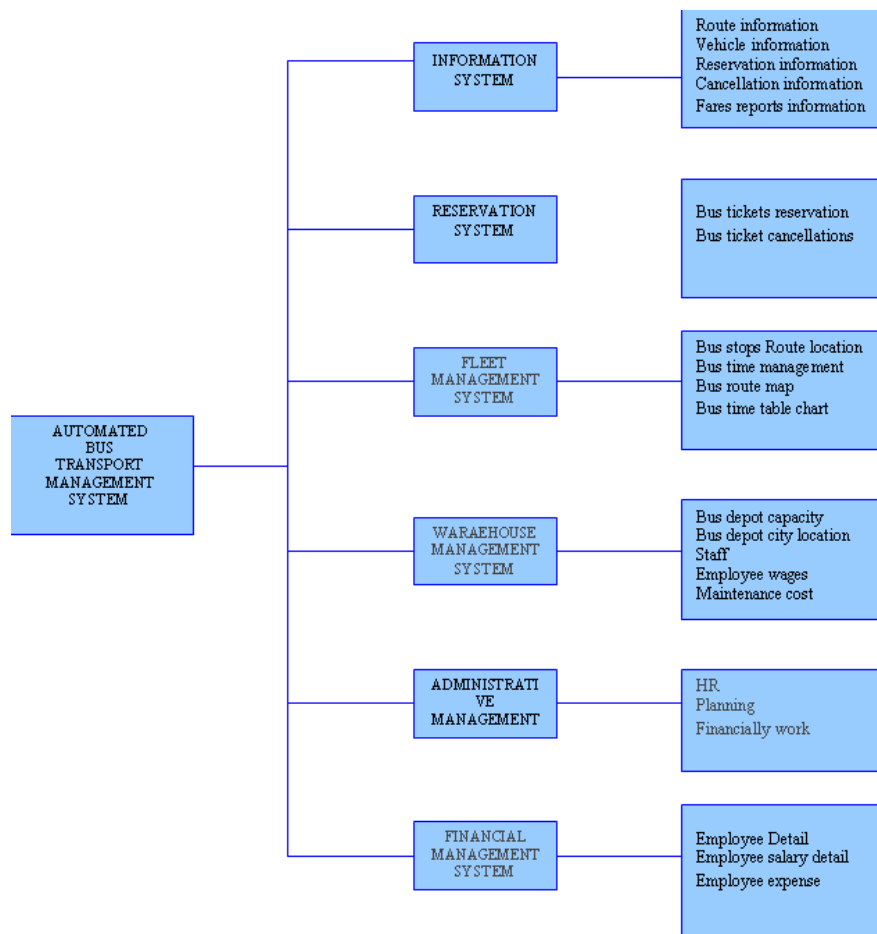
### **BACKGROUND**

## 2.1 Project Overview

Automated transport management system (ATMS) is a project taken by us to initiate a proper management system for transport sector. We research the whole system and try to create a new system which digital and as well as proper systematic.

## 2.2 Related Works

There are lots of research and project done on this topic previously. Many countries already develop their transport sector and build a proper management system based on their situation and the following existing solution. In this section we discuss on a one of the existing solution of this project topic.



*Fig 2.1: Existing system diagram*

It is a diagram of existing automated bus transport management system. If we elaborate this diagram we can see that this system only works for a bus and this only bus management system. Following this diagram this system controls bus information, ticketing management,

fleet management, administrative and financial management of a bus. In a word this system only works on internal management of a bus. This system does not cover the whole transport system that means the internal and external problems of a transport system. According to this existing project we can cover some problem of transport sector but there are lots of problems still have to be faced.

### **2.3 Scope of the Problem**

After analyzing our current transport system there are lots of things we have to change to stabilize the transport system. There are too many vehicles considered to the number of roads. And most the vehicles are unfit. On the top of that drivers are not willing to carry licenses and vehicle papers. They feel uneasy to carry them. And also drivers and passengers do not want to follow traffic rules properly. Passenger get on the bus from anywhere except the bus stoppage. When they try to get off from the bus, drivers stop the bus in the middle of the road and most of the occurrence causes due to these types of problems. The way billing system that is now followed by bus companies is too much time consuming and full of errors. People suffer too much from this improper way billing system.

### **2.4 Targeted Problems**

The problems we are facing now in transport sector are respectively mentioned here. After analyze our transport sector we come up some problems which must be solved to get a proper transport sector. The existing problems are:

1. Analog Way Billing System
2. Manual License checking
3. Reckless Bus Stoppage
4. Uncontrolled Speed
5. Traffic rules violation

These are the most important and common internal and external transport problems that we must come up with a digital solution.

## **2.5 Existing Solution**

Many countries in the world already develop and maintain a great system in their traffic sector. And their solution is based on their countries financial other situation. Some of the solutions are too expensive to follow base on our countries situation and some solutions we cannot follow because of our ecological and structural situation. So, we must find another solution that we can follow based on our all kinds of situation.

## **2.6 Our Countries Situation**

Bangladesh is a developing country. We rapidly develop in every sector like education, transportation, medical, IT and so on. Our transportation sector is also rapidly developing. There are lot of developing project is already ongoing. Metro Rail is the biggest project to develop transportation Sector. Besides, government of our country takes some necessary steps to control over the roads and transport. But they do not take the steps in a digital way. People do not follow the rules very easily. If the system is being weak then people will not follow them. The system needs to be automatic so that the people must have to follow. To develop a smart system, we need to build a proper system with digital way.

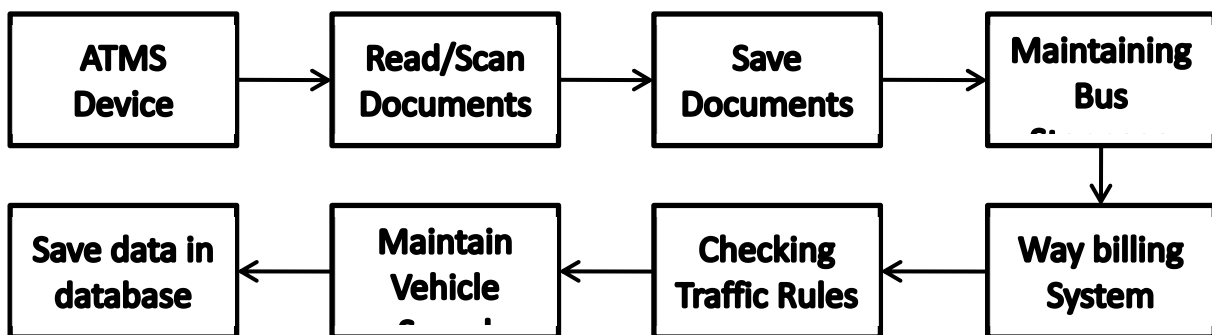
**CHAPTER THREE**  
**SYSTEM AND REQUIRMENT ANALYSIS**

### 3.1 Introduction

This Chapter is about the requirements of the entire system. To build this entire system which components and equipment's we will use and the detailed description will be mention in this chapter respectively. The detailed description about automated Transport management system describes from the next point on and that is in the below:

### 3.2 Architecture of Proposed System

Our proposed system on transport sector is Automated Transport Management System (ATMS). The whole system is control with one device which is called ATMS device. Our targeted problems can be controlled completely with this one device.



*Fig 3.1: Architecture of ATMS System*

From the following figure it is clear that, we can control and solve our targeted and main problems of our transport system with one ATMS device. The main component and topics are all present here and in ATMS system we connect all the components with one another. In this way with one device we are able to control almost whole transport management system.

### 3.3 Description of Proposed System

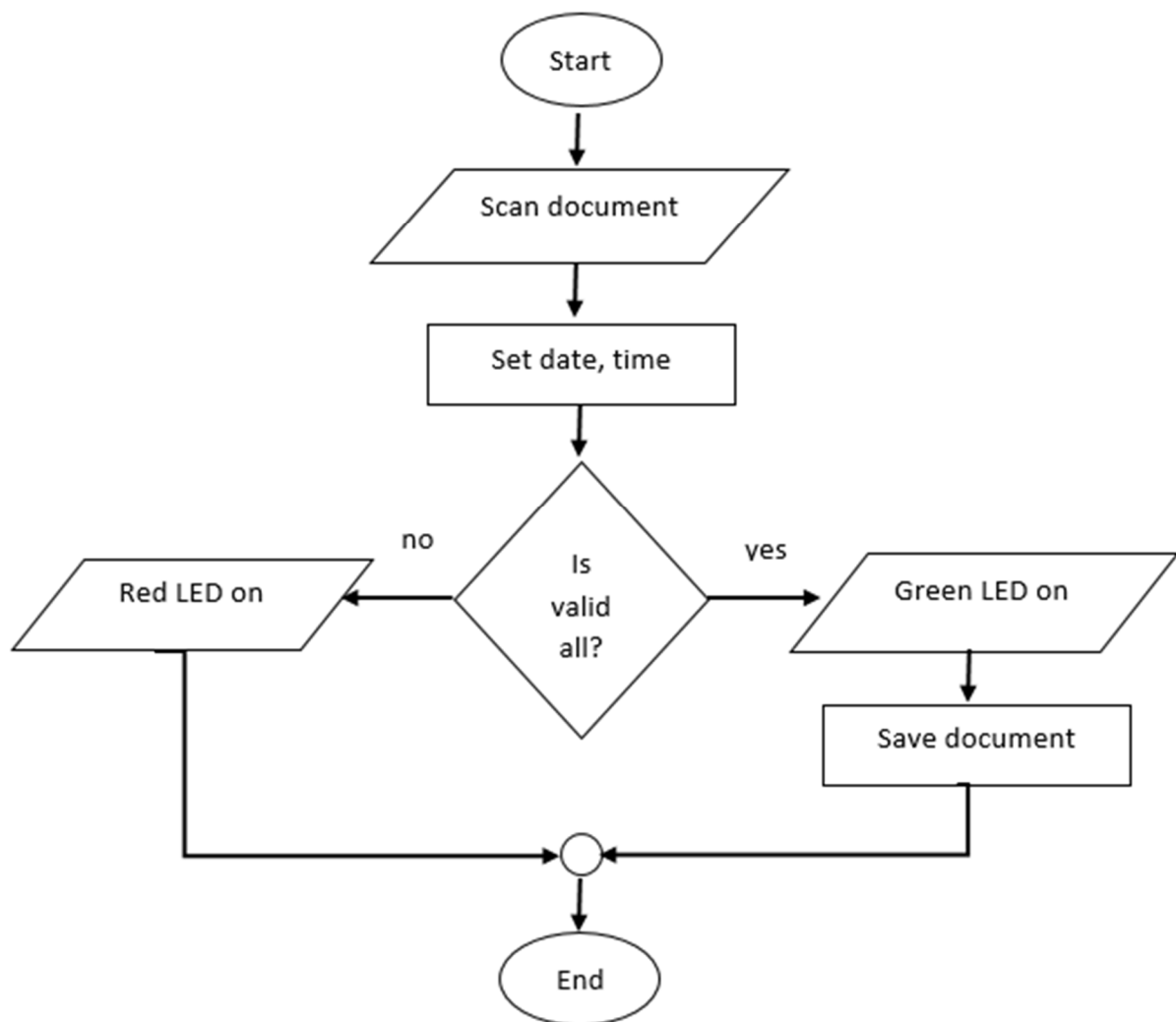
Now our System description is going to elaborately mention here. We will divide our entire system into some parts to elaborately describe.

#### 3.3.1 ATMS Device System

The work procedure for ATMS device system is to mention earlier in fig 3.1. Scanning documents and saving is must for every ATMS system. It shows error without saving vehicle and license documents. ATMS system controls the vehicle to stop anywhere and take passenger. No bus cannot take passengers from anywhere without bus stoppage. Way billing

is the main feature of ATMS device system. Way billing process is handled digitally with this system. Traffic rules checking and vehicle speed maintaining is secondary features of this system. All the data can be saved into database.

### 3.3.2 Scan Documents and Saving

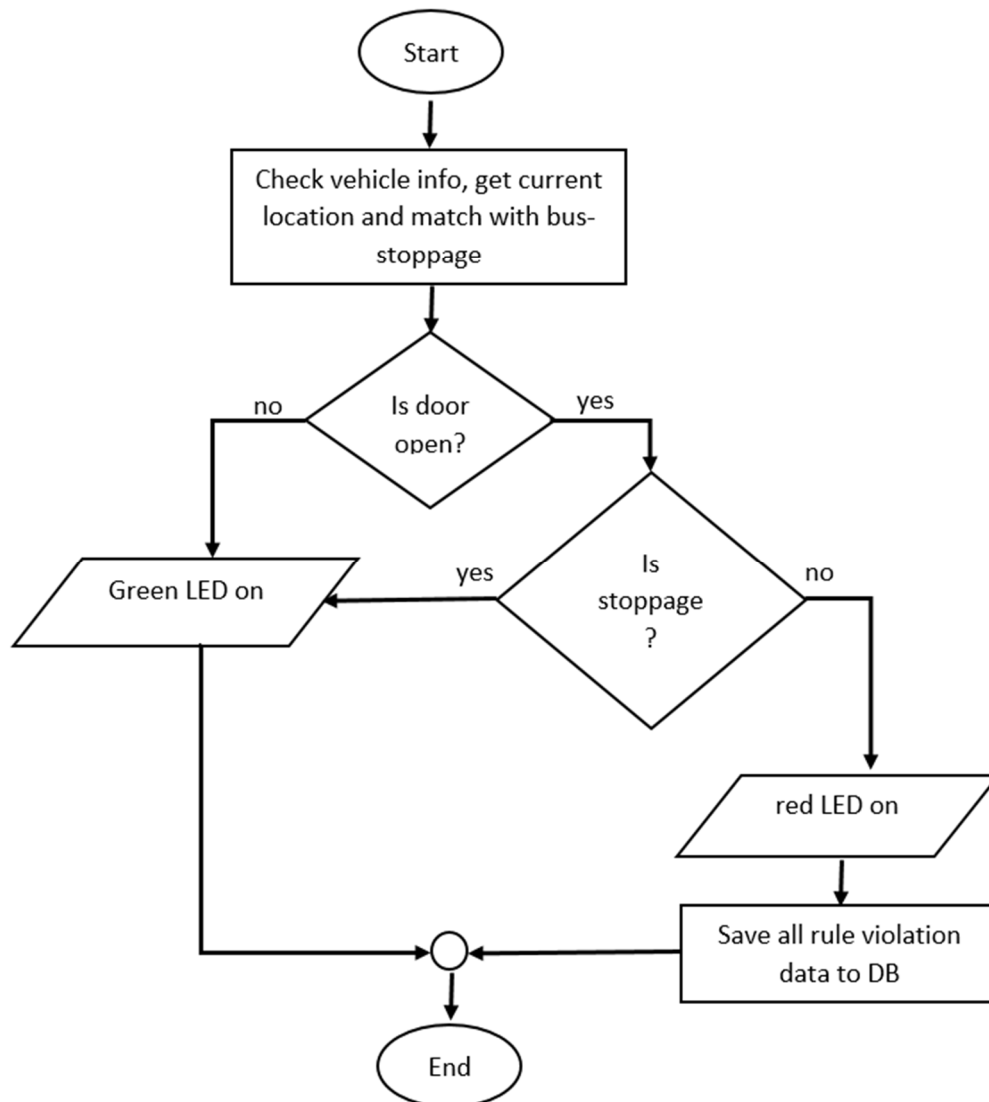


*Fig 3.2: Flowchart for scanning documents and saving*

For every ATMS device scanning and saving is must. From the following flowchart document scanning and saving can be done in first time use of this device. We have to set date into ATMS device and then we must scan documents. Then device will check if the documents are valid or not. And the lighting system will show the status if ATMS device is

ready to use or not. Red lights mean there is an error in saving documents into device and green light means saving information in device is successfully done.

### 3.3.3 Maintain Bus Stoppage



*Fig 3.3: Flowchart for bus stoppage checking*

ATMS System will control bus stoppage problem. ATMS will check whether the bus stop at bus stoppage or not through GPS system for a specific location. If a bus stop at a location ATMS will check whether it is traffic signal or bus stoppage. If a bus opens its door without reaching in bus stoppage, then the red light will be on.

Here we can add another option to check bus stoppage with sensor. In every bus stoppage there is sensor placed there and ATMS system also can hold a sensor. If the two sensors met each other than ATMS can recognize as bus stoppage.

### 3.3.4 Way Billing System

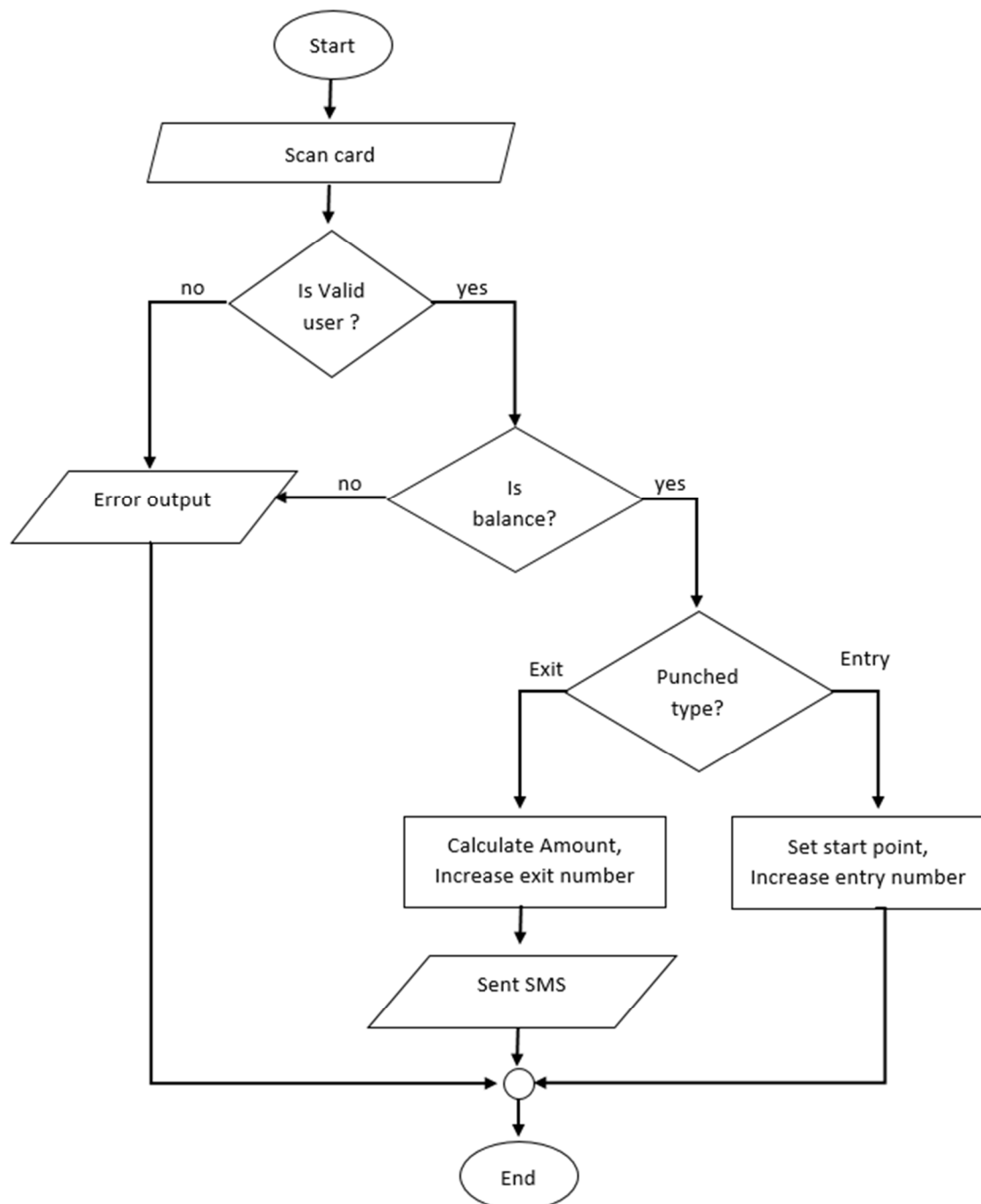


fig 3.4: Flowchart for one door buss way billing system

Counting passengers and create a total bill is called waybill. ATMS device will do it automatically and also don't waste time. And the way billing will be accurate. The following flowchart shows that how way billing works in a ATMS device automatically by using RFID card and module. Here the flowchart is shortly described.

Waybill system work in 2 ways:

1. Counting Passengers
2. Create bill

**a) Way billing System for two door bus:**

**a. 1. Counting Passengers (for two door bus):** This feature only count how much people are getting in the bus in a specific location and how much passenger is getting down. It can be controlled with sensor which can count people through direction. There will be two doors in a bus. In front door, sensor will be count how much people getting in and in back door it will be count how much people getting down. In front door when a person will be entered then the sensor will read at a specific location one person is getting in. But in case if the person immediately decides not to ride then he must get down with the front door then the sensor will detect that object coming from opposite direction and it will erase one person from reading.

As well as in back door, when a person gets down at a specific location then sensor will detect the direct and count as one object out. But if a person getting in through back door then ATMS system will be warned with a sound to request that person to get down through the door immediately.

**a. 2. Create Bill (for two door bus):** There will be two ATMS device set up in a bus. One is front door and other is in front of back door. When a person gets in a bus he must punch his bill card in front door ATMS device which can be called as primary ATMS device. Then ATMS device received his card with the location and time he gets in the bus. if any person misses to punch the card within 15-30 second after he get in the bus then ATMS device made a warning sound and request him to punch his bill card. And when a person reaches at his destination he must punch the card in back door ATMS device which can be called as secondary ATMS devise so that ATMS device can disconnect the bill card and stop counting the bill and distance for this card.

**b) Way billing System for one door bus:**

**b. 1. Counting passengers (for one door bus):** Here the counting system is almost same with two door bus systems. The different is only one counting sensor do the whole counting system and it also count through direction. And for the people who do not want to ride after getting in bus, he must punch his card in Secondary ATMS device.

**b. 2. Create Bill (for one door bus):** Working system for billing is same as two door system bus. The difference is primary and secondary device placed in front door area.

### **3.3.5 Checking Traffic Rules**

ATMS device system has stable light system. This light system indicates that if vehicle has any traffic rules related issues or not like expired driving license, invalid vehicle papers, taking passengers from non-bus stoppage area, violating traffic signals etc. There are two lights in light systems that are green and red light. Green light indicates that ATMS do not find any traffic related issues and ATMS Device is stable. If red light is on then it can be easier for traffic to know about the vehicle status.

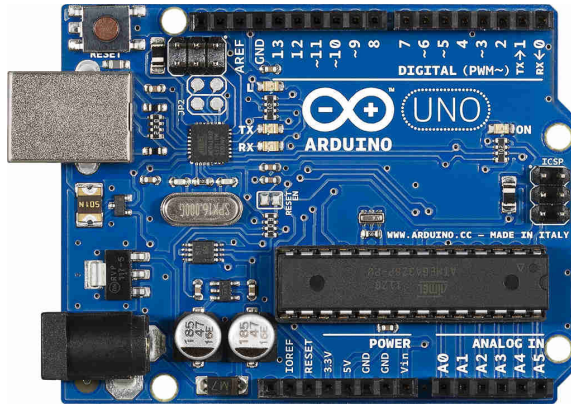
### **3.3.6 Maintain Vehicle Speed**

Maintaining vehicle speed is important in traffic rules. And ATMS device hold a sensor which can measure vehicle speed. if speed cross over the limit ATMS device show error warning and light system show that with red light on.

## **3.4 Equipment for Proposed System**

- **Arduino Uno**

Arduino Uno is an open source micro-controller board. It carries ATmega328P – 8 bit AVR family microcontroller. It has 14 Digital I/O pins and 6 Analog I/O pins. Arduino has own IDE that compile C and C++ language based computer codes. It can connect with computer directly by USB cable and can also be powered by 5V-12V DC (7V-12V recommended). Many more usable functions are available in Arduino IDE that makes an easy coding. This board is able to read and write sensors, buttons, motors, various lights, modules etc. It's digital and analog pins work with 0V-5V. Because of its flexibility Arduino has been the brain of thousands of projects worldwide.

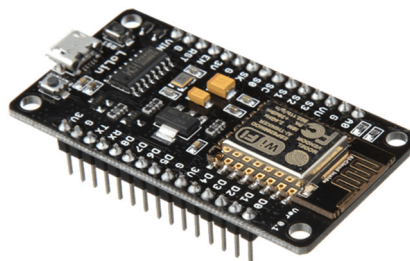


*Fig 3.5.1: Arduino UNO*

In our project we use it as a center control device. All others components like RFID reader, Wi-Fi module, GPRS module, lights etc. are connected with this. It acts as a bridge with physical hardware and internet module. Internet modules handle data with database and sent to Arduino UNO. Arduino UNO controls other devices that connected with it according to received data and vice-versa.

- **Node MCU**

Node MCU is an open source firmware and development kit that helps to prototype an IoT product with Arduino IDE or in few Lau script lines. Its hardware is based on the ESP-12 module.



*Fig 3.5.2: Node MCU*

In ATMS device Node MCU is used for sent HTTP request via Wi-Fi communication with internet. Arduino UNO and Node MCU communicate each other via serial communication. Arduino UNO request to Node MCU and then it sent HTTP request to server.

- **Neo-6m GPS module**

NEO-6M GPS module is a well-performing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which provides a strong satellite search capability. With the power and signal indicators. The module can save the data when the main power is shut down accidentally. It can serial communicate with other electronic device.



*Fig 3.5.3: Neo- 6m GPS Module*

Location based work such as vehicle tracking, bus stoppage control, way billing etc. are easily handled by neo-6m. We get a latitude and longitude point of a current location by it. Then draw a circle or polygon based on this point. After that we compare this circle or polygon with our saved database and make a result.

- **RC522 RFID module**

The RC522 is a 13.56MHz RFID module that is based on the MFRC522 controller from NXP semiconductors. RFID or Radio Frequency Identification system consists of two main components, a transponder/tag attached to an object to be identified, and a Transceiver also known as interrogator/Reader.



*Fig 3.5.4: RC522 RFID Module*

In ATMS device we needed a digital media for passenger unique identity. RC522 module helps us in this field. RC522 provides us solid build card or key ring with different electrical signal value and we called it as an ID number. At first we store passenger information in database with this ID number. When a passenger punches his/her card then we can easily identify.

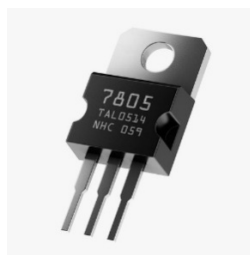
- **18650 Li-Ion Battery**



*Fig 3.5.5: 18650 Li-on Battery*

The 18650 is a type of rechargeable lithium-ion battery classified by its 18mmX65mm size. These batteries are mostly used in laptops, flashlights, and high-drain devices. 18550 is a very popular model due to its high capacity and discharge rate. Output rating voltage of this battery is 3.7v.

- **7805 Voltage Regulator IC**



*Fig 3.5.6: 7805Voltage Regulator IC*

7805 is a linear voltage regulator that's input voltage is 7V-35V and output voltage is 4.8V-5.2. It saves ATMS device burn from high current.

- **LED's**

Various sizes of LED's are used in ATMS device. LED's helps to indicate various conditions of devices. It is very easy and low costing method.

- **Registers**

Registers are used for maintain current rate and safety of electronic components.

- **Capacitors**

Time gap is a common issue of electronic circuit. Whole device take reboot due to this problem. Capacitors are the best solution to this problem. Capacitor store charge and make sure availability of current for a very short time that reason whole system can run smoothly.

- **Wires and Others**

Wires and some little components also needed in our project like the other items. Wires and other components such as battery holder, breadboard etc. helps to inter connected to each other's.

### **3.5 Necessary Software and Language**

Software's are highly needed to complete and run this project with the previously described components. We use some software to inter connect the components to one another. Working purpose and short description of each software is given bellow:

- **Arduino IDE**

Arduino IDE is used for writing and compiling the code into the Arduino module. Here we used it for writing and compiling code for Arduino UNO and Node MCU module. Many more library functions are available and easy to debugging.

- **Xampp Controller**

Xampp is a free and open-source cross-platform web server pack. It provides Apache server, MySQL database and others essential components for web server. For prototype model we use our desktop as a localhost by using Xampp.

- **A Better Code Editor**

We need a code editor for build our code. ATMS device run PHP file on server. We making code such as HTML, CSS, jQuery, Ajax, PHP etc. used by Brackets code editor. It helps us code indentation properly, error finder, and flexible to previewing file.

- **Web Browser**

The GUI of ATMS device is web based. So we need a web browser for looking output of ATMS GUI. We recommended Google Chrome or Mozilla Firefox for better output.

- **C**

C is very known and useful language for hardware. We used it for coding Arduino and Node MCU Wi-Fi Module.

- **PHP**

Hypertext Preprocessor (PHP) is used for server side scripting. Database handling is easy by PHP. PHP is a worldwide most popular scripting language.

- **jQuery**

A JavaScript library that is easy to use and write less, lightweight. We used it for web page interactivity and some task like time-date, auto load page etc.

- **HTML & CSS**

HTML stands for Hyper Text Markup Language & CSS is stands for Cascading Style Sheet. This markup language is used for making web page frame and design. Bootstrap framework was also used for responsive web page.

## **CHAPTER FOUR**

### **CODING AND TESTING**

## 4.1 Introduction

In this Chapter, we will discuss about the development process of ATMS system such as algorithm which is used to develop the system. A brief discussion about background coding will also mention in this chapter such as how the system is built by the component and how the language is used and working process of database will be shown here. And also some testing result will be shown here with short description and the comparison about Expectation and actual result will be mentioned.

## 4.2 Algorithm

Since this project is IoT based project. We didn't use any extra complicated built in algorithm which are used for machine learning. Here the two simple algorithms are described later, these are actually the algorithmic way of our system. How the component work with the component's built in algorithm, this will be described here?

### Algorithm 1: Arduino Uno

- Step1: Start.
- Step2: Looking for RFID.
- Step3: If RFID available then sent to Node MCU and get feedback.
- Step4: If RFID valid then Green Light ON otherwise Red Light ON.
- Step5: Send request to Node MCU for gate pass& vehicle validation.
- Step6: If vehicle validation error then Green Light ON otherwise Red Light ON.
- Step7: If gate pass ok Green Light ON and go to step-9 otherwise Red light ON and go to step-8.
- Step8: If gate is open then sent rule violation error to Node MCU and give a Red alert.
- Step9: Get GPS data from GPS module and sent to Node MCU.
- Step10: End.

### Algorithm 2: Node MCU

- Step1: Start.
- Step2: Receive a request from Arduino UNO
- Step3: Check request
  - ◆ If request is RFID
    - Make a RFID HTTP request to server.
    - Send back result to Arduino UNO.

- ◆ If request is gate pass
  - Make a gate pass HTTP request to server.
  - Send back result to Arduino UNO.
- ◆ If request is vehicle validation
  - Make a vehicle validation HTTP request to server.
  - Send back result to Arduino UNO.
- ◆ If request is rule violation
  - Make a rule violation HTTP request to server.

Step4: Store GPS data to server.

Step5: End.

### 4.3 Background Coding

Our systems background codes will be describing here. The important parts of our system and how the system is developed in the background, it will be shown here and shortly describe each part and the functions of the coding.

In the server there are two types of code. One is frontend another is backend. Back end code run against http request. Some important part is shown below:

```

9      $time = date('m-d');
10     $date = date('y-m-d');
11     $servername = 'localhost';
12     $username = 'root';
13     $password = '12345';
14     $db = 'atms';
15     $mysqli = new mysqli($servername, $username, $password, $db);
16     $conn = new mysqli($servername, $username, $password, $db);
17
18     if ($conn->connect_error){...}
19
20
21
22
23     $pointnameresult = $conn->query("SELECT * FROM bus_stoppage_point"); // input all avialabe bus stopage points
24     if($pointnameresult->num_rows>0){...}
25
26
27
28
29     $sql1="SELECT BL_SL FROM bus_current_location WHERE V_ID='$busid'";
30     $sql2 = "UPDATE bus_current_location SET Latitude='$latitude', Longitude='$longitude', left_stopage='$pointname', Time='$time', Date='$date'
31     WHERE V_ID='$busid'";
32     $sql3 = "INSERT INTO bus_current_location (BL_SL, V_ID, Latitude, Longitude, left_stopage, Time, Date) VALUES
33     ('','$busid','$latitude','$longitude','$pointname','$time','$date')";
34
35     $result1 = $conn->query($sql1); // if a bus is pre inserted then run UPDATE query otherwise run INSERT query for save bus corrent location
36     data
37
38     if($result1->num_rows > 0){...}
39     else{
40         if (!$mysqli -> query($sql3)){
41             echo("Error description: " . $mysqli -> error);
42         }
43         echo 'run insert query';
44     }
45
46
47
48
49
50
51
52
53
54
55
56
57
58     //check a point possition within a polygon
59
60     class pointLocation {...}
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

```

Fig 4.1: Background Code 1

This code is for find bus current location. Some locations are stored into database with those polygon points. When GPS module sends a point to the system, then the code will check if this point is inside a polygon or not. If inside, then store this location name otherwise this point is outside of bus route. In previous codepointLocation class does this task.

RFID card reading code is shown below:

```

1  <?php
2  // by the name of ALLAH
3  ?>
4
5  <?php
6  date_default_timezone_set("Asia/Dhaka");
7  $time = date('H:i:s');
8  $date = date('y-m-d');
9  $pid = $_GET['pid']; // get passenger id
10 $busid = $_GET['busid']; //get bus id
11 $action = 'newUSER';
12 $servername = 'localhost';
13 $username = 'root';
14 $password = '12345';
15 $db = 'atms';
16 $conn = new mysqli($servername, $username, $password, $db);
17
18 if ($conn->connect_error){
19     die("Connection Failed: " . $conn->connect_error);
20 }
21
22 $currentlocationresult = $conn->query("SELECT left_stopage AS ls FROM bus_current_location WHERE V_ID='$busid'"); // input a bus current
23 location that the passenger punched
24 $locationfetch = $currentlocationresult->fetch_assoc();
25 $currentlocation = $locationfetch['ls'];
26 //echo $currentlocation;
27
28 $sql1="SELECT * FROM passenger_list WHERE P_ID = '$pid'"; // find that passenger is registered or not
29 $result1 = $conn->query($sql1);
30 if($result1->num_rows>0){
31     //...
32 }
33 else{
34     echo 'invalid_p';
35 }
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104

```

Fig 4.2: Background Code 2

Here the code for passenger card read and check a passenger card is valid or invalid. Node MCU make a gate request with bus id and card id. This code searches this card id to DB. If ID is saved in database, then code will take next process otherwise showed the output as invalid passenger message.

```

void cardread(){
    String cardId;
    char for_serial[]="";
    int i=0;
    while(port.available()){
        for_serial[i] = port.read();
        //Serial.print(for_serial);
        cardId.concat(String(for_serial[i]));
        i++;
    }
    Serial.print(for_serial);
    Serial.println();

    HTTPClient http;

    //strcpy(cardId,for_serial.c_str());
    String Link = address+"passenger_history.php?pid="+cardId+"&busid="+busid;
    http.begin(Link);
    int httpCode = http.GET();|
    delay(10);
    String response= http.getString();
    Serial.println(httpCode);
    Serial.println(response);
    Serial.println(cardId);
    Serial.println(for_serial);
    int amount;

```

*Fig 4.3: Background Code 3*

This code is for counting passenger specifically exit and entry number.



```

1  <!-- by the name of ALLAH -->
2  <?php
3      date_default_timezone_set("Asia/Dhaka");
4      $time = date('H:i:s');
5      $date = date('y-m-d');
6      $busid = $_GET['busid']; // get bus id
7      $action = 'newUSER';
8      $servername = 'localhost';
9      $username = 'root';
10     $password = '12345';
11     $db = 'atms';
12     $conn = new mysqli($servername, $username, $password, $db);
13
14     if ($conn->connect_error){
15         die("Connection Failed: " . $conn->connect_error);
16     }
17     $entrysql="SELECT COUNT(P_action) AS entrynum FROM passenger_history WHERE P_action='entry' AND V_ID='$busid' ";
18     $exitsql="SELECT COUNT(P_action) AS exitnum FROM passenger_history WHERE P_action='exit' AND V_ID='$busid' ";
19
20     $entryresult = $conn->query($entrysql);
21     $exitresult = $conn->query($exitsql);
22
23     $entryfetch = $entryresult->fetch_assoc();
24     $exitfetch = $exitresult->fetch_assoc();
25
26     $totalentry = $entryfetch['entrynum'];
27     $totalexit = $exitfetch['exitnum'];
28     //echo 'Entry: ' . $totalentry. ' <br>Exit: ' . $totalexit;
29     $onbus= $totalentry-$totalexit;
30     echo 'Total passenger on bus: ' . $onbus;
31
32     ?>

```

*Fig 4.4: Background Code 4*

In the frontend side some features need to reload automatically. jQuery functions make it easy. jQuery select html class and run PHP code into it every one second.

```

7 <title>Online Attendance System</title>
8 <link rel="stylesheet" href="CSS/style_one_load.css">
9 <link rel="stylesheet" href="CSS/history_box.css">
10 <link rel="stylesheet" href="CSS/bootstrap.min.css">
11 <script></script>
12 <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css">
13 <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>
14 <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>
15 <link href="https://stackpath.bootstrapcdn.com/font-awesome/4.7.0/css/font-awesome.min.css" rel="stylesheet" integrity="sha384-wvXpqpZZVQGK6TAh5PVlGofQNHSoD2xbE+QkPxCAFLNEevoEH3Sl0sibVc0QVnN" crossorigin="anonymous">
16 <script src="Script/script_one.js"></script>
17
18 <script>
19 $(document).ready(function(){
20
21     aboutDay();
22     setInterval(aboutDay, 1000);
23     setInterval(function(){
24         $("#tablepart").load("historytablePart.php");
25         refresh();
26     },1000);
27     setInterval(function(){
28         $("#entryhtml").load("entry.php");
29         refresh();
30     },1000);
31     setInterval(function(){
32         $("#exithtml").load("exit.php");
33         refresh();
34     },1000);
35
36     setInterval(function(){
37         $("#businfo").load("businfo.php");
38         refresh();
39     },1000);
40
41
42 });
43
44 </script>
45 </head>

```

*Fig 4.5: Background Code 5*

## 4.4 System Testing

System Testing is a level of testing that validates the complete and fully integrated software product. The purpose of a system test is to evaluate the end-to-end system specifications. Usually, the software is only one element of a larger computer-based system. Ultimately, the software is interfaced with other software/hardware systems. System testing is considered when a system is completely built up. System testing is used for checking functions of the system and the features are correctly works or not. We individually check every feature that we develop in this project and we'll include the test result in this section. The features that we will check here are: license information insertion, license validation, RFID reading and data collection and location tracking.

There are lots of ways to test a system. What kind of testing we use in what kind of system, it will depend on the systems environment. We test our system and system's feature according to be bugging. Be bugging is the process of adding known defects to the application intentionally for the purpose of monitoring the rate of detection and removal. This process is also known as defect seeding or Fault injection or defect feeding. Be bugging is a way to

improve the quality of the product by introducing a new known defect. It is also used in determining the reliability of test set/test suite. It is achieved not by developing more tests but by introducing new defects. Here we will include our systems test results according to feature wise.

#### **Documents and License Validation:**

For this feature testing according to be bugging we arranged some random license and their validation date. We put them in the system and collect the result. The testing table is given below:

| <b>Documents name</b> | <b>Type</b>        | <b>Saved Data</b> | <b>Input</b> | <b>Result</b> | <b>Original Outcome</b> |
|-----------------------|--------------------|-------------------|--------------|---------------|-------------------------|
| Route Permit          | Last date checking | 2020-08-01        | 2020-05-11   | Ok            | Ok                      |
| Fitness               | Last date checking | 2021-01-01        | 2020-05-11   | Ok            | Ok                      |
| License               | Last date checking | 2020-04-01        | 2020-05-11   | Over          | Over                    |

*Table 4.1: Documents and License Validation*

#### **RFID card Reading and Data collection:**

For this feature testing, we use RFID module and RFID card to check card validation, data collection and passenger counting. Testing table is given below:

| <b>Punching Type</b> | <b>Card Type</b> | <b>Card Validation</b> | <b>Starting Data</b> | <b>End Data</b> | <b>Passenger Counting</b> |            |
|----------------------|------------------|------------------------|----------------------|-----------------|---------------------------|------------|
|                      |                  |                        |                      |                 | <b>Previous</b>           | <b>New</b> |
| Up                   | Card             | Yes                    | Saved                |                 | 10                        | 11         |
| Up                   | Ring             | Yes                    | Saved                |                 | 11                        | 12         |
| Down                 | Card             | Yes                    |                      | Saved           | 12                        | 11         |
| Down                 | Ring             | Yes                    |                      | Saved           | 11                        | 10         |
| Up                   | Card             | No                     | Unsaved              | Unsaved         | -                         | -          |
| Up                   | Ring             | No                     | Unsaved              | Unsaved         | -                         | -          |

*Table 4.2: RFID card Reading and data collection*

### Location tracking:

| Magnitude | Longitude | Result                | Actual                      |
|-----------|-----------|-----------------------|-----------------------------|
| 23.756242 | 90.375461 | Dhanmondi 27Bus stand | Dhanmondi 27Bus stop        |
| 23.727356 | 90.38611  | Azimpur Bus stop      | Azimpur Bus stop            |
| 23.738929 | 90.383563 | Science Lab Bus stand | Science Lab. Over Bridge    |
| 23.750887 | 90.373622 | Dhanmondi 32 Bus stop | Dhanmondi 32 Road Bridge    |
| 23.759675 | 90.366354 | Asad Avenue Bus stand | Asad Ave, Dhaka, Bangladesh |

*Table 4.3: Location tracking*

### Indicator Signal:

| License Validation | RFID Reading | Location Tracking | Indicator Signal |     |        |
|--------------------|--------------|-------------------|------------------|-----|--------|
|                    |              |                   | Green            | Red | Yellow |
| Ok                 | Ok           | Ok                | On               |     |        |
| Ok                 | Invalid      | Ok                |                  | On  |        |
| Over               | Ok           | Ok                |                  | On  |        |
| Ok                 | Ok           | Invalid           |                  | On  |        |
| Waiting            | Waiting      | Waiting           |                  |     | On     |

*Table 4.4: Indicator Signal*

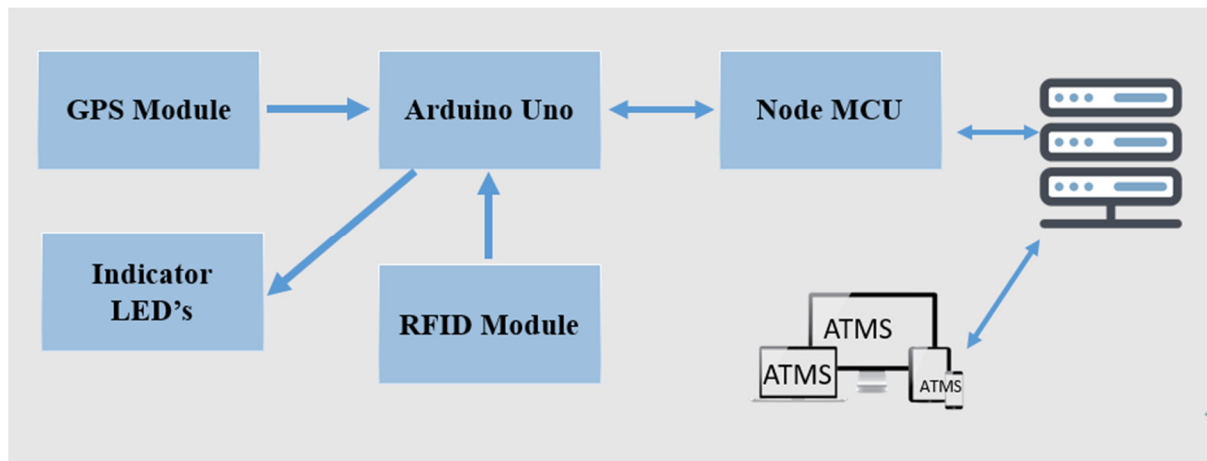
## 4.5 Comparison between Expected and Actual Testing Result

After testing our system, we compared our testing result with the expecting result. The testing result shows that the system is working quit accurately. From the previous point license validation part is accurate and the system is working fine if the license validation is not over and the indicator signal also working accurately with this point. And we expected that with our system license validation can be done accurately. Other features like way bill, bus stoppage with location tracking, Indicator signals also works quite accurately which was beyond expectation. Systems can read RFID and their data. Saving it to the database and also count passengers to complete perfect way bill the system testing shows us the perfect way bill completion.

## **CHAPTER FIVE**

### **DESIGN AND IMPLEMENTATION**

## 5.1 System Design



*Fig 5.1: System Design*

ATMS device system is designed to work various kinds in a one place. The total system is depending on Arduino UNO which is the central of our system. This is worked as the brain of the device. The other additional components in the system are connected to each other through this. Arduino UNO receives all the data and signals that the other components in system send. Data's and signals are send and stored in the database by the help of node MCU which is also connected to Arduino UNO. Node MCU works here as an agent who set up the connection to the internet by HTTP request with the system. GPS module used here to track locations by sending magnitude and longitude of a place. RFID module set in the system which worked as the reader that read passenger card and receive data. Indicator LED use here as a physical output which are giving signal about the working process of the whole system.

## 5.2 GUI Design

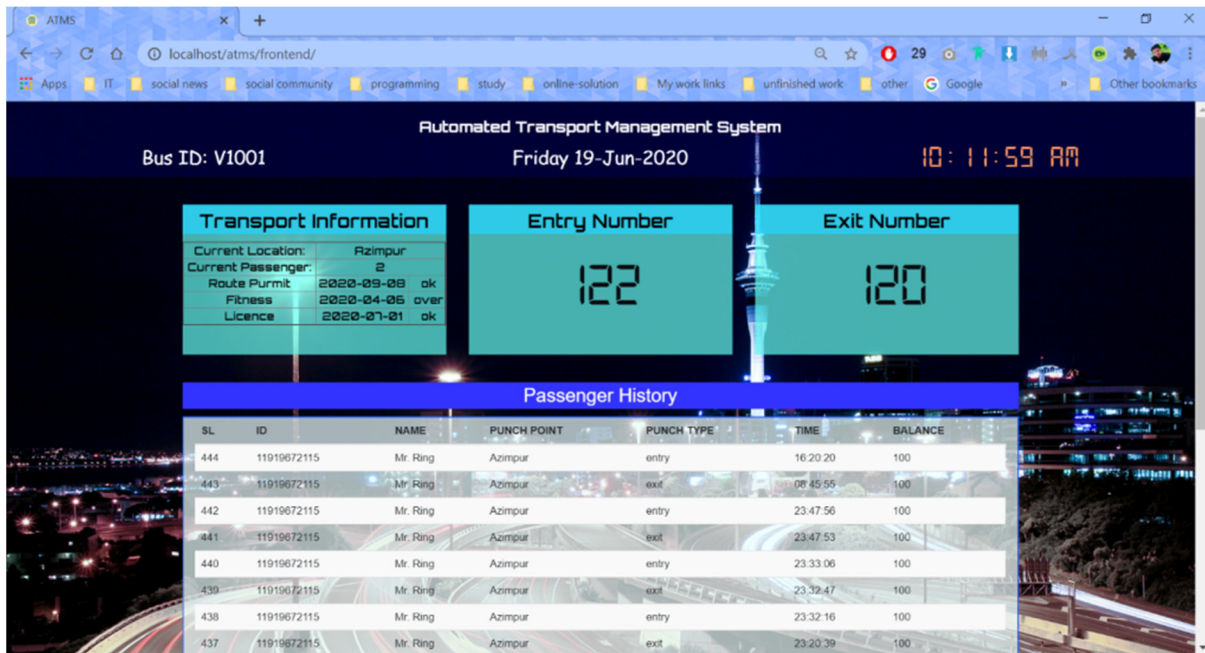


Fig 5.2: GUI Design

### 5.3 User Interface

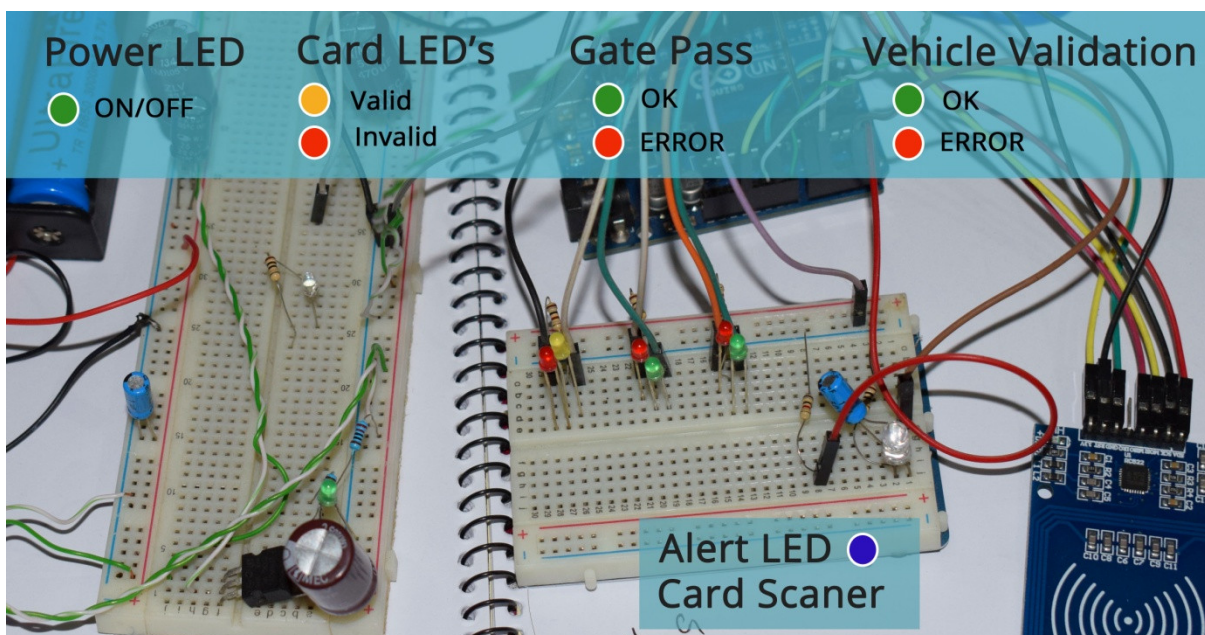


Fig 5.3: UI Design

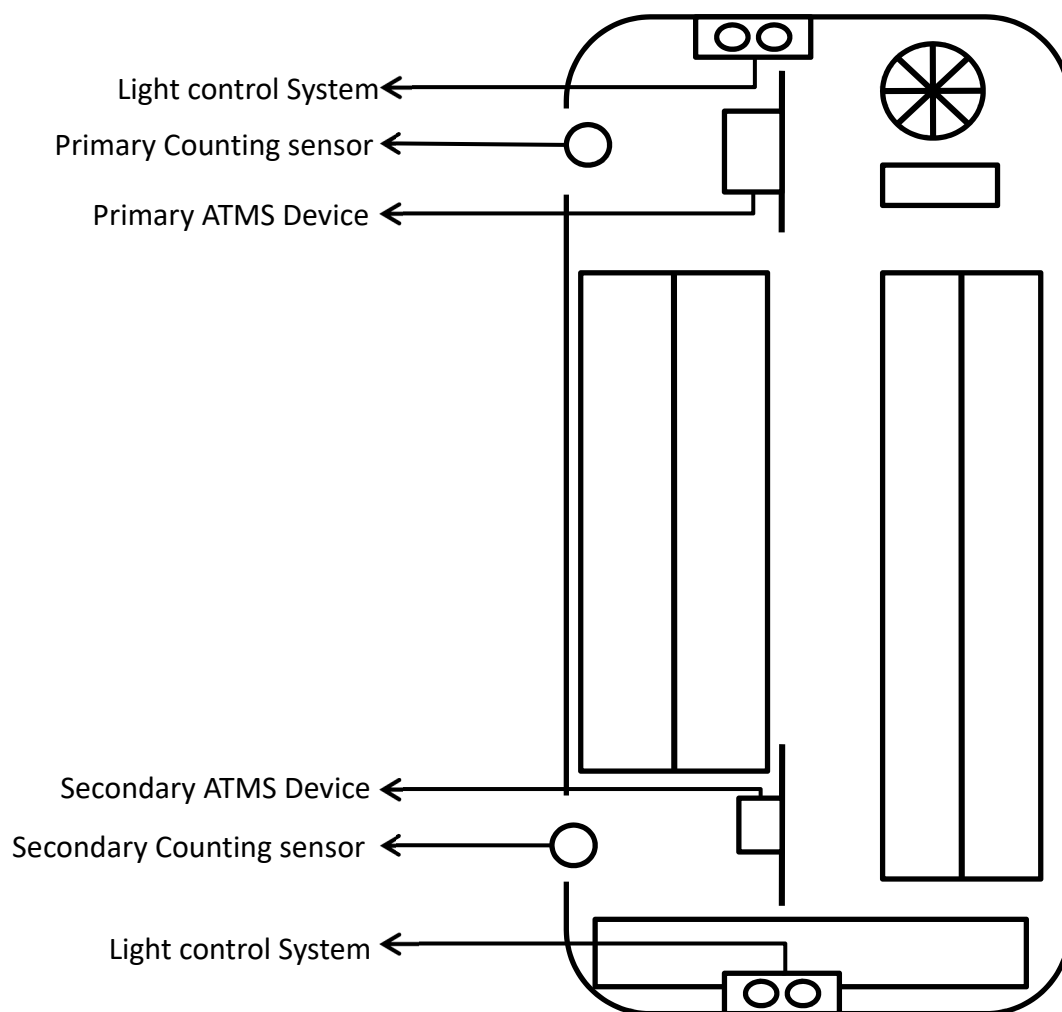
The following figure is described as UI which is stand for User Interface. This user interface is now incomplete and this interface has to develop later. But here the following figure indicates that which feature is shown on User interface which things ATMS device monitor shows to the user. There may be some other feature can be adding later depend on our need.

## 5.4 System Implementation

Here in this topic we talk about the implementation of ATMS device system. In a vehicle where actually device can be placed and how it exactly works we will show that here with diagrams and figures. In previous Chapter we talked about internal procedure of ATMS device system and here we talk about external procedure of the device

### 5.4.1 Structural View of System Implementation (two door bus)

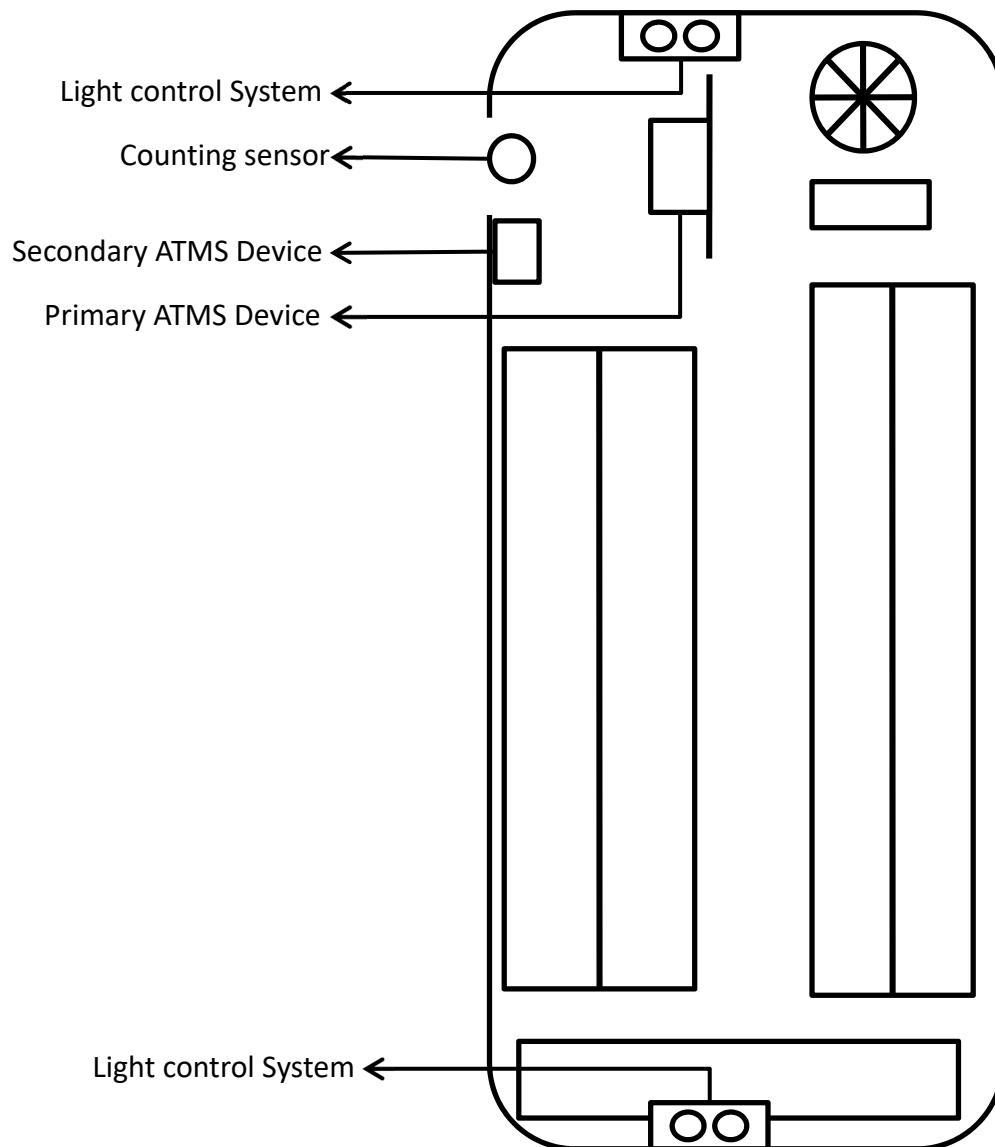
From the above figure, we can see the implementation and device placement. The figure is about two door bus. There are two ATMS device and two counting sensor needed into a two door bus. Counting sensors placed on the door ceiling. In two door bus there is one counting sensor and one ATMS device placed in each door. Primary sensor and ATMS device placed in front door and count how many passenger board on bus and primary ATMS device receive bill card. On the other hand, secondary sensor and ATMS device place in back door and count how many passengers get off from the bus. Sensor will count passenger through directions



*Fig5.4: System Implementation (two door bus)*

#### **5.4.2 Structural View of System Implementation (one door bus)**

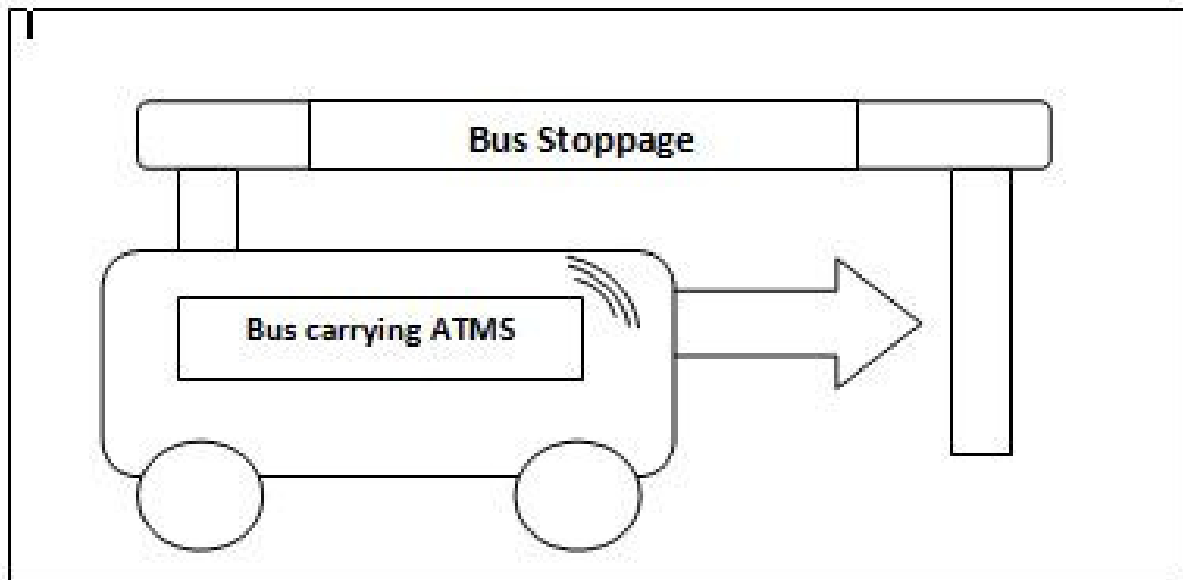
The following figure is about one door bus system. In one door bus, there will be one sensor and two ATMS device and all of them placed in front door. Like two door bus system, here sensor count passenger through directions. When a passenger goes up through the door sensor will detect the direction and count as one passenger in and likewise when passenger goes down counter will count one passenger out. ATMS device works here same as two door bus. Primary device connect bill card and secondary device disconnect the connected card.



*Fig5.5: System Implementation (one door bus)*

### 5.4.3 Structural View of System Implementation (Bus Stoppage)

From the given figure below we can see a scenario of a bus stoppage. In this system, every bus stoppage's magnitude and longitude have to include in ATMS device system. ATMS device can continuously tracking area with the help of GPRS module. GPRS module collects longitude and magnitude of an area and matched with the saved bus stoppage area. The route of the bus and all the bus stoppage is saved in database of the system. It contains bus stoppage the following information like bus stoppage name, place name, road no etc. When a bus reaches in bus stop, GPRS sensor will collect area coordinates and ATMS will match them with route database and then give feedback according to indicator system and ATMS device will recognize the place as bus stoppage and with this system ATMS device can easily track or recognize locations.



*Fig 5.6: System Implementation (Bus Stoppage)*

**CHAPTER SIX**  
**RESEARCH REPORT ON THIS PROJECT**

## **6.1 Introduction**

In this section, we'll reveal what we find after research on this topic. After discussing about our systems working process, we'll discuss about social impact of this project here. The detailed pros and cons about existing and our developed system will be including here. Our systems benefit and importance are discussed in this section. Previous important researches about this project and the research results are also discussed in bellow.

## **6.2 Pros and Cons of Existing System**

There are lots of drawbacks in existing transport system. Bangladesh still follows full analog system in transport section. This Existing analog system has more disadvantages than benefit. This is full of irregularities, indiscipline and disorderliness. Everyday People of this country suffer as well as the country also comes to a loss in many ways for this unbalanced transport system. The result of this improper analog transport system is traffic jam which helps to lose too much valuable time of the city's people. Most of the people late to their destiny due to huge traffic jam. Unorganized car parking is one of the causes. Publics transport like buses make anywhere like bus stoppage. Buses stop at random place and Pick up passengers and also pick down anywhere like middle of a busy road. Sometime public transports get instructed to stop the vehicle in random place by passenger because there is no designated bus stoppage and the system is not very strong. And Random vehicle stoppage is one big problem which causes traffic jam, accident etc. Traffic jam has turned daily trips into nightmares. "According to a World Bank report, in the last 10 years, the average traffic speed in Dhaka has dropped from 21 kilometers per hour (kmph) to 7 kmph, and by 2035, the speed might drop to 4kmph, which is slower than the walking speed. Another study, commissioned by BRAC Institute of Government and Development, says traffic congestion in Dhaka eats up around 5 million working hours every day and costs the country USD 11.4 billion every year" (The Daily Star, June5, 2020). The financial loss is a calculation of the cost of time lost in traffic congestion and the money spent on operating vehicles for the extra hours. Accident Research Institute (ARI) of the Bangladesh University of Engineering and Technology (BUET) unveiled an estimate in 2018. It showed that five million work hours are lost annually to traffic congestion and there is a waste of Tk 370.00 billion every year (The Financial Express, June 14, 2019). According to Numbeo.com ranking about "Traffic Index

by City” Dhaka is in no 10 out of 228 cities. In Bangladesh Number of vehicle increased day by day but the system is not improved to monitor this huge sum of vehicle. Here is the simple statistics about number of registered vehicles increased year wise in Dhaka city:

| <b>Year</b> | <b>Total No of<br/>Reg. Vehicle</b> | <b>Public<br/>Transport(Bus)</b> | <b>Private Cars</b> |
|-------------|-------------------------------------|----------------------------------|---------------------|
| 2015        | 95,743                              | 2221                             | 18,422              |
| 2016        | 1,10,520                            | 3479                             | 18,010              |
| 2017        | 1,39,748                            | 3294                             | 19,573              |
| 2018        | 1,71,349                            | 2755                             | 16,319              |
| 2019        | 1,58,417                            | 3606                             | 15,016              |

*Table 6.1: Statistics of year wise no of vehicle*

According to the Bangladesh Road Transport Authority (BRTA), as of July 2019, there are 4,057,743 registered motor vehicles (Dhaka Tribune, July 29, 2019). And also according to BRTA a total of 522,000 fitness certificates were renewed in fiscal year 2017-2018. In the next fiscal, about 607,000 more were renewed. But there is no perfect system to check car license, driving license fitness of a vehicle in a daily basis. It is hard to manually check every single vehicle’s status.

Traffic accident is also the one of the main result of this unorganized transport system. Drivers do not try to control vehicle speed and it is hard for traffic police to maintain and control vehicle speed manually. Random bus stoppage is also a cause of road accident. Unlicensed driver, unlicensed and unfit car is also a great cause of road accident. And there is no way in this system to keep in touch every vehicle and check their license in daily basis. And it is a great opportunity for a driver who wants to skip the license registration and renewal. For these reason road accident and fatality rate is quite high in Dhaka city. A July 2019 report found that between January and June, over a mere 180 days, there were 2,159 road accidents which led to 2,329 fatalities. The report identified unlicensed drivers and a lack of driving discipline as the foremost causes of fatalities (Dhaka Tribune, July 29, 2019). According to Green Club Bangladesh (GCB), in 755 road accidents 1027 found dead including 141 women, 166 children and 1301 people injured across the country in January and February 2020 (The Financial Express,

March 05, 2020). Here in presented a report of “Nirapad Sharak Chai” which is an organization who collect information about Transport management. They include a shot statistic about No of road accidents, fatalities and injured people in the past three years: (The Daily Star, January 05, 2020)

| <b>Year</b> | <b>No of Accident</b> | <b>Death</b> | <b>Injured</b> |
|-------------|-----------------------|--------------|----------------|
| 2017        | 3349                  | 5645         | 7908           |
| 2018        | 3103                  | 4439         | 7425           |
| 2019        | 4702                  | 5227         | 6953           |

*Table 6.2: Report of Year wise road accidents and causality*

These report also point some factors which are behind cause of these accidents are weak traffic management, faulty vehicles, poor enforcement of law, Illiterate and unskilled drivers and people’s carelessness. And these are the result of this Existing unorganized transport system.

Way billing and collecting transport fare system is also in a bad condition. Present way billing system is a total improper system. And transport fare is not collected according to the way it should be. So, almost everyday People have to bargain with vehicle employee and most time it turns into fight and casualties. People and transport system are not in harmony regarding this topic. And there is no way to manage and control this improper transport fare system and way billing.

This existing analog system is not suitable for a developing country. This system does not have any kinds of benefit but it has way more disadvantages for the developing society and country.

### **6.3 Effect of This Project in Our Daily Life**

We already mention that our project ATMS system is an IoT based digital system. ATMS system build up to remove some major problems of transport system like Manual license checking, driving license checking, vehicle speed control, analog way billing system, manual collection of transport system, random bus stoppage etc. We hope our Project is able to remove this difficulty of the existing transport system and effect of our system will be a great change in society and also in transport system. We hope our project ATMS system can

change the whole transport system digitally and since this project is user friendly, people can be easily adapting to this system and can be used transport system comfortably.

#### **6.4 Pros and Cons of This Project**

Automated Transport management system (ATMS) is an IoT (Internet of Things) based digital system to control transport system of Dhaka city. ATMS system is build up in a systematic way and in previous section the buildup process is already mentioned. Researching the existing system and setting target with pointing out main problems was the first step. Then analyzing the problems and finding the most user friendly solution for the problems by researching and analyzing existing solution and our countries situation. These processes are followed to make the project effective, useful and workable for the society. And now our project ATMS system is able to cover some major areas of transport sector and it is able to make the whole system smooth and perfect for everyone.

We already described about ATMS systems coverage area and how this system is actually worked. Here we will shortly describe usefulness and advantages of our system and how this project makes the social life easier.

ATMS systems remove manually bus fare collection and in replace it provide smart card system to collect bus fare. In this way, passengers do not have to quarrel with anyone for unfair bus fare and bus companies do not have to worry about their losses. It also removes manual passenger counting by stopping bus at side of the road and do not have to waste lot of times. It will accurately count passengers and will save other necessary data's alongside with way billing. It removes the most annoying factor of transport system that is random bus stoppage. ATMS system forces the bus driver to stop at only in the bus stoppage. It also forces driver to maintain vehicle speed and help him to forget about overtaking tendency. this system also provides a very useful service that is to carry important documents of the vehicles which most of driver think as burdensome. This ATMS system digitally and forcibly control the system make everyone to follow the rules and regulation.

**CHAPTER SEVEN**  
**CONCLUTION**

## **7.1 Conclusion**

The major aspect considered in this paper is setting up systematic and suitable transport management system which can deal with the problems and negative issues of the present transport system. The goal of this paper is to remove problems from transport sector which are the cause of bad effect of the development of society. The major problems and negative issues can be removed with system and can create a balanced transport system. The paper in particular focuses on the elements requiring immediate attention. Best practices in the developing countries need to agree to a package of measures for achieving sustainable mobility.

## **7.2 Limitation**

It is already told that only the major problem can be covered with ATMS device. That means there will be minor problems still exists after ATMS device installation. Transport sector is too big to cover with one system. To convert the whole transport system into digital, we need to build up several systems. ATMS system only covers public transportation problems which are caused by intentionally. ATMS system is a system which is forced people digitally to maintain a systematic way. So, the minor problems which are not caused by the people are not included in this system.

## **7.3 Future Thoughts**

ATMS system can be upgraded day by day according to our needs. It can be added new features by developing the system according to circumstances when transport system wants to cover new problems. From the previous sections it is seen that ATMS is a user friendly system. When transport system needs to cover up other area then ATMS can be used there by adding new features in the system.

## REFERENCES

- [1] Albertto Fernandez-Isabel and Ruben Fuentes-Fernandez, “Analysis of Intelligent Transportation Systems Using Model- Driven Simulations”, Academiceditors: AntonioPuliafito,SymeonPapavassiliou and Dario Bruneo; Received: 4 April 2015 / Accepted: 10 June 2015 Published: 15 June 2015.
- [2] Prof.SadkoManzuka, PhD, “Intelligent transport systems “, Intelligent Transport Systems Department Faculty of Transport and traffic Sciences University of Zagreb, Zagreb, 2015.
- [3] Vorgelegt Von Joachim WahleausWinterberg ( Sauerland ) , ”Information in Intelligent Transportation Systems “ ,Referent : Prof. Dr. M. Schreckenberg , Korreferent: Prof. D. E. Wolf , Tag der mundlichenprufung: 15.01.02
- [4] FawziNashashibi ( National Institute for Research in Computer Science and Control -178 publications 2,070 Citations ) , Arnaud de La Fortelle ( Mines ParisTech ,Paris ,France -126 Publications 1,629 Citations ) , “ Certification of Automated Transport Systems” , Article in Procedia- Social and Behavioral Sciences . December 2012.
- [5] Noah OluwatobiAkande, OladiranTayoArulogun and RafiuAdesinaGaniyu ,IsiakaAkinkunmiAdeyemo , “ Improving the quality of Service in Public road transportation using real time travel information system “, World Review of Intermodal Transportation Research , Vol. 7 , No. 1, 2018
- [6] Huong Nguyen –Minh,“Contribution to the Intelligent Transportation System “,<https://tel.archives-ouvertes.fr/tel-01498818> ,submitted on 30 Mar 2017
- [7] SumitMallik , “Intelligent Transport System “ ,International journal of civil Engineering Research . ISSN 2278-3652 Volume 5 , number 4 (2014),pp. 367-372
- [8] S.Suman, B.Raghaviah and N.SureshBabu , “ Intelligent Transport Management System with Wireless Network “ ,International Journal of Electronics , Communication & Instrumentation Engineering , Research and Development ( IJECIERD ) , ISSN 2249-684X ,Vol.2,Issue 3 (Spl.) Sep 2012 8-14 .
- [9] TolgaErcan ,” Sustainability Analysis of Intelligent Transportation Systems” ,2013 . Electronic These and Dissertations. 2746. <http://stars.library.ucf.edu/etd/2746>
- [10] Heijden , Van der ,M. C. , Ebben , M. J. R. , Gademann , A. J. R . M., &Harten, Van, A. (2002),” Scheduling vehicles in automated transportation systems: algorithms and case study “. OR Spektrum, 24 (10, 31-58. DOL: 10.1007/s291-002-8199x ,published : 01/01/2002
- [11] Tiza Michael ,Anand Kumar ,Shubham Kumar ,”A Survery of Literature on Automated Transport Systems “ ,International Journal of Engineering Technology Science and Research ,IJETSR,www.ijestsr.com,ISSN 2394-3386,Volume 3,Issue 12,December 2016.

- [12] Tom Voegelé, Co-rapporteurs: Bogdan Godziejewski, Sylvie Grand-Perret, Dr. Natasha Merat, Ornulf Jan Rodseth, Maegrit van Schijndel-de Nooij, “Connected and Automated Transport”, COM/2017/0283 final, 31 May 2017.
- [13] S.M. Sohel Mahmud, Mohammad Wahidur Rahman, Shahnewaz Hasnat-E-Rabbi, “Transport System in Bangladesh : issues and options for sustainable Development “, Research Assistant, Accident Research Center (ARC), BUET, Dhaka, Bangladesh.
- [14] Barbara Richardson (1999), “Towards A Policy On a sustainable Transportation system, Transportation Research Record 1670, TRB ([www.trb.org](http://www.trb.org)), pp.27-34.
- [15] Timothy Beatley (1995), “The Many Meanings of sustainability”, Journal of Planning Literature, Vol.9, No. 4, May, 1995, pp. 339-342.
- [16] Victoria Transport Policy Institute, “Basic Principles of people-Centred, Equitable and sustainable Transport“, <http://www.vtpi.org>.
- [17] William G. Barker (2005), “Can A sustainable Transportation System be Developed for San Antonio, Texas”, Transportation Research Record 1924, Transportation Research Board ([www.trb.org](http://www.trb.org)), pp. 120-128.
- [18] Ashan, H.m. (2005), “Need for a sustainable Public Transport System in Dhaka City, the Capital of Bangladesh “, Institute for Transport studies, the University of Leeds, UK, 17 March 2005.
- [19] M.M. Haque and J. B. Alam “Strategies for safer and Sustainable Urban Transport in Bangladesh” BUET, Dhaka, Bangladesh.

# omated\_Transport\_Management\_System\_ATMS\_\_July-1-2020\_edition.pdf

## ORIGINALITY REPORT

14%

SIMILARITY INDEX

13%

INTERNET SOURCES

4%

PUBLICATIONS

12%

STUDENT PAPERS

## PRIMARY SOURCES

|   |                                                                 |     |
|---|-----------------------------------------------------------------|-----|
| 1 | Submitted to Daffodil International University<br>Student Paper | 4%  |
| 2 | en.wikipedia.org<br>Internet Source                             | 1%  |
| 3 | www.dhakatribune.com<br>Internet Source                         | 1%  |
| 4 | www.tutorialspoint.com<br>Internet Source                       | 1%  |
| 5 | dspace.daffodilvarsity.edu.bd:8080<br>Internet Source           | 1%  |
| 6 | www.guru99.com<br>Internet Source                               | 1%  |
| 7 | dspace.library.daffodilvarsity.edu.bd:8080<br>Internet Source   | 1%  |
| 8 | dspace.bracu.ac.bd:8080<br>Internet Source                      | <1% |
| 9 | www.thedailystar.net                                            |     |

|    |                                                              |      |
|----|--------------------------------------------------------------|------|
|    | Internet Source                                              | <1 % |
| 10 | hdl.handle.net<br>Internet Source                            | <1 % |
| 11 | lastminuteengineers.com<br>Internet Source                   | <1 % |
| 12 | www.nctr.usf.edu<br>Internet Source                          | <1 % |
| 13 | Submitted to East Delta university<br>Student Paper          | <1 % |
| 14 | pcosalus.com<br>Internet Source                              | <1 % |
| 15 | components101.com<br>Internet Source                         | <1 % |
| 16 | ethesis.nitrkl.ac.in<br>Internet Source                      | <1 % |
| 17 | www.ehow.co.uk<br>Internet Source                            | <1 % |
| 18 | Submitted to Manipal University<br>Student Paper             | <1 % |
| 19 | Submitted to Napier University<br>Student Paper              | <1 % |
| 20 | Submitted to CSU, San Jose State University<br>Student Paper | <1 % |

---

|    |                                                                       |      |
|----|-----------------------------------------------------------------------|------|
| 21 | <a href="http://www.codatu.org">www.codatu.org</a><br>Internet Source | <1 % |
|----|-----------------------------------------------------------------------|------|

---

|    |                                                 |      |
|----|-------------------------------------------------|------|
| 22 | Submitted to Monash University<br>Student Paper | <1 % |
|----|-------------------------------------------------|------|

---

|    |                                                                                                                                                                                                                                                  |      |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 23 | B.S. Sourab, H. S. Ranganatha Chakravarthy, Sachith D'Souza. "Implementation of home automation using eye blink sensor", 2014 International Conference on Electronics, Communication and Computational Engineering (ICECCE), 2014<br>Publication | <1 % |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|

---

|    |                                                                     |      |
|----|---------------------------------------------------------------------|------|
| 24 | <a href="http://pt.scribd.com">pt.scribd.com</a><br>Internet Source | <1 % |
|----|---------------------------------------------------------------------|------|

---

|    |                                               |      |
|----|-----------------------------------------------|------|
| 25 | Submitted to City University<br>Student Paper | <1 % |
|----|-----------------------------------------------|------|

---

|    |                                                                                |      |
|----|--------------------------------------------------------------------------------|------|
| 26 | Submitted to Jabatan Pendidikan Politeknik Dan Kolej Komuniti<br>Student Paper | <1 % |
|----|--------------------------------------------------------------------------------|------|

---

|    |                                                                       |      |
|----|-----------------------------------------------------------------------|------|
| 27 | <a href="http://www.scribd.com">www.scribd.com</a><br>Internet Source | <1 % |
|----|-----------------------------------------------------------------------|------|

---

|    |                                                         |      |
|----|---------------------------------------------------------|------|
| 28 | Submitted to University of Westminster<br>Student Paper | <1 % |
|----|---------------------------------------------------------|------|

---

Exclude quotes      On

Exclude bibliography      On

Exclude matches      < 10 words