

SMART BUS TRACKING SYSTEM USING IoT

Ms.S.Poorani
Assistant Professor-EEE
Mangayarkarasi College of Engineering
Madurai
pooranimce@gmail.com

S.Boomika
Final year-EEE
Mangayarkarasi College of Engineering
Madurai
boomika1312@gmail.com

S.Deepa
Final year-EEE
Mangayarkarasi college of Engineering
Madurai
ds764183@gmail.com

P.Nagajothi
Final year-EEE
Mangayarkarasi College of Engineering
Madurai
jyothi312002@gmail.com

J. Sakthi Meenakshi
Final year-EEE
Mangayarkarasi College of Engineering
Madurai
Sakthimeenakshi6789@gmail.com

ABSTRACT

The rapid growth of vehicles implies more fuel is required, resulting in the emission of harmful gases into the environment, causing air pollution. The primary cause of vehicle pollution is the continually growing number of vehicles. People don't have time to invest in waiting for transport. Waiting time for transport in such crowded cities leads to less productivity on a whole. People face this problem in their daily life where they have no idea about the current status of their transport. So the proposed solution is an android based application that will help the user to check out the current location of the bus and also will help the user to know how much time the bus will take to reach the current location of the user. The system will use GPS as the basis for the application and basic android application will be interfacing with the updated database to provide the

real-time data to the user, hence enhancing the user-experience.

KEYWORDS: GPS Module, RFID Reader Module, ESP 8266 Wi-Fi Module.

INTRODUCTION

There are buses available for passengers travelling to different locations, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the vehicle to reach its destination location would assist the passengers with various routes, track the current location of the bus and give the correct time for the bus to reach its destination. The proposed system deals with overcoming the problems stated above. The system is an Android application that gives necessary information about all the buses travelling in Mumbai. The platform chosen for this kind of system is android, reason being Android Operating System has come up

on a very large scale and is owned by almost every second person. As more and more applications of android operating system is developed day by day on large scale ever since it is arrival.

LITERATURE SURVEY

A vehicle tracking system is very useful for tracking the movement of a vehicle from any location at any time. In this work, real time Google map and GPS based vehicle tracking system is implemented. These are some of the technical literature in engineering and technology where people have tried to implement similar kind of Systems which are mentioned below with their shortcomings with respect to our Application.

- [1] Authors “Keerthana.M,Rama.B , Vijayalakshmi.S” have implemented “Smart Bus Tracking System” The proposed system reduces the waiting time of remote users for bus. A system is used to track the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via web based application. This System is a web based system but nowadays people mostly tends to use Android apps since they are more portable and smart phones are used more widely in today’s world. Also a web based system is inconvenient for a user to use on a regular basis while waiting for a bus at the bus stop.

- [2] . Authors “Md. Marufi Rahman, Jannatul Robaiat Mou, Kusum Tara, Md. Ismail Sarkar” have implemented the system “Real Time Google Map and Arduino

Based Vehicle Tracking System” using GSM and Arduino coordinates sent by arduino is shown on google maps.

- [3] Authors “Manish Chandwani, Bhoomika Batheja, Lokesh Jeswani,Praveen Devnani, Prof. Richard Joseph” have implemented the system “Real Time Bus Tracking System”.

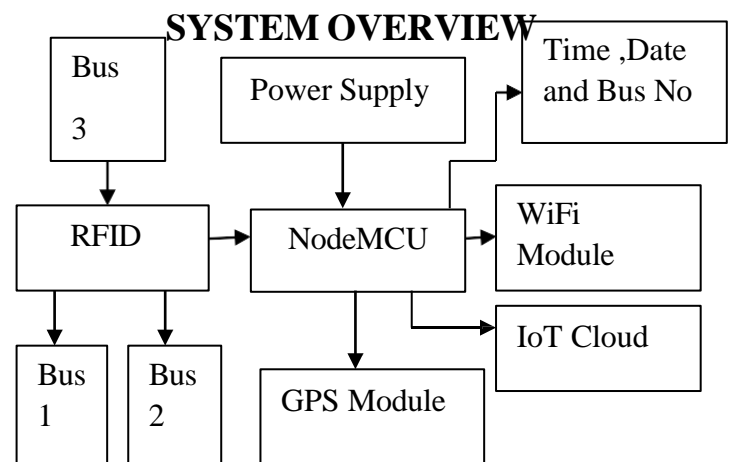


Fig 1:Block diagram of System overview

COMPONENT EXPLANATION

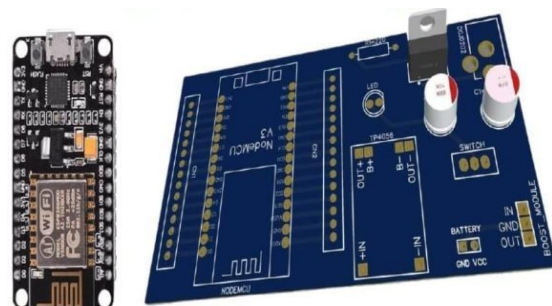


Fig 2: Microcontroller Arduino with NodeMCU

Arduino and NodeMCU are microcontroller development board with wifi capability. It uses an ESP8266 microcontroller chip. Whereas Arduino UNO uses an ATmega328P microcontroller. Besides the chip, it contains other elements such as crystal oscillator, voltage regulator. The NodeMCU offers a variety of development environments, including compatibility with the Arduino IDE. It can be used to build smart home devices, remote sensors, data loggers, and other internet-enabled devices.



Fig 3: ESP 8266 Wi-Fi Module

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT (Internet of things) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems.

The ESP8266 Wi-Fi module is highly integrated with RF balun, power modules, RF transmitter and receiver, analog transmitter and receiver, amplifiers, filters,

digital baseband, power modules, external circuitry, and other necessary components.

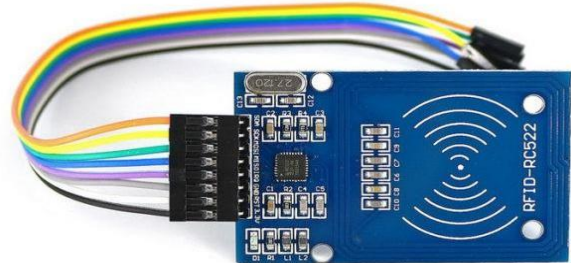


Fig 4: RFID Reader Module

RFID devices use electromagnetic fields to automatically identify and track compatible RFID tags. The tags contain unique electronically stored information, which is read by the RFID readers. RFID tags are used in many industries and commonly in security applications.

Radio Frequency Identification (RFID) is a technology that uses radio waves to passively identify a tagged object. It is used in several commercial and industrial applications, from tracking items along a supply chain to keeping track of items checked out of a library.



Fig 5: GPS Module

The GPS module is a wireless chip module combined on the mainboard of a mobile phone or machine. It can communicate with the global satellite positioning system in the United States. It can locate and navigate according to the condition of a wireless network signal. GPS sensors are receivers with antennas that use a satellite-based navigation system with a network of 24 satellites in orbit around the earth to provide position, velocity, and timing information.

POWER SUPPLY:

Power Required By NodeMCU and Nodemcu operates at 5v & 3.3V. For 3.3V there is already an LDO voltage regulator to keep the voltage steady at 3.3V. NodeMCU can be powered using Micro USB jack and VIN pin.

RESULT:

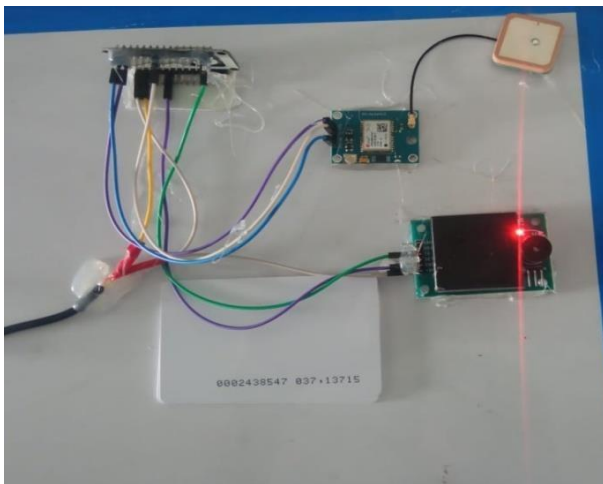


Fig 6: Components arrangement

Bus Monitoring using IOT

ID.NO	Bus Identified	Time	Date	
1	Bus-1	3:58:26 PM	25/04/2024	Track
2	Bus-2	3:58:37 PM	25/04/2024	Track
3	Bus-3	3:58:44 PM	25/04/2024	Track
4	Bus-3	3:58:53 PM	25/04/2024	Track
5	Bus-2	3:59:13 PM	25/04/2024	Track
6	Bus-3	3:59:25 PM	25/04/2024	Track
7	Bus-1	3:59:39 PM	25/04/2024	Track

Fig 7: Output 1

Crop Monitoring using IOT

Longitude :
 Latitude :

Fig 8: Output 2

CONCLUSION

In near future, we would like to enrich our proposed application by adding the following features. In this research study, we design and develop a real-time bus tracking system using GPS tracking technology which needs only a smartphone and a real-time server. Our application consists of two fundamental concepts: first it collects the realtime location information of buses via GPS technology and secondly updates the location information in the database server. The bus-side, server-side and client-side modules provide all the expected functions. Since this application does not need any external hardware except a smartphone which is available to anyone in the world, the overall cost is very low or no cost needed for tracking the bus location. It provides nearly accurate data in real time that makes possible for the user to track the buses.

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