

# Real Time College Bus Monitoring and Notification System

M. S. Minu, Deepak Adithya K. N.

**Abstract:** In today economic and traffic condition no one can predicts at wat time and when the required transportation of a person can arrive .The aim of the paper work to provide a app which can be used for college students so that they can manage the time during all days usefully and get to their transport point at the right time and not lose the bus or any other college transportation receive provided by the college. I intent to use IOT and concepts with the help of Arduino to complete and implement this product. This paper also aims to add feature like estimate time of arrival, notification, students data base etc.

**Keywords:** Arduino, Economic and Traffic, College Students.

## I. INTRODUCTION

In the growing and evolving environment the time is so precious that if you lose some it may cause you major incident like during exam days for school or college students that may miss their bus are their time for last minute revision they need to do before the exam. For such issues I have developed this paper.

This paper is on IOT device which tracks the activity of the bus of the day and report it to the students that are using the service and notification will be sent to the student 5 minutes before arrival of the bus in the morning or departure for the college. So that they can get ready according and go to the bus stop/after college to the bus safely and manage their time accordingly in the morning.

In this application I have also designed which that the ETA (estimate time of arrival) will be shown. In the mornings will we wake up last or get ready late we can use this and manage the time accordingly and catch the bus. I also included the ID card in the mobile application you can show the ID card whenever we get on/off the bus to the person in charge to check whether the student on board are all the students who paid for the transportation and other didn't get on the bus.

## II. LITERATURE REVIEW

The common and most efficient way to track the package or any moving object is via Global Positioning System (GPS).

**Revised Manuscript Received on 30 September 2018.**

\* Correspondence Author

**M. S. Minu**, Assistant Professor, Department of Computer Science and Engineering, SRM Institute of Science and Technology, Chennai (Tamil Nadu), India.

**Deepak Adithya K. N.**, Student, Department of Computer Science and Engineering, SRM Institute of Science and Technology, Chennai (Tamil Nadu), India.

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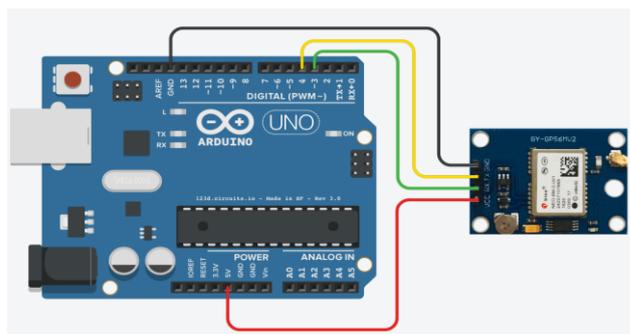
The GPS is a developing hardware unit where it's used derive the location of the moving object. Since it's a developing hardware the products accuracy is around 80% correct. The software for this hardware is also developing in future this device will be used in every field. This GPS device get data for more than two satellite and give us the location of the moving object we are looking for in our case it's a bus. This device is recommended by various scientist and research people due to its accuracy and the data it provides along with the location such as the traffic condition, the speed of bus, its location using latitude and longitude etc. The tracking helps us to monitor and regulate the driver activity. We can ensure that the product reaches the destination on time and safely. This intern helps us increase the delivery on time rate and the opinion on the agency. ETA (estimate time of arrival) we apply the concept of ETA by using speed, route and traffic on the road. We use to get the distance, route, climate and traffic to apply an algorithm with gives us the ETA. While we are doing we take the speed to be 40 km/hr since it's the speed limit in India. We can change it accordingly with the speed limit of the place where the application is being used. ETA can change according to climate conditions because in rainy or winter days the roads will be slippery and the transportations gets slowed down accordingly.

## III. COMPONENTS USED

### A. GPS Tracker

The one which is used Ublox 6m GPS tracker

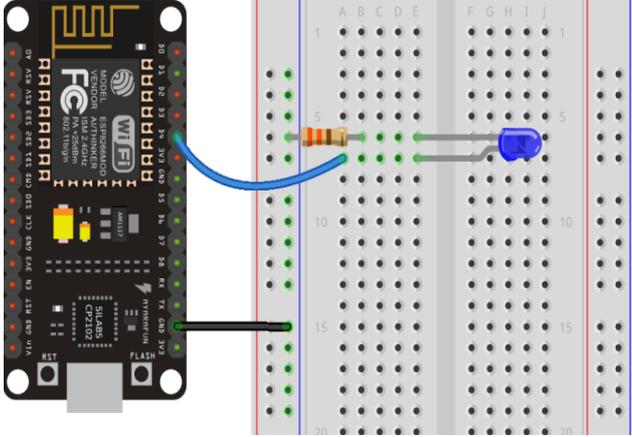
- This tracks the bus continuously and report it to the application by using the parameters such as speed, geographic location and the route and upload it to the server and is viewed through the mobile application.
- Accordingly to the speed the ETA is given .Since it depends on the speed of the bus the ETA will change accordingly to the number of stops it does in between till it reaches the location of the required student.



## B. ESP8266 Microcontroller

ESP8266-12f is a Wi-Fi microcontroller and chip which is used here to read the GPS reading with help of latitude and longitude and it uploads it to My SQL database which we used by the server we manage.

It pushes a notification once the bus arrive at the location of our pick up location. Overall it verifies the data it receives and upload it the server of the system which is later used by the application.



## IV. SOFTWARE SPECIFICATIONS

In this prototype, the application was built with the help of java, xml and embedded c coding with is done in android studio environment to develop the mobile application. The tracking device coding was done with the help of Arduino IDE and was combined with the application in the android studio respectively. The backend were developed using java My SQL, java script. The database is used for the storage of the student data.

## V. PROPOSED SYSTEM

Taking the important of the time into account to commute to and from college requires making the college journey entirely transparent and accountable. The proposed model conceptualizes a comprehensive monitoring system which would track the bus continuously in real time.

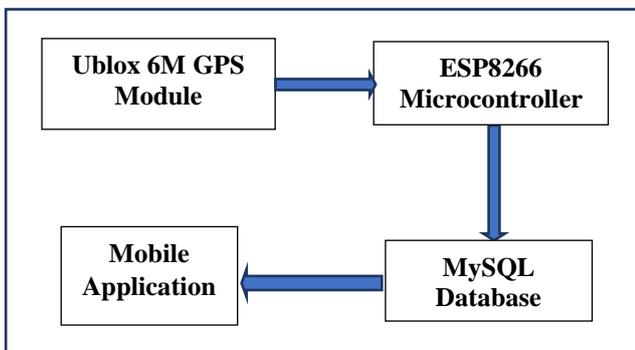


Figure 1. Block Diagram

The functionalities of the proposed model includes tracking the location, the speed, the list of passengers which should be onboard and the route of the bus and plotting these information on a map integrate dosing the Google Maps API. The user interface is of an android application which serves has the tool to locate the bus, to estimate its time of arrival and notifies the required student accordingly.

The application has the ID card of each and every student how uses the transportation service in a database and when the student login in with his/her roll no it show. The application will also send you the notification on changes of the bus or bus route we need to take on a circumstance bases.

Figure 1 shows the overall block diagram and the flow of the system. The hardware assembly is kept at the entrance of the college bus. The sensor integrated to the microcontrollers the GPS system. The GPS system is used to track the real time bus location and send the information to the server accordingly which is then used by the application that are using to application to track their transports locations and details.

The applications also as the ID card within it so the students doesn't have to carry it around .when he/she gets on the bus they simply have to show their ID card in the mobile phone. If the mobile that carry around has a problem then they can use their friend to show the ID card has the ID card is directly attached to their roll no in database if the login in the application it will be updated in the application automatically.

The GPS module continuously reads the coordinates of the bus's current location and the speed at which the bus is travelling which is subsequently read by the microcontroller. The data is continuously uploaded to server using the Wi-Fi connectivity in the bus. The upload data is then show the application for live tracking. This data also helps us in calculating the ETA.

The mobile application for the model works on the Android operating system. The application can accommodate three types of user administration, students and drivers. On signing up, the unique ID will be generated the college for the future verification. The students then will have to use the same password with their roll no to login. A Google Map API is integrated to the application UI to plot the location and route of the bus.

In the students login the students can view the bus details the drive details. The application also show us the location, time of arrival and so on. In the drivers login we can view the number of students which should get on board, their pick location and the route to be followed. The route can change according to road and climate condition which will also be shown in the student login. In the administer login we can see the time of arrival of the bus, the route, no of students which should we on board and the drive details.

## VI. ADVANTAGES

The advantages of the system is as mentioned below:

- Since we can track the bus activity it makes us to converse more time and work efficiently.
- With the help of ETA we can get ready correctly on the days when we get up late and miss the timing we normally get ready.
- If we miss the bus in our stop we can check for the nearby bus station and its timing to arrive there accordingly

## VII. DISADVANTAGES

The following points are the disadvantage:

- The accuracy of the device is still be tested and it may cause problem accordingly to the service and device maintenance.
- The algorithm may cause change to the ETA on bases of bad climatic condition and other unavoidable road conditions.
- The route mentioned in the map may not be accurate accordingly to the road and bad climatic conditions.

## VIII. CONCLUSION

This is a developing project with the help of the IOT and Android studio. The later development and the accuracy of the project depends on the development in both hardware and software

In this project we try to save the time of the students mainly and some faculty who uses the college transportation service and we also tend to help them with easy and tension mornings for a bright and peaceful day.

We also intend to develop this project for school and public transportation services in the near future.

## ACKNOWLEDGEMENT

I thank my teachers and my fellow student who helped me complete this paper work in the required time. I also thank the college for standing by me throughout this process and help me in time of needs.

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