

College Bus Tracking and Notification System

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Abstract— The advanced environment is recommended by a variety of technology day by day. Often the associated changes in technologies are improving advanced business methods. Several technologies have been exhibited in the system for growing people's life more comfortable and healthier day by day. Android is the newest and rapidly developing technology available for all users or users in today's business. A tremendous rise in end-user assent has been encountered in the past few years. The plan is based on the latest GPS technology using IoT which permits the college students to track the movement of the college buses and maintain a schedule as well as implement real-time bus locations for the users. Unique and stunning conditions on the roads affect the smooth operation of the bus system and the change of vehicles. Also, daily difficulties such as traffic, sudden delays, broken vehicle dispatching incidents take place, and as an outcome of which the program of the students is affected and they necessarily have to wait for the arrival of their particular bus and also attempt to miss their bus. The foremost objective of this application is to render the specific location of the user's respective buses in Google Maps and also joined with the specialty of emitting an alarm signal to the driver if the user is beside the bus stop. It is the real-time system as the current location of the bus is renewed every moment in the form of latitude and longitude which is received by the user by their application with the help of Google Map API.

Keywords— college bus tracking; GPS tracker; Node MCU; buzzer

I. INTRODUCTION

The Internet of Things (IoT) offers our society feasible as correlated. Now we nearly have internet support wherever and we can apply it whenever. Fixed computing materials would be revealed to internet influence. IoT seeks to build high-level connectivity (with the assistance of the internet) amid materials or systems or services to little by little makes self-regulation in all areas. Assume that all devices are attached and all erudition would inter with each other over standard and different protocol domains and utilization. In the growing and evolving ecosystem, the time is so valuable that, if you waste some it may create extreme troubles like during exam days for students to stop for the bus without recognizing the exact spot of the bus. Most of them suggest doubtful where the location of the bus and they could not predict the time arrival and time for them to get combat-ready. Other than that, not understanding the individual identification for a bus will also confuse them on which bus they should take.

To overcome this difficulty, Real-Time Tracking and notification system is developed. The system implements a mobile application that is interfaced with Google map which represents all transmitted information to the user along with the location of the bus on the map. The GPS implies handled to trace the real-time bus spot and send the information to the server hence which is formerly applied through the application to support their transportations locations and features. The main purpose of the system is to track the movement of the

bus spot and communicate it to the users through an android application on Google map and also the user can instruct the driver to wait for a minute throughout alarm after dropping their bus at the stop. So, this helps the user to get prepared and maintain their time accordingly in the morning and catch the college bus on time. Utilizing the IoT technology, highlights of the project are connected to the android application. An IoT method consists of sensors/tools which “interact” through the cloud in some set of connectivity. Once that information receives to the cloud, software manners also then force determine to act, before-mentioned as giving an alarm or automatically modifying these sensors/tools externally that necessary to the user. NodeMCU is used to combine the GPS module and buzzer for real-time location tracking and notification for the user.

II. COLLEGE BUS TRACKING OVERVIEW

The familiar plus several productive ways to follow the aggregate or some impressive thing is via Global Positioning System (GPS). The GPS is a developing device assembly wherever it's applied to determine the position of the impressive object. Since it's generating the hardware gives the exactitude of the outcomes is nearby 80% accurate. The software for this hardware is additionally prolonging in future this method will be utilized in each department. This GPS device receives information for further more than two satellites and provides us the location of the traveling object we are looking for in our case it's a bus. It accelerates the announcement once the bus reaches the place of our select-up place using a GPS tracking method of the 6m module. The GPS implies trace that real-time bus discovering and convey the message to the server severally which is later used by the application to trace their transportations spots and features. Overall it validates the data it acquires and uploads it to the server about the method which is following used by the application. The functionalities regarding the existing design pursuing the place, arrival, and leaving time of bus and considering this information on a map combine dosing the Google Maps API.

III. COMPONENTS

A. Arduino Node MCU 8266

The NodeMCU is an advancement board emphasizing the successful ESP8266 WiFi chip. As it rotates out, thee can edit the ESP8266 just like any other microcontroller. It's an undeniable advantage above the Arduino or PIC is that it can directly connect to the Internet via WiFi. Though, the ESP8266 breakout board has inadequate pins although the chip itself produces several output ports. The NodeMCU illustrates the difficulty over emphasizing 10 GPIO pins every proficient of handling PWM, I2C, and 1-wire interface. This ESP8266 advancement board seems like an Arduino Nano. Addressing of Arduino, an added benefit of this board is that you can correlate it immediately to your PC or Mac and process it like an Arduino. Since NodeMCU is an open-source

platform, its hardware configuration is open for edit/modify/build. NodeMCU Dev Kit/board consists of ESP8266 wifi equipped chips. The ESP8266 is a low-cost [HYPERLINK "https://en.wikipedia.org/wiki/Wi-Fi"](https://en.wikipedia.org/wiki/Wi-Fi) \o "Wi-Fi" Wi-Fi chip developed by Espressif Systems with TCP/IP protocol.

B. Ublox 6m GPS tracker

The specifications toward measuring rate are rate matches range covered divided by the time taken frequently described as $x = d/t$. Through working two GPS points (locations) we can evaluate the range covered. We can utilize the clock inside the GPS receiver (a highly circumstantial clock that synchronizes frequently with the atomic clocks aboard the GPS satellites) to evaluate how long it germinated the vehicle to travel in those two points. In a split second, the GPS transceiver will usually produce the following tasks to manage speed. Persuade the difference between the two latitudinal/longitudinal locations into a unit of determination.

C. Arduino Piezo speakers (buzzers)

A "piezo buzzer" is a miniature speaker that thee can combine directly to an Arduino. "Piezoelectricity" accumulates with certain solid materials it is an advanced material of today's electronics. This material produces electricity by compressing. It is a non-conductive material that is placed between two materials. The metal plate is used to collect the charges. This effect acts like a miniature battery, thus because it is used to produce electricity. Some examples of piezoelectric materials are PZT (also known as lead zirconate titanate), barium titanate, and lithium niobate. These man-made materials have a more pronounced effect (better material to use) than quartz and other natural piezoelectric materials. It is electricity result from pressure and latent heat.

IV. SOFTWARE SPECIFICATION

In this project, Android studio is handled to produce an android. In this IDE, XML as a front end, and java as a back end. Firebase is used to store the data in the cloud. [HYPERLINK "https://firebase.google.com/"](https://firebase.google.com/) This implies a portable policy that supports the fast produce high-quality apps. The open-source Arduino IDE software is used to write code and upload it to the NodeMCU board to get a real-time location of the devices.

V. EXISTING SYSTEM

The popular plus several dynamic ways to trace the case or any effective object is via Global Positioning System (GPS). The GPS remains a developing hardware assembly wherever it's utilized to determine the position like an effective object. Because it's growing hardware the efficiency of the outputs is nearby 80% correct. The software during this hardware is more improved in the future this tool will be utilized in every field. This GPS tool gets data for more than two satellites and gives us the position of the traveling object we are looking for in our case. It drives information once the bus reaches the

place of our select-up place using a GPS tracking system of the 6m module which is shown.

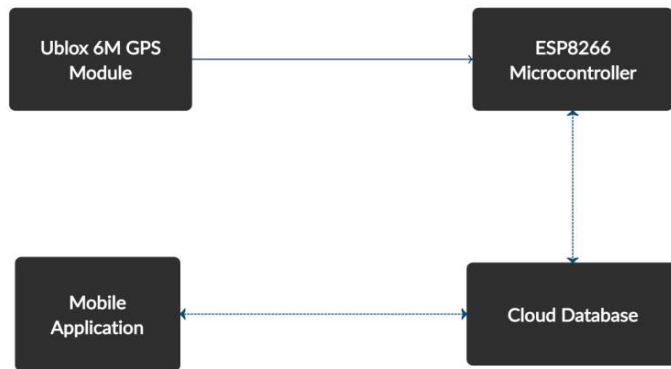


Fig. 1. Existing System Architecture.

The GPS is utilized to trace the current bus situation and transfer the knowledge to the server therefore which is formally accepted by the employment to track their conveyor's locations and details. Overall this validates the information it collects and uploads it to the server of the scheme which is succeeding utilized by the application. The functionalities of the current tracking the spot, arrival, and departure time of the bus, and proposing this knowledge on a map integrated dosing the Google Maps API.

VI. PROPOSED SYSTEM

This foremost goal from the proposed work is to develop the bus tracking and monitoring method through the android application. Knowing the consequence of the time in the report to travel to and from college wants to make the college journey completely transparent and responsible. The proposed model imagines a complete monitoring scheme that would trace the college bus continuously in current and involves notification to the driver when the users miss the bus. The student login with his/her roll no in the firebase correlated to the android application and this acts on the android operating method. The application can contain three types, administration, users, and drivers. After sign up, the user has to use the identical password with their roll number to login.

A Google map API is united into the application UI to propose the location and direction of the bus. The application shows the current location and it gives an alarm option for the user to send notification sound to the driver. In the driver's login, we can view the number of students who should get on board, their pick location, and the route to be followed. The route can change according to road and climate conditions which will also be shown in the student login. In the administrator login, we can perceive the time of arrival of the bus, the route, no of students which should we onboard, and the drive details. Using ETA algorithms, location and speed can be measured. The current system does not give an exact estimated time and location to the user.

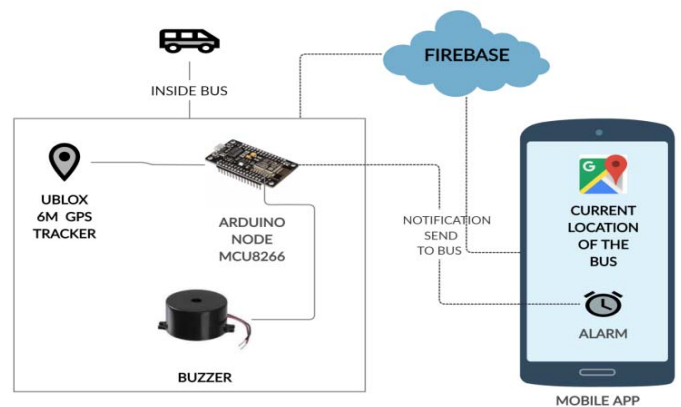


Fig. 2. Proposed System Architecture.

VII. IMPLEMENTATION OF PROJECT

The design of the current location college Bus monitoring and notification system contains two aspects of implementation such as IoT united hard devices and android application. The hardware components are combined with the Arduino NodeMCU and integrate with the android mobile application. Android Google API can be used to track your mobile current location. In this project, we will transfer the location coordinates to the Local Server and you just demand to open a 'webpage' on your computer or mobile, where we will notice a link to Google Maps with bus Location Coordinates. When we click on that link, it catches on to Google Maps, revealing the bus location. While the bus Tracking System through Google Maps, GPS Module is applied for making the Position Coordinates, NodeMCU 8266 to retain transfer data to networks or portable over Wi-Fi, and Arduino is utilized to making GPS and Wi-Fi communicate each other. Thus, we contain the efficiency of the project.

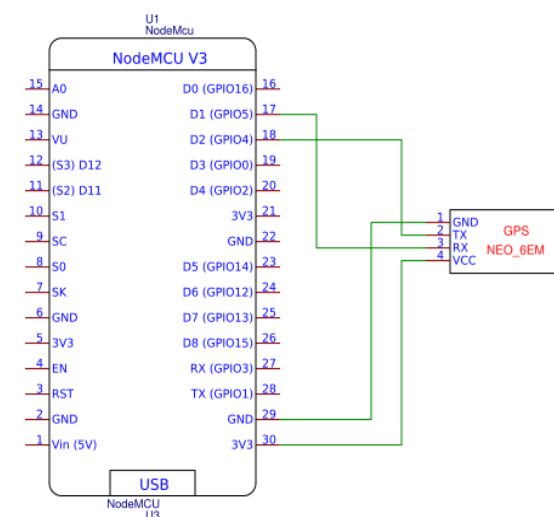


Fig. 3. Pin Diagram for GPS Module.

VIII. ADVANTAGE

- The user can trace the college bus in real-time through Google Maps.
- This application provides the alarm option to give the notification to the driver if the users miss their stop.
- The accurate and exact locations are determined using the ETA algorithm.

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