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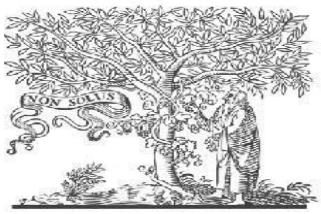

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Title **Design of Bus Tracking and Fuel Monitoring System**

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Design of Bus Tracking and Fuel Monitoring System

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ABSTRACT

The need for efficient public transportation system such as buses is rapidly increased due to the increasing in population, the passengers need to know the accurate arrival time of the particular bus to particular station and then plan their journey from their home .Fuel monitoring have been the major problem that most of bus companies looking to solve. This paper developed a bus tracking and monitoring the fuel and speed system to provide a facility for the management requirements by the administrator. The proposed system based on Arduino, GPS and map suit ASP.MVC which provide the actuated arrival time in addition to graphically showing the bus location on Google map. The design also enables the owner of the buses to monitor the bus instantaneously because the system administrator can easily maintained database information of buses and its fuel tank at any time of the service.

KEYWORDS: Micro controller; GPS ; NODEMCU; Fuel Sensor; Speed Sensor; Google Maps.

1. Introduction

Vehicle tracking systems are popular among people as retrieval device and theft prevention. The main benefit of vehicle tracking systems is the security purposes by monitoring the vehicle's location which can be used as a protection approach for vehicles that are stolen by sending its position coordinates to the police center as an alert for the stolen. When a police center receives an alert for stolen vehicles, they can make an action to prevent this theft. Nowadays, it is used either as a replacement or addition for car alarms to protect it from theft or it can be used as a monitoring system to keep track the vehicle at the real time. So, many applications can be used for this purpose to block car's engine orders as an action to protect the vehicle. Due to the advancement in technology vehicle tracking systems that can even identify and detect vehicle's illegal movements and then attentive the owner about these movements. This gives an advantage over the rest applications and other pieces of technology that can serve for the same purpose.

Nowadays, vehicle tracking is one of the most important applications. For example, the maps given to vehicle drivers may play a large role in vehicle tracking and monitoring.

The major difficulty is that vehicle owners may not be able to distinguish the vehicle in a place as a result of overlapping maps, which adversely affects the process of tracking and monitoring. It requires some types of systems to identify and detect where objects were at some time or what distance travelled during at rip to a vehicle. This may be an additional point and help the police in preventing thefts and locating the vehicle by relying on reports from these approved systems and studying and analyzing them to detect stolen vehicles' locations [13]. This system is a necessary device for tracking of vehicles any time the owner wants to observe or monitor it and today it is really trendy among people having costly cars, used as theft avoidance and recovery of the stolen car.

2. Proposed System

GPS uses a tracking method to find the position of the lost vehicle in terms of latitude and longitude values and it transfers that information using GSM module in the form of text SMS to the automobile owner. It provides the bus arrival time depending on the user source and destination[14-18]. The overall outcomes functionality of the system comes from the interaction between the system components, which are a device on the bus, web application and desktop application. Device on the bus consist of Arduino, GPS, fuel sensor and speed sensor.

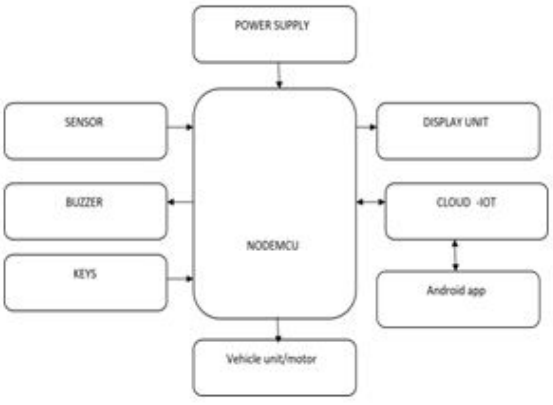

Fig: Block Diagram

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The GPS receive the coordinate information from satellites and send it the Arduino, the fuel and speed sensors used to me a
sure the speed and fuel level and send it to the Arduino, which collect all this data and send it to the server [2]. Sensors are used to identify the alcohol consumption and accident detection. The automobile owner can know the position of the vehicle whenever he wants by sending the TRACK command. If alcohol sensor or accident detection sensor is activated the owner gets the message and the sensors data will be updated in the things peak channel. The device in the bus send a frame to the pc in the central station (server) .that frame consists of speed, location of the bus and its fuel level. The pc stores this information in the database in order to view it in the desktop application or web application [3].Once the information is uploaded in the server the commuter an access the information via the web site using internet .The ASP. MVC and visual studio 2013 with embedded of Gogol map are used to design the website that provide view of buses to the user and he/she can select the station where he stopping and the rout want to go. After that all buses that belongs to the require rout and the time that will take to reach the user station will display. The bus tracking and fuel monitoring system takes input from GPS and send it through the NODEMCU to the desired mobile using mobile communication. The GPS is to find the location of the monitored or tracked bus and then uses the satellite or radio system to send the location data to monitoring centre [4].

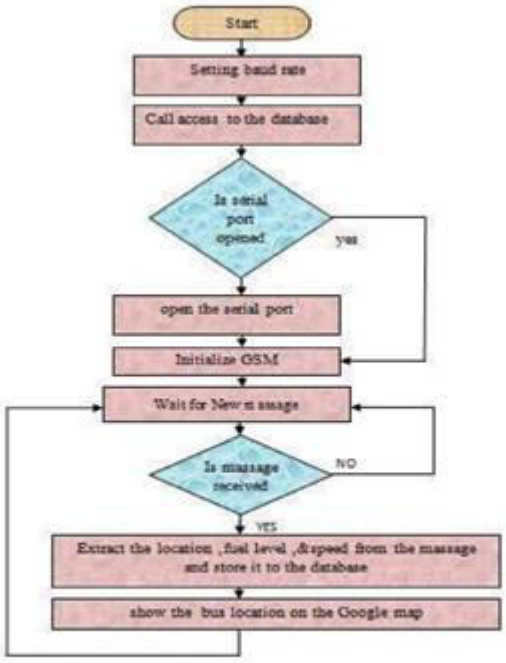

Fig: Sending message at the bus unit

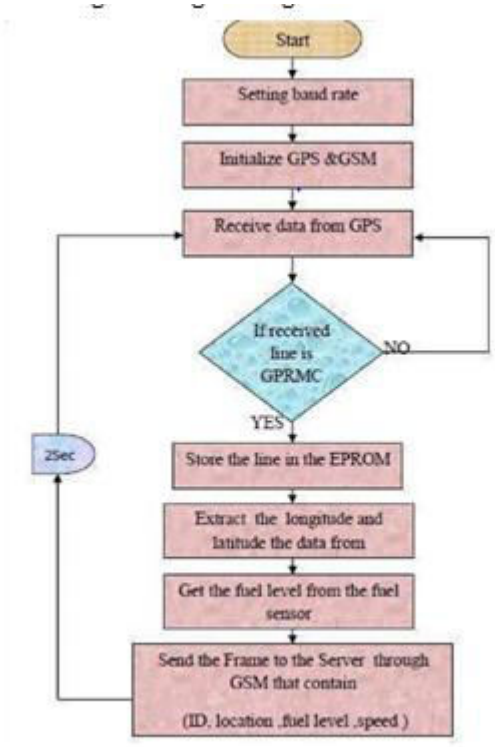

Fig: sending message at the bus Unit

3.Working

The bus tracking system is a cost effective and efficient system, at the bus station people have to wait for long time without even knowing when the bus will arrive, the passengers, can't find the time of arrival of

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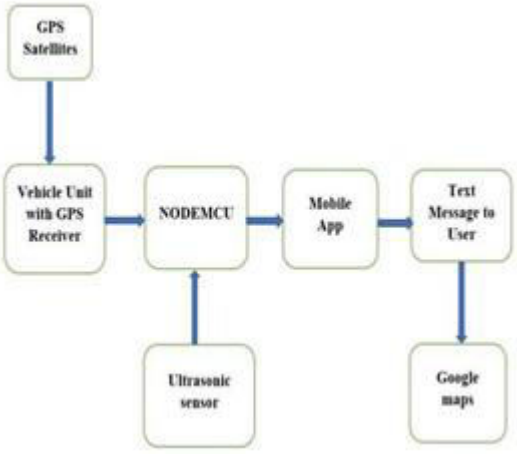
particular bus at the particular destination even at their

homes and plan their journey accordingly. The proposed system present the bus arrival time prediction and fuel monitoring system that provide the accurate arrival time and bus view to the passengers, and provide

Bus monitoring, schedule management and fuel monitoring to the bus company owner. Fuel level Detection circuit calculates the fuel level from the fuel gauge which is present in all the vehicles the current position of the vehicle was acquired by Global Position System (GPS) receiver [5]. The Arduino collect the data from fuel sensor,

4. Flowchat



The project consists of a GPS receiver, NODEMCU, ultrasonic sensor with a microcontroller. The whole system is attached to a bus. The GPS system will send the latitude and longitude to the GSM modem and ultrasonic sensor will send the fuel level to the GSM modem. The SMS sent and then reach the bus, which is travelling, because the bus has advice with NODEMCU . The User will receive the SMS and send to the microcontroller in the bus. An ultrasonic sensor is placed in the front part of the vehicle, if any vehicle draws near then alert message is sent to the mail via Blynk application[6]. To avoid the sparks in the vehicle temperature sensor is utilized and it is placed in the engine part of the vehicle if the temperature inside the car increases then Notification is sent to mail through Blynk. The values of all the sensors are collected by Node MCU as it has inbuilt Wi-Fi module all the data is transferred to the cloud through WiFi and analysis is done in Blynk app and notifications are sent according to the conditions. The bus is installed with he GPS tracking device and ultrasonic sensor which is enabled with the GPRS module. The GPS device obtains the spatial data from its nearest available satellites. It calculates the location with the nearest point from the bus position to the road position. GPS and speed sensor send it to the server at the base station using NODEMCU [10]. An important feature of the Arduino is that you can create a control program on the host PC, download it to the Arduino and it will run automatically. Remove the USB cable connection to the PC, and the program will still run from the top each time you push the reset button. Remove the battery and put the Arduino board in a closet for six months. When you reconnect the battery, the last program you stored will run[11]. This means that you connect the board to the host PC to develop and debug your program, but once that is done, you no longer need the PC to run the program.

5. Implementation

The ultrasonic sensor obtains the fuel level present in the tank. The location and the fuel level is then sent to the database server using GPRS module and ultrasonic sensor [12]. The application server is linked with the database server that reads the location input from the database. Hence the location is displayed on the map using map server.

6. Software Implementation

The software used by the Arduino is Arduino IDE. The Arduino IDE is across platform application written in Java, and is derived from the IDE for the Processing programming language andthe Wiring project. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as highlighting, matching, and automatic in dentition, and is also capable of compiling and uploading programs to the board with a single click. There is typically none edit to edit makefilesorun programs on a command-interface. Although building on command-line is possible if required with some third-party tools such as Another Arduino IDE comes with a C/C++library called "Wiring"(from the project of the same name), which makes many common input/output operations much easier. Arduino programs are written in C/C++, although users only need define two functions to make a run able program: setup ()–a function run once at the start of a program that can initialize settings. Loop ()– a function called repeatedly until the board powers off [8] .

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FIG: A Screenshot of the Arduino IDE Showing

For the above code to work correctly, the positive side of the LED must be connected to pin 13 and the negative side of the LED must be connected to ground. The above code would not be seen by a standard C++ compiler as a valid program, so when the user clicks the "Upload to I/O board" button in the IDE, a copy of the code is written to a temporary file with an extra include header at the top and a very simple main() functionatthe bottom, to make it a valid C++program [9].

The Arduino IDE uses the GNU tool chainand AVR Libctocompile programs, and usesa vrdudeto upload programs to the board.

For educational purposes there is third party graphical development environment called Mini bloqavailable under a different open source license.

7.RESULT

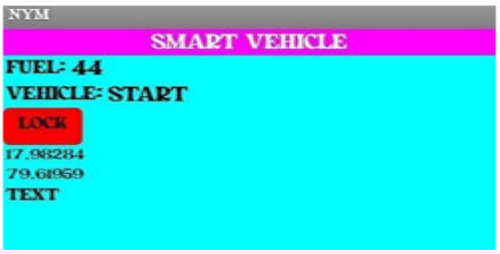

Fig: Smart Vehicle

8. Applications:

The system is capable of vehicle tracking, and monitoring. This type of vehicle monitoring will provide effective and vehicle location using GPS and GSM modules in real time. The vehicle tracking based on GPS will notify the location of the vehicle.

9. CONCLUSION

This paper offers a smart design of tracking and monitoring the busses which helps the bus companies to provide high quality of service. This design can provide the location of the busses of the service with an error less than 10m in the case of slow speed and clear environment and the system give the accurate arrival time of the bus and provide the location of the bus in Google map for both user and administrator**.** This system reduces the waiting time of remote users for bus and provides bus tracking at any location, management and fuel monitoring. The vehicle tracking system is technology that is used by many companies and individuals to track a vehicle by using many ways like GPS that operates using satellites and ground based stations or by using other approaches which depends on the cellular mobile towers. The vehicle unit, which is the hardware component that is attached to the vehicle, is configured to receive signals from the cellular mobile tower and send it to the web server to represent the location on the map by using Google maps in real time. It is very important to consider some hardware specifications in order to get satisfying results. Thus Raspberry Pi can be used as an embedded computer attached to the tracked vehicle especially when using cellular method.

10.FUTURE SCOPE

GPS Tracking Devices market for commercial vehicles will be a major market in 2020. Deployment of GPS tracker helps to track and monitor commercial vehicles such as trucks, buses, heavy commercial vehicles, Logistics and construction vehicles. The increasing sales of commercial vehicles would increase the adoption of GPS Tracking Devices. The worldwide vehicle tracking systems market size is expected to reach $15,957.5 million by2025, from $4,765.0 million in 2017, growing at annual growth rate of 19.9% from 2018to2025.Vehicle Tracking Systems Market comprises the revenue generated from the sales of

the complete solution, which includes hardware, software, and other subscription fees associated with the tracking and data reporting technology. This solution takes in to the loop the different aspects such as GPS, GSM/ GPRS, digital maps, specialized software, and others. By tracking and managing these vehicles in real-time, enterprises can efficiently utilize the in resources. Vehicle tracking System by track ensures the safety of vehicles. In case of an emergency, Utrack helps to locate the vehicles and show the exact location from where a distress signal was received Smart phone plays an important role in the day to day life. Technological revolution helps manufacturers introduce a variety of smart phones at lower prices. Advancements in technology and different software applications allow smart phone users to access GPS signals to track vehicles, etc. Utrack has developed a mobile application which is easy to install, provide user-friendly GUI, and are affordable. Adoption of smart phones as tracking devices is increasing rapidly. Many cab service providers and transportation companies are using tracking devices to track their vehicles. GPS tracking devices are available in sizes that are smaller than a smart phone and are expected to become even smaller in the near future. With recent technological advancements, it is possible to develop thumb anailsized GPS receivers and tiny batteries, which make GPS tracking unit along lasting applications.

REFERENCE

[1] Sivapriya N, Ravi T.N.,"Efficient Fuzzy-Based Multi-constraint Multicasting with Fault Tolerance Routing Mechanism", Lecture Notes on Data Engineering and Communications Technologiesbook series (LNDECT), Springer, Vol. 44, Chap. 54, pp. 475-484, Online ISSN: 2367-4520, ISBN: 978-3-030-37051-0, January 2020.

[2] N.Sivapriya, R.Mohandas, "Optimal Route Selection for Mobile Ad-hoc Networks based on Cluster Head Selection and Energy Efficient Multicast Routing Protocol", Journal of Algebraic Statistics,Volume 13, No. 2, 2022, p. 595 - 607, ISSN: 1309-3452, June 2022.

[3] S.Kotadia, "RFID based tracking system**",** International Research Journal of Engineering and Technology (IRJET), Volume: 02 Issue: 06 |Sep-2015.

[4] S. Gharge, M.Chhaya, G. Chheda and J. Deshpande, "Real time bus monitoring system using GPS, "An International Journal of Engineering Science and Technology,Vol.2,Issue3, June2012.

[5] M. Manikya Kumar, K.Rajesekhar, K. Pavani,"Design of punctually enhanced bus transportation system using GSM and Zigbee,"International Journal of Research in Computer and Communication Technology, Vol.2,Issue12,December 2013.

[6] M.Kumbhar1andMeghana,"Real Time Web Based Bus Tracking System" ,International Research Journal of Engineering and Technology(IRJET)Volume:03Issue: 02 | Feb2016. [7] Ravi and Rohitaksha,**"**an Innovative Approach for City Bus Location with Route Navigation System using Android", European Journal of Advances in Engineering and technology, 2015, 2(3): 38-45.

[8] Kainka, F. D. Franzis, "Starterpaket Arduino Mega2560".Haar: Franzis Verlag. , December2013.[9] Sivapriya N, Ravi T.N.,"QoS Routing Protocols in MANET : A Survey", International Journal of Pure and Applied Mathematics, vol. 119, issue no. 12f, pp.16573-16579, ISSN 1314-3395, May 2018.

[10] Dr.Nookala Venu, "Analysis of Xtrinsic Sense MEMS Sensors" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE), ISSN:2278-8875 Vol 4, Issue:8, August 2015, PP: 7228-7234

[11] Dr.Nookala Venu, Dr.A.ArunKumar and Karthik Kumar Vaigandla. Review of Internet of Things (IoT) for Future Generation Wireless Communications. International Journal for Modern Trends in Science and Technology 2022, 8(03), pp. 01-08.

[12] Dr.Nookala Venu, Karthik Kumar Vaigandla, Dr.A.ArunKumar, "Investigations of Internet of Things (IoT): Technologies, Challenges and Applications in healthcare", International Journal of Research (IJR), ISSN: 2236-6124, Volume XI, Issue II, Feb 2022, PP: 143-153.

[13] Karne, RadhaKrishna, and T. K. Sreeja. "ROUTING PROTOCOLS IN VEHICULAR ADHOC NETWORKS (VANETs)." *International Journal of Early Childhood* 14.03: 2022.

[14] Karne, RadhaKrishna, et al. "Optimization of WSN using Honey Bee Algorithm."

[15] RadhaKrishna Karne, Dr TK. "COINV-Chances and Obstacles Interpretation to Carry new approaches in the VANET Communications." *Design Engineering* (2021): 10346-10361.

[16] Karne, RadhaKrishna, et al. "Simulation of ACO for Shortest Path Finding Using NS2." (2021): 12866-12873.

[17] RadhaKrishna Karne, Dr TK. "Review On Vanet Architecture And Applications." *Turkish Journal of Computer and Mathematics Education (TURCOMAT)* 12.4 (2021): 1745-1749.

[18] Karne, Radha Krishna, et al. "GENETIC ALGORITHM FOR WIRELESS SENSOR NETWORKS."

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