Dokobus : Cloud Enabled Bus fleet Management System

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ABSTRACT

DokoBus is very useful in tracking bus movements from anywhere at any time. In this project, Google's real-time mapping and Arduino-based car tracking system is implemented via Global Positioning System (GPS) and Global Mobile Telecommunications (GSM) system. The GPS module provides location coordinates at regular intervals. The GSM module then transfers the vehicle's location to the Web server in length and length. Finally, the Google map API is used to display location and place name on a website. Therefore, the user will be able to continuously monitor the moving vehicle. In order to demonstrate the effectiveness of the system, this function presents the test results of the program. The proposed system is relatively easy to use and has low maintenance costs.

I INTRODUCTION

The main motive for DokoBus was inspired by seeing the students of Jeppiaar Engineering College running towards the already decently sized crowd near the college notice board whenever there was any change made to the bus routes of the college. Seeing their exhausted pale faces frantically searching for their bus they need to get into for them. This current system of updating students about any changes is on an A4 sheet stuck on the college notice board at the corner of the college campus. This solution seems simple enough, but sometimes simple is not always the way to go with a problem.

DokoBus aims to solve this problem and many other loose ends the previous system had, the first problem and the most important is the security of the students, an institution always should aim for the security of its people, in this case the students. The current system doesn’t inform the parents about any change, just the students, this might be fine at first but the world is not perfect and there might be delays due to traffic, breakdowns, etc. Therefore parents can get worried about their ward when they don’t return home at the usual time. DokoBus could be the best place for parents to find out about the location about the bus via live tracking or any updates to the route.

II LITERATURE REVIEW

1. Real time Google map and Arduino based vehicle tracking system

The car tracking system is very helpful in tracking car traffic from anywhere at any time. In this project, Google's real-time mapping and Arduino-based car tracking system is implemented via Global Positioning System (GPS) and Global Mobile Telecommunications (GSM) system. The GPS module provides location coordinates at regular intervals. The GSM module then transfers the car's location to the owner/user's cell phone in terms of length and duration. At the same time, the location is displayed on the LCD. Finally, Google Maps shows the location and place name on your mobile phone. Therefore, the owner/user will be able to continue monitoring the mobile vehicle using the mobile phone.

In order to determine the feasibility of the system, this function presents the test results of the vehicle tracking system. The proposed system is easy to use and ensures safety and employment at low maintenance costs.

2. Impact of Data Quality and Target Representation on Predictions for Urban Bus Networks

Passengers of urban bus networks often rely on forecasts of Estimated Times of Arrival (ETA) and live-vehicle movements to plan their journeys. ETA predictions are unreliable due to the lack of good quality historical data, while 'live' positions in mobile apps suffer from delays in data transmission. This study uses deep neural networks to predict the next position of a bus under various vehicle-location data-quality regimes. Additionally, we assess the effect of the target representation in the prediction problem by encoding it either as unconstrained geographical coordinates, progress along known trajectory or ETA at the next two stops. We demonstrate that without data cleaning, model predictions give false confidence if mean errors are used, highlighting the importance of a holistic assessment of the results. We show that target representation affects the prediction accuracy, by constraining the prediction space. The literature is vague about quality issues in public transport data. Here we show that noisy data is a problem and discuss simple but effective approaches to address these issues. Research generally only focuses on a single method of target representation. Therefore, comparing several methods is a useful addition to the literature. This gives insight into the value of addressing data quality issues in urban transport data to enable better predictions and improve the passenger experience. We show that 'rephrasing' the prediction problem by changing the target representation can yield massively improved predictions. Our findings enable researchers using deep learning approaches in
public transport to make more informed decisions about essential data cleaning steps and problem representation for improved results.

3. Internet of Things (IOT) Based Ambulance Tracking System Using GPS and GSM Modules

This project aims to solve and at the least decrease the rate of this problem, using Internet of Things (IoT) technology. Each ambulance will be equipped with GPS and GSM modem which in case of emergency will send its GPS coordinates to the cloud server, which will then mark the shortest distance from its present location to the hospital via the place from where the emergency call has been raised. The components used for this project are GSM Module SIM900A along with Arduino UNO and Cloud computing. The data from the modules will be stored in a cloud server from where the paramedic officials can access it using a unique ID and password that will be issued to them on the integration of this system into the infrastructure. A fourth signal, to be controlled by the Arduino module, is to be implemented in the traffic lighting system. This project is aimed to be a comprehensive solution for emergency services in the region's most-affected by gridlocks.

4. AFTSMS: Automatic Fleet Tracking & Scheduling Management System

With increasing numbers of fleets on roads, budget & time constraints [1], scheduling of fleets, security concern about driver over speeding of fleet, private use of fleet by drivers for their own benefits has led to devise of fleet management software solution system for vehicle owners. This helps fleet front office employees and administrators (owner) in effectively and efficiently controlling the fleets by integrating vehicle units which consists of sensors, GPS receivers, GSM technology, small screen monitors & on-board equipment with reservation & scheduling management and central server. The Fleet Management system allows transportation companies to eliminate or minimize the risks associated with vehicles, improving productivity, scheduling and reducing their overall transportation costs.

III ARCHITECTURE MODEL

Our proposed system uses a simple Arduino Uno Board with Atmega328 and SIM800A set which has GPS and GPRS shield that can be used by the user to track a vehicle. With this the vehicle is monitored continuously and its live location is sent to the system. The position of the vehicle is given by the GPS receiver in terms of latitude and longitude as. This data is sent to the system using the GSM module. The main objectives of our proposed system are,
(i) Getting the live coordinates of the vehicle using GPS receiver
(ii) Sending the received coordinates to the system using GSM module.

(iii) Display the live location of the vehicle on the website integrated with Google maps API.

![Architecture Diagram](image-url)

**IMPLEMENTATION**

The proposed system is composed of these modules:
1. User Interface Module
   a. Web interface
   b. Mobile interface
2. GPS Module
3. Live Tracking Module
4. Authentication Module
5. Bus Routes Module

**IV MODULE 1: USER INTERFACE**

The Mobile application User Interface has the login page as the home screen. After the user logs in the profile of the user is presented along with the map integrated with the application which on default shows the bus route of the student with the live location of the bus (during active hours). The students can also check other routes if needed using the application. The Web Application has the Map showing all available routes on the College website. When the user clicks on any of the routes it displays all the information of that route along with the bus number. During active hours, the live location is also displayed.

![Web Application](image-url)
V MODULE 2: GPS MODULE

Our project uses Arduino Uno and Ublox Neo-6m GPS modules to receive coordinates of the buses in real time. Which is sent to the system and updated in client applications. The NEO-6M GPS Module can track up to 22 satellites and identifies locations anywhere in the world. They are low power (suitable for battery powered devices), inexpensive and easy to interface. It can track up to 22 satellites on 50 channels and achieves the industry’s highest level of sensitivity i.e. -161 dB tracking, while consuming only 45mA supply current. Unlike other GPS modules, it can do up to 5 location updates a second with 2.5m Horizontal position accuracy. The u-blox 6 positioning engine also boasts a Time-To-First-Fix (TTFF) of under 1 second.

VI MODULE 3: LIVE TRACKING MODULE

For live tracking, we have used the GPS module paired with Arduino UNO. Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. By Connecting the Ublox neo 6m module’s txd to the 0th Hardware Serial pin (Rx) of Arduino UNO.

To send the data to the web server we used, SIM900A GSM Module is responsible for establishing connections between an in-vehicle device and a cloud for transmitting location information of the vehicle. The TXD of the GSM module is connected to the 9th Software serial pin of Arduino and RXD of the GSM is connected to the 10th Software Serial Pin of Arduino. Then a program coded in C in Arduino IDE is stored in local memory of the Arduino. Both Arduino and the GSM module require separate power inputs of 12V. When powered on the program in the Arduino runs till it is turned off. The program is to receive the GPS coordinates and send it to a web server which will then be stored on a database (firebase).

VII MODULE 4: AUTHENTICATION MODULE

Each student needs to register with DokoBus to use the Android Application which is made for our college. We have planned to use Firebase as a Database for our project. Students can login once to use the app. Authentication is done using a student’s roll number and their Date of Birth. After verifying the user from the database they will be presented with the HomePage of our application.

VIII MODULE 5 BUS ROUTES MODULE

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IX CONCLUSION

In this paper, we proposed a cheaper solution to track and manage the Bus fleet for any college or organisation. The hardware we have used requires little to no maintenance. Managing the bus routes and other details like the driver details, addition of new routes or buses to an existing route is much more easier and efficient. In future, we have planned to include a way to know if a student has boarded the bus or not by either using RFID or Facial Recognition.

X REFERENCES

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