An Alternative approach for avoiding Traffic Jam

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Abstract

In present days very often people encounter a blocked or closed connecting roads on their way to reach destination, they will be blocked near such roads for longer time and resulting in getting delayed in reaching their destinations. In this paper, we are proposing a solution to this problem by designing a system that notifies the people with the information about the blockage of any such connecting roads in advance in the previous junction [Signal or circle] itself so that he/she can choose an alternative way to reach their destination there-by avoiding the delay in reaching the intended destination and also the traffic jam and congestions near the blocked roads.

Keywords –connecting roads, previous junction, alternative way, intended destination

1. Introduction

The population growth in India is growing rapidly with the average rate of 2.1% per annum. The growth is even higher in the urban areas like Delhi, Bangalore and Mumbai. Cities and traffic have developed conjointly since the foremost large human settlements. The same forces that draw inhabitants to rendezvous in large urban areas also lead to sometimes insufferable levels of traffic jam on urban street throughout.

As population is getting increased, people are facing some of the major problems in our routine life. To travel from home to office and from office back to home, it consumes lots of time attributable to heavy traffic jam at the traffic signal or barricade at the connecting roads. Such blockages are playing major role in increasing traffic jam/congestion/sudden road barricade in many metropolitan cities. Poor traffic management is another problem in many cities in India. There are about 30 million vehicles in India; growing at the high rate of about 15-20% and the transport demand is set to grow by 1.5 times in the next 5 years. Some of the main issues that causes poor traffic management are-Delays, safety, Parking and environment problem

With the increase in technology, many advance system is being developed now to control a small amount of traffic face by every individual .some of the solution are-Delta’s video walls, intelligent traffic system.

2. Existing System

Delta’s video walls is a pioneer in providing innovative video wall solutions, partnered with Pan Intellecom Ltd to install and check its 24/7 Video Wall at the Bangalore Traffic. This video wall helps the traffic police to manage response and investigate incident causing accident and damages. Large Display board was required to monitor the surveillance camera which was installed across the city. These video walls provide a high definition projection technology. Delta’s huge product portfolio compose of a solution to fit every need that can help the traffic management to mange well. With the help of this traffic management centre we can control the traffic congestion and better road development in the city.

Bangalore –Garden City have improve a lot from past 10 years. Population rate have also increase by 50% and traffic population by 5 times leading to congestion, pollution, road barricade and increase in traffic road violations. To address some of the issues-BTRAC was in charge of setting up the surveillance cameras across the city that has the latest traffic management technology; they are used by the traffic police as part of the modernization plan under BTRAC. This traffic Management Centre is a 5 storey building that has a large video wall comprising of 64 Nos. of 70 inches diagonal cubes and 40 workstations. To monitor continuously various part of
the city. Data received by the camera is analyzed and acted by many traffic engineers at the traffic management centre. This video wall at the centre can help us to manage some of the problem in real time, but still further enhancing is required for the monitoring system and controlling of the traffic.

Intelligent traffic system (ITS) - the pilot project was launch in Ahmedabad for the first time in India to alert the people about the traffic situation. With the launch of a pilot project to alert individual about the traffic situation. This project was launched by Japanese firm Zero Sum Ltd in association with the Ahmedabad Municipal Corporation (AMC) and it was funded by Japan International Co-operation Agency, which gave 1 million USD to implement this project.

The project consists of 4 LED-based boards that provide real time information about the traffic situations to people travelling on that route. 14 camera based sensors and 4 LED based variable message sign board were installed on regular intervals. Based on the information received by the sensors the information will be flash on the board that help the people to take decisions. This project is still under developing in Ahmedabad .

3. Propose Solution

The project entitle “An Alternative approach for avoiding traffic jam” help the user to take another route by avoiding heavy traffic signals or blockage. This system displays the message like the intelligent traffic system without the use of sensors. It does not take any extra data to display the message in the LCD display board. This system is cost effective and easy to maintain and use.

With the increase in technology many new product have launch in the market which is making a great impact. The increasing demand of wireless technology also serves many purposes for domestics used. Displaying the message using microcontroller is another advance technology that can be implemented. It can be used in various sectors to convey the information to the people.

4. Component Description

4.1. LCD Display Board

Display Board is central thing in many institution organization or public sectors places like bus stations, railway stations and roads. An LCD display board is used in this method to display the message sent by the users (admin, traffic police). This framework is design to control or avoid several problems of traffic jam to reach our harbour by giving information about the sudden blockages of the roads or heavy traffic jam by notifying the people with the message in the previous signal/circle.

This Framework used a 16*2 LCD Display board to display a message. It used 16 characters which is display in two lines. They are connected with a serial LCD kit which is supported by arduino Uno. The serial LCD kit consists of pre programmed ATmega8L-8PU microprocessor. Only three connections is interface with the LCD and serial LCD kit (i.e. GND, VCC, and RX).

Some of the features of the 16 x2 LCD –
- it has 5x8 dots with cursor
- They are Build-in controller
- Power supply available is +5 volt
- They have 1/16 duty cycle

4.2. Embedded Systems

An Embedded system is a platform that combines both hardware and software, main component of these devices used the embedded products such as Microprocessors and Microcontrollers, Microprocessors are treated as general purpose processors and they take the inputs, process them and produced the output, whereas, a microcontroller not only accepts the data as inputs which are fetch by the user but also it manipulate, interfaces the given data with various devices, controls the data and produced the result.

A microcontroller is used in this technique, which will control the system and help us to display the message using an LCD display Board. This technique is an implementation to the idea of the wireless communication between a mobile phone and a display board. This model combines the advantages of the microcontroller and wireless technology; to build an effective communication system .An Embedded system is used in this technique to interface with the Display board. An Arduino Uno is used in this system which is based on ATmega328 (datasheet). They are open source where hardware is reasonably priced and development software is free. It has 14 digital input/output pins (it consist of transmitter, receiver, External interrupts, PWM outputs, Serial peripheral interface). A USB plug and External power supply are also present in the board. Arduino Uno is used as they are open source and cost effective, and user can easily understand its basic function and programming.

4.3 GSM Modem

A GSM modem is used in this system to communicate with the user and the board through GSM SIM. A GSM module used a GSM/GPRS modem for the communication with the serial port and USB, so that it can interface with a computer or a microprocessor/microcontroller system. An external power supply adaptor is used in the GSM modem to catch the signal of the SIM easily. An AT
commands is used in the program to communicate with the GSM modem.

AT commands are instruction fetch to control the modem. AT abbreviation is ATTENTION and they are used to prefix other parameters in a string. The AT command combined with other parameters can be used as the communications package or typed in manually as a command line instruction. Every command line starts with AT or at. Many commands are used to control for dial-up modem such as:

ATD-for Dialling
ATA-for Answering
ATH-for hook controlling
AT+CMGS-for sending message
AT+CMSS-for sending message from storage
AT+CMGL-for listing the SMS message
AT+CMGR-for reading the SMS message
AT+CGMM-for knowing the model number
AT+CGMR-for knowing the software version

5.2. GSM module

The main used of the GSM modem in this system is to receive the message send by the user. A GSM SIM is put on both the sending and receiving side. Only authorize user can used this number to send the information.

5.3. GPS module

The main function of the GPS in our system is to find out the nearby junction. We first check out the longitude and latitude of the nearby areas and this information is display on the LCD display board.

5.4. Arduino Uno

Arduino Uno is used in this system as they are open source and easy to implement. They are connected with the Display board to display the message send by the user. Data are collected and are fetch on the board, and for every signal area it required Arduino Uno to be installed with LCD display board.

5.5. Database module

The main used of the database in this system is to keep the information about the GPS. All the information regarding the longitude and latitude is store on the database and they are monitor.

4.4. GPS Modem

For finding out the nearby junction a GPS modem is used in this system to know the longitude and latitude information about the area. We used a simple application called GPR Locator to know the location and display the exact location using Google map. As this system is Dynamic it should be able to display the information in a short period of time without any delay. With help of the GPS modem only the nearby location/junction message should be display on the board.

5. System Module

5.1. User module

The main purpose of this user module is to provide security. They are design specially for authorize users to access the application and send the required information to the display board.

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6. Implementation

Implementation of this system has been done in two phases.

1. Hardware implementation
2. Software implementation

i) Hardware implementation:

All the hardware is interconnected in this phase, Arduino Uno is connected with the GPS, GSM modem and LCD Display board.

Step 1: Assemble all the hardware devices
Step 2: Connect the Arduino with this system
Step 3: Check the Arduino Uno by taking simple examples
Step 4: After checking, connect the Arduino with the LCD Display board by giving proper pin number.
Step 5: Connect the Arduino Uno with the GSM modem for receiving the message send by the user.
Step 6: Connect the GPS modem for finding out the nearby location by giving proper longitude and latitude.
Step 7: Display the message on the LCD board with both longitude and latitude.

ii) Software implementation:

An Android app is created for the user to access and send the data. User registration is provided with valid id and password.

Step 1: Create an app on the android
Step 2: Register with proper information
Step 3: Enter ID
Step 4: Enter Password
Step 5: IF ID and PASSWORD equals to the Employee ID & Password in DB

Then show confirmation message

Type the message to be displayed

IF Send button chosen

Then display the message

ELSE

Show Not Authorization message

Step 6: END program
7. Future scope

1. It can be used for commercial purpose for displaying the message more than one message at a time.
2. As LCD display board cannot display more number of characters as they have limitation number of characters, they can be replace by LED Display board, where more number of characters can be Display with moving eye catching fashion.
3. In this project we are using a GSM network for sending and receiving the message and displaying the message on the LCD Display board by using proper commands. The same can be implemented by using different microcontroller, which is convenient for the developer.
4. This project can be used in school and college for notifying the students for immediate gathering or any information need to be reached to the students.
5. This project can be further enhance with the new technology such as IOT.

8. Conclusion

The Development of this System reduces men power and time. GSM based Digital notice Board System Consist of both hardware and software which reduces the complexity, system Size and Cost. This project can be used not only for the traffic signals but also for large commercial and education purpose.

9. References


