

GPS Based Road Traffic Management System

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Abstract:- Traffic jams are prominent in almost every urban area cross the world. Traffic management is one of the crucial things where monitoring and controlling of traffic needs to be done with real time information. By implementing Intelligent traffic management system (ITMS), surveillance of the real time traffic can be achieved, for the purpose of smooth and well-organized transport system.

Keywords: Intelligent traffic management system (ITMS), traffic monitoring, traffic control, Global positioning system (GPS).

I. INTRODUCTION

Ever increasing flow of traffic leads to traffic congestions, which leads in the proper management of transportation as well as providing well organized and smooth traffic movement for road users.

An Intelligent traffic management system (ITMS) can be defined as a developed system which enables users to be better informed about real time traffic. Technologies are applied to collect real time data and to provide information for road users for better traffic management system.

II. OBJECTIVES

1. To solve many existing issues in traffic signals by installing automated traffic signals.
2. To track the exact location of city bus by installing GPS.
3. To achieve smooth movement of traffic on Old BSC road.
4. To avoid traffic congestion and to prevent accidents in Gundi Circle.
5. To provide solution for various traffic problems by adopting Intelligent traffic management system.

III. METHODOLOGY

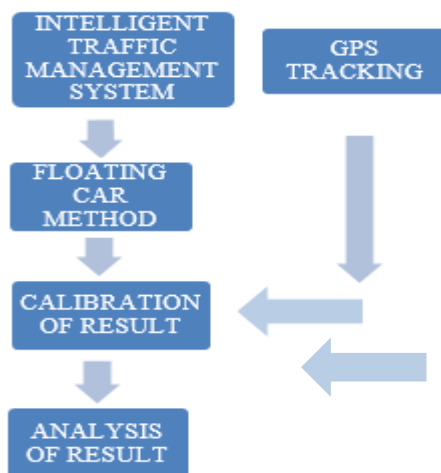


Figure 1 . Flow chat showing methodology of the project.

Floating Car Method.

Floating car data are positions of vehicles traversing city streets throughout the day. In this method traffic data will be collected at a known fixed location, the driver tries to float in the traffic stream and collects time delayed, total time taken to reach the destination and later average speed, average time delayed will be calculated which gives the outcome that can be used to determine the reason for traffic congestion in the place where this method is carried out .

Intelligent traffic management system (ITMS)

ITMS is defined as an advanced application which enables users to be better informed about real time traffic. Technologies are applied to collect real time data and to provide information for road users for better traffic management system.

IV. RESULT AND DISCUSSIONS

A. Case study 1: Improper time management of City Bus at Davanagere. The city bus in Davanagere is not up to time as observed there is a lot of time difference on arrival time of these buses. Due to this, the passengers have to wait for longer periods of time.

Table 1 . Arrival time of 101 city bus at Davanagere.

Day	Bus No.	Morning Session	Evening Session
1	101	10:00 AM	4:45 PM
2	101	10:33 AM	4:31 PM
3	101	10:19 AM	4:58 PM

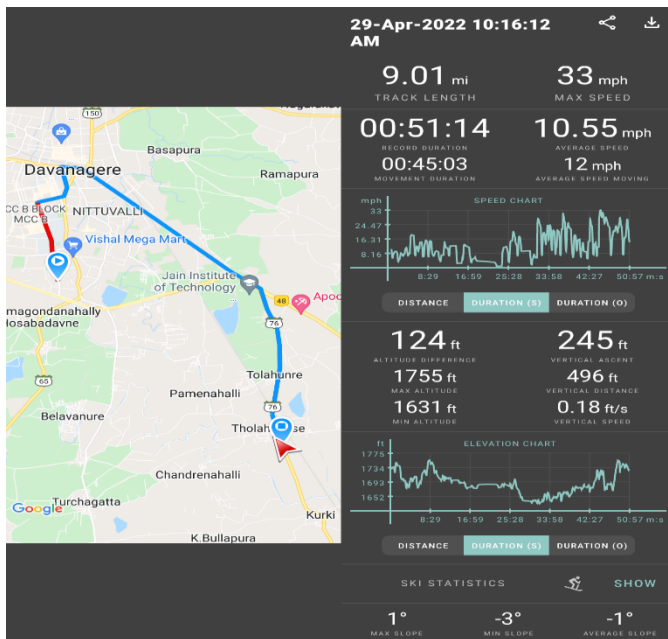


Figure 2. Geo Tracker application.

The above table shows the time variation of the city bus, the solution for this problem is to install GPS in city bus. By doing this the bus can be tracked by passengers in app called Geo Tracker at their convenience.

B. Case Study 2: Traffic congestion at Old BSC road Davanagere. There is a congestion of traffic in Old BSC road due to presence of a shopping mall and a series of road side shops. Lack of parking in this place and difficulty in movement of traffic can often be seen. The pedestrian footpaths near some shopping hubs can often be seen occupied by street vendors forcing pedestrians to walk on the roads, reducing in speed and flow for road users.

Table 2 . Collected data of traffic volume.

Type of vehicle	Normal time	Peak time	Total length occupied by vehicles in meter
Two wheelers	103	159	185.4
Car	5	2	19.9
Auto	55	105	144.1
Total No. of vehicles	163	226	349.1

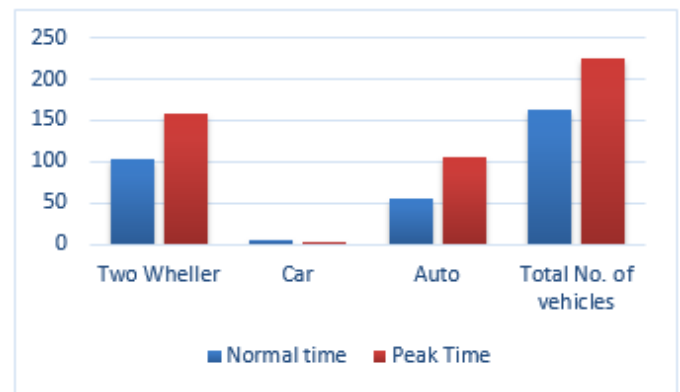


Figure 3. Graph representing vehicular density.

Vehicular density (K) = No. of vehicles per unit length of road

$$\text{traffic flow} = n \times 3600/t$$

- Non-Peak Time (K) = 467/Km.
- Peak Time (K) = 648/Km.

Where, q=Traffic Flow, t=time, n=Total number of vehicles, K=Vehicular Density.

The solution for this problem is to shift the road side shops. By providing separate lanes for two wheelers and four wheelers by adding cone barricade or single barricade, faster and anticipatory responses to traffic incidents.

- C. Case Study 3: Traffic congestion due to a greater number of vehicles from opposite lanes at Dental College Road Davanagere.

Floating Car Method.

Table 3. Outcome of floating car method.

Journey speed	Average stopped delay	Average running time	Average running speed
24.3 kmph	1.7 min	5.21 min	31.2 kmph

This method has been adopted at Dental College Road and Vidyarthi Bhavan road Davanagere. After collection of data and calculation the result gives the parameters such as Journey speed, Average stopped delay, Average running time, Average running speed which are mentioned below respectively. By analyzing the results, the reason for the traffic congestion can be determined.

D. Case Study 4: Traffic signals out of sync at ITI Circle Davanagere.

Traffic signals are out of sync as a result the road users have to wait for up to 90 seconds and sometimes there will be no vehicles even when there will be green signal still on. The solution for this problem is to install Automated Traffic Signals which manages the signals automatically. Automated Traffic Signals detects a greater number of vehicles present in a lane and clears it first by turning the signal into green. By installing the automated signals, the waiting time for the road user can be reduced.

IV. CONCLUSION

After pursuing the above case studies, it can be concluded that, GPS can be installed to achieve proper time management of city bus so that the passengers can track the location of bus at their convenience. Traffic congestion has been a greater problem due to urbanization, to solve this issue in a narrow road, width of road can be increased, dividing the lanes for two wheelers as well as for four wheelers by adding the cone barricade or single barricade. Due to improper management of traffic signals collision and accidents have been common, to overcome this problem automated traffic signals can be calibrated efficiently. By implementing Intelligent traffic management system (ITMS), surveillance of the real time traffic can be achieved, for the purpose of smooth and well-organized transport system.

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