

A NOVEL ALGORITHM FOR URBAN TRAFFIC CONGESTION DETECTION BASED ON GPS DATA COMPRESSION

N.K.Ajeesh¹, M.Nagaraj² and P.Saravanan³

Abstract - Transportation is the backbone for any economy. As the number of vehicles is increasing day by day, traffic jams or congestions are very common. Jams are not only frustrating, but also increases air pollution. It has adverse effect not just for our climate, but everybody's health too. Most ITS techniques are not capable to solve the problem of traffic congestion in the developing regions due to high cost and assumption of orderly traffic. This paper focuses on techniques used for detecting the traffic jam and for avoiding congestion on roads. The survey is done to study the challenges faced by the current vehicle detection techniques and the solution provided for reducing and avoiding congestion. By using GPS system we can easily detect traffic jam and it can monitor the whole road network. It requires only low installation cost and can be incorporated with the strategies for congestion avoidance while will help to improve the traffic flow. Here we can find the traffic status in all the signals by using GPS and GSM. The driver can check the status of the traffic and can use the alternative path to the destination. The traffic analysis is done and the data are stored in database. We can identify the collision between the vehicles. Every vehicles has some unique ID for its GPS and GSM. So the vehicles can be tracked easily. Re-routing can be done so that it reduces traffic congestion. Re-routing can be done through vehicular Ad-Hoc networks. The status of the traffic can be displayed to every user. The main aim of this system is to reduce the wait time and to reduce traffic jams and to minimize pollution.

Keywords – Intelligent Transportation Systems (ITS), Traffic network, GSM, GPS, In-vehicle route guidance system (RGS)

I.INTRODUCTION

Due to recent rapid urbanization, many large cities in the world are experiencing an unprecedented increase in road traffic congestion. The Global Positioning System (GPS) is a space-based satellite navigation system that provides location information. This system uses GPS to track the location of the vehicle. This system will track location of the vehicle and will send details about the location to the admin. This system helps admin to find out the location of the driver driving the vehicle. Admin will know which driver is in which location. This application helps the admin to find the location of various drivers. Traffic system can

¹ Department of Information Technology, Dr.N.G.P. Institute of Technology, Coimbatore, Tamil Nadu, India

² Department of Information Technology, Dr.N.G.P. Institute of Technology, Coimbatore, Tamil Nadu, India

³ Department of Information Technology, Dr.N.G.P. Institute of Technology, Coimbatore, Tamil Nadu, India

analyse the the position of the vehicles and can monitor the traffic and can guide the vehicles to route between different paths. The driver is capable of knowing the location the vehicles and the traffic in different signals. This signals are got by GSM/GPS. Now the technology cannot view the whole detail of the traffic. It shows only the location of the vehicle. By using this device the driver is capable of viewing all the vehicles and can view the traffic in the signals.

GPS devices may be able to indicate:

- The paths are available,
- Traffic congestion and alternative routes,
- The traffic in different signals,
- The alternative route to the destination,
- The status of traffic in all the signals,
- The different options to reach destination.

Features of the system:

- Traffic flow GUI,
- Signal light timings for each road,
- Manual override for particular sides,
- Dynamic traffic density input module,
- Dynamic signal scheduling functionality,
- Traffic scheduling algorithm implementation.

II.BACKGROUND STUDY

We use vehicle transportation to travel from one place to another. We use cars, bikes and other vehicles for transportation. Nowadays the no of the vehicles is increasing in the world. The count cannot be decreased and cannot be controlled. Due to increase in vehicle count the no of accidents are increasing. In huge cities the traffic is increasing. So the people cannot efficiently reach their destination in correct time. The wait time is increased. Due to heavy traffic the environment gets affected. Sound and air pollution is rapidly increasing in human living areas. So to control this government is taking some measures, Scientists are trying to find new technologies to reduce traffic congestion. The main aim is to reduce the traffic jam and to reduce the delay time of the vehicle. Noise pollution can be rapidly decreased by using this system. Alternative routes are provided to decrease the traffic jam. The main necessity to introduce a system is to decrease the traffic because the no of vehicles is rapidly increasing. So new models can be implemented to reduce the traffic jam.

III.FUNDAMENTALS

The GPS is capable of identifying the position of the vehicles and GSM can be used to transfer the details through vehicular Ad-Hoc network. The user should ON the GPS and

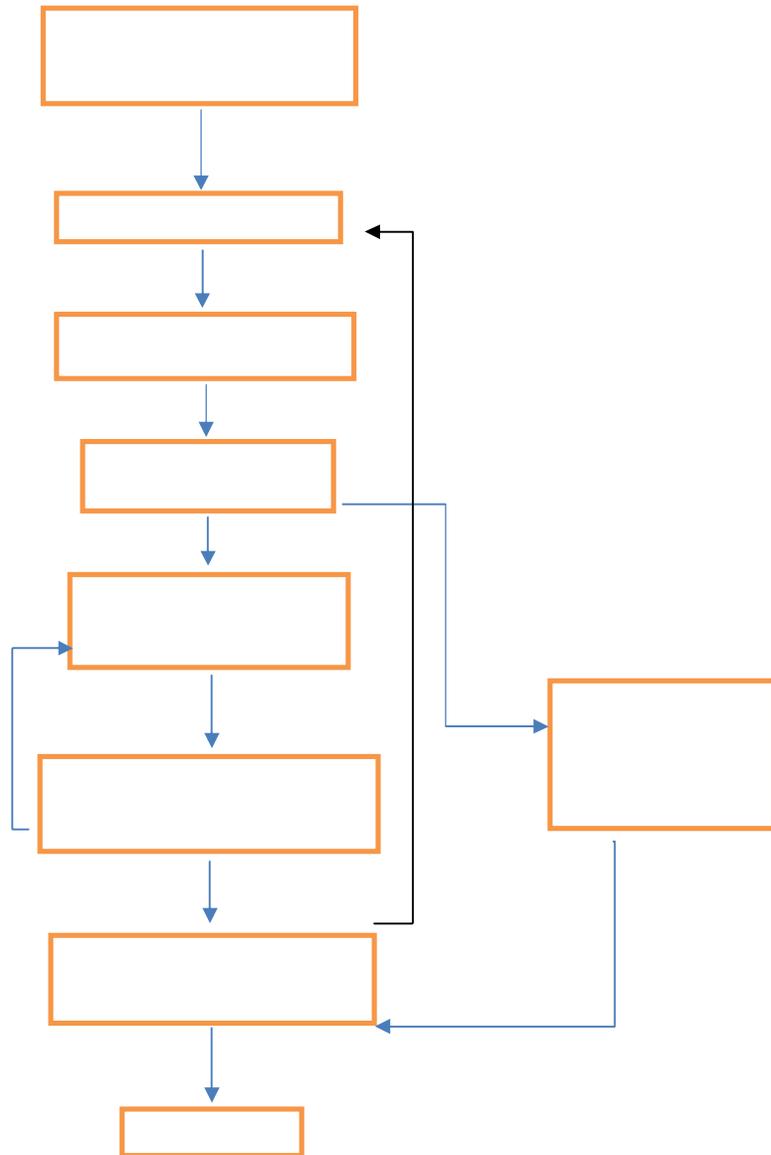
GSM signals so that the vehicle can receive the signals and can transfer the details. The admin can monitor the details of the vehicles and can send messages to the user through GSM. The GPS receiver has a clock which gives the location of the vehicle. Whenever a user is in traffic, the admin can send messages to the users to choose the alternative paths.

IV.OUR MODEL

In this model the user can use the GPS/GSM and can know the location. User can give the source and destination and click the status button. The status and traffic between the source and destination is displayed in the screen. The alternative paths between the source and destination are also displayed. The control of the whole system is done using a microcontroller chip. So if the user identifies the congestion in the path, the user can use the alternative paths. Whenever the traffic status changes it is updated in DB and Cloud and its updated to the user and the admin. This system will keep track on all the vehicles and send messages if required. Whenever the user shifts an alternative path it is updated in the DB. If the user starts his travel. Before starting he can check the status of the traffic and can choose the path. The signals are traced and its managed in the DB. The signals are controlled by microprocessor chip.

V.APPROACH

Current enabling technology allows adopting the principle of stigmergy and swarm intelligence to the traffic system: Equipped with location sensing and wireless networking technology every vehicle is able to virtually modify the local environment and to indirectly communicate with other vehicles, which in return benefit from this information and are therefore able to decide upon their subsequent route. Analogously to the example of nature, this collective of vehicles should hypothetically be able to tackle a complex problem in a self-organizing way while the single entity just follows a local aim. The concept for annotating a virtual road network by a collective of vehicles is based on the idea of correlating real and virtual spaces: Virtual environments represent their physical counterpart as a common information space in order to create awareness among the participants. This idea enables vehicles to change their local virtual environment and to benefit in their individual aims in their real environment, in return. The pheromone principle of ant colonies cannot be adopted for the traffic system exactly as it works in nature. The aim of the ant system is the exploration of a food source no matter where this source is located; vehicle try to reach a distinct destination as quickly as possible. Consequently, it is not applicable to only consider the continuously changing the intensity of the pheromone trails for the decisions of the individuals of the collective. The route through the road network to the destination has to be considered, as well, thus making the decision model for the vehicles more complex but letting the principle of stigmergy still be valid.



VI.IMPLEMENTATION

Initially the GPS is turned on for getting the positions. The geographical position of the nodes is identified and displayed in screen. Then the system analyzes the traffic density and it gives information to the user. According to the traffic density the signals will be scheduled and the signals will be switched to get the other direction for every user. Based on the density of the traffic the driver can change the routes. The system will check priority vehicles like ambulance etc. It overrides these vehicles. When an priority vehicle is approaching, every user will get the message. So that they can give path to the prioritized vehicles. Every time it checks the traffic density. Rerouting is provided for alternative vehicles. It the routing is done and the vehicles reaches, the system stops checking the routes. Whenever there is an accident the driver can know it. Police can easily trace the vehicles by checking the data. This system

provides an easy way to detect and avoid congestion. It enables the user to switch between the paths. It helps the police to find the vehicles which are responsible for the accidents. The data are stored in DB and it can be used when necessary. The outcome of this system is it is faster to produce the results.

VII.FEATURES

Admin Login: Admin will Login with his admin ID and password.

View Vehicle Location: User can view location of different vehicles.

User Login: User can login with user ID and password.

Vehicle Tracking: System will track location of both vehicle and driver using GPS.

Current Status: The current status of all the signals can be displayed in the screen and the congestion can be identified.

Send Location Details: System will send location details to admin.

Re-routing: User is provided with alternative routes to destination.

VIII.CONCLUSION

Every system should produce a best solution, so that the errors can be minimized. Introducing this concept reduces the time and space complexity of the system and increases the efficiency of the system to produce better result. The users should be provided with the best answers so that wait time can be minimized. The admin can know the alternative location of particular vehicles and vehicle theft can be identified. Introducing this system will be efficient and it provides a way to reach for e the destination with minimum delay and less wait time. Every user should be provided QOS.

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