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VEHICLE TO VEHICLE COMMUNICATION

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ABSTRACT*— *Traditionally, the vehicle has been the extension of the man's ambulatory system, easy to the driver's commands. Recent advances in communications, controls and embedded systems have changed this model, the way to the Vehicle to Vehicle Communication. The car is now a standard sensor platform, absorbing information from the environment (and from other cars) and feeding it to drivers and infrastructure to assist in safe navigation, pollution control and traffic management. This concept will help transition to the Internet, providing all the services required by the autonomous vehicles. In this article, we discuss the evolution from Intelligent Vehicle Grid to Autonomous.

I. INTRODUCTION

Traffic congestion in modern cities seriously affects our living quality and environments. Vehicles on the roads produce mass air pollutions that emit greenhouse gases such as carbon dioxide, hydrocarbons, and nitrogen oxides. Idling vehicles caused by traffic jams and red signs at intersections waste a large amount of fuel and seriously pollute the air. Studies show that about 30% of man-made dioxide emissions are from transportation systems. In particular, inefficient traffic management leads to fuel wastage of billion gallons per year. Furthermore, badly designed traffic signals produce frequent disruptions to traffic flows and increase delays as shown in Fig.1.

Fig.1 An example of traffic jam [1]

Previous efforts have been made to increase the traffic flows in urban arterial roads, to reduce the waiting time at intersections, and to navigate vehicles in congested roads. Traditional traffic controls employ fixed signal durations and thus cannot adapt to real-time traffic conditions. Adaptive traffic controls on collecting real-time traffic information by dedicated detectors, such as inductive loops [1], magnetic sensors, and video cameras. Green-sign durations and phase orders are then varied based on traffic conditions. New approaches for collecting traffic information may involve wireless sensor networks (WSNs), RFIDs, or vehicular communications (VCs). The WSN-based systems rely on a lot of roadside sensors.

II. OVERVIEW

The RF-based system is based on installing of RF readers on road segments, incurring huge infrastructure cost. The Vehicular Communication based systems need a GPS receiver with an onboard unit (OBU) in each vehicle. Through OBUs, vehicles can communicate with each other and roadside units via vehicle to- vehicle and vehicle-to-roadside communications, respectively [1]. Vehicle to Vehicle and Vehicle to Roadside communications can facilitate the exchange of real-time traffic conditions and enable drivers/traffic controllers to make better decisions. Vehicle to Roadside communications can provide information covering large regions in urban areas, whereas communications enable direct exchange of local Vehicle to Vehicle information among vehicles, especially in sub-urban and rural areas without roadside infrastructures. In this work, we consider the Vehicular communication-based approach. Our work is motivated by, which use the longest-queue first approach with maximal weight matching to minimize queue lengths and provide quality-of-service to higher-priority vehicles, such as ambulances and police cars. However, there are several drawbacks. First, the traffic flows with longer queues may have lower passing rates than those with shorter queues [2]. A more sophisticated and realistic model should be considered. Second, the Longest Queue First approach may cause starvation to shorter queues. Third, some lanes may have mixture of straight-going and right/left-turning vehicles that require more accurate estimation on their passing rates, which is not addressed in Longest Queue First. Through vehicular communications, we try to utilize turning intentions and lane positions of vehicles to maximize traffic flows and provide fairness among traffic flows. This information is collected by the traffic controllers located at road intersections as shown in fig 2.

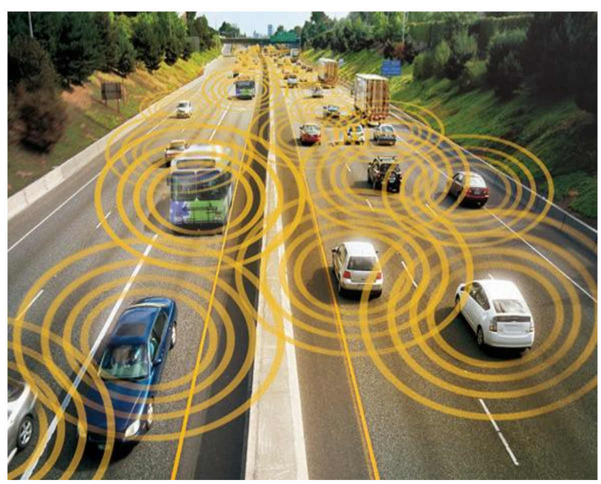

Fig.2 An example of communication of various vehicles [2]

Our signal scheduling algorithm takes the demands of all lanes into consideration [2]. Furthermore, while assigning more duration to the traffic flows with higher passing rates, our framework also gives turns to those with lower passing rates for fairness provision. To design and implement a RF-based prototype to verify the feasibility of our framework. Vehicles on the roads produce mass air pollutions that emit greenhouse gases such as carbon dioxide, hydrocarbons, and nitrogen oxides. Due to which large amount of fuel and seriously pollute the air. So in this project we are using a GPS modem in car unit, where we continuously tracking location of car and sending data with the help of microcontroller and RF transceiver. We are monitoring and display 2 main things: (Time of traffic, Location).We can count amount of cars in a single road.

III. BLOCK DIAGRAM

Fig.3 shows the block diagram of vehicle unit.

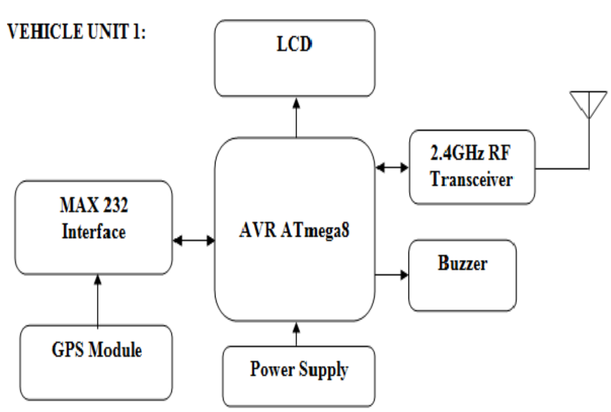

Fig.3 Vehicle Unit

RF Transceiver: - It will communicate with the vehicles as well as the signal unit. Also it will broadcast the messages. The CC2500 is a low-cost 2.4 GHz transceiver designed for very low-power wireless applications. The circuit is intended for 2400-2483.5MHz ISM (industrial, Scientific and Medical) and SRD (Short Range Device) frequency band.

LCD: **-** It will display the message to alert the driver

AVR ATmega8:- It acts as an interface b Between different modules. It takes input from GPS module via MAX232 IC & process the bit stream received. RF Transceiver will broadcast the messages.

Power supply: **-** Power supply is a consisting of step down transformer, rectifier, filter, regulator and power on indication. It is design to a provide 5v regulated power supply.

Fig. 4 shows the block diagram of signal unit.

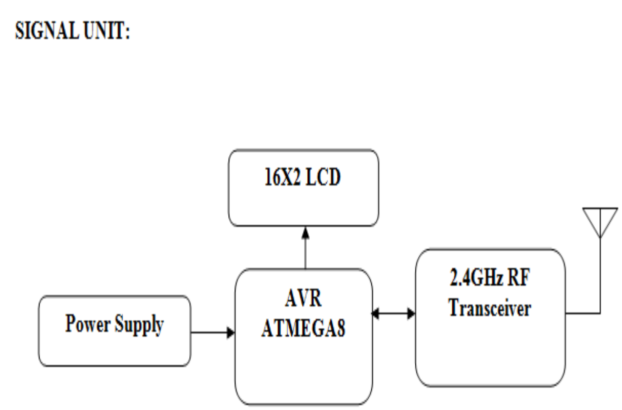

Fig.4 Signal Unit

RF Transceiver: - It will communicate with the vehicles as well as the signal unit. Also it will broadcast the messages.

LCD: **-** It will display the message to alert the driver

AVR ATmega8:- It acts as an interface between different modules. It takes input from GPS module via MAX232 IC & process the bit stream received. RF Transceiver will broadcast the messages.

Power supply: **-** Power supply is a consisting of step down transformer, rectifier, filter, regulator and power on indication. It is design to a provide 5v regulated power supply.

IV. FLOWCHART

Fig. 5 shows the flow of project.

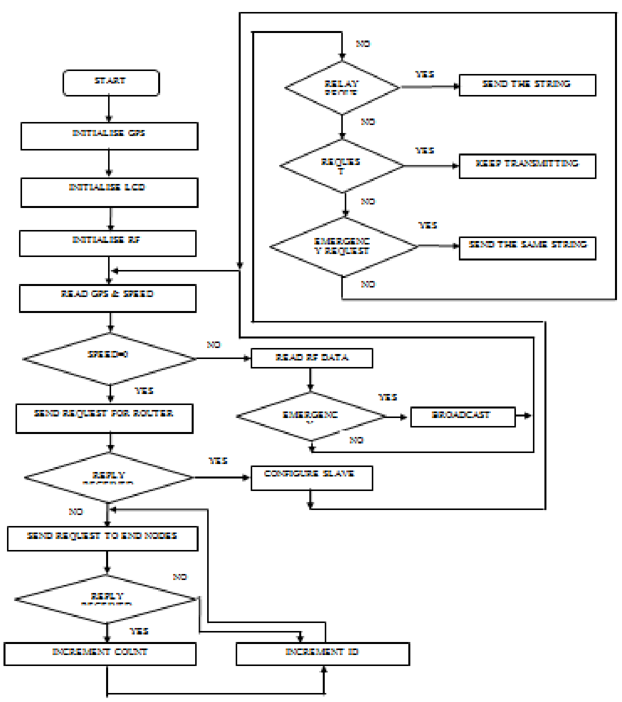

Fig.5 Flowchart

V. ADVANTAGES

a. Reduction in direct & indirect loss of Time, Money & life.
b. High % reduction in Traffic congestion.
c. Smooth Transportation

VI. DISADVANTAGES

a. Cost issue.
b. Communication range.

VII. APPLICATIONS

a. For traffic controlling.
b. For traffic jam detection.
c. System can be used for ambulance, police vans, VIP cars etc.

VIII. CONCLUSION

In this paper, we have outlined two applications, urban sensing and efficient traffic management. We have identified the interplay between the Radio Frequency (RF) and Satellite. We have also identified the role of Vehicle to Vehicle communications for the propagation of data to facilitate its search in urban sensing and for the support of distributed processing in local route optimization.

IX. REFERENCES

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