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WIRELESS SENSOR NETWORK BASED SMART INTELLIGENT TRAFFIC LIGHT CONTROLLER

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Abstract:

Vehicular Ad hoc Networks is a special type of mobile ad hoc networks. A dedicated short range communication is allotted to communicate with nearby vehicles and equipments in roadside. The importance of this network is to improve the road safety and reduce the fatalities caused by road accident. This network also provides the information about an environment such as flood, fading, raining. The one of the issues in VANET is security. The various methods are applied to detect the presence of attackers in route discovery phase. A stable clutter is created in this work which exhibits long average cluster member duration, long average cluster head duration. Vehicle to vehicle nodes, school zone, road zone are framed in the network simulator and the simulation is carried out using Network Simulator version-2. The objective of this work is to intimate the information about vehicle irregularities and environment condition to driver and nearby vehicles. The network parameters throughput and power delay are studied using the simulator for created network.

Keywords: **Wireless sensor network, throughput, packet loss, route**

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I. INTRODUCTION

Any Wireless Sensor Networks made-up of large number of sensor nodes. Each node is empowered by a communication interface which is mainly characterized by low power, short transmission distance and minimal data rate. The maximum data rate in ZigBee technology is 256 kbps. The physical transmission range is in between 10 to 20 meters. Wireless sensor network technology is distributed over a large roadway of areas, for monitoring traffic and environmental data. The components of wireless sensor network are sensors, radio wave, WLAN and evaluation. The challenges is wireless sensor network are quality of service, security issue, energy efficiency, network throughput, performance, ability to cope with node failure, cross layer optimization and scalability to large scale of deployment. Intelligent Transportation Systems starts to receive much attention recently by research institutes, industrial factories and standardization entities as they affect widely the life of people. The scope of intelligent transport system is to provide fundamental services and applications that will improve transportation and mobility safety and enhance the available resources and time which influences on driving speed and affects crash rates. The applications of intelligent transportation system based on deploying advanced technologies and distributing them on the intelligent infrastructure

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systems and vehicles systems. Estimate speed of vehicle and number of vehicle on the road are carried out based on traffic monitoring system. The proposed road condition and traffic monitoring system should be economically feasible. So the system can be applied such as reducing the number of system components and reusing and utilizing existing infrastructure. The system should be feasible and able to avoid the need of digging up roads or creating additional infrastructure in form of laying wires or making overhead structures. The system is constructed using cheap and easily available in commercial. The scope of this proposed work is to construct a road monitoring system which is able to better quantify a road anomaly. Wireless sensor network model consists of vehicle detection, communication protocol and road intersection configuration

II.METHODOLOGY

Recently there has been increasing interest in exploring computations and communication capabilities in transportation system. Many automobiles manufacture begin to equip GPS, digital map and communication interface with new vehicles. The exiting cars can easily upgrade with the rapid advance of information technology. So the need of new wireless devices in wireless communication which is self organizing, self healing network without the interference of centralized infrastructure in wireless communication. The limitations in the existing systems are: the traffic signal control only work on timing based, system can't be work on priority based and Can't be find location using short range communication.

VANET has to include accurate topology for the simulation. The street topologies should manage different densities of inter sections, contain multiple lanes information, different categories of streets and speed limitations. VANET have to face many obstacles, this obstacle includes hurdles in vehicular movement and vehicular communication. For example when wireless signal passes through specific environment such as building or mountain signal may get disturb. In realistic environment each category of vehicle has its own characteristics of driving, So VANET simulation has to correctly represent these characteristics. If are not allowed in some particular times then the buses have to move in some predefined lane. Moreover speed capabilities of a car or a bus or a truck are different from each other. So the simulator has to consider all these parameters in account. A trip is a path form source to destination. There may be trip available for same source and destination. The trip selection may according to the interest of drive. So VANET simulations have to take drivers interest in account. A path is the set of road segments taken by a car on its trip between an initial and a destination point. The drivers can select their paths with respect to constraints such as distance, speed limitation, time of the day, road congestion and even the drivers' personal habits. Vehicles do not abruptly break and accelerate and crosses the speed limit. Models for acceleration and deceleration is considered with respect to type of vehicle. Drivers can give response to their environments, with respect to static obstacles such as buildings and dynamic obstacles, such as neighbor cars and pedestrians. So mobility of models of simulator has to behave according these properties. Intersection management is one of the challenges for the VANET simulation. There are many ways to control the intersection vehicle based on traffic density or at traffic light. Simulation has to differentiate all of the conditions. Traffic density is different during different time of the day. Simulation has to differentiate between rush hour and normal hour, occasion of specific event. This constrain may change the trip and path selection of a vehicle.

VANET has to take external influences in to account. These external influences can be temporary road works, blockage due to accident, Communication networks are used to find the external influence. This method allows applications of Intelligent Transport Systems (ITSs) to exploit

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the primary collected data in order to create intelligent decisions with respect to an earlier valuable selected information. The traffic monitoring systems generate more amount of data and the systems process these useful information. Those systems need historical information to correctly estimate current state of traffic and to count the number of vehicle, work on priority based. Therefore, in this work present a optimal traffic algorithm that is suitable for WSN where its nodes are assigned to a linear topology.

It shows the validity of the optimal traffic algorithm by building a complete end-to-end road traffic monitoring system using nodes deployed in an indoor environment with the aim to prove the optimal traffic algorithm potential in meeting the expectations of ITS applications. It is appropriate to mention that the proposed implementation just considers stationary WSN nodes.

The Vehicles need to send small beacon packets periodically. These periodic beacon packets include the vehicle's ID and the current location coordinates. These beacon packets also allow vehicles to build their neighbour information table. If the source vehicle has no route to the destination vehicle, then source vehicle starts the route discovery in on-demand. After generating RREQ, node looks up its own neighbor table to find if it has any closer neighbour vehicle toward the destination vehicle. If a closer neighbour vehicle is available, the RREQ packet is forwarded to that vehicle.

If no closer neighbour vehicle, the RREQ packet is flooded to all neighbor vehicles. A destination vehicle responses to a received RREQ packet with a route reply (RREP) packet in the following three cases: The receiver first to be receive RREQ packet from the source vehicle. A high source sequence number is allotted to the new RREQ packet compare to the RREQ packet previously responded to by the destination vehicle.

The RREQ packet has the same source sequence number as the RREQ packet previously responded by the destination vehicle. The new packet indicates a better quality route. In the sensing phase, the system collects information about the driver, the vehicle state and environmental changes. Perform reasoning about uncertain contextual information, so as to deduce the behavior of the driver.

III. RESULT AND DISCUSSION

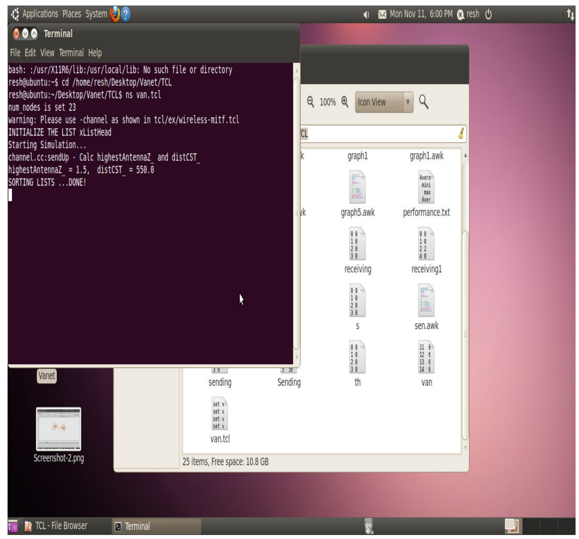

Fig.1 Data Entry

Fig.1 show that the data entry. The source node creating the data and generate the corresponding key for encryption. Here the data is signed by the encrypting key and send this encrypted data to destination node. The destination node receiving the encrypted data and decrypting the data by using the key shared by receiver.

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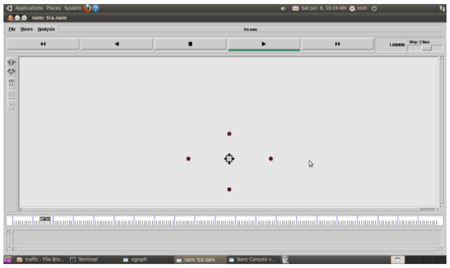

Fig.2 Network formation

Fig 8..2 shows that the network formation. The network is formed hospital zone and school zone. Remain other nodes are vehicle nodes. The vehicle node collects the data from one vehicle to another vehicle

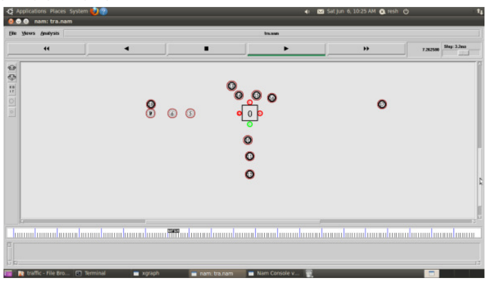

Fig.3 v2tl collects the information

Fig 8.3 shows the collection of information from one vehicle to traffic light. Each vehicle head collects the information and send to its corresponding polling point. The polling point sends the information which is collected by it to vehicle collector. The vehicle collector is available for a period of time. The vehicle collector sends its gathered information to base station

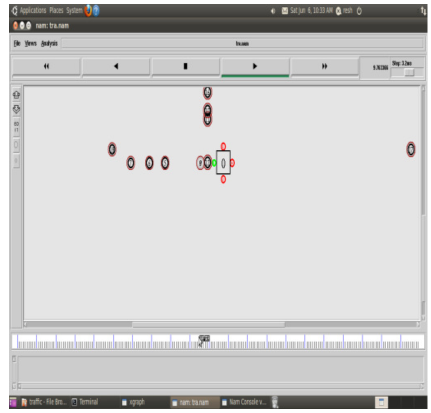

Fig.4 v2tl collects the information

Fig 8.4 shows the collection of information from head to vehicle. The network is formed with red alert vehicle and vehicle node. Each vehicle head collects the information and send to its corresponding vehicle point.

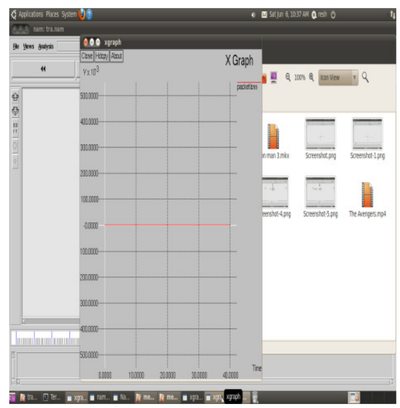

Fig.5 Packet loss graph

Fig.5 shows that the packet loss graph. The graph shows that the energy consumption of the proposed system is lower than the existing system. Here the red color indicates proposed consumed packet loss.

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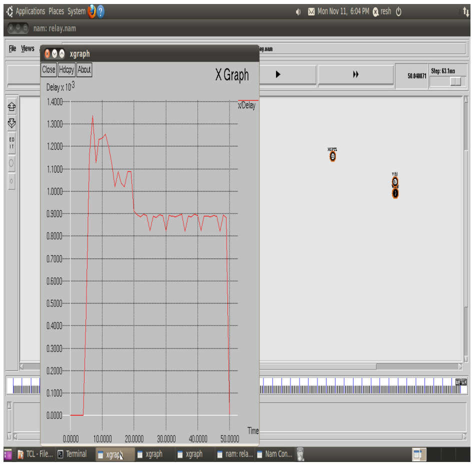

Fig. 6Energy consumption graph

Fig. 6 shows that the energy consumption graph. The graph shows that the delay time of the proposed system. The red color indicates the proposed delay time.

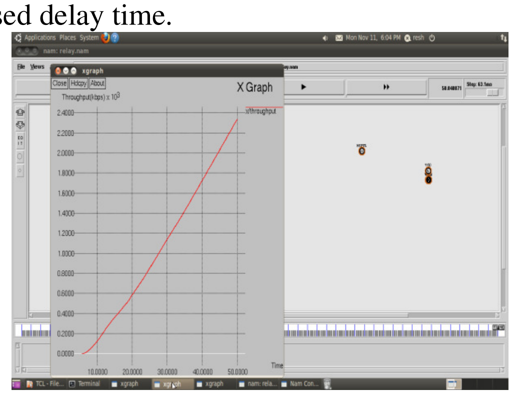

Fig. 7 Throughput

Fig. 7 shows that the throughput. The graph shows that the throughput of the proposed system which is higher than the existing system. The red color indicates the proposed throughput. So the proposed scheme has better throughput than the existing scheme.

IV. CONCLUSION

This wireless sensor networks (WSNs) that focuses on road traffic monitoring applications, and for GIS data collection for better practices targeted by Intelligent Transportation Systems (ITSs). That utilizes the proposed optimal traffic algorithm method protocol. The proposed protocol is designed to support WSN to form in a linear topology (LWSN). This work demonstrates the validity of optimal traffic algorithm the protocol by building a complete end-to end road traffic monitoring system by using 4 nodes deployed in an indoor environment. Regarding the ingoing work, we intend to increase the scalability of the system in order to support more nodes in the wireless sensor network compared to current implementation. Whereas our target is to extend the proposed optimal traffic algorithm scheme to support 50 nodes. Furthermore, the main features of the proposed MAC are to overcome some of limitations of the propriety optimal traffic algorithm implementation by decreasing the protocol overhead, increasing maximum data packet size, and supporting the linear network topology. The implemented system on top of this framework can be further improved to perform real-time, reliable and efficient Traffic Signal monitoring system. For future works, a customer visiting module and work on 100 nodes will be added and integrates with the IoT system to perform fast response.

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