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Enhancement of High Density Wireless Sensor Network Using VANET

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Abstract: GPS navigators has widely adopt by drivers. However, due to this sensibility of GPS signals to terrains, vehicles cannot to get their locations, when they are anyone inside a tunnel or a road it's surrounded by high rises, where Satellite signal is ended. This is mainly used for safety and convenience problems. But the VANETS advance into their critical areas and to become more dependent on these localization systems. GPS is starting to locate some uncertain problems, such not always being the available or not being robust enough for this some different applications. For the reason a number of other localizations techniques such as Cellular Localization, Dead Reckoning and Image Video Localization have been used in VANETs (Vehicular Adhoc Network) to overcome the GPS limitations. To address this issues, a novel Grid-based On-road localization Technique (GOT) is proposed, where these vehicles with and without accurate of GPS signals self organizes into a Vehicular Ad Hoc Network (VANET), exchange the locations and distance information and helps to each others to calculate an accurate position for all these vehicles inside the network. The location information's can be exchanged among vehicles one or multiple hops away.

Key words: Grid based On road localization Technique · Vehicular Ad Hoc Network · Mobile Ad Hoc Network · Vehicle Monitoring · AODV Protocol and Localization

INTRODUCTION

The Vehicular Ad hoc Network (VANET) is expected to significantly improve the safety of transportation systems by providing timely and efficient data dissemination has being interested as Vehicular Adhoc Networks (VANETs) for several years since the deployment of this type of networks will be able to provide significant improvements in terms of road safety, where the majority of protocols adopted flooding techniques to warn all the nodes, as well as the traffic authorities, about the accident.

The proposed solution is essentially based on a technique of clustering, where a cluster head is chosen among a group of vehicles and a technique, for the establishment of the relative positions of the nearby nodes. The IEEE 802.11p Medium Access Control (MAC) uses carrier sense multiple access with collision avoidance and some concepts is defined as the distance every cluster head establishes a local coordinate system and calculates the positions of all its neighbors in the group using the distances measured between vehicles. In the aim to reduce the calculate time in dangerous situation, the orientation of the coordinate system of the first cluster head and the global system are considered the same. This new solution provides sufficient location information and accuracy to support basic network functions [1-3].

Real-time video transmission has high requirements of terms on bandwidth and delay, while VANET's is characterized by very limited radio resources and high mobility. Furthermore, to ensure that good behaviour under any type of circumstances, also study the impacts of GPS drift on their schemes. However, [4] due to the sensibility of GPS signals to terrains, vehicles cannot to get their locations, when they inside tunnels or on a road surrounded by high rise where satellite signal is blocked. To address the issues, they proposed a novel Grid based On-road localization Technique (GOT), where vehicles with and without accurate GPS signals self organize into

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a Vehicular Ad Hoc Network (VANET), exchange location and distance information and help each other to calculate an accurate position for all the vehicles inside the network.

The majority of localization methods presuppose that some of network nodes (beacons) know their position and these nodes act as a source for localization of the rest network nodes. Vehicles, equipped with Global Positioning Systems (GPS) receivers, are mostly used as beacon. However, not all the vehicles have been equipped with their GPS. Also we give an overview of the existing methods of localization and especially their use in VANET networks. The localization of a vehicle compared to an event when it's informed for the existences of accident or a looming danger. It's a mission of immense consequence that can avoid impact of vehicles and loss of human life [5,6]. Up to now, several VANET studies have focused on communication methods based on IEEE 802.11p, Adhoc networks, such as vehicular Ad-hoc networks in which vehicles are consider as vehicles, due to highly mobile environment this change topology rapidly GPS information does not work in urban areas where the node density is low [7]. Vehicles node move very fast in roads and highways, to be a safe and transport system, any vehicle should know about where a traffic problem due to broken vehicles or some other reason , where an accident has been taken place for provide safety in an intelligent transport system. In these networks, vehicles communicate with each other and possibly with a roadside infrastructure to provide a long list of applications varying from transit safety to driver support and internet access. In this network, acquaintance of the concurrent position of nodes is an assumption made by more protocol, algorithms and applications. Here a very rational supposition, since GPS receivers can be installed their easily in the vehicles, a number of VANET applications into three main groups according to their localization requirements and show how position information is used by these protocols and algorithms [8].

To become an enable technology when attempting to provide instantaneous video transmission in vehicular networks; to present an applications that makes the use of traffic, focusing instead of evaluate the efficiency of different flooding schemes with the purpose of achieving a long-distance real-time video transmission under different circumstances, such as different vehicle densities and different degrees of GPS accuracy.

This establishment has been extensive and more number of system equations have been explores to calculate locations through the help of location-aware nodes that are two hop away, First of all, because of the size of vehicles, the signal reflection and interference problem is more serious when measuring signal attenuation and thus the calculated distance is likely to be more inaccurate. Recently to calculate the locations, further inside the tunnel to calculate the locations. Inside of this situation, errors are propagated by exponentially when they using this existing methods, resulting high inaccuracy [9-13].

Vanet Network: Automatic vehicles information can be viewed on electronic maps using the Internet or specialized software. The advantage of WiFi based navigations system function is that it can be effectively locates a vehicle, which is inside big campuses like airports and tunnels, universities. In VANET (Vehicular Adhoc Network) network can be used as parts of automotive electronics applications, which has to be identify an optimal minimal path of navigation with minimal traffics intensity.

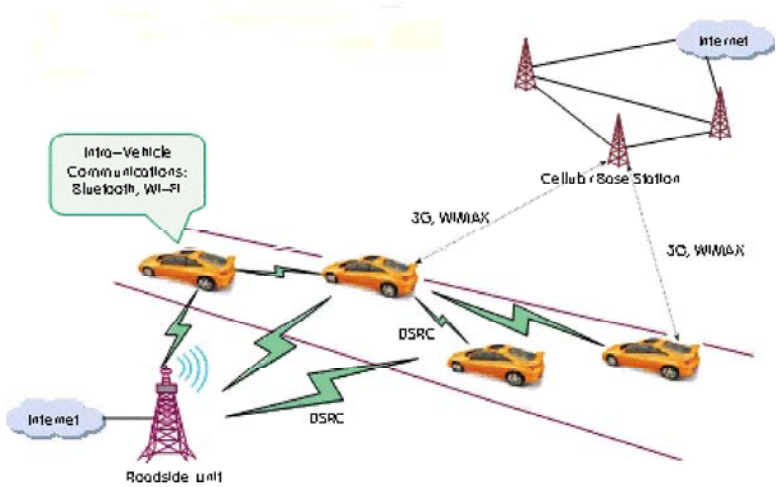

Fig. 1: VANET Network

Inter Vehicle Communication: In the intelligent transportation system, vehicles need only a concerned with activity on the road ahead and not been behind. There are two different types of message forwarding in inter-vehicle Communications; navy broadcasting and intelligent broadcasting [14]. In navy broadcasting, vehicles to send broadcasting messages periodically and its regular intervals. Upon receipts of the message, the vehicles ignore the message, if it has comes from a vehicle behind it. If the message has to come from a vehicle in frontally, the receiving vehicle sends its own broadcasting message to vehicles behind it. This ensures that all enables vehicle moving in the forward directions to get all screen messages.

Multiple Ad-hoc networks technology integrated with VANET (Vehicular Adhoc Network) such as, ZigBee, Wimax IEEE and Wi-Fi for convenient and effective simple plain communications within automobiles on active mobility [15]. Security measurement are defined as vehicles by VANET, flowing communications within the automobiles, edutainment and telemetric.

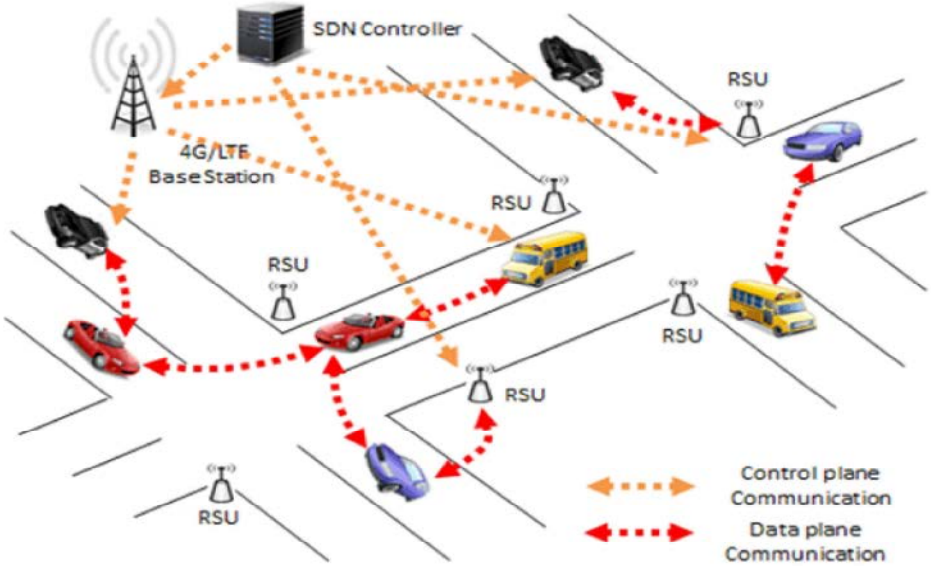

Fig. 2: Inter Vehicle Communication

Intelligent broadcasting with implicit acknowledgement addresses the problems are inherent in broadcasting by limiting the number of messages broadcasting for a given emergency event. If the event detecting vehicles receive the same message from behind, it assumes that at least one vehicle in the back has received it and cases broadcasting.

Vehicle to Road Side Communication: Vehicle to roadside communication configurations provides a high bandwidth links between the vehicles and roadsides unit. The roadside units may be placed at every kilometer or less, enabling high data rates to be maintained at heavy traffic. For instances, when the broadcasting dynamic speed limits, the roadside units will determines the appropriate speed limits according to its internal timetable and traffic conditions. The roadside unit will periodically broadcast a message containing the speed limit and will compare any geographic or directional limits with vehicle data to determine if a speed limit caution applies to any of the vehicles in the locality [16-18]. If vehicles violate the desired speed limits of broadcasting data will be deliver to the vehicle in the form of an auditory or visual warning, requesting that the driver reduce his speed.

Vehicle Monitoring: VANET, Most of us all the vehicles have GPS for finding the locations of the vehicle. It is mainly helps to finding the vehicles easily, the GPS handset reports wrong information's, when they are in crowded metropolitan area, such as Manhattan, where there are build many tall buildings. The GPS receivers also lose satellite connections in some places such as tunnels or multi-floor bridges, resulting in safety and convenience problem. Grid-based On-road localization Technique (GOT), where vehicles with or without accurate GPS signal self organize into Vehicular Ad-hoc Network (VANET), exchange the locations and distance information and help each others to calculate an accurate positions for all the

vehicles inside the networks. A vehicle obtains the location and distance information's in its neighborhood through communication [19, 20]. The information will be discarded if its distance to the corresponding node is larger than our communication threshold. If a vehicle only knows the location of its neighbors and distances to them, it must know at least three location-aware neighbors to enable the location calculation.

AODV Protocol: In AODV, the network is silent until a connection is needed. At that point the network node that needs a connection broadcasts a request for connection. Other AODV nodes record the node that they heard it from, creating an explosion of temporary routes back to the needy node. When a node receives such a message and already has a route to the desired node, it sends a message backwards through a temporary route to the requesting node. The needed nodes than begin using the route that has the least number of hops through other nodes. Unused entries in the routing tables are recycled after a time.

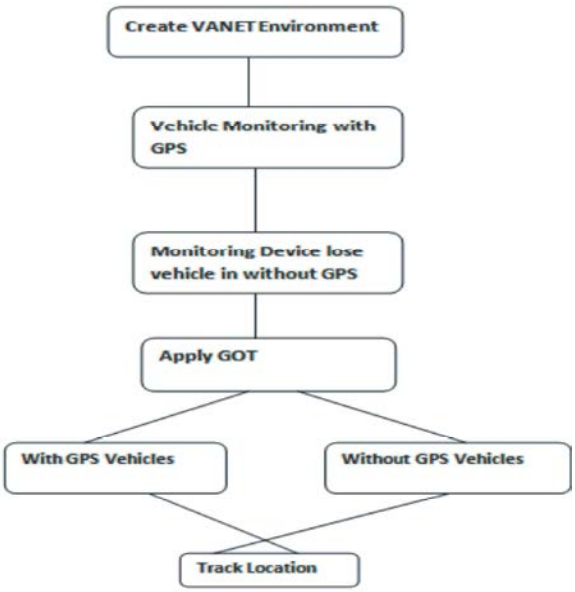

Fig. 3: Block Diagram of Vehicle Monitoring System

Traffic Analysis: Traffic analysis is the process of intercepting and collecting messages on the way to track important information in communication pattern. That information is not leaking or not modified just do monitoring and analysis activities. It can get information from the monitor frequency and timing packets. In evidence-based statistical traffic analysis model, every captured packet is treated as evidence supporting a point-to-point (one-hop) transmission between the sender and the receiver. A sequence of Point – to - Point traffic matrices is created then they are used to derive End- to-End (Multihop) relations. This approach provides a practical attacking framework against Mobile Wireless Network but still leaves substantial information about the communication patterns undiscovered. Statistical traffic analysis attacks have attracted broad interests due to their passive nature, i.e., Attackers only needed to collect information's and perform analysis quietly without changing the network behavior. The predecessor attacks and disclosure attacks are two representatives. However, all these previous approaches do not work well to analyze traffic because of the following three natures of Mobile Wireless Network:

The Broadcasting Nature: In wired networks, a point-to-point message transmission usually has only one possible receiver. While in wireless networks, a message is broadcasted, which can have multiple possible receivers and so in occurs additional uncertainty.

The Ad Hoc Nature: Mobile Wireless Network lack network infrastructure and each mobile node can serve as both a host and a router. Thus, it is difficult to determine the role of a mobile node to be a source, a destination, or just a relay.

The Mobile Nature: Most of existing traffic analysis models does not take into consideration the mobility of communication peers, which make the communication relations among mobile nodes more complex.

Network Simulator: Network simulation is a technique, where a program models simulated to the behavior of a network either by calculating the interaction between the different network entities using a mathematical formulas or actually capturing and playing back observations from a production network. Network simulation plays a vital role in communication and computer networks in which program models of the behavior networks by calculating the interaction between the different network entities using mathematical formulas. The behavior of the networks can be observed in a test lab.

Network simulator software predicted to the behavior of a computer network. In simulators the computer network modeled and then performance is analyzed. Typically the users can they customize the simulator for their specific needs. Usually simulator come with support for the protocols and network in use such as WLAN, Wi-Max, TCP, WSN, cognitive radio. Network simulator can also provide other tools to facilitate visual analysis.

Network Simulator (version 2), widely known as NS-2, is simply a discrete event driven network simulation tool for studying the dynamic nature of communication networks. It is an open source solution implementation in C++ and Otcl (Object Transmission Control Language) programming languages. NS-2 provides a highly modular platform for wired and wireless simulations supporting different network element, protocol traffic and routing types. In general, NS-2 provides users with a way of specifying network protocols and simulating their corresponding behaviours. Result of the simulation is provided within a trace file that contains all occurred events.

RESULTS

Create Network Topology: The below Figure 5 shows that NAM output, it is a network animator which describes that to shows the output on animation. For the animation the node has created and to move the nodes of one node to another node.

event	time	from node	to node	pkt type	pkt size	flags	fid	src addr	dst addr	seq num	pkt id

```
r : receive (at to_node)
+ : enqueue (at queue)          src_addr : node.port (3.0)
- : dequeue (at queue)          dst_addr : node.port (0.0)
d : drop    (at queue)

r 1.3556 3 2 ack 40 ------- 1 3.0 0.0 15 201
+ 1.3556 2 0 ack 40 ------- 1 3.0 0.0 15 201
- 1.3556 2 0 ack 40 ------- 1 3.0 0.0 15 201
r 1.35576 0 2 tcp 1000 ------- 1 0.0 3.0 29 199
+ 1.35576 2 3 tcp 1000 ------- 1 0.0 3.0 29 199
d 1.35576 2 3 tcp 1000 ------- 1 0.0 3.0 29 199
+ 1.356 1 2 cbr 1000 ------- 2 1.0 3.1 157 207
- 1.356 1 2 cbr 1000 ------- 2 1.0 3.1 157 207
```

Fig. 4: Turn ON Tracing

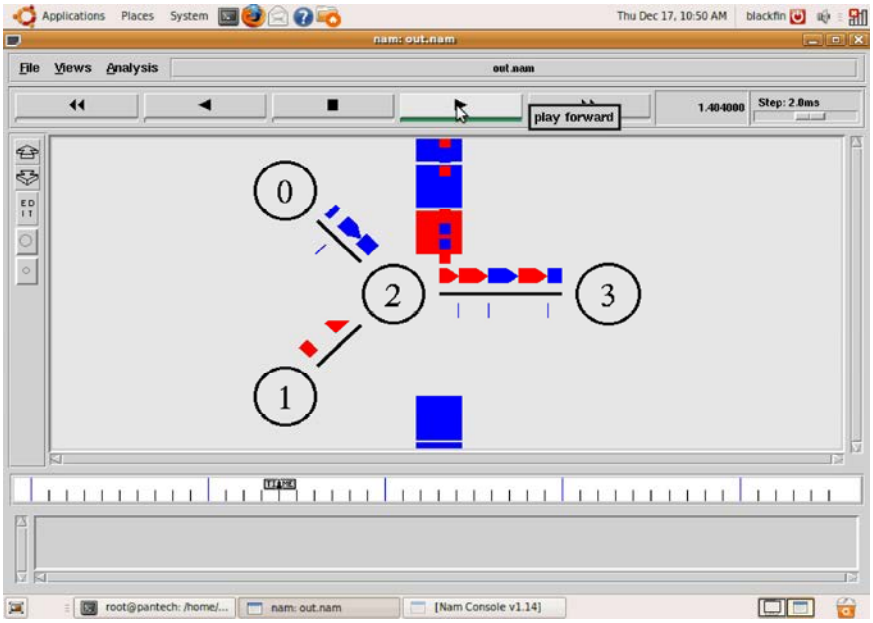

Fig. 5: NAM Output

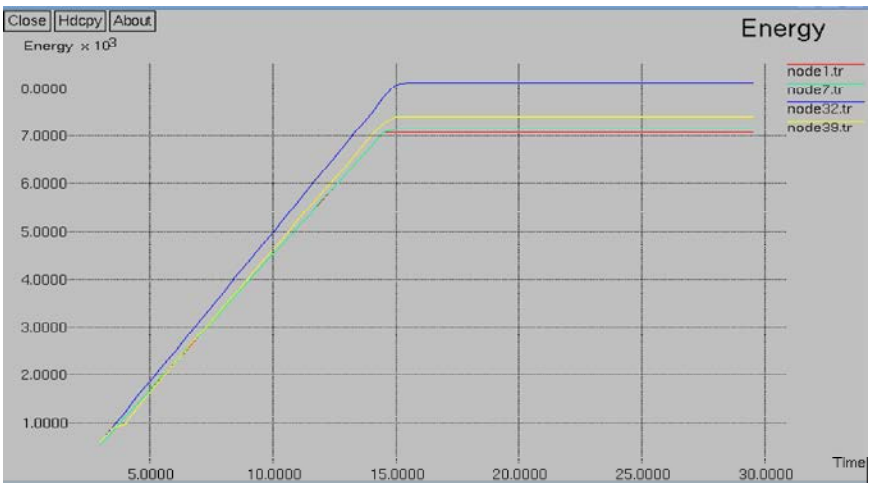

Fig. 6: Energy Value

The Fig. 6 denotes the energy diagram of the communication system. In this system the threshold value only fixed to the node operation. The source node and destination nodes are automatically considered. For the node threshold value decreases the packet losses will be created.

Testing and debugging: The testing and debugging phase of a project can easily take more time than it took to write the application. Testing includes both checking that the code runs at all, that it runs correctly under all circumstances and that it runs the same way before you made changes. TCL's (Transmission Control Language) error diagnostics make it easy to track down coding errors; the modular nature of TCL (Transmission Control Language) code makes it easy to do unit testing of functions and the test package makes it easy to write integrated regression test suites.

Debugging Code: The first step to debugging a TCL (Transmission Control Language) script is to examine the TCL (Transmission Control Language) error output closely. TCL (Transmission Control Language) provides verbose error information that leads you to the exact line where a coding error occurs. TCL (Transmission Control Language) error messages consist of a set of lines. The first line will describe the immediate cause of the error.

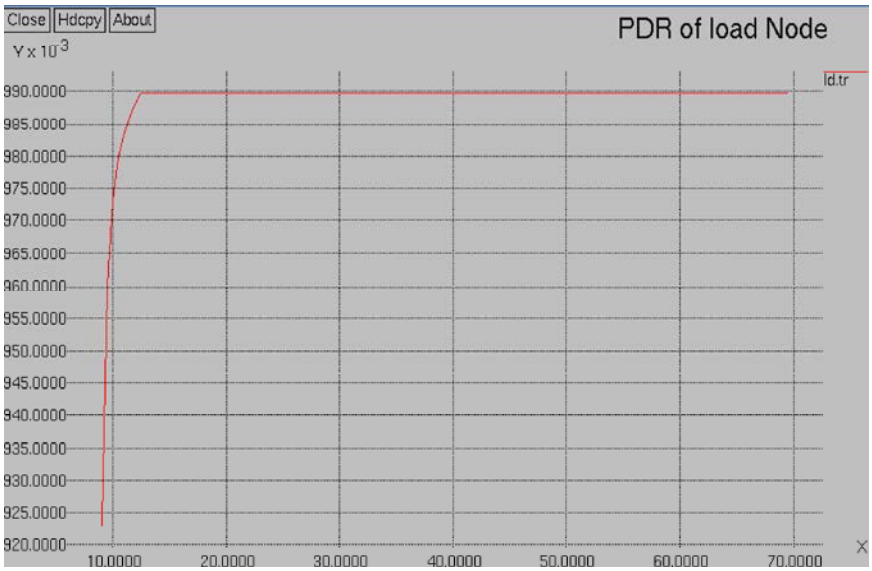

Fig. 3: PDR of load node

For the simulation process the threshold value, Source node, Destination node and load node has been created. For the simulation process the source node has been delivered the data between the sources to the destination via load node. In order to the process the load node has varied by means of threshold value. The data has delivered by clusters by means of load node.

CONCLUSION

In this paper, an analytical model has been presented to analyze the reliability of the IEEE 802.11p in VANETs' safety and warning applications. This paper proposes GOT, a Grid-based On-road vehicle localization Technique. For study the different geometric relationships among their vehicles and design a grid-based mechanism to identify the vehicle location. Some other solutions for localization, such as cellular, dead reckoning, video/image processing, distributed ad hoc and cooperative localization were discussed. All of these approaches have their own advantages and disadvantages. We also discussed data fusion techniques for position information. The DPDR (Data Packet Delivery Ratio) and delay analysis at different numbers of maximum hops allowed within clusters shows that increasing the maximum number of hops up to three increases the DPDR (Data Packet Delivery Ratio) at the cost of slight increase in the delay. This survey will help researchers to develop new efficient approaches for address localization issues in VANETs (Vehicular Adhoc Network). The simulation results, which coincide with the analytical results, show that the proposed model is quite accurate in calculating the system reliability and the proposed SPAWN algorithm has high performance compared with other algorithms.

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