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Providing High Security in User for Vehicular Ad-Hoc Network

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ABSTRACT-Vehicles have to be prevented from the misuse of their private data and the attacks on their privacy. Investigate the authentication and privacy issues in VANETs. The architecture of vehicles are dynamically clustered according to different related metrics from these clusters, a minimum number of vehicles are selected as vehicular gateways to link VANET. Issues pertaining to gateway selection, gateway advertisement and discovery, service migration between gateways when exchanging messages between vehicles, there are network issues that must be addressed, including the hidden terminal problem, high density, high node mobility, and data rate limitations. Vehicles (users) and a Regional Trusted Authority, we consider a VANET consisting of a city lay and highway, finite numbered registered RTAs nodes along roads and a large number of vehicles on or by the roads. RTAs are always reliable, while vehicles on city ride and in highway ride is used analyze the various metrics and compared with different routing protocols such as AODV, DSDV, DSR in simulation.

I. INTRODUCTION

VANET has become an active area of research, standardization, and development because it has tremendous potential to improve vehicle and road safety, traffic efficiency, and convenience as well as comfort to both drivers and passengers. Recent research efforts have placed a strong emphasis on novel VANET design architectures and implementations. Due to road accidents millions of people around the world die every year and many get injured. Implementation of safety criteria's such as speed limits and road conditions are applied but still more work is required. This require use of Vehicular Ad Hoc Networks **-** is a technology that apply on moving cars as nodes in a network to create a mobile network. VANET turns every participating car into a wireless router or node, allowing cars approximately 19 to 300 meters or more according to the protocols used in VANET of each other to connect and, in turn, create a network with a wide range. The range can vary according to the algorithms and protocols applied and implemented. As cars fall out of the signal range and drop out of the network, other cars can join in, connecting vehicles to one another so that a mobile Internet is created. It is estimated that the first systems that integrate this technology are police and fire vehicles to communicate with each other for safety purposes. Such network comprises of sensors and On Board Units installed in the car as well as Road Side Units. The data collected from sensors on the vehicles can be displayed to the driver, sent to the RSU or even broadcasted to other vehicles depending upon its importance and nature.

Considering the tremendous benefit expected from vehicular communications and the huge number of vehicles, it is clear that vehicular communications are likely to become the most relevant realization of mobile ad hoc networks. The appropriate integration of on-board computers and positioning devices, such as GPS receivers along with communication capabilities, opens tremendous business opportunities, but also raises formidable research challenges.

As no infrastructure is involved, VANETs depend heavily on distributed measures to regulate access to the wireless channel. Protocols for random access, Time Division Multiple Access TDMA and flooding are implemented and evaluated in simulators. It is quite understandable that showing results with simulators somewhat differs from Real time scenarios. In some cases though, real time provides opportunities for two nodes to exchange info which would not have been possible in the simulators due to a simplistic propagation model.

VANET has given bundles of benefits to organizations without any discrimination with size. Transformation of the vehicle's on-board computer from a nifty gadget to an essential productivity tool has been done by Automobile high speed Internet access, making virtually any web technology available in the car. While such a network does have certain safety concerns, this does not limit VANET's potential as a productivity tool. It allows for "dead time" time that is being wasted while waiting for something to be transformed into "live time" time that is being used to accomplish tasks. A commuter can turn a traffic jam into a productive work time by having his email downloaded and read to him by the on-board computer, or if traffic slows to a halt, read it himself. While waiting in the car to pick up a friend or relative, one can surf the Internet. For Internet access, Mobile IPv6 is a widely accepted solution to provide session continuity and reach ability to the Internet for mobile nodes. While integrated solutions for usage of Mobile IPv6 in mobile ad hoc networks exist, a solution has been proposed that, built upon on a Mobile IPv6 proxy-based architecture, selects the optimal communication mode and provides dynamic switching between vehicle–vehicle and vehicle–roadside communication mode during a communication session in case that more than one communication mode is simultaneously available.

SCOPE

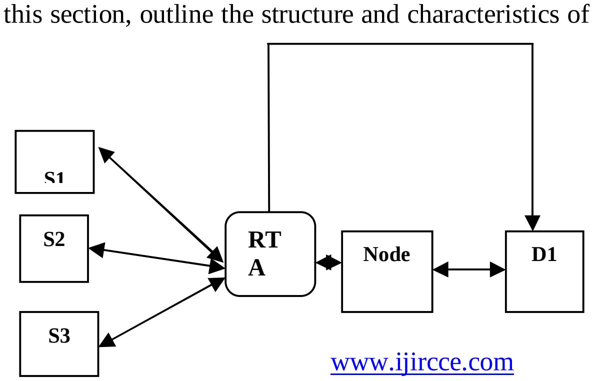
These are also similar to MANETs in many ways. For example, both networks are multi-hop mobile networks having dynamic topology. There is no central entity, and nodes route data themselves across the network. Both MANETs and VANETs are rapidly deployable, without the need of an infrastructure. Although, MANET and VANET, both are mobile networks, however, the mobility pattern of VANET nodes is such that they move on specific paths (roads) and hence not in random direction. This gives VANETs some advantage over MANETs as the mobility pattern of VANET nodes is predictable.

MANETs are often characterized by limited storage capacity and low battery and processing power. VANETs, on the other hand, do not have such limitations. Sufficient storage capacity and high processing power can be easily made available in vehicles. Moreover, vehicles also have enough battery power to support long range communication. Another difference is highly dynamic topology of VANETs as vehicles may move at high velocities. This makes the lifetime of communication links between the nodes quite short. Node density in VANETs is also unpredictable; during rush hours the roads are crowded with vehicles, whereas at other times, lesser vehicles are there. Similarly, some roads have more traffic than other roads.

II. RELATED WORKS

A.VANET MOBISIM

Vanet MobiSim is an extension to CanuMobiSim, a generic user mobility simulator. CanuMobiSim is a platform and simulator-independent software, coded in Java and producing Mobility traces for different network simulators. It provides easily extensible mobility architecture, but, due to its general purpose nature, suffers from a reduced level of detail in specific scenarios. Vanet MobiSim is therefore aimed at extending the vehicular mobility support of CanuMobiSim to a higher degree of realism. In this section, outline the structure and characteristics of Vanet MobiSim and detail the resulting vehicular mobility support.



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B.MACRO-MOBILITY FEATURES

When considering macro-mobility not only take into account the road topology, but also the road structure (unidirectional or bidirectional, single- or multi-lane), the road characteristics (speed limits, vehicle-class based restrictions) and the presence of traffic signs (stop signs, traffic lights, etc.). Moreover, the concept of macro-mobility also includes the effects of the presence of points of interests, which influence movement patterns of vehicles on the road topology. All these different aspects of macro-mobility are discussed in details in the remainder.

C. ROAD TOPOLOGY DEFINITION

The selection of the road topology is a key factor to obtain realistic results when simulating vehicular movements. Indeed, the length of the streets, the frequency of intersections, the density of buildings can greatly affect important mobility metrics such as the minimum, maximum and average speed of cars, or their density over the simulated map. Vanet MobiSim allows defining the road topology in the following ways, the first two being already implemented in CanuMobiSim: User-defined graph: the road topology is specified by listing the vertices of the graph and their interconnecting edges.

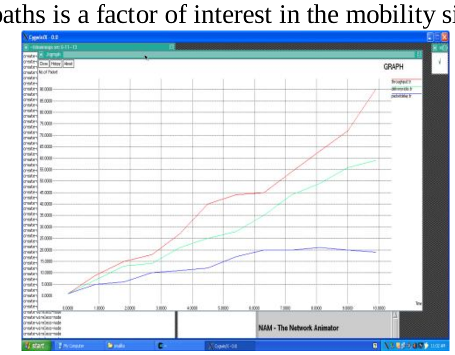
D.ROAD TOPOLOGY CHARACTER

As stated before, the concept of vehicular macro-mobility is not limited to motion constraints obtained from graph-based mobility, but also includes all aspects related to the road structure characterization, such as directional traffic flows or multiple lanes, speed constraints or intersection crossing rules. None of these aspects is present in CanuMobiSim, thus the following enhancements are introduced by VanetMobiSim: By default, intersections are fully regulated by stop signs, forcing vehicles to stop and wait for free road before crossing. Alternatively, it is possible to regulate traffic at intersections by means of traffic lights, whose temporization is customizable.

E. VEHICLE MOVEMENT PATTERN SELECTION

Two choices are given for the trip generation module. The first is a random trip, as the start and stop points of movement patterns are randomly selected among the vertices of the graph representing the road topology. The second is an activity sequences generation, in which a set of start and stop points are explicitly provided in the road topology description and cars are forced to move among them. Independently from the trip generation method employed, the path computation.

The first method selects the shortest path to destination, running a Dijkstra's algorithm with edges cost inversely proportional to their length. The second method does not only considers the length of the path, but also the traffic congestion level, by weighting the cost of traversing an edge also on the number of cars traveling on it, thus modeling the real world tendency of drivers to avoid crowded paths. The last method, which is not present in the original CanuMobiSim, extends the other two, by also accounting for the road speed limit when calculating the cost of an edge, in a way that fastest routes are preferred? The combination of trip generation and path computation methods offers a wide range of possibilities, when the definition of vehicular movement paths is a factor of interest in the mobility simulation.



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F.MICRO-MOBILITY FEATURES

The concept of vehicular micro-mobility includes all aspects related to an individual car's speed and acceleration modeling. The micro-mobility description plays the main role in the generation of realistic vehicular movements, as it is responsible for effects such as smooth speed variation, cars queues, traffic jams and overtaking. Three broad classes of micro-mobility models, featuring an increasing degree of detail, can be identified depending on whether the individual speed of vehicles is computed i) in a deterministic way, ii) as a function of nearby vehicles behavior in a single lane scenario, or iii) as a function of nearby vehicles behavior in a multi-flow interaction scenario. CanuMobiSim provides implementations for models belonging to the first two classes. The Graph-Based MobilityModel fall into the first category, as the speed of each vehicle is determined on the basis of the local state of each car and any external effect is ignored. They all constrain a random movement of nodes on a graph, possibly including pauses at intersections or smooth speed changes when reaching or leaving a destination. The movement is random in a sense that vehicles select one destination and move towards it along a shortest-length path, ignoring other vehicles during the motion. While these models may work for isolated cars, they fail to reproduce realistic movements of groups of vehicles.

Vanet MobiSim adds two original microscopic mobility models, both of which account for the interaction of multiple converging flows, by acting consistently with the road infrastructure, and thus fall into the third category mentioned above. These models extend the IDM description, which is the most realistic among those present in CanuMobiSim, in order to include the management of intersections regulated by traffic signs and of roads with multiple lanes. The first new micro-mobility model is referred to as IntelligentDriver Model with Intersection Management. It adds intersection handling capabilities to the behavior of vehicles driven by the IDM. In particular, IDM-IM models two different intersection scenarios: a crossroad regulated by stop signs, or a road junction ruled by traffic lights. In both cases, IDM-IM only acts on the first vehicle on each road, as IDM

G.VANET MOBISIM VALIDATION

Several tests were run on the vehicular movement traces produced by CanuMobiSim and Vanet MobiSim, in order to verify that the overall mobility description provided by these tools is able to model vehicular traffic with a sufficient level of realism. This also gives us the possibility to comment on the different outputs obtained with various microscopic mobility models implemented by CanuMobiSim and by VanetMobiSim. First, different micro-mobility models are tested on a user Vehicles travel between entry/exit points at borders, identified with circles and squares, crossing the city section according to the fastest path to their destination.

Thus, the vehicular density and speed distributions showed next are not representative of a steady state behavior, but rather give a view on which is the general car mobility under the different models. The different values of IDM-IM k and IDM-LC p did not lead to significant differences in the results, and that the IDM parameters were set to suitable real world values. In the following, report results obtained with the Random Waypoint Model in order to provide a benchmark of this popular model, which causes nodes to move with random constant speed over a straight trajectory towards a destination casually selected in the square area, and then to pause for a random amount of time. Due to its nature, this model is not bound by road constraints. RWP and CSM, ignoring car-to-car interactions, are not affected by the number of vehicles present on the topology, leading to an unrealistically constant mean speed.

III. CONCLUSION AND FUTURE ENHANCEMENT

This chapter comprises of complete simulation criteria for considering the resolution of specified objectives and their problem reports simultaneously, that is, the behavior of routing protocols in VANETs by considering the realistic vehicular traces. The three metrics of PDR, E2ED, THROUGHOUT are evaluated using AODV protocol in three density regions of low density, medium density and high density in city scene as well as in highway scene.This chapter comprises of complete simulation criteria for considering the resolution of specified objectives and their problem reports simultaneously, that is, the behavior of routing protocols in VANETs by considering the realistic vehicular traces. The three metrics of PDR, E2ED, THROUGHOUT are evaluated using AODV protocol in three density regions of low density, medium density and high density in city scene as well as in highway scene.

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