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# VANET: A NEW APPROACH FOR SIMULATION OF ROAD ACCIDENCE MONITORING

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**Abstract**

Vehicular ad-hoc networking is an emerging technology for future on-the-road communications. Due to the virtue of vehicle-to-vehicle and vehicle-to-infrastructure communications, vehicular ad hoc networks (VANETs) are expected to enable a plethora of communication-based automotive applications including diverse in-vehicle infotainment applications and road safety services. Even though vehicles are organized mostly in an ad hoc manner in the network topology, directly applying the existing communication approaches designed for traditional mobile ad hoc networks to large-scale VANETs with fast-moving vehicles can be ineffective and inefficient. To achieve success in a vehicular environment, VANET-specific communication solutions are imperative. Via inter-vehicle communications, drivers can be informed of crucial traffic information such as treacherous road conditions and accident sites by communicating with each other and/or with the roadside infrastructure. With better knowledge of traffic conditions, it is plausible that the problem of accidents can be alleviated. Traffic monitoring and management can also be facilitated by vehicular communications. Simulation will be carried out in Road Traffic simulator so as to provide the secure communication between the vehicles and avoid traffic congestion. In this paper, the need for road traffic micro simulation for evaluating IVC protocols. As the selection of a mobility model influences the outcome of simulations to a great extent, the use of a representative model is necessary for producing meaningful evaluation results.

**INTRODUCTION**

Recently, Vehicular communication systems have attracted much attention, fueled largely by the growing interest in Intelligent Transportation Systems (ITS). These systems are aimed at addressing critical issues like passenger safety and traffic congestion, by integrating information and communication technologies into transportation infrastructure and vehicles. They are built on top of self organizing networks, known as a Vehicular Ad hoc Networks (VANET), composed of mobile vehicles connected by wireless links. VANETs support two types of communication: vehicle - to- vehicle (V2V) and vehicle-to-infrastructure (V2I). While V2V

deals with communication among vehicles themselves, V2I is concerned about transmitting information between a vehicle and the fixed infrastructure that is installed along the road. Such infrastructure may include gateways or base stations, and they provide services such as Internet access in VANETs. Vehicular networks share a number of similarities with MANETs in terms of self-organization, self-management, and low bandwidth. However unlike in MANETs, the network topology in vehicular networks is highly dynamic due to fast movement of vehicles and the topology is often constrained by the road structure. Furthermore, vehicles are likely to encounter a lot of obstacles such as traffic lights, buildings, or trees, resulting in poor channel quality and connectivity. Therefore, protocols developed for traditional MANETs fail to provide reliable, high throughput, and low latency performance in VANETs. Thus, there is a pressing need for effective protocols that take the specific characteristics of vehicular networks into account. The propose techniques takes advantage of broadcast nature of VANET to IVC would likely influence driver behavior, and strongly advocate the use of simulation. Support to some observation is simple traffic models are inappropriate for road traffic simulation, the impact of IVC on road traffic can be directly evaluated.

**2. LITERATURE REVIEW**

VANET is a widely discussed area of wireless communication at present. VANET is a subset of MANET [3] where nodes represents vehicles moving at high pace and vehicle traffic determined regularity [3]. This technology enables communication between vehicles and nearby road-side infrastructure [6] and is made possible through a wireless sensing device installed in the vehicles. With the inception of VANET, new opportunities and related technologies like applications for traffic jam, accident control and weather updates have appeared. VANET performance can be tested in real situations but factors like cost, inaccurate results and protocol evaluation of complex environment may contribute towards a disappointing end. An automated tool called simulation can imitate the protocol and yield a similar result to that of the real world. VANET differs from MANET (mobile ad-hoc network) because in VANET the nodes strictly follow the traffic rules and their pattern of movement is very complex. To attain good results from VANET simulation, it is important to generate a realistic mobility model that is as realistic as real ad-hoc network communication. The usage of mobility model signifies the movement of mobile node that will consume the protocol. In this section, we will further explore the mobility model, different types of mobility model and classify them according to the level of details they generate. Traditionally, the mobility models used in many network simulation tools do not take into account driver behavior or specific characteristics of the urban environment (presence of stop lights, intersections, merge lanes, etc). As a result, the simulation of network protocols may be unrealistic. One major advancement, in this domain was the concept of trace-based mobility modeling to be used in network simulation environments. Here, realistic mobility patterns are generated (off-line) and used as representative models for the evaluation of network protocols. In fact, as a common practice in many simulation platforms, the mobility traces are normally inserted into network simulation modules as independently-generated off-line files. This way, the system complexity is reduced. Two methods for the generation of trace files can be distinguished. First, real-world observations can be used, i.e. the mobility of real vehicles is observed in a city or highway environment and the resulting trace information is processed for use in network simulations [7]. Another approach is to employ traffic micro simulation tools coupled with network simulators. An early example is based on the integration of VISSIM traces with the network simulator ns-2 [1], a frequently used simulation framework. Similarly, mobility patterns can be extracted from these real world observations to analytically model traffic works [5]. Nevertheless, such “decoupling” design philosophy faces one dilemma: If the results from the network simulation module can affect the mobility trace, this methodology is unable to generate the real-time interaction between the mobility model simulation module and the network simulation module. For example, in vehicular safety applications, vehicles will generate alert messages to change the mobility patterns of other vehicles. In this case, the network simulation model and the mobility simulation model need to interact with each other in a real-time manner. Whenever IVC does not influence the mobility of the vehicles, the use of traces is sufficient. In most cases, however, IVC will be used to distribute traffic related information. Thus, the vehicles will probably change their speed or route according to the received information.

## 3. ANALYSIS OF PROBLEM

A vehicular ad hoc network (VANET) is an ad hoc wireless communication system setup between multiple vehicles in a neighborhood. Reduction of road accidents and traffic congestion are two serious challenges in today’s society. Existing active safety systems have improved safety of the occupants. However, the state-of-the-art expensive active safety systems provide limited range and view. Therefore governments and automotive industry are working towards communication based cost effective safety systems. Vehicular Ad-Hoc Network (VANET) provides a unique opportunity to establish communication-based cooperative safety systems. VANET comprises two modes of communication: Vehicle to Vehicle (V2V) communication and Vehicle to Infrastructure (V2I) communication.

## 4. RESULT AND DISCUSSION

"**S**imulation of **U**rban **Mo**bility", or "SUMO" for short, is an open source, microscopic, multi-modal traffic simulation[9]. It allows to simulate how a given traffic demand which consists of single vehicles moves through a given road network. The simulation allows addressing a large set of traffic management topics. It is purely microscopic: each vehicle is modeled explicitly, has an own route, and moves individually through the network. Network simulation is commonly used to model computer network configurations long before they are deployed in the real world. Through simulation, the performance of different network setups can be compared, making it possible to recognize and resolve performance problems without the need to conduct potentially expensive field tests. SUMO [1] is actually an open-source discrete event network simulator. It can be used to model computer networks or just as well for queuing network simulations. SUMO only provides the necessary framework for developing a certain simulation module, but these models are developed independently of SUMO and follow their own release cycles. This means that several frameworks can be modeled in the same research area.

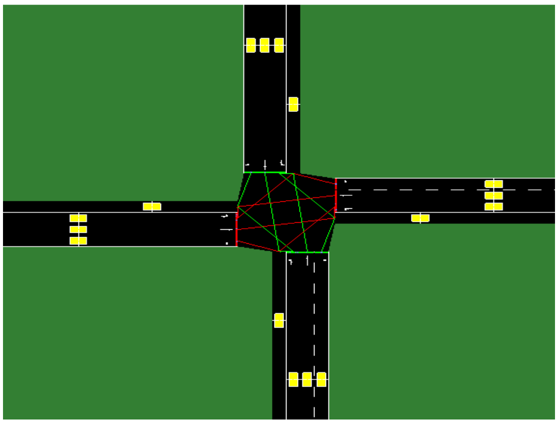

**Fig 1: Various detector are used to track the vehicles**

### 4.1 Track the Vehicle in network

Positions of vehicles over time for a certain vehicle type (or all vehicles). This application can used to trace out the location of vehicles. The output is divided into time step-sections. The final output is available in xml file and output is divided into time step-sections:

<timestep time="40.00" id="1" vType="passenger/wagon">

<vehicle id="t16" lane="-101263564#0_0" pos="181.06" x="36025.08" y="57280.56" lat="20.989549" lon="77.714035" speed="8.05"/>

<vehicle id="t18" lane="-101261306_0" pos="159.11" x="155.05" y="28914.04" lat="20.738604" lon="77.365243" speed="8.20"/>

<vehicle id="t31" lane="-101261255#3_0" pos="95.43" x="40346.94" y="49623.96" lat="20.919779" lon="77.754304" speed="18.00"/>

<vehicle id="t35" lane="-59151776_0" pos="40.62" x="47936.26" y="61702.09" lat="21.027588" lon="77.829254" speed="10.97"/>

<vehicle id="t40" lane="-101261306_0" pos="7.60" x="7.78" y="28878.47" lat="20.738302" lon="77.363824" speed="0.00"/>

</timestep>

**4.2 Induction Loop**

An instantaneous induction loop is writing a value to the output device as soon as a vehicle was detected. This detector differs between different states:

- "enter": a vehicle has entered the detector in this simulation step
- "stay": a vehicle which entered the detector in a prior step is still on the detector
- "leave": a vehicle has left the detector in this simulation step

The final output is available in xml file and output is divided as per detector:

<instantOut id="**20**" time="**925.29**" state="**leave**" vehID="**t149**" speed="**26.92**" length="**15.00**" type="**bus/flexible**" occupancy="**0.64**" />

**5. APPLICATIONS**

**5.1Security Management**

*5.1.1 Road safety*

Safety applications a real way spar amount to significantly reduce the number of accidents, the focus of which to avoid accidents from happening in the first place. Vehicle platooning is another way to improve road safety. By eliminating the hassle of changing lane and/or adjusting speed, platooning allows vehicles to travel closely yet safely together [9]. Fuel economy can also benefit from reduced aerodynamic drag 1 as a vehicle head way is tight ended (e.g., the spacing can be less than 2m). Together with adaptive cruiseontrol assisted byV2Vcommunications, the problem of vehicle crashes due to human error can be all evicted.

*5.1.2 Traffic monitoring and management*

Traffic monitoring and management essential to maximize road capacity and avoid traffic congestion. Crossing intersections in city street scan be tricky and dangerous sat times. Traffic light scheduling can facilitate drivers to cross intersections. Allowing a smooth flow of traffic can greatly increase vehicle throughput and reduce travel time. A token-based inter section traffic management scheme is presented in which each vehicle waits for a token be for intersection. On the other hand, with knowledge of traffic conditions, drivers can optimize their driving routes, whereby the problem of (highway) traffic congestion can be lessened.

**5.2 Less Fuel Consumption and Environments Effect**

As VANET is used Proactive technique for implementation, so driver is aware about traffic condition and infrastructure. As each time it can consider shortest path i.e. Reduction in travel times is due to vehicles taking alternative, no congested, but longer routes. So necessary fuel is consumed. On the other hands, harm the environment.

## 6. CONCLUSION

As vehicular transportation has become an integrated part of our daily routine, there is a growing demand for inter-vehicle communications and in-vehicle computing. VANETs can realize V2V and V2I communications. This emerging vehicular networking paradigm is considered promising, enabling a wide spectrum of new on-the-road applications including safety, convenience, and comfort services .Vehicular communications are a major component of a future intelligent transportation system. Designed mainly for safety-related reasons, a vehicular network can also be used by applications with a different profile, like traffic management or passenger entertainment. The complexity of analytical models and the financial cost of tests with real hardware have imposed computer simulations as the leading solution for V2X communications research. First point out the factors that differentiate simulating a VANET from modeling a classical MANET. This dissertation tries to facilitate the first stage of a study on vehicular communications by providing with meaningful information concerning the multitude of existing VANET simulators. The simulation framework relies on state-of-the-art simulators from both domains, thus, it incorporates well - known models for road traffic micro simulation.

**7. REFERENCES**

1. Christoph Sommer, Reinhard German, and Falko Dressler, "Bidirectionally Coupled Network and Road Traffic Simulation for Improved IVC Analysis" IEEE TRANSACTIONS ON MOBILE COMPUTING, VOL. 10, NO. 1, JANUARY 2011 3

2. Razvan Stanica ⇑, Emmanuel Chaput, André-Luc Beylot, "Simulation of vehicular ad-hoc networks: Challenges, review of tools and recommendations" 2011 Elsevier Computer Network, January 2011.

3. Josiane Nzouonta, Neeraj Rajgure, Guiling (Grace) Wang, "VANET Routing on City Roads Using Real-Time Vehicular Traffic Information" IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 58, NO. 7, SEPTEMBER 2009

4. H. Hartenstein and K.P. Laberteaux, "A Tutorial Survey on Vehicular Ad Hoc Networks," IEEE Comm. Magazine, vol. 46, no. 6, pp. 164-171, June 2008.

5. Christoph Summer, Robert Krul, Reinhardt German and Falko Dressler, "Emissions vs. Travel Time: Simulative Evaluation of the Environmental Impact of ITS" 978-1-4244-2519-8/10 ©2010 IEEE

6. M. Bakhouya , J.Gaber , P.Lorenz, "An adaptive approach for information dissemination in Vehicular Ad hoc Networks" Journal of Network and Computer Applications, journal homepage: www.elsevier.com/locate/jnca

7. C. Sommer and F. Dressler, "Progressing Towards Realistic Mobility Models in VANET Simulations," IEEE Comm. Magazine,vol. 46, no. 11, pp. 132-137, Nov. 2008.

8. C. Summer, Z. Yao, R. German, and F. Dressler, "Simulating the Influence of IVC on Road Traffic Using Bidirectional Coupled Simulators," Proc. IEEE INFOCOM: Mobile Networking for Vehicular Environments (MOVE '08), Apr. 2008.

9. Simulation of Urban Mobility (SUMO). http://sumo.sourceforge.net