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Advance root finding vanet algortim Analysis

Subtitle as needed

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Abstract

Vehicular Ad-hoc Networks (VANETs), which considers both buses and cars as vehicular nodes running in both clockwise and anti-clockwise directions. It is a hybrid protocol, uses both the greedy forwarding approach and the carry-store-and-forward approach to ensure the connectivity of the routes. Our solution to situations, when the network is sparse and when any (source or intermediate) node left its initial position, makes this protocol better in city scenarios. We only consider Vehicle to-Vehicle (V2V) communication in which both the source and destination nodes are moving vehicles. The paradigm of cross-layer design has been introduced as an alternative to pure layered design to develop communication protocols. Cross-layer design allows information to be exchanged and shared across layer boundaries in order to enable efficient and robust protocols. There has been several research efforts that validated the importance of cross-layer design in vehicular networks.

Keywords: *Vehicular Ad-hoc Networks (VANETs) , Vehicle to-Vehicle (V2V) communication.*Cross layer.

I. INTRODUCTION

A **vehicular ad hoc network** (**VANET**) uses cars as mobile nodes. VANET Vehicles connected to each others through an ad hoc formation form a wireless network called “Vehicular Ad Hoc Network”. Vehicular ad hoc networks (VANETs) are a subgroup of mobile ad hoc networks (MANETs). It includes V2V communications and V2R communications and is important component of ITS. It is estimated that the first systems that will integrate this technology are police and fire vehicles to communicate with each other for safety purposes.

In Vehicular Ad Hoc Networks (VANETs), there are generally very few communicating vehicles along a routing path in areas with low traffic density. Existing schemes based on the Store-Carry-Forward (SCF) technique utilize a moving vehicle to bridge the communication gap between two disconnected vehicles on the lane. connectivity between vehicles depends heavily on the density of vehicles on the surrounding roads. Vehicular Delay-Tolerant Network (VDTN) uses a store-carry-forward paradigm to allow forward bundles to asynchronously reach the destination hop by hop over

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traveling vehicles equipped with short-range Wi-Fi devices. To overcome the problem of disconnectivity and falsy

communication between the vehicle using protocols. Anchor-based connectivity-aware routing (ACAR) for vehicular ad hoc networks (VANETs) ensure connectivity of routes with more successfully delivered packets. ACAR is a hybrid protocol, using both the greedy forwarding approach and the store-carry-and-forward approach to minimize the packet drop rate. Also influence of the transmission range on the end-to-end delivery delay. Distributed protocol base on DSDV protocols are able to capture in a very quick time (few seconds) the current traffic conditions even on a quite long road of about 70 km and information display on OBU.

Research Methodology

In the new vehicles may have computer network devices, computing devices, storage devices, and even an Event Data Recorder (EDR). Specifically, vehicles in this research are assumed to be endowed with the following features:

- A computer center, which will provide data processing, computing and storage;
- A wireless transceiver, such as DSRC which provide fast communication for VANET;
- A unique ID, such as an electronic license plate [12] which is given by registration authorities or is stored in EDR. We only discuss security in this report.

The radar detects any obstacles ahead. GPS navigation system, specifically the GPS receiver and maps, provides the coordinates and localization. To simplify the hardware security, we assume that all the devices are tamper-proof, like an EDR.

Network Model

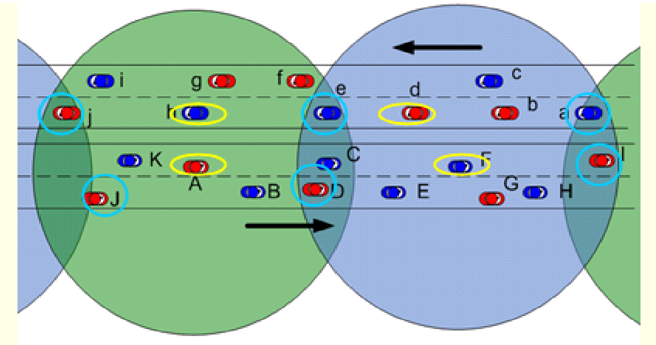


Figure 5. Representation of cell leader and cell routers

in a preset map

There are two types of cells [10, 11]: dynamic cells and position-based cells. Although dynamic cells are flexible, they are not efficient. The position-based cells, on the other hand, are created beforehand and vehicles use their GPS coordinates to map to their respective cells. These preset cells avoid the need to undergo the complex process of forming a cell and electing a cell leader. In this project, we use position-based cells to build a communication network. Cells are shown in Figure 5 as shadow areas which are set statically. Vehicles compare their GPS coordinates with these preset cells to identify their host cell.

We can configure the road with virtual digital cells, for example every 200 meters a cell on the road, i.e., the cells' radius is 100 meters such that all the vehicles inside can directly send or receive packets without any routing. The radius of cells is same with the transmission range of radar such that all the neighbors inside can be directly detected by radar. Overlap, which is intersection area between two cells, must be decided before the cells are formed. The size of overlap depends on the size of cells and the road condition. If the size of cells is very large, the overlap may be small proportion of the cells; if the road is highway, the overlap may be larger to contain more vehicles as potential routers.

In this project, we use a highway scenario, and the cells are 100 meter-radiuses, therefore, we select 20-30 meter overlaps. When vehicles are close to the overlap of two cells, they may be chosen as routing vehicles. The need for routers depends on the transmission range. If the transmission range can reach the next cell leader without needing an intermediate hop, then there is no need to have cell routers. The steps to form a network cell are:

- By consulting loaded digit map, each vehicle can decide the width of the overlap regions between two cells;
- Partition the digital map into cells, for example 100 meter-radius cells, making sure the overlaps;
- Vehicles decide its cells based on its GPS coordinates and preset digital maps;

Traffic Simulator

We extended a microscopic traffic simulator based on the microscopic transport simulator from the Dresden University of Technology [16], which features a realistic traffic model. A snapshot is shown in figure 10. Vehicles in our simulator can accelerate if there is reasonable space ahead, decelerate if the space in front is small or forward vehicles suddenly decelerate, completely stop if there is no way to move or change lane or steadily drive and change lanes. In this project, we use a two-direction highway scenario with two lanes in each direction. The total road length is 3 Km, cell radius is 100 meters, traffic arrival rate is 3600 vehicles/ hour, mean velocity is 33.3 m/s, and transmission radius is 100 meters.

shows the comparison of our algorithm with flooding. In flooding each vehicle within transmission range receives the message and broadcasts it to its neighbors' till it reaches the destination vehicle. Our algorithm needs less number of hops compared to flooding.

The next experiment was run to calculate the time taken to detect the malicious vehicles in the system. The experiment was run for two ranges of transmission: one with a range of 100m and another with a range of 500m. Since the time depends on the number of intermediate hops, the increased range of transmission would certainly decrease the time. However, the increased transmission range would increase the probability of packet collisions. A full network model is needed to evaluate the packet loss. Figure 12 shows the time taken to detect the malicious vehicles with respect to their proximity from the vehicle generating the verification request.

Detecting false position information and reducing the chances of attack is the key to the success of VANETs. This project focuses on this prime area. Radar acts as the eye of the system and allows a vehicle to trust the information received from the vehicles within its range. The capability to verify record is also available for achieving global security. Our approach is efficient in identifying compromised vehicles and reduces the burden on channel available.

We are working on increasing the precision of our system to detect all compromised vehicles and on simulating. The algorithm divides the road in front of the vehicle to a number of regions (_). For each region, an aggregation ratio ( ) is assigned. The aggregation ratio is defined as the inverse of the number of individual records that would be aggregated in a single record. Each region is assigned a portion (_ where _ _ _ _ _) of the remaining free space in the broadcast message. The aggregation ratios and region portion values are assigned according to the importance of the regions and how accurate the broadcast information about the vehicles in that region is needed to be. For example, assigning decreasing values to the aggregation ratios and equal values to

portion parameters will result in broadcasting less accurate information about regions that are farther away from the current vehicle, since for those regions, each individual record will represent large number of aggregated vehicles (records).

Simulation Results

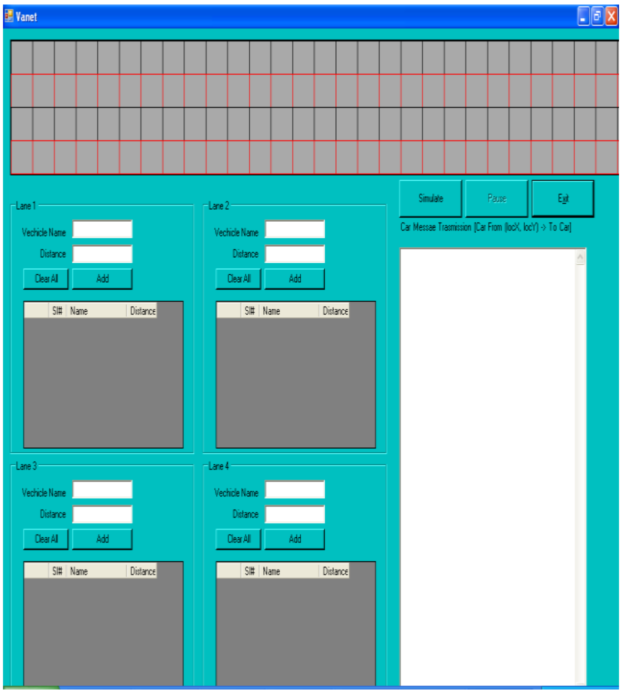


Figure Simulation Input Section

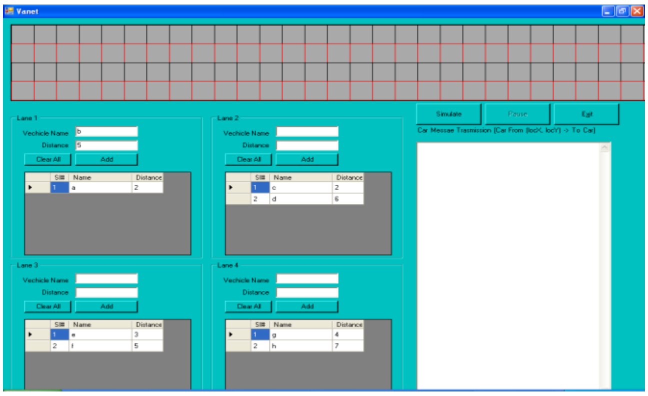


Figure Data generation traffic model

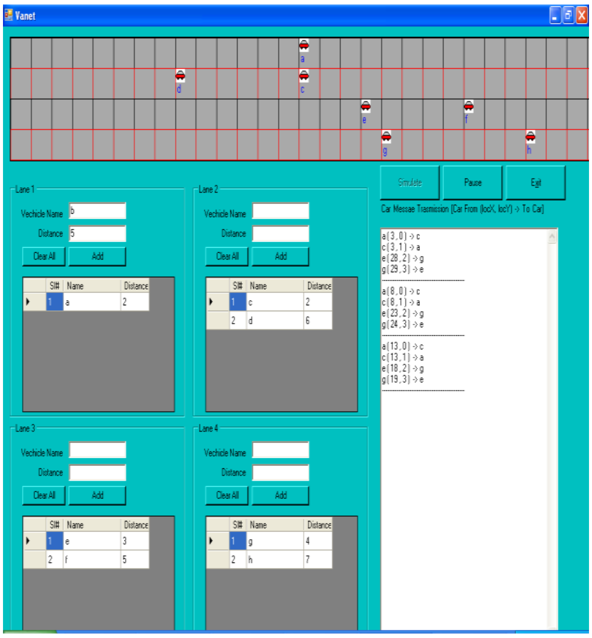
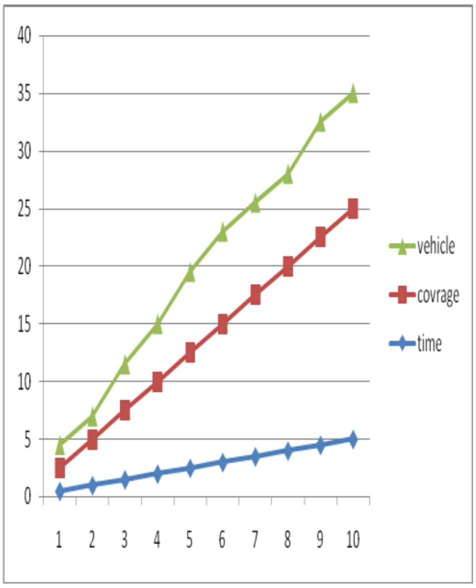


Figure Data *Aggregation Model*

Comparative



Graphical Analysis

CONCULSION

we introduced the system, which is a part of project Road side that is still under development. The goal of View is to provide the driver of a vehicle with information about traffic and road conditions. The importance of the system is to gather and differnciating traffic information between the vehicles on the road. We presented the basic design of the system, and the algorithms used for data aggregation and information dissemination using the standards. Privacy is an important issue in such a system. Different privacy levels should be

available from which the drivers can select. One level of privacy could be to completely hide any information about the vehicle while it continues to participate in relaying other vehicles' information. Another level is to allow others to gain information about the vehicle without identifying it. Security and trust are two other important issues in such a system. A fraudulent vehicle could disseminate information about nonexistent vehicles, or broadcast bogus information about existing vehicles. Different mechanisms should be proposed to prevent this and to identify those fraudulent vehicles to avoid them. For future work, we are continuing to work in a number of different directions as the privacy and the security issues. We are experimenting with a linear programming model to estimate the aggregation parameters dynamically based on the road condition. We believe that the project will greatly enhance and ease the driving experience. At the same time, they will encourage and trigger several applications to be built over these systems

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