An Automatic Control of Vechicle To Vechicle Monitoring System To Avoid Congestion

R.Sankari[1], S.Vimalathithan[2], J.Jenifer[3]
[1]Dept of Computer Science
[2, 3]Associate Professor
[1, 2, 3] Indra Ganesan college of engineering

Abstract- *Congestion detection is major problem in urban roads. To make smart decisions to avoid congestion Vehicular Ad-Hoc network (VANET) is one of the solution.vehicular traffic re-routing to alleviate congestion suffer from two intrinsic problems: scalability,as the central server has to perform intensive computation and communication with the vehicles in real-time;. Our privacy-aware reporting is based on the observation that in dense areas, vehicles naturally experience a higher degree of anonymity similar to a person walking through an inner-city crowd. Therefore, a density-based traffic reporting mechanismis proposed wherein vehicles report to the server only if the road density is higher than a predefined threshold. The server computes the smoothed average of the traffic density on each road segment as it receives new traffic reports. Computing the smoothed average of the traffic density at each vehicle (using a moving time window) is of little use in our case because the vehicles do not report often due to our privacy-aware reporting protocol (e.g., a vehicle rarely reports twice from the same road segment). A Density-based Road Side Unit deployment policy (D-RSU), specially designed to obtain an efficient system with the lowest possible cost to alert emergency services in case of an accident. Our approach is based on deploying RSUs using an inverse proportion to the expected density of vehicles. The obtained results show how D-RSU is able to reduce the required number of RSUs, as well as the accident notification time.*

Keywords- Intelligent vehicles, Road Side Unit, congestion.

I. INTRODUCTION

Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link. The mobile communication in this case, refers to the infrastructure put in place to ensure that seamless and reliable communication goes on. These would include devices such as protocols, services, bandwidth, and portals necessary to facilitate and support the stated services. The data format is also defined at this stage. This ensures that there is no collision with other existing systems which offer the same service.

1.2 TRAFFIC CONTROL SYSTEM

Traffic Re-routing System for Congestion Avoidance differs from the above research in three aspects. First, we take full communication to perform scalable re-routing. Thus, each vehicle can get accurate global knowledge of the travel time and, at the same time, is able to exchange route planning decisions with surrounding vehicles more efficiently. Therefore, it is more scalable since it reduces the computation burden of the central server. A privacy enhancement mechanism, where each vehicle only uploads its location report when located in low sensitivity areas.

A. Congestion prediction

Periodically, the service checks the road network to detect signs of congestion. A road segment is considered to exhibit congestion signs is a threshold. Choosing the right value for is particularly important for the service performance.

B. Selection of vehicles to be re-routed

When a certain road segment presents signs of congestion, the service looks for nearby vehicles to re-route. Specifically, we select vehicles from incoming segments (i.e., segments which bring traffic into the congested one). To decide how far from congestion to look for candidates for re-routing, the service uses a parameter L (level), which denotes the furthest distance (in number of segments) the vehicle can be away from the congested segment.

C. Re-Routing Strategies

This section presents our three re-routing strategies; all of them use the estimated travel time in the computation of the (k-)shortest path(s) for each of the vehicles selected as described in the previous section.

II. RELATED WORK

` A vehicular ad hoc network (VANET) [1] is an ad hoc wireless communication system setup between multiple vehicles (vehicle-to-vehicle or V2V) or between a vehicle and some roadside infrastructures (V2I). Many applications have been proposed on VANETs for different purposes such as safety, infotainment, financial, navigational aid etc. [2].Traffic congestion has been studied extensively in traffic flow theory for various reasons such as road capacity planning, estimating average commute times etc. Congestion information can be useful for many VANET applications also, such as for route planning or traffic advisories. Typically, congestion information is collected as the number of vehicles passing a point per unit time by some roadside equipment and transmitted to other places for broadcasting to vehicles. Moreover, the congestion information [3] is usually available only at a single macroscopic level for all vehicles and is not customized for the requirements of each vehicle.

III. LITERATURE REVIEW

Wang, H., et al. [8] developed an framework for collaborative traffic information collection, merging and storage for city intelligent transportation system based on the wireless sensor network. The proposed frameworks not only solve the given problem but also have higher flexibility and reliability compared to traditional city transportation system. Author also introduced relative research about the emergency response scheme and transport priority schemes.

P. Händel, et al. [1] developed an framework to deployed a smart phone based measurement system for the road vehicle traffic monitoring and usage-based insurance (UBI). Author described that the given framework consists of seven layers, spanning from the physical smart phones and servers to the overall business perfect at the top layer. Also, the purpose of proposed framework (sensed by the primary data) is to model, predict, and control the traffic flow.

IV. SYSTEM MODEL

Hence, the main contribution of this article is the distributed system for re-routing. This system, has four main features: (1) a scalable system architecture for distributed rerouting, (2) distributed re-routing algorithms that use VANETs to cooperatively compute an individual alternative path for each vehicle that takes into account the surrounding vehicles' future paths. (3) privacy-aware re-routing that significantly decreases sensitive location data exposure of the vehicles, and (4) optimizations to reduce the VANET overhead and thus improve vehicle-to-vehicle communication latency. When a road is selected to compose the alternative route, its weight is updated considering the impact each vehicle will have in that road.

a) Identify and detect the congestion, its location, severity and boundaries.
b) Ones detect the congestion broadcast the information by affected vehicles to nearby vehicles which take decision.

Logically, the traffic guidance system operates in four phases executed periodically:

(1) data collection and representation;
(2) traffic congestion prediction;
(3) vehicle selection for re-routing; and
(4) choosing alternative routes for each such vehicle and pushing the guidance to the vehicles. Since data collection has been studied extensively in the literature, we assume that the centralized service receives traffic data from.

Due to this many Automobile industries are taking initiative to find efficient solution for congestion control, unaware of congestion increase the severity of it. The more severe the congestion, the more time it will take to clear once the cause of it is eliminated. The ability for a driver to know the traffic conditions on the road ahead will enable him to seek alternate routes saving time and fuel. In order to provide drivers with useful information about traffic ahead a system must:

a) Identify and detect the congestion, its location, severity and boundaries.
b) Ones detect the congestion broadcast the information by affected vehicles to nearby vehicles which take decision.

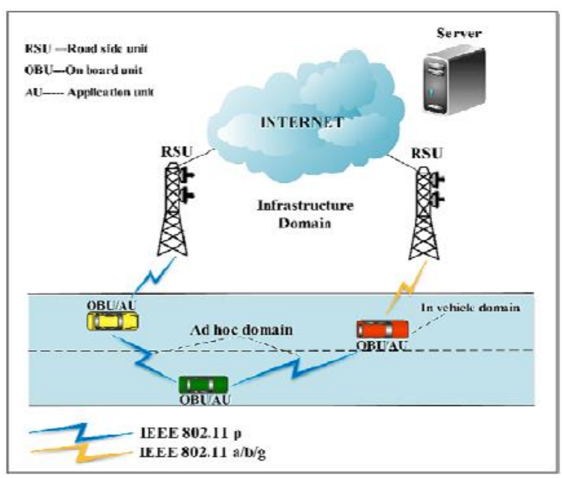

Fig: RSU Monitoring

V. PERFORMANCE EVALUATION

Researchers now are so much interested in automatic real-time traffic congestion estimation tool as it is the most significant factor on which intelligent transportation systems are based. Some of the researchers have focused in their work on traffic flow estimation. It is measured as the rate at which vehicles pass a fixed point (e.g. vehicles per minute). They used spot sensors such as loop detectors and pneumatic sensors to quantify the traffic flow However; the sensors are very expensive and need a lot of maintenance especially in developing countries because of the road ground de-formations. In addition, metal barriers near the road might prevent effective detection using radar sensors. It is also found that traffic congestion also occurred while using the electronic sensors for controlling the traffic.

Table 2. Parameter values for the simulations.

Parameter	Value
Density of vehicles (veh./km^2)	25, 50, 75, 100, 125, and 150
Number of RSUs	1, 2, 4, 8, and 16
Simulated city	Madrid
Simulated area	2000 m × 2000 m
Number of crashed vehicles	2
Downtown size	1000 m × 1000 m
Downtown probability	0.7
Warning message size	13 and 18 KB
Packets sent by vehicles	1 per second
Warning message priority	*AC3*
Normal message priority	*AC1*
Mobility generator	*C4R* [2]
Mobility models	Krauss [7] and downtown [10]
MAC/PHY	802.11p
Radio propagation model	RAV [11]
Maximum transmission range	400 m
Broadcast storm reduction scheme	eMDR [4]

Fig: Report

EXPERIMENTAL EVALUATION

The main objective of our simulation-based evaluation is to study the performance of the distributed re-routing strategies in DIVERT.

IMPLEMENTATION:

1. Privacy-aware Density Reporting

The estimated density is computed locally by each vehicle, which obtains information about its neighbor vehicles by periodic exchange of beacons.

procedure onDenistyCheckTimeout()
N_i = getEstimatedNumberofCars(r_i, $side$, $\{beacon_k\}$)
if $N_i \geq max[\theta * N_{max}, bound]$ **then**
  $p = 1/N_i$
  if rand $< p$ **then**
    sendtoTMC(N_i, r_i, $side$)
  end if
end if

As depicted in Algorithm, each vehicle periodically checks the number of vehicles Ni on the current road ri. To obtain accurate traffic information, each vehicle encapsulates in the beacon the current road identifier (i.e., ri) and direction of traffic (i.e., side). When a vehicle estimates the number of cars , it only counts the beacons with the same ri and side as itself.

2. K Shortest Path Compression

procedure compresskpath()
k = KPaths.size() {the number of k}
P = KPaths[0] {the shortest path}
while k>0 **do**
  P_k = FindMostOverlappingPath(P)
  P = Compress(P, P_k)
  k = k-1
end while

Let us notice that only dEBkSP (distribution Entropy Based k Shortest Paths)can take advantage of larger k values, while the centralized version cannot. A larger k allows for better traffic balancing but introduces higher computational complexity since the centralized server needs to compute k paths for all the selected vehicles. This is not a problem for dEBkSP which distributes the path computation to individual vehicles. Therefore, dEBkSP can result in higher performance than EBkSP when higher k values are used.

VI. CONCLUSION

Our system, on the other hand, is designed to be effective and fast, although not optimal, in deciding which vehicles should be re-routed when signs of congestion occur as well as computing alternative routes for these vehicles. DIVERT, offloads a large part of the re-routing computation at the vehicles, and thus, the re-routing process becomes scalable in real-time. V2V communication to better balance the need for privacy, scalability, and low overhead with the main goal of low average travel time. In the future this system may be implemented for the practical implementation which will work for various dynamic traffic flows.

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