STUDY ON INTELLIGENT NAIVE BAYESIAN PROBABILISTIC ESTIMATION PRACTICE FOR TRAFFIC FLOW TO FORM STABLE CLUSTERING IN VANET

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ABSTRACT

The Vehicular Ad hoc Network (VANET) is one of the promising and encouraging technologies, and it is going to attract great attention in the near future. VANET has turned into a main module of the intelligent transport system. It is a self-controlled, wheeled network, and a wider and stimulating class of Mobile Ad hoc Network (MANET). VANET's raise many innovative challenges because of their high – class and unique features, such as high-node mobility dynamic topology changes, wireless links breakage, network constancy, and network scalability. A well – organized routing protocol is one of the challenging matters of such networks. In this project an intelligent naive Bayesian probabilistic estimation practice for traffic flow to form a stable clustering in VANET, is proposed. The Proposed scheme aims to improve routing by employing awareness of the current traffic flow as well as considering the blend of several factors, such as speed difference, direction, connectivity level, and node distance from its neighbors by using the intelligent technique. The proposed technique has proven to be more strong, stable, robust, and scalable than existing ones

1. INTRODUCTION

Safety as well as luxury in travel has gained significant importance in social life. For the past few decades, every year many people have lost their lives, while others have been injured in highway accidents because the driver is unable to estimate the circumstances on the road ahead. Well-organized traffic control systems are also becoming abundant. On the other hand, traffic crowding is becoming an increasingly severe problem. Due to the crowding effect, vehicles waste millions of hours and gallons of fuel daily. Therefore, a clogged flow condition has a damaging influence on the economy, health, and environment. However, a huge quantity of accidents and congestion may be avoided by gathering and allocating information related to human safety. The information is collected using an intelligent network scheme among moving vehicles on urban roads or highway setups. As part of Intelligent Transportation Systems (ITS), it affects the financial and social causes of motor vehicle accidents. Vehicular Ad-hoc Networks (VANETs) have attracted growing attention from both industry and theoretical scholars recently. VANETs are a special case of MANETs, where the mobile nodes in these networks are vehicles that are fitted out with wireless communication devices, i.e. On Board Units (OBU), Application Units (AU), and Global Positioning Systems (GPS).

The stable clustering methods have been well considered in Mobile Ad-hoc Networks (MANETs) in recent years. However, considering the high-class features of VANETs, these traditional and outdated clustering methods are inappropriate for VANETs. Several stable clustering-based schemes in VANETs have been proposed. It is a significant issue with all these old schemes that they do not keep the long life of clusters and the stability of the cluster head, due to the high movement of vehicles, the continuously changing topology of vehicles and other related factors in VANETs. In the proposed project, an intelligent clustering algorithm whose purpose is to extend the lifetime of a cluster head. It will take advantage of being aware of the lane of automobiles on the road and then transmit this awareness to further adjacent vehicles to determine the best and ideal cluster head. The technique of choosing the cluster head is the essential way to attain a more stable cluster. Project scheme takes the traffic flow lane use information, speed alteration, direction, connectivity level, cluster size and vehicle distance into consideration, for selecting a long-lasting cluster head.

When traveling on a highway, a group of consecutive vehicles can form a platoon, in which a non leading vehicle maintains a small distance with the preceding vehicle. It has been shown that there are many benefits to driving vehicles in platoon patterns. First, since adjacent vehicles are close to each other, road capacity can be increased, and traffic1 congestion may be decreased accordingly. With the advance of technologies, the performance of platoons can be further enhanced (VANETs). In the past few years, many studies have been conducted on the dynamics of a VANET- enabled platoon under traffic disturbance, which is a common scenario on a highway.

The decentralized nature of wireless ad hoc networks makes them suitable for a variety of applications where central nodes can't be relied on and may improve the scalability of networks compared to wireless managed networks, though theoretical and practical limits to the overall capacity of such networks have been identified. Minimal configuration and quick deployment make ad hoc networks suitable for emergency situations like natural disasters or military conflicts. The presence of dynamic and adaptive routing protocols enables ad hoc networks to be formed quickly.

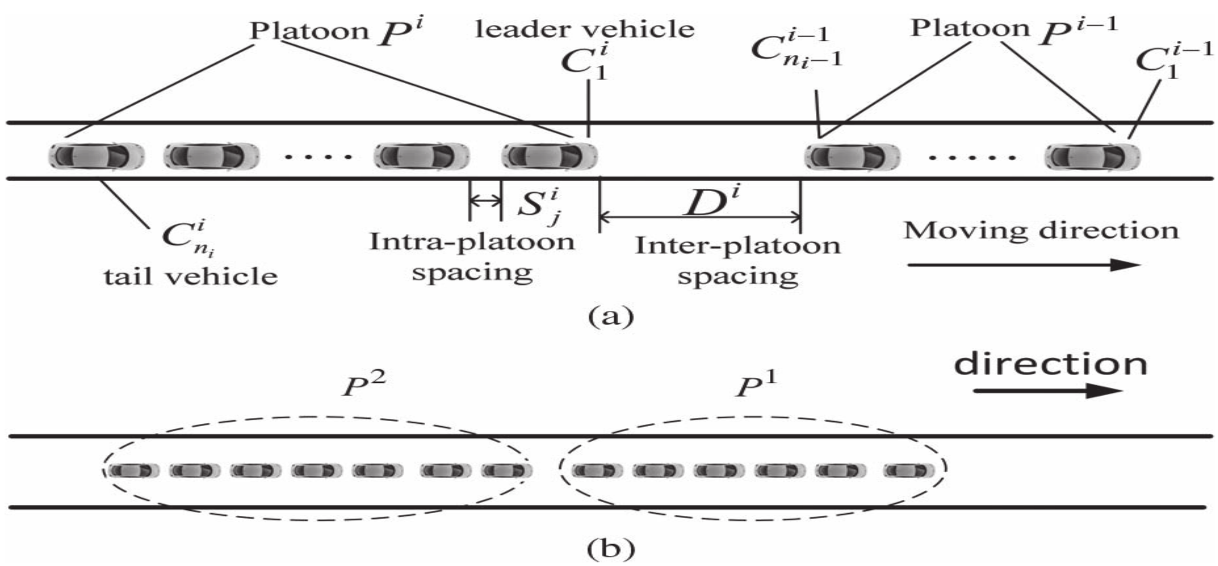


Fig.1 (a) Example of a platoon with platoon parameters

Fig .1(b) Two large adjacent platoons with small interpolation spacing

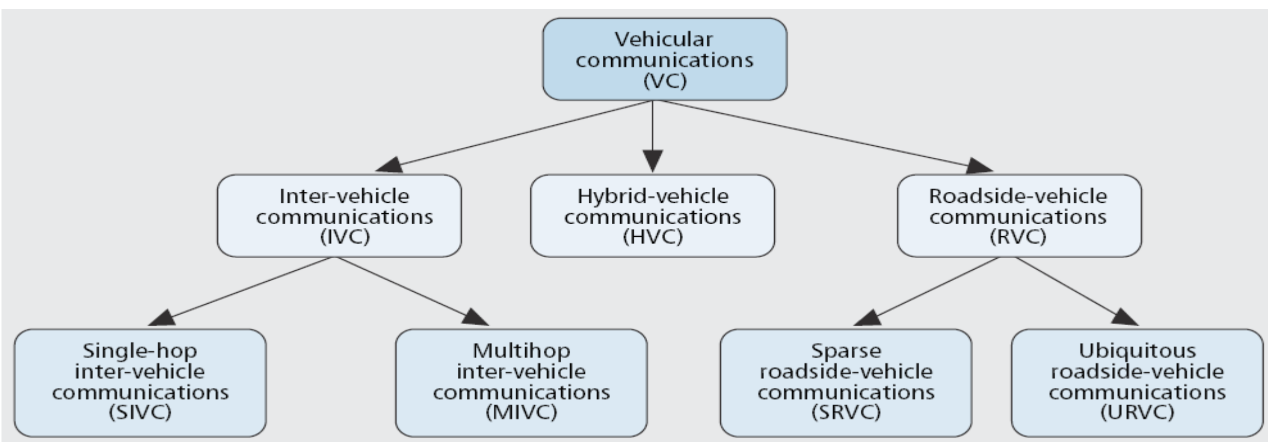
2. PROBLEM STATEMENT

Vehicular Ad-Hoc Network (VANET) is a group of wireless mobility nodes and it is self organized into a network without the need of any infrastructure. High mobility is big challenging issue in Vehicular Ad-Hoc Network (VANET) that determines its packet-forwarding scheme based on the relative velocity between the forwarding node and the destination node. The region for packet forwarding is determined by predicting the future trajectory of the destination node based on its location information and velocity. Prediction - Based Routing (PBR) protocol is used to predict the vehicles route life time, but it didn't predict the future position of the vehicles.

A Cooperative vehicle safety system which can be used to communicate between vehicles and Road side unit. The DSDV protocol is designed to be comprehensive and self-contained, simple and efficient for more reliable operation and it transmit the messages with in the short time, when compared to existing one. It adopts an EEE 802.11 standard for wireless access and aim at implementing a reference system.

3. OBJECTIVE OF THE RESEARCH

To reduce the topology maintenance overhead and support more reliable routing, an option is to make use of evolving graph-based reliable routing scheme for VANETs. The novelty of the work lies in its unique design of a reliable routing protocol that considers the topological properties of the VANET communication graph using the extended evolving graph. Considering that vehicles travel at high speeds on highways, the data delivery service could have many disruptions due to frequent link breakages. It is very important to ensure that the most reliable links are chosen when building a route.

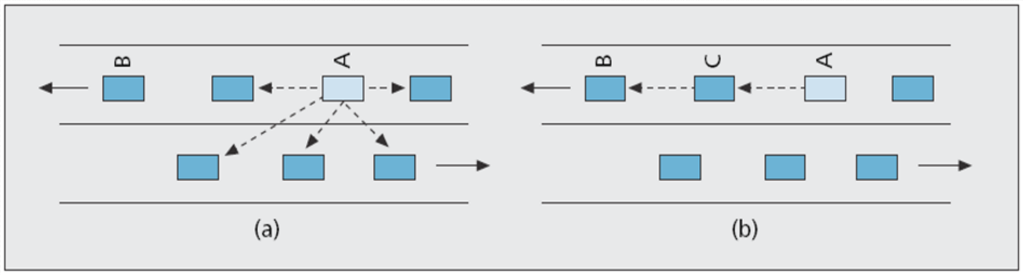


3.1. Vehicular communication systems

3.1. Inter-vehicle communication (IVC) Systems

- IVC systems are completely infrastructure-free; only onboard units (OBUs) sometimes also called in-vehicle equipment (**IVE**) are needed.
- Single-hop and multi-hop IVCs (**SIVCs and MIVCs).**
- SIVC systems are useful for applications requiring short-range communications (e.g., lane merging, automatic cruise control)

- MIVC systems are more complex than SIVCs but can also support applications that require long-range communications (e.g., traffic monitoring)



a) Single-hop IVC system b) multi-hop IVC system

Roadside-to-Vehicle Communication (RVC) Systems

- RVC systems assume that all communications take place between roadside infrastructure (including roadside units [RSUs]) and OBUs.
- Depending on the application, two different types of infrastructure can be distinguished
  - Sparse RVC (**SRVC**) system
  - Ubiquitous RVC (**URVC**) system

RVC Systems –SRVC

- SRVC systems are capable of providing communication services at hot spots.
- A busy intersection scheduling its traffic light, a gas station advertising its existence (and prices), and parking availability at an airport, are examples of applications requiring an SRVC system.
- An SRVC system can be deployed gradually, thus not requiring substantial investments before any available benefits.

RVC Systems –URVC

- A URVC system: providing all roads with high-speed communication would enable applications unavailable with any of the other systems.
- Unfortunately, a URVC system may require considerable investments for providing full (even significant) coverage of existing roadways (especially in large countries like the United States)

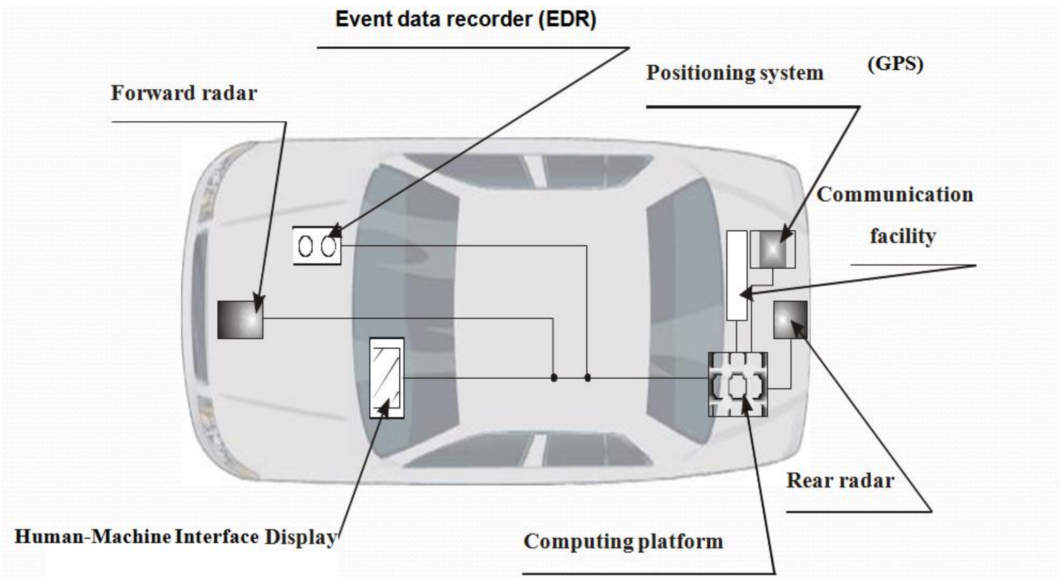
Hybrid Vehicular Communication (HVC) Systems

- HVC systems are proposed for extending the range of RVC systems.
- In HVC systems vehicles communicate with roadside infrastructure even when they are not in direct wireless range by using other vehicles as mobile routers.
- An HVC system enables the same applications as an RVC system with a larger transmission range.
- The main advantage is that it requires less roadside infrastructure. However, one disadvantage is that network connectivity may not be guaranteed in scenarios with low vehicle density.

OBU for each equipped vehicle (Assumptions)

- A central processing unit (CPU) that implements the applications and communication protocols
- A wireless transceiver that transmits and receives data to/from the neighboring vehicles and roadside
- A GPS receiver that provides relatively accurate positioning and time synchronization information
- Appropriate sensors to measure the various parameters that have to be measured and eventually transmitted
- An input/output interface that allows human interaction with the system

A Modern Vehicle



4. SIMULATION RESULTS

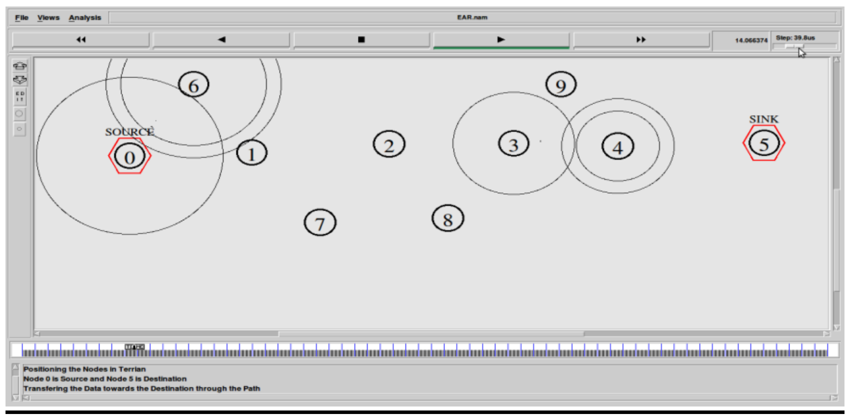


Figure 4.1 V2V Communication between the source and sink

4.2. Figure Node weight calculation

5. CONCLUSION

The dynamics of a VANET-enabled platoon under disturbance. In particular, proposed a novel DA-Platoon architecture, in which both platoon dynamics and VANET behaviors are taken into consideration. With a specific design of the DA-Platoon architecture, have analyzed the intraplatoon dynamics, and have identified three possible transient responses to different disturbance scenarios. Based on the analysis, have further derived the desirable intraplatoon spacing and platoon size, under traffic disturbance and VANET constraints. Next, to mitigate the adverse effects of traffic disturbance, have also designed a novel driving strategy for the leading vehicle of DA- Platoon, with which can determine the desired interplatoon spacing. Finally, extensive simulation experiments have been conducted which validate our analysis and demonstrate the effectiveness of the proposed driving strategies, in terms of acceleration noise, fuel consumption, and exhaust emissions. A traffic movement based stable clustering algorithm using the Naïve Bayesian method, with the aim of creating stable clusters in urban scenarios. The parameters of the vehicles such as traffic weight, speed, cluster size, connectivity level, direction and vehicle distance are used in our technique for cluster head selection. The cluster head will be selected from the lane having the heaviest traffic flow, aiming to enhance the stability of the cluster as well as the lifetime of the cluster head. The proposed algorithm is compared to the current algorithms and it expressively performs well and increases the stability and lifetime of both the cluster and the CH.

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