SURVEY ON ASIAN VEHICULAR NETWORK PROBLEMS & SOLUTION THROUGH VANET

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ABSTRACT

Vehicular ad hoc networks, an emerging network platform based on vehicle-to-vehicle and vehicle-to-infrastructure communications, promise valuable applications to enhance driving safety, comfort, and efficiency. In this article we introduce the different solutions those can be improve the Traffic system in India and abroad & every one sharing the roads should respect each other's presence and their right of advancement on roads. We have survey on different Metro cities Delhi, Mumbai, Kolkata, Chennai, Hyderabad & Bangalore etc. There are many accidents happened & expands the huge fuels due to improper communication between vehicles and not used the proper path. Vehicular ad-hoc networks (VANETs) offer a vast number of applications without any support from fixed infrastructure. These applications forward messages in a multi-hop fashion. Designing an efficient routing protocol for all VANET applications is very hard. Hence a survey on traffic control applications, safety applications, driver assistance and location based services.

Index Terms- Vehicular Network, security, game theory

INTRODUCTION

Transport department of each and every city around the India & world has been entrusted with the responsibility of providing a smooth public transportation system on roads, controlling pollution under permissible limits, reducing the jam and control the speed of the Vehicles. These departments function by devising policies, implementing them and then monitor and regulate the functioning of the transport in the city. But they are fails to provide the information for secure deriving, reduce the jam & comfort journey[1].

Due to their important role in traffic safety as well as in ensuring a pleasant driving experience, Intelligent Transportation Systems (ITS) are receiving ever more research attention these days from the academic, R&D and industry community. ITS can provide a range of user services such as vehicle safety information and trip planning with the use of communication devices. Moreover, effective implementation of ITS could also improve traffic management systems to relieve traffic jams, provide essential information to drivers or just for infotainment purposes. However, the effective implementation of ITS would rely heavily on Inter Vehicle Communication (lVC). This means that

consensus cooperation is required in order to distribute information from one vehicle to another in wireless communication networks. For IVC, the use of ad-hoc networks was deemed the most suitable method . This is because vehicles moving on the road equipped with wireless communication devices are themselves the mobile nodes, which then inter-link to form a vehicular adhoc network (VANET). Besides having IVC, a VANET could also consist of Roadside to Vehicle Communication (RVC) [3] whereby vehicles could communicate with fixed infrastructures on the roadsides to provide an even wider range of possible applications.

Researchers in India & abroad are working on a Vehicular Adhoc Network (VANET), which when fully operational would allow communication among vehicles and also between vehicles and roadside equipment. Researchers say that VANET technology could alleviate road congestion and prevent accidents.

Researchers at the Indian Institute of Technology (IIT) in Kharagpur plan to equip vehicles with sensors, which will be controlled by a telematics box inside the car. Researchers say that the box would then communicate with the driver, and pass on vital traffic information.

The aim of VANET is to provide a safe environment for drivers. Safety applications will monitor the surface of the road and approaching vehicles and feed information that could put the vehicle at risk back to the driver. The technology would allow drivers to warn other vehicles of potential dangers, while an emergency braking system will be installed to prevent accidents.

Post-crash notification technology would allow a vehicle involved in an accident to broadcast messages to vehicle in the area, as well as to the emergency services. Road hazard control notification enables cars to notify other vehicles in the area of road slides, or unpredictable terrain ahead, while the cooperative collision warning alerts drivers that they are about to collide.

VANET will also provide drivers with the latest traffic information. The congested road notification feature detects and notifies drivers of road congestion ahead, allowing motorists to alter their course. The TOLL feature enables drivers to pass through a tolling area without stopping, while the parking availability setting helps motorists find parking spaces.

VEHICLE'S REAL PROBLEMS IN PROGRESSIVE COUNTRY

Local transport

Buses on the Delhi BRTS. Delhi was one of the first cities in India to introduce CNG powered buses. Many cities like Ahmedabad has introduced BRTS. The iconic double decker BEST bus in Mumbai covered in the livery of a Bollywood film

Huge node on the road

Public transport is the predominant mode of motorised local travel in cities.[9] This is predominantly by road, since commuter rail services are available only in the six metropolitan cities of Mumbai, Delhi, Chennai, Bangalore, Hyderabad and

Kolkata, while dedicated city bus services are known to operate in at least 25 cities with a population of over one million.[5]

Intermediate public transport modes like tempos and cycle rickshaws assume importance in medium size cities.[9] However, the share of buses is negligible in most Indian cities as compared to personalized vehicles, and two-wheelers and cars account for more than 80 percent of the vehicle population in most large cities.[5]

Traffic in Indian cities generally moves slowly, where traffic jams and accidents are very common.[6] India has very poor records on road safely—around 90,000 people die from road accidents every year.[7] At least 13 people die every hour in road accidents in the country, also in the year 2007 road accidents claimed more than 130,000 lives, overtaking China.[8]

A Reader's Digest study of traffic congestion in Asian cities ranked several Indian cities within the Top Ten for worst traffic.[6]

We face many problems for successful & secure data communication in Wireless network like Vehicular Network.

Due to the following reasons:

1. **Highly dynamic topology**:

In Vehicles are moving at high speeds, the topology always changing.

2. **Frequently disconnected network**:
   The highly dynamic topology results in a frequently disconnected network since the link between two Nodes can quickly disappear while the two nodes are transmitting formation.

3. **Patterned Mobility :**
   Node follow a certain mobility pattern that is a function of the underlying roads, the speed limit , the traffic lights , traffic condition , and drivers driving behaviors. There are many Patterned Mobility problems due to mobility in city and Communication between ships in the Sea Area.

4. **Limitless" Battery Power and Storage**:
   Power and storage limitation are big problem in Wireless Network due to light weight easy for mobility & their storage capacity also less.

5. **Potentially large-scale:**
   In a City center or highways at the entrance of big cities the network could be quite large scale.

6. **Variable Network density**:
   The network's density depends on Vehicles density which is highly variable.

7. **Security**:
   Security is the biggest problem in VANET because its nature any restricted Vehicle can come or out from the network area. So they can access the Private Information of any Vehicle & misuse the information and also send or Broadcast fraud message.

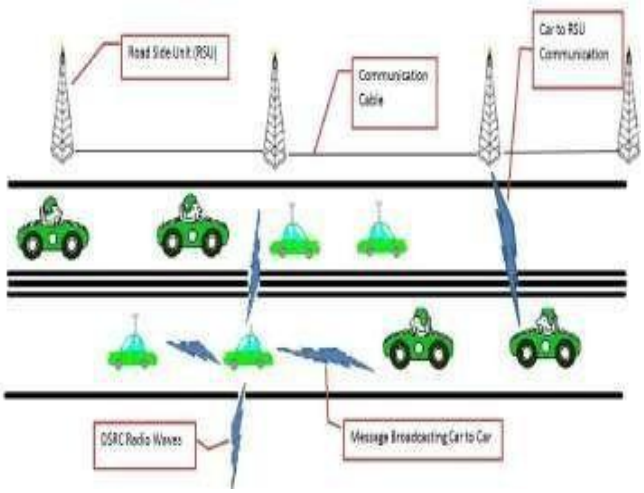
There are many algorithm & methodology can use for solve the problem of VANET like Localized algorithms, Games Theory etc.

SURVEY ON SECURITY PROBLEMS IN VANET:

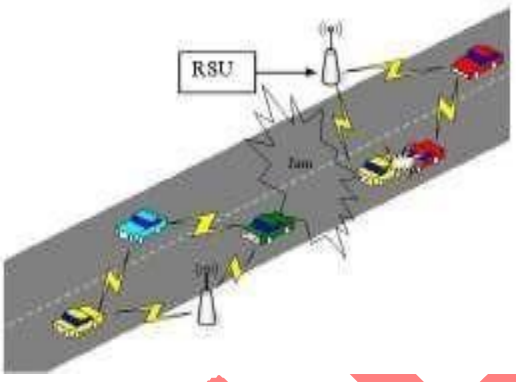
Basic Risk- Unfortunately, there some security problems in VANET. There are some problematic issues such as confidentiality and data integrity. Moreover, there are some issues unpredictable temporary situations e.g. traffic jam because of an accident. In VANET information transmission is propagated in open access environments. It is very necessary that transmitted information cannot be harmful by users who have malicious goals.
Above problems are difficult to solve in VANET due to Network size, Speed of the Vehicles, their geographic positions and random connectivity.

As Mentioned in [1], there is classification of three major groups of behavior of attackers:

1. Insider Versus outsider
2. Malicious versus rational
3. Active versus passive



VANET structure



There are three important parameters in VANET proposed security schemes.

- **Security in VANET Protocols:**

  One of the most popular Adhoc protocols which are used in VANET is AODV. Unfortunately , AODV do not define special security mechanisms. Several researchers tried to improve security weakness in AODV, such as SAODV which try to improve AODV which can help improving security too such as that introduced PRAODV and PRAODVM[4].

- **Privacy:**

  All vehicles' drivers want their personal information, trip path, speed or more important such asthe driver's identity to be kept away from unauthorized observers .

- **Threats:**

  Following threats are against the availability of Vehicles to Vehicles , Vehicles to Road side Units. Several attackers are available in this group:

- Black Hole Attack
- Malware
- Denial of services
- Broadcast tempering
- Spamming
- Greedy drivers

SURVEY ON HIGH MOBILITY PROBLEMS & SOLUTION THROUGH VANET

I have done survey on many highway of India. With the guidance of my guide - Due to high speed node, communication between the vehicles is challenging for VANET. On highway there are huge vehicles passing where approximately 50% vehicles are moving on opposite direction. Each vehicle is assigned with varying speed with various maximum speeds ranging from 10 km/h to 120 km/h. In these conditions it is challenging to secure communication for the VANET.

I. PROPOSED SCHEME

A. Cooperative security scheme:

VANET can be globally represented important features for forwarding process by the following steps:

1) The root node corresponds to the source node that first broadcast the message to nearest node.
2) Each intermediate node forwards the message to neighbor node.
3) Each intermediate node ignores those packets that it already received.
4) Each link in the tree corresponds to an encounter in the vehicular network , which is associated with atimestamp and the spatial coordinates indicating the position of the vehicles.[2]

B. Games theory for VANET:

Game theory is a branch of mathematics aimed at the modeling and understanding of resource conflict problems. Essentially, the theory splits into two branches: noncooperative and cooperative game theory. The distinction between the two is whether or not the players in the game can make joint decisions regarding the choice of strategy. Noncooperative game theory is closely connected to minimax optimization and typically results in the study of various equilibria, most notably the Nash equilibrium. Cooperative game theory examines how strictly rational (selfish) actors can benefit from voluntary cooperation by reaching bargaining agreements. Another distinction is between static and dynamic game theory. In general, the theory provides a structured approach to many important problems arising in signal processing and communications, notably resource allocation and robust

transceiver optimization. Recent applications also occur in other emerging fields, such as cognitive radio, spectrum sharing, and in multihop-sensor and adhoc networks.

When compared to a pure optimization approach, game theory allows additional modeling of attacker behavior and interaction between defense and attackers. Such a mathematical abstraction (framework) is useful for generalization of problems, combining the existing adhoc schemes under a single umbrella and future within the research community in game theoretic approaches to the problem of security in general and wireless network security specifically.

The objective of the game is to locate central points on the road topology as potential attack targets (e.g. jamming) and deploy countermeasures in the most effective manner.

Security game formulations:

1. Attack and Defense Model
2. VANET security Games model
3. Zero sum game model
4. Fuzzy game
5. Fictitious play[3]

3. Survey on Mobility support Optimization Problem:

Mobility the biggest problems in VANET because node (vehicle) move very fast, so it is the big problem in proper communication, communicating node may be move in similar direction or opposite direction.

There are some approaches for find mobility support optimization problem [9]:

- The informed mobility optimization problem
  - -Find the optimal node positions
  - -Minimize total energy consumption
  - -Maximize the energy utilization
- Use global information to make mobility decisions.
- Localized algorithm

CONCLUSION:

In this paper, we have discussed real problems of Indian Vehicular system. I have done survey on Vehicle's real problems in progressive country like Indian metro cities, where I have find out the real traveling problems, we have define some techniques for mobility & security problems of VANET. Finally we have impress with games theory because we can make the plan & develop the strategy for find the security and mobility problems.

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