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A Survey on Principal of VANET in Internet of Things

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Abstract

VANET is an ideal technology in which the world looks different to the twenty-first century. VANET uses a special mobile node to create a network. It converts a node into a wireless node by allowing it to connect to each other from 150 to 350 meters. Another node may be involved in creating the network because the node is not within signal range. Vehicles can be placed in a group for communication. VANET has a control plan to manage clustering media access and create VANET as a global topology. Most algorithms and protocols are taken from mobile ad-hoc networks (MANETs) that have some challenges and issues. This paper is a literary survey to present the challenges and issues of clustering in VANET with clustering based routing protocols to expand the scope of research on VANET.

Keywords: VANET, clustering, clustering issues, clustering based routing protocols, Issues and challenges of clustering in VANET.

1. Introduction

Network Temporary Network (VANET) uses different vehiclesas portableconnectionsin the MANET to create a set of connections. VANET is a subdivision of MANET (Mobile Temporary Network) [1]. Each participant converts the vehiclesinto a wireless router or point with the help of VANET algorithms and protocols, allowing cars to connect 100 to 300 meters from each other and gradually to the car nodes. Create a network with. When cars are moving from the signal range and outside the network, other vehiclescan connect, joining channels to each other so that the mobile internet is produced by a different topology. The Vehicle Ad Hoc Network (VANETS) has attracted a lot of attention over the years to improve road safety and security.

Clustering in vehicle ad hoc networks is a scheme used to transfer data from one node to another in a cluster. The cluster approach consists of three parts: the cluster head, the cluster gateway, and the cluster member. Clusterhead makes transmission arrangements and data advancing. A cluster member is usually called a common cluster node, which participates in a single cluster without any interconnections between adjacent clusters. Various algorithms and protocols have been defined for the performance of cluster nodes, focusing on the minimum number of clusters [3].

Most VANET clustering algorithms are derived from the MANET (Mobile Temporary Network) and these algorithms only consider the location and direction of the nodes in the geographical area. The existence of nodes does not mean that they exhibit the same motion pattern that we believe to be absolute location elements in VANET clustering; Topology and structure of direction, not only considering the position and direction of motion and position [4].

2. Literature survey

VANET consists of vehicle or mo-bile connections that interconnect with one another via wired / wireless links. Vehicles have the ability to communicate in a peer-to-peer (P2P) manner along with other vehicles along the road. The hardware must have vehicles and roadside infrastructure to provide safety and security for the occupants of the vehicle. Wireless communication technology is needed to entertain passengers. Therefore, there has been a growing interest in research on VANET in recent years [5].

VANETs have introduced effective information technology in consumer communities as their extensive series of vehicles include Intelligent Transport Systems (ITS), entertainment and security applications during vehicle movement. Vehicles in VANETs act as intelligent machines, providing resources to end users. But For the extreme flexibility and vehicle distribution on the road, sending messages to their final destination on VANETs is a very challenging task. For this problem, clustering has been proposed [6].

VANET contains commercial purposes, where VANET plays a main part, which can be broadly classified into two classes.

A) Security related applications for WANAT:

These apps are accustomed to upturn security on the roads. They are divided into different categories:

i.Vehicle collision prevention: According to studies, warning drivers before a collision can prevent 70% of accidents. If the driver receives a timely warning message, a collision can be avoided to keep the driver's life safe [7].

ii. Co-operative driving system: Drivers can get information on traffic related issues such as curve speed warning, lane change warning etc. These codes help the driver to drive safely [8].

iii. Traffic Optimization Scheme: Traffic can be optimized using vehicles to send information about jams, accidents, road construction, etc. so that they can select their individual way and save period and resources [9].

B) User based applications for VANET:

These apps provide user information. In addition to VANET security it provides the following services to the user:

To me. Examine application systems: These applications can be used to offer facilities such as distributing melody, cinemas, messages, etc. between vehicles on the node network [11].

ii. Internet Connectivity Plan: VANET provides long-term connectivity to the Internet for long-term users through which people connect with each other to share information and gain valuable knowledge.

iii. Plan for furtherfacilities: VANET can be used in other user-based applications for instance payment facility to find long-term tax, find out the fuel station, restaurant, bill, etc.

Features of VANET:

The special features of VANET are: These are summarized as:

Points in VANETs normally run at extreme speeds. This makes it difficult to estimate node attacks. [6].

VANET contains commercial applications, where VANET plays a main part, which can be classified into two comprehensive groups.

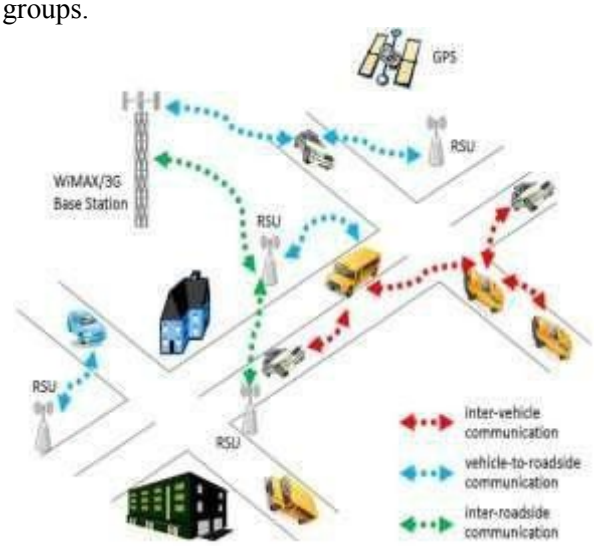

Figure 1 VANET Communication:

The above figure shows three types of communication in VANET. Inter vehicle communication in which mobility nodes communicate with each other.

3. Clustering MechanismFor Routing Protocols

Researchers have revealed immense attentionin clustering routing protocols and mesh network cluster nodes that are widely known to the research community.

The clustering routing protocol has several advantages, such as:

i. Through the routing stage, the clustering mechanism minimizes flood overhead without losing network signal performance by minimizing re-entry of packets.

ii. During the data-transmission phase, data aggregation in the cluster can reduce the number of messages flowing through the network [13].

iii. During the routing phase, the clustering process facilitates network changes due to the mobility of the node and local changes that are not revised by the entire network. Clustering for mesh networks includes energy efficient communication channel capability, management capability and routing or multicasting scalability. Researchers have done an excellent job for cluster-based routing protocols and have presented many of the most effective and efficient clustering approaches [14].

A typical cluster structure is shown in Fig. 2.

Where CH (cluster head) is a controller of a whole data aggregated inthe network for broadcasting and C1, C2, C3 are three clusters with gateway for another cluster in the same network. Clusters are

formed with the help of different algorithms and protocolswhich Vehicle to roadside communication alters in between the vehicle and Roadside Unit (RSU).Inter roadside communication alters in between the means of signal transmission which includes WIMAX, GPS and base stations defines the CHs, cluster member and cluster gateway [15].

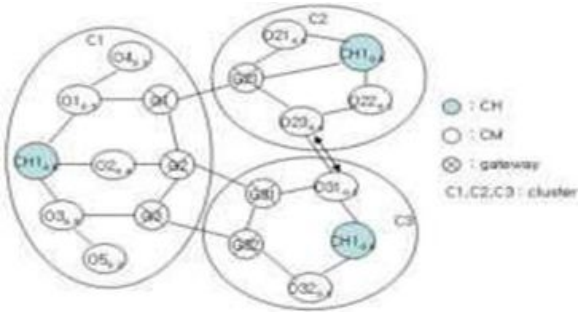

Figure 2 Clustering Mechanism:

Clustering can be divided into two stages, cluster management and cluster formation. Cluster structure means understanding how to create a cluster structure in the beginning. Cluster management is the process of updating the cluster structure according to changes in network topology for node mobility or connection. During the creation of the cluster, an important operation is how to select the node as the cluster head. During the maintenance phase, it is important to know how to adjust the cluster structure nodes for the network's response as the changing environment affects the performance of the clustering node scheme [16].

As we know, clustering works very effectively and efficiently to diminish power utilization, scalability and high mobility of network nodes. However, clustering routing protocols also have drawbacks, as building and maintaining a cluster can be a daunting task and additional communication costs can add overhead [17].

In the clustering process, the network must initially select certain nodes as CHS (cluster head) according to some algorithm, and then inform the adjacent nodes by circulating some information to allow CHS members to be included. Is required. Therefore, the installed node adds additional control overhead for node power-consumption and memory-usage, which places a heavy burden on the nodes. Further CHs are re-selected to balance the workload and the cluster structure is reconstructed for moving or unused CHs [18].

During the shutdown process, CHS periodically transmits messages to its member to keep abreast of any changes in the network. Additional messages consume resources and release network output. As the geographical density gradually increases it brings additional traffic collisions and congestion. Therefore, when designing or analyzing clustering routing protocols, we should consider the additional costs for conversion, re-clustering and self-examination of control packets during the cluster formation and maintenance phase.

4. Issues/challenges for vanet and clustering

Here we discuss the basic encounters and matters of VANET and clustering. Although the features of the VANET are separated from the specific network, some features have some challenges for the VANET. These challenges can be classified into the subsequent classes:

A) Technical challenges:

Technical challenges are related to technical limitations that must be addressed prior to VANET setup. Some of the challenges are listed below:

i. Network Regulatory: As a result of great mobility, network channel status and topology modification speedily. For this reason, we cannot use tree-like structures because these structures cannot be set and the topology varies.

ii. Conflict and congestion control: Unbound networks are also challenging. The traffic burden is less in rural areas. For this reason, network segmentation occurs rapidly when the traffic load is very high during congestion, resulting in network congestion and network nodes.

iii. Environmental impact: VANETs use electromagnetic waves for communication. These waves are affected by environmental changes. Therefore environmental impact should be considered as an issue for VANET installation.

1) MAC Design: MAC design is a major issue since VANET uses shared media to communicate. Several policies such as SDMA, TDMA and CSMA are given.

2) Safety: The security of these messages should be satisfied as VANET provides important road safety and security applications for life but these messages are transmitted, which is a major issue.

5. Conclusion

The study has been carried out for to find the Principle of VANET to identify the cause through which further study can be approved for better VANET technologies. Study shows the major introduction part and issues parts and the field in which the VANET can be improved for better tomorrow.

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