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Clustering Based Data Dissemination Protocol for Vehicular Ad Hoc

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ABSTRACT
The wirelessly connected networks of vehicular nodes are Vehicular Ad Hoc Networks (VANET). The discrete optimization is assumed as the optimal path issue that allows QoS-aware data dissemination and reliable in VANETs. According to the limited bandwidth of the wireless interface, dynamic topology, frequently disconnected networks with the optimal path is of great importance in vehicular communication. By calculating an enhanced fitness function, it works intelligently to select the optimal route and most stable route among known routes. By Euclidean distance to calculate the proposed method that comprises the link stability in the polar coordinate system and the obstacles as objective of probability of occurrence.
Keywords: *CAEHONET protocol, EHO, Improved whale optimization algorithm, energy, clustering, ACO and NS2 platform*

I. INTRODUCTION

Intelligent Transportation Systems (ITSs) present a technology that can be applied to vehicles as well as infrastructure to transfer information between them to improve minimizing traffic congestion, safety, and productivity. The services connected to traffic and transport management is provided by the advanced applications of ITSs. Based on the transport networks uses, make a safer, more coordinated and allow the users to be better informed. One of the key component of ITSs is Vehicular Ad hoc Networks (VANETs) [1-16]. In the research community, the great interest attracts recently is vehicular networks and number of useful applications are proposed [17]. The vehicle collision avoidance is this range from safety applications. For media content sharing, trip planning and information retrieval with the vehicle collision avoidance, to other valuable applications. The monitor roads and other environmental conditions are established by a mobile sensor network in vehicles. To transfer data from remote sensor nets to Internet servers with the help of vehicular networks can act as “delivery networks” [18].

The main challenge in VANETs is to maintain the communication between vehicles to send data from a source to a node destination. This data transmission is performed as a wireless and multi-hop mode. Hence, the propose of an efficient data transmission in VANETs protocol is one of the most important issues [19-24] on which many studies have been conducted and several methods have been proposed to solve it. Despite the different approaches proposed so far, a comprehensive approach to address this issue has not been provided yet [25].

The road-safety as well as comfort applications such as weather information, Internet access and so on are provided by emerging field of several useful applications. Many studies related to these communication protocols verifies the robust data packets delivering and applications rely on a reliable [26-29]. The Vehicle-to-Road-Side-Unit (V2R) and Vehicle-to-Vehicle (V2V) are the two types of communication on a simply vehicular network then it provided better data packets transmission. The road users used robustly and rapidly data provides VANET information, also the support the requirements convinces routing protocols [30-36].

Due to several link failures on the routing paths already established, the unpredictable direction changes of vehicles and high mobility are the unique characteristics of VANETs. Because of high-rise buildings, sometimes direct communications between some vehicles are impossible in addition smaller distance than the transmission range. The wireless links instability and frequent disconnections problem addressed to major proposed routing protocols dedicated. The performance of routing is affected by most existing protocols never completely think the direct effect of the current obstacles on the connectivity [37-49]. For transmitting the data packets, the choice of the best connected paths combines the traffic density and accuracy of the connectivity [50].

II. A RECENT ANALYSIS

A lot of works is presented to analyze the optimal data dissemination protocol for VANETs some of them are reviewed here,

The automate the clustering of nodes and nominations of cluster heads based Evolutionary Game Theoretic (EGT) framework was proposed by [51] that achieve cluster stability in VANETs. The Lyapunov function is used to test the stability

and the equilibrium point was established systematically. By using static and mobile scenarios to different cost functions by their proposed evolutionary game performance is empirically investigated. For different populations and speeds, the robustness of their proposed EGT approach and the simulation results demonstrate the effectiveness.

For a given m, polynomial computational complexity is ODDA and deployment for the number of dropboxes [52]. The benchmark methods were used to analyze the performance evaluation and the simulation results demonstrates the superior performance than existing algorithms.

For trust computation among the different devices, the varying transmission characteristic of vehicles defines according [53-55] to a different trust metric then the global and local levels are evaluated. For creating secure clusters, the key parameter with current security level of vehicles is established by the trust metric. This method designs the secure clustering for trust establishment. Based on various network scenarios, the different evaluation metrics is to evaluate the performance of their proposed scheme.

Most of the recent research works are mentioned about the data dissemination of VANETs. Because of the dynamic characteristics by the efficiency of network transmission is low. The very challenging problem can prove the efficient routes discovery and maintenance for data dissemination in VANETs. The Content Centric Networks (CCN) into VANETs forming information-centric VANETs was proposed by many studies to improve transmission performance. For assisting the data dissemination, the drop boxes are very useful in vehicular networks. The between vehicles and reduce the data delivery delay that increase the contact probabilities between vehicles [57-60]. For data dissemination, the efficient and stable routes provided by control protocols are clustering. The frequent cluster reformation is created by rapid changes in network topology in VANETs that provides stability routes. In VANETs, the QoS-aware data dissemination and reliable are enabled by considered as a type of discrete optimization. According to dynamic topology, disconnected network and limited bandwidth of wireless interface with the optimal path is of great importance in vehicular communication, also the data transfer in VANETs is discussed by many studies.

III. CLUSTERING PROCESS

The sequential vehicles into clusters set groups the topology. The designated cluster head (CH) links the members of each cluster at the intra-cluster level. The multi-hop link is used to connect the cluster heads at the inter-cluster level. The access to a time bounded with each cluster member providing the key objective of this protocol, which to send its message on contention-free channel. By using the multi-hop inter-cluster communication protocol to adjacent cluster heads exchange their status of cluster. Finally, all their cluster members' aggregates the information by cluster heads broadcast using the intra-cluster dissemination protocol. The same vehicle proximity map of its surroundings is obtained by broadcast transmission by each cluster member successfully receiving this as the map is broadcasted from a single source. By use contention-free MAC under the high data load of beacon transmissions in order to attain reliability. The synchronization of both intra-cluster and inter-cluster channel are combined by contention-free MAC. By applying extensive inter-cluster bandwidth reuse, the high bandwidth efficiency is provided by intra-cluster aggregation protocol. In all clusters that takes place simultaneously based on the aggregation process. For adjacent cluster heads' communication and more reliable map dissemination in the aggregation phase makes the channel in an efficient bandwidth reuse. For more reliable map dissemination in the aggregation phase makes the channel available by this efficient bandwidth reuse and cluster heads' communication adjacent. By silencing not only the transmitter's cluster, we utilizes cluster colouring to attain highly reliable transmission but also members of the two adjacent clusters.

CH Selection

The initialization of CH selection process is the next step. Each node's Clusterhead Level (CHL) is evaluated and broadcasted. Based on CH selection, the highest CHL weight with node and fuzzy logic are the important method. The linking with other CH in different clusters and various roles routing are performed by CH. The other cluster member to join in the cluster is the investigation of CH. For any node within that cluster radius to join, the CH and broadcast and invite it automatically becomes the CH if there in only one node.

Affiliation and Invite

The broadcast of CH invite message for all the nodes within the vicinity to join and participates in the cluster. The members on joining rest contain turn out to be members of clusters.

Maintenance

Based on continuous link to its cluster CH to ensure by all members evaluates their link which is carried out by periodically to confirm its status in terms of cluster affiliation. The reclustering

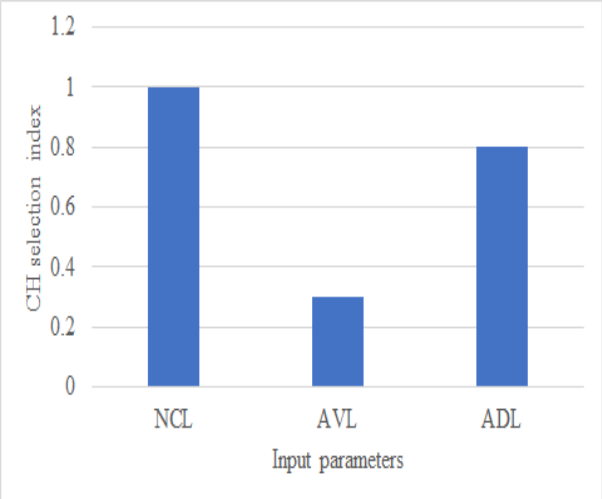
procedure is initiated which may take us back to step 2 above while the CMs fail to receive communication from CH.

CH Selection Process

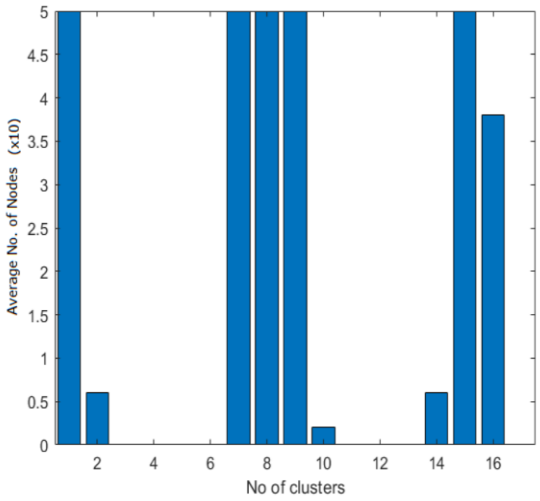
When considering the criterion of a CH selection with top priority is the Cluster stability. To consider the CH selection depends upon the fuzzy logic method by the parameters like connectivity levels, lane weighting, direction and speed are utilized, which are explained as follows:

IV. RESULTS

The performance metrics such as average cluster lifetime, CM duration, CH duration and cluster size and others are achieved by VANET structure by proposed system was simulated on the platform of NS2. Each with a coverage radius of 1000 m, the two RSUs with 1500m length and width of 24 m (12 m each direction) by the road highway network used in this work is a two-way lane. By each simulation being simulated 1000 s real time and averaged, the permitted maximum vehicle speed of 50 km/h (13.89 m/s) and assuming the random nature of vehicular speeds are utilized. This allows the vehicle to know their positions on the road segment by all the vehicles in the network are equipped with OBU and global positioning system (GPS). Approximately 250 m radius used by communication range of a vehicle thereby using QPSK modulation frequency 5.9GHz. The communication with vehicle heading on different directions by an RSU used is not limited to one way vehicles. One of the important vehicle synchronization is RSU with the grouping of vehicles dependent on it movement of direction.



(a)



(b)

Fig.1: Analysis of (a) CH selection index and (b) number of nodes in a cluster

The comparison of the same vehicular scenario with and without lane weighting was carried out to compare the effect of lane weighting on CH stability. Figure 1 shows two scenarios such as cluster one while vehicle with ID no. 3 and vehicle with ID no. 1 is selected as the CH. For the simulation period, the node 4 was then elected as the new CH and node 3 CH without the use of lane weighting was shorter. The coordination operation of the cluster over taken another CH must be selected and the re-selection of CH is done when a CH leaves the cluster and another CH. The CH selection with the impact of various input parameters are shown in Figure 3. As much as possible number of directly connected vehicles important of a CH to have the highest NCL is a crucial parameter in selection.

V. CONCLUSION

The unused routes between a source and a destination node are created. The AODV protocol is modified according to their characteristics to provide optimal results. In this work, considering the deficiency of AEHO algorithm in local search mechanism, clustering and routing process is done. Due to which it is termed as intelligent algorithm, the proposed framework allows efficient communication with the help of creating the augmented number of clusters. With the utilization of proposed method, the Root Delay distribution, data delivery time, stability and efficiency is determined. In addition, the QoS parameters is also analyzed like, PDR, throughput and routing overhead by using proposed and existing methods. The data transmission capacity is also improved with the help of the proposed scheme.

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