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An Analysis on VANET and WSN Routing Algorithm- A Review

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Abstract: *Wireless Sensor network (WSN) and vehicular Ad Hoc Network (VANET) are the subcategories of MANET. Both WSN and VANET are most emerging and trending technology which recently attracted more researches. Though WSN and VANET are subcategories of VANET, they have different routing protocols due to their own challenges, this paper brings out the comparison of some of their common routing algorithm namely voting algorithm, hierarchal algorithm, DSDV and AODV.*

Keyword: *Voting algorithm, hierarchal algorithm, DSDV and AODV.*

I. INTRODUCTION

VANET is one of the significant application of MANET, it provides a wireless communication with Dedicated Short Range Communication (DSRC) in between vehicles and the routing protocol of VANET is categorized by routing protocol is categorized in 2010 by Linetal [7]. In VANET Vehicle to Vehicle (V2V) communication or Vehicle to Road Side Unit (RSU) or Vehicle to Infrastructure (V2I) communication take place. WSN is a sensor network in which communication takes place through wireless medium. The sensors are distributed in Ad-hoc manner. The sensors work with each other to sense some physical phenomenon and then gathered information which is processed to get results. This paper gives a comparative analyze on voting, hierarchical, DSDV and AODV algorithms.

II. MATERIALS AND METHODS

In this section, various routing algorithms present in both VANET and WSN are discussed.

A. Voting Algorithm in VANET

Here we are applying voting algorithm to the RSSI layer so its called RSSI –Voting Algorithm (RVA) it is like DECA on asymmetric link scenarios this algorithm is designed for the performance improvement of reliable broadcasting protocol. Here every node voted for a highest RSSI [1] level node from its neighbor table. A sender chooses a node which has majority votes to broadcast its message. The advantage is that they will improve protocol performance and asymmetric scenario.

B. Majority Voting Algorithm In WSN

It is used find faults in the self-diagnosis phase [2], based on majority voting scheme to find weather a sensor node is a faulty or fault prone. They exchange and receive their neighbor status i.e.) 0 or 1.it compares the readings of neighbor's node are similar or not. If the readings are similar it is a good node i.e.) Is 1 or else it is 0 i.e.) bad node. The limitations are it consumes low energy but when fault rate is high if fault rate is high there will be low accuracy. The advantage are the sensor node predicts its own status by analyzing the status received from its neighboring nodes .so it will be fault free.

III. HIERARCHICAL ROUTING ALGORITHM

A. Hierarchical Routing Algorithm In VANET

The choice of proactive [4] and of reactive routing depends on the hierarchic level where a node resides. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding on the lower levels. The choice for one or the other method requires proper attribution for respective levels. The Advantage are it depends on depth of nesting and addressing scheme and reaction to traffic demand on mesh parameter.

B. Hierarchal Routing Algorithm In WSN

In this clusters are created and head node is assigned to each node which acts a leader of their group having responsibilities like collection, aggregation. The aggregated data from their cluster are transmitted to the BS. The data aggregation in the head nodes greatly reduces energy consumption in the network by total message send to BS [3]. The advantages are low power consumption,

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reduce network traffic, and increase network life time.

IV. DESTINATION SEQUENCED DISTANCE VECTOR ROUTING (DSDV) ALGORITHM

A. DSDV Routing Algorithm In VANET

It is an earliest ad hoc routing protocol and implements [4] the distance vector strategy and they mainly uses a shortest path algorithm to implement only one route to destination which stored in the routing table. To maintain routes reliability, each node must periodically broadcast its routing table to its neighbors. DSDV protocol guarantees to produce the loop free routes, excludes extra traffic caused by frequent updates, as well as reduces overhead control message, it also keeps only the optimal path to every node instead of keeping multi paths which will help to reduce the size of routing table. The advantages of DSDV are it is quite suitable for creating ad-hoc networks with small number of nodes, Solve the Routing Loop problem, Count to infinity problem is reduced, DSDV maintains only the best path instead of maintaining multiple paths to every destination. The limitations of DSDV are DSDV requires a regular update of its routing tables, which uses up battery power and a small amount of bandwidth even when the network is idle whenever the topology of the network changes, a new sequence number is necessary DSDV is not suitable for highly dynamic networks.

B. DSDV Routing Algorithm In WSN

The base station maintains a routing table that contains All possible destinations and number of nodes (or hops) need to reach the destination, The sequence number (SN: sequence number) which mainly corresponds to a destination node. The sequence number, used in distinguish between old and new roads, which prevents the formation of routing loops. The update depends on two parameters: time which is known as the transmission period and events. usually it update the packet which consist of The new sequence number which incremented the sending nodes and for each new road the destination address and the number of nodes separating the destination nodes, The sequence number (which holds data received from the destination) is stamped by the destination. The advantages are DSDV eliminates the two problems of "routing loop", and that of the "counting to infinity"[8]. The limitations in this protocol are a mobile unit must wait until it receives the next update initiated by the destination in order to update the input associated with this destination in the distance table, which makes the DSDV to act slow. The DSDV uses periodic updates and event-based, causing excessive control in the communication.

V. AD-HOC ON-DEMAND DISTANCE VECTOR (AODV) ALGORITHM

A. AODV Routing Algorithm in WSN

It reduce broadcast number by creating nodes when there is a need for it. It uses the principle of sequence number in order to maintain the consistency of routing information. When there is a case of node mobility, frequently route changes, so that roads maintained by nodes become disabled. The numbers sequence which allows using most new fresh roads, it uses route request in order to create a path for destination and maintains route in a distributed manner, by keeping a route table at every transit node belonging to sought path. A node broadcasts a route request if it would need to know a route to a destination and that this route is not available. This happen when the destination is not known before or when the existing road to the destination has expired its lifetime and it has become defective. The RREQ (field sequence number of destination) [6] packet contains the last known number sequence associated with the destination node. This value entered are copied from the routing table. If the sequence number is not known, the zero will be assumed. The sequence number source of RREQ packet contains the value of the number sequence of the source node. The advantages are routes maintained is distributed manner, the limitations are protocol does not present in routing loop and it designed to avoid the problem "counting to infinity" when network topology changes it helps in fast convergence,

B. AODV routing algorithm in VANET

It is designed for Ad-hoc networks that offers a low network overhead by reducing flooding of messages and reduce the memory size by minimizing routing table size by which entries for recent active routes, also keeps next hop route instead of whole route. It provides dynamically updates to route condition adapting and eliminates looping in the routes, by using sequence number in destination. The advantages are flexible to highly dynamic network topology and large-scale network. The main limitations are [7] it causes large delays in a route discovery, also route failure may require a new route discovery which produces additional delays that decrease the data transmission rate and increase the network overhead.

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VI. CONCLUSION

This paper presents a detailed knowledge on the difference/comparison on various routing algorithm-voting, hierarchal, AODV and DSDV in VANET and WSN. It is very useful in upcoming researches on both VANET and WSN regarding its routing algorithm. The future works can be expanded for other existing routing protocols.

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