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Recent Review on Trending Routing Protocols for Data Transmission

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Abstract: ***the route creation is done by inter-connecting the most adjacent nodes. Routing is the main issue in wireless network. The whole data delivery depends upon this because if the selected route is not appropriate or efficient then data will not be delivered to the destination effectively or timely. Hence the route selection must be efficient like it should be created by following the satisfying level of performance is not reachable. By shortest path so that consumes less time and energy for data transfer. There are various criteria which influence the process of routing. Routing is the most prominent field for research work. Lot of work has been already done in this field but still focusing the particular parameter for routing does not able to perform routing effectively. This study provides a review over the traditional approaches that were used for routing in previous work. This work can be act as a guide to the researchers who works in this field.***
Keywords: Wireless sensor Network, Routing, Reactive, Proactive, Hybrid.

I. INTRODUCTION

Routing is the best process of selecting the paths in a network. In the past, the routing was also used to forward the network traffic among networks. However, later this function is much better described simply as forwarding. Routing is performed for many kinds of networks, including circuit switching for the telephone network, electronic data networks such as the Internet and transportation networks. This work is primarily concerned with routing in electronic data networks using the packet switching technology. Routing protocol is common objective of WSNs, Sensor node of resources efficiently utilizing to extend the lifetime of the network. Different routing techniques can be adopted for different applications based on their requirements.

Routing methods can even be enhanced and also adapted for specific application. Generally, the routing protocols in WSNs depending on the network structure, can be classified into data-centric, hierarchical, location based routing. In data-centric, all the nodes are functionally equivalent and associate in routing, a query received from the base station to the event. In hierarchical approach, some nodes have added the responsibilities in order to reduce the load on other nodes in the network. In location based, the knowledge of positions of sensor nodes is exploited to route the query from the base station to the event.

Routing schemes differ in their delivery semantics

A. Unicast send a message to a single specific node.
B. Broadcast send a message to all nodes in the network.
C. Multicast sends a message to a group of nodes that have expressed interest in receiving the message.
D. Any cast send a message to anyone out of a group of nodes, typically the one nearest to the source.
E. Recast sends a message to a geographic area.

To distinguish mobile ad hoc network routing protocols, routing information is acquired and maintained by mobile nodes. On the basis of this criterion, mobile ad hoc network routing protocols can be divided into three major aspects as follows:

Proactive routing.
Reactive routing.
Hybrid routing.

Proactive routing protocol is also called as the "table driven" routing protocol. All nodes in proactive routing protocols need to maintain a consistent view of the network topology such as the Destination Sequence Distance Vector (DSDV), Wireless Routing Protocol (WRP) and the Fisheye State Routing (FSR). Reactive routing protocols for mobile ad hoc networks are also known as the "on-demand" routing protocols. In a mobile ad hoc network due to node mobility, active routes may be disconnected. Therefore, route maintenance is an important operation of reactive routing protocols. The Dynamic Source Routing (DSR) and Ad hoc on-demand Distance Vector routing (AODV) are the examples for reactive routing protocols for the mobile ad hoc networks. Normally, the hybrid routing protocols for mobile ad hoc networks exploit the hierarchical network architectures. Proper pro-active and

reactive routing approaches are exploited at different hierarchical levels, respectively.

II. ROUTING PROTOCOLS

Some of the routing protocols are listed as below

A. The Wireless Routing Protocol (WRP)

For mobile ad hoc networks Unicast routing protocol is proactive by wireless routing protocol (WRP). Improved Bellman-Ford Distance Vector routing algorithm is used by the WRP. To adapt the dynamic features of mobile ad hoc networks, some mechanisms are introduced in order to ensure the reliable exchange of update messages and also to reduce the route loops.

Using WRP, each of the mobile node maintains a distance table, routing table, a link-cost table and a Message Retransmission List (MRL). An entry in the routing table contains the distance to the destination node, the predecessor and the successor along with the paths to the destination, and also a tag to identify its state, i.e., is it a simple, a loop or an invalid path. Storing successor and predecessor in the routing table helps to detect the routing loops and avoid the counting-to-infinity problem, which was the main shortcoming of the original distance vector routing algorithm. In its link-cost table, a mobile node creates an entry for each neighbor. The entry contains on the cost of the link connecting to the neighbor, and number of timeouts since an error-free message was received from that neighbor.

B. The Destination Sequence Distance Vector (DSDV) Routing Protocol

The DSDV is a proactive unicast mobile ad hoc network routing protocol. Like WRP, DSDV is also based on the traditional Bellman-Ford algorithm. In mobile ad hoc, networks are quite different due to their mechanisms to improve the routing performance. In routing tables of DSDV, an entry stores the next hop towards a destination, a destination sequence number that is created by the destination and the cost metric for the routing path to the destination. Stale routes from fresh ones and avoid formation of route loops for distinguishing from Sequence numbers used in DSDV.

C. The Dynamic Source Routing (DSR) Protocol

The Dynamic Source Routing (DSR) is the reactive unicast routing protocol that utilize the source routing algorithm. In source routing algorithm, each data packet to reach its dissemination contains complete routing information. There are two major phases in DSR, the route discovery and the route maintenance phase. When packet is sent by a source node, it firstly consults to its route cache. If the required route is available, before sending it the source node includes the routing information inside the data packet. Otherwise, the source node starts a route discovery operation by broadcasting the route request packets. To limit the communication overhead of the route request packets and a node processes route request packets that both it hasn't seen before and address is not presented in the route record field. If the route request packet reaches the destination or an intermediate node has the routing information for the destination, a route reply packet is generated. While the route reply packet is generated by the destination, it contains addresses of the nodes that have been traversed by the route request packet. Otherwise, the route reply packet encompasses the addresses of nodes; the route request packet has navigated to the concatenated with the route in the intermediate node's route cache.

D. The Ad Hoc On-Demand Distance Vector Routing (AODV) Protocol

For the mobile ad hoc networks, the Ad Hoc On-demand Distance Vector Routing (AODV) protocol is a reactive unicast routing protocol. As a reactive routing protocol, AODV needs only to maintain the routing information. Routing information is maintained in routing tables at nodes in AODV. Besides, AODV adopts the destination sequence number technique used by DSDV in an on-demand way.

In AODV, when a source node wants to send packets to the destination but no route is available at that time, it starts a route discovery operation. The source broadcasts route request (RREQ) packets in the route discovery operation. A RREQ includes addresses of the source and also the destination and the broadcast ID which is used as its identifier, the last seen sequence number of the destination and the source node's sequence number. In order to reduce the flooding overhead, a node discards RREQs that it has seen before and the expanding ring search algorithm is used in the route discovery operation. RREQ starts with a small TTL (Time-To-Live) value. If the destination is not found, the TTL is increased in following RREQs.

III. RELATED WORK

Lakshmi Praba (2011), [1] in this author explains that Wireless Mesh Network (WMN) is a new wireless technology. Features of WMN are that it covers the large area, broadband access, self configuration, self healing and well organized. The Routing is the main field of interest for researchers. There are number of protocols available for the purpose of routing in WMN. Categories of these protocols are Proactive (table driven) and Reactive (On demand). By using various parameters packet delivery ratio, routing overhead and dropped packets as metrics the performance of DSDV is evaluated with respect to variable transmission rate and mesh client speed.

Amith Khandakar (2012), [2] in this author defines that Mobile Ad hoc network is a distributed network where nodes are mobile and decentralized and can communicate without central administration. The mobile nodes are connected via wireless channels and multiple hops are used to transmit the data. For the efficient and timely delivery of message routing protocols are used in case of ad hoc mobile networks. Various metrics are used to evaluate the performance of ad hoc mobile networks. DSR, AODV and DSDV is compared on the basis of performance metrics namely PDF, End to end delay and Normalized Routing load while varying the number of nodes, speed and Pause time. In this author also provides a step by step process on the basis of assumption that how to carry out such a comparative study, which could be used for future research.

Jieun Cho (2009), [3] describes a routing protocol to achieve efficient data transmission without any interruption and it uses location based virtual grid for this. Relative landmark is used to maintain the process of routing in case when there are holes in sensor network. After applying simulation result shows that the suggested method is much preferable as compare to earlier ones.

Abdul Waheed Khan (2015), [4] proposed a scheme namely virtual grid based data dissemination (VGDD). VGDD focus to optimize the trade-off between network lifetime and data delivery performance along with low cost of maintenance and hardware. VGDD follows a set of rules to distribute the update related to the mobile nodes efficiently by using shortest route. Furthermore, to cope with speed's variation of mobile sink, VGDD makes use of appropriate forwarder nodes for guaranteed data delivery. After simulation it is observed that the performance of the network is increased in manner of latency and data delivery as compare to earlier schemes.

Kumar.S (2010), [5] in this author analysis and simulate the AODV and OLSR routing protocols for both Wireless Ad-hoc Network and Wireless Mesh Network. In Ad-hoc network wireless mobile nodes temporarily forms a network without using any existing network structure. WMN has become popular among users due to its features like fast and easy to deploy, and instant communication. WMN is a self organized, self configured, self healing network in which nodes automatically establish a temporary network by using mesh connectivity. Routing in both networks is nontrivial due to highly dynamic nature of the nodes. Simulation shows that three metrics i.e. delay, network load and throughput of networks can be used to evaluate the performance.

Zhenqiang Ye (2003), [6] proposed a modified version of the popular AODV protocol that allows us to discover multiple node-disjoint paths from a source to a destination. They found that very few of such paths can be originated. Furthermore, as distances between sources and destinations increase, bottlenecks inevitably occur and thus, the possibility of finding multiple paths is considerably reduced. From above it can be concluded that it is necessary to place what we call reliable nodes (in terms of both being robust to failure and being secure) in the network for efficient operations.

Ning Du (2012), [7] describes and designs an optimized routing protocol for MANET which refers to a certain extensions to OSPF for MANET and OLSR routing protocol. The route selection technique in this scheme focuses to reduce the retransmission of packets on the same destination and destroy the broadcast message and also reduce the overhead of traffic in network. Simulation proves optimized OSPF protocol improves the performance when using in MANETs.

Marcello Caleffi (2007), [8] describes an augmented tree-based address space structure and a hierarchical multi-path routing protocol, referred to as Augmented Tree-based Routing (ATR), which use this structure to overcome the problem of scalability and make a robust network which is able to handle the node failure. Simulation results and performance comparisons with existing protocols prove that ATR is much effective as compare to others.

IV. CONCLUSION

The path selection process in the network is called as routing. A routing protocol states how routers communicate with each other, exchange information which enables them to select the routes between any two nodes in a computer network. Routing algorithms determine the specific choice of route. The criteria for choosing the best path using existing routing protocols involve various options like shortest path. This study provides an overview to the routing process along with the methods used for it.

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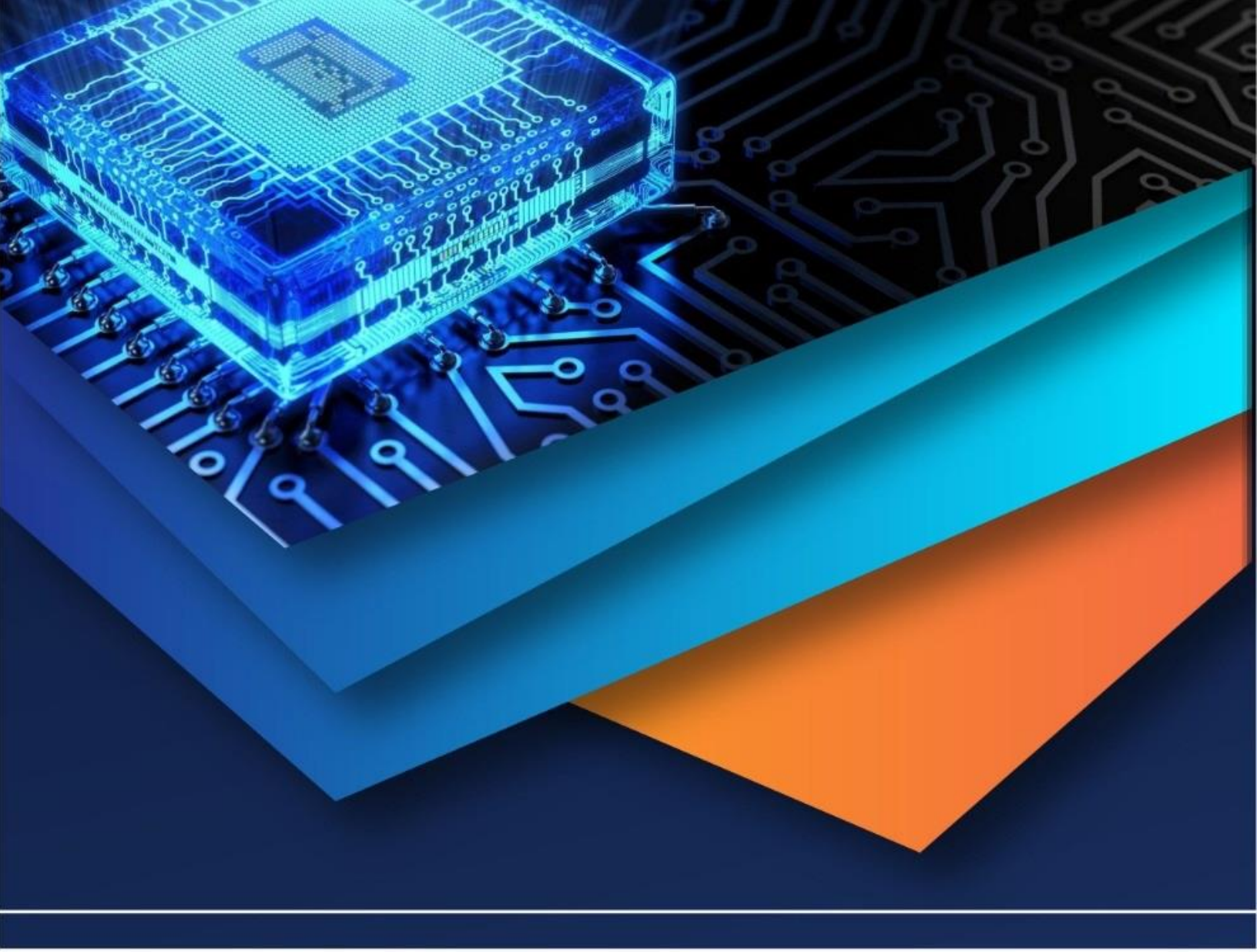

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