EXTENDED DYNAMIC SOURCE ROUTING PROTOCOL FOR AD HOC NETWORK

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Abstract:
MANET is a collection of self-configurable mobile nodes. Several routing protocols are proposed for ad hoc network among which DSR and AODV On demand routing protocols are mostly used. Existing Dynamic source routing protocol is not suitable for large network because packet size gets increased according to the number of nodes travelled by route discovery packet. In this paper, extended DSR routing protocol is proposed to eliminate the above limitation of existing DSR. Proposed protocol will be suitable for small and large both types of networks.

Keywords: MANET, Extended DSR, Intermediary Node

1. Introduction

Network of computers are playing an important role in different areas of the world. Network is divided into two types- wired and wireless network. Wireless network is further classified into two categories- infrastructure oriented and infrastructure less

In infrastructure oriented, base stations are fixed and mobile node can move while communicating.

In infrastructure less, network is formed without fixed base station. Ad hoc networks are self-configurable and autonomous systems consisting of mobile nodes which act like host as well as router which are able to support movability & organize themselves arbitrarily [1].

2. Existing protocols

Mobile nodes in ad hoc network need routing protocol to communicate with each other. Many routing protocols are proposed by researchers. These protocols are classified into three categories.

Table driven

In this protocol each node of the network maintains routing table in which information about their neighbors and hop-counts were mentioned. If any node moves out of the network the routing table gets updated. Routing table at each node helps to discover the shortest route from source to destination. Existing protocols in this category are: DSDV [2], WRP [3], GSR [4].

On-demand

In this protocol routes from source to destination are established on-demand. Route discovery & Route maintenance mechanisms are used to discover & maintain the path. Each node maintains a cache to store the current route for further use. If any error occurred during communication then a RouteError packet is broadcasted to all nodes. Existing On-demand routing protocols are DSR [5], AODV [6], CBRP [7], TORA [8].

Hybrid

It is a combination of reactive & proactive protocols both. Protocol comes under this category is ZRP [9].

Among them only some protocols are in use. All the protocols have some benefits and limitations.

Different types of comparisons have been done among these protocols to improve the performance by the researchers [10]. Some researchers also proposed modified routing protocols. Secure routing protocols are also proposed to provide secure communication [11].

Overview of Dynamic Source Routing Protocol

DSR is an On-demand (Reactive) routing protocol. It is source initiated i.e. whenever a node wants to communicate with another node it looks up into its cache to determine the route towards destination if it exists, and then it is used to send the packet. But if route towards destination is not found then route discovery process is initiated by broadcasting a route request packet to the neighbors. The route to the destination is checked at each intermediate node's cache, if it doesn't it appends its address to the route record of the packet & then the packet is forwarded to its neighbors. DSR is not suitable for large networks as the packet size gets increased according to number of nodes traveled by route discovery packet.

3. Proposed protocol

In this proposed work, extra features are added in DSR to provide efficient routing protocol. In this, route discovery packet defines an intermediary node after traversing a fixed number of nodes as shown in figure 1. Intermediary nodes have extra memory to store the information.

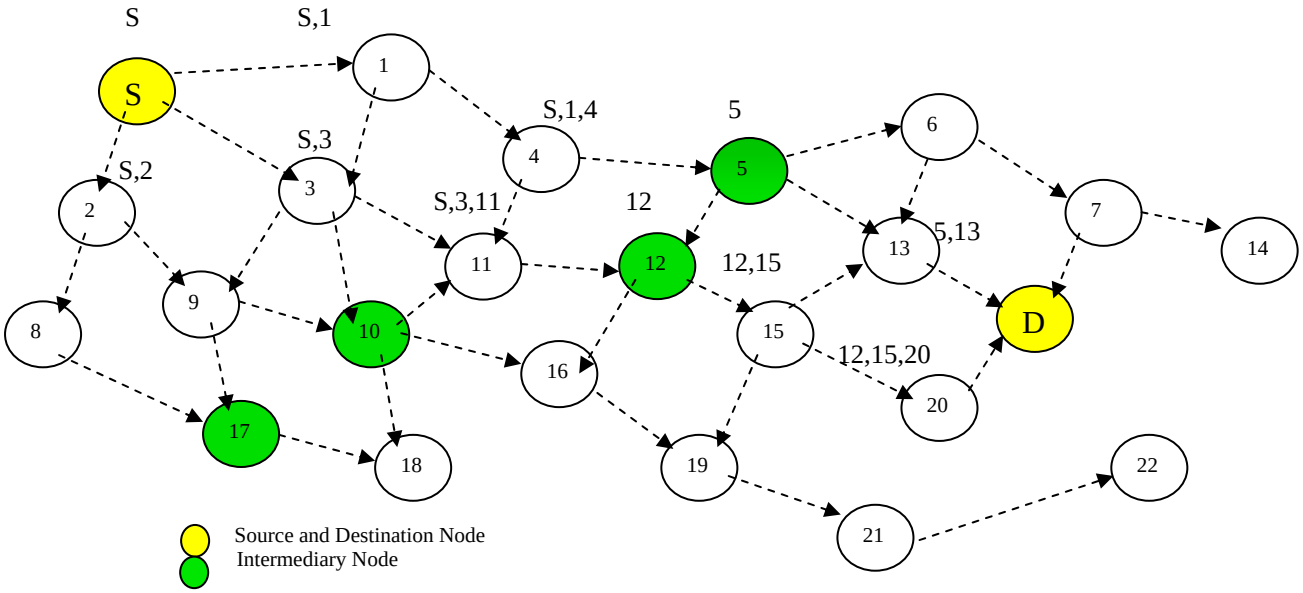

Figure 1

Route Discovery Process:

In the Route Discovery Process, Route discovery (RREQ) packets are broadcasted by the source node to its neighbors. Each node checks its cache for required path, if path is found, then it sends the Route Reply packet to the source. If path does not exist in the cache, it forwards the RREQ packet to its neighbors after adding its own identity to the packets. RREQ packet defines the intermediary node after traversing a fixed number of nodes. Intermediary node stores the identities of traversed nodes from source till that node. And forwards the RREQ packet, after replacing the identities of previous traversed nodes with its identity in the packet to its neighbors.
When the destination is reached a Route Reply (RREP) packet has been generated and sent by the destination to the intermediary node and then intermediary node will forward it to the source node.

Route maintenance

When link failure is found by any node, corresponding node send the route error RERR packet to source or intermediary node. If route error packet is received by source, it can send the packets through the other existing paths to destination in its cache or it can broadcast route discovery packet again. Intermediary node broadcast the route discovery packet for destination.

Source address of packet can be found by scanning the source field in the packet.
By introducing the intermediary the packet size has been reduced and the overhead in large networks has been reduced. Multiple paths are available from source to destination as shown in the figure 2. But shortest path is selected on the basis of hop count.

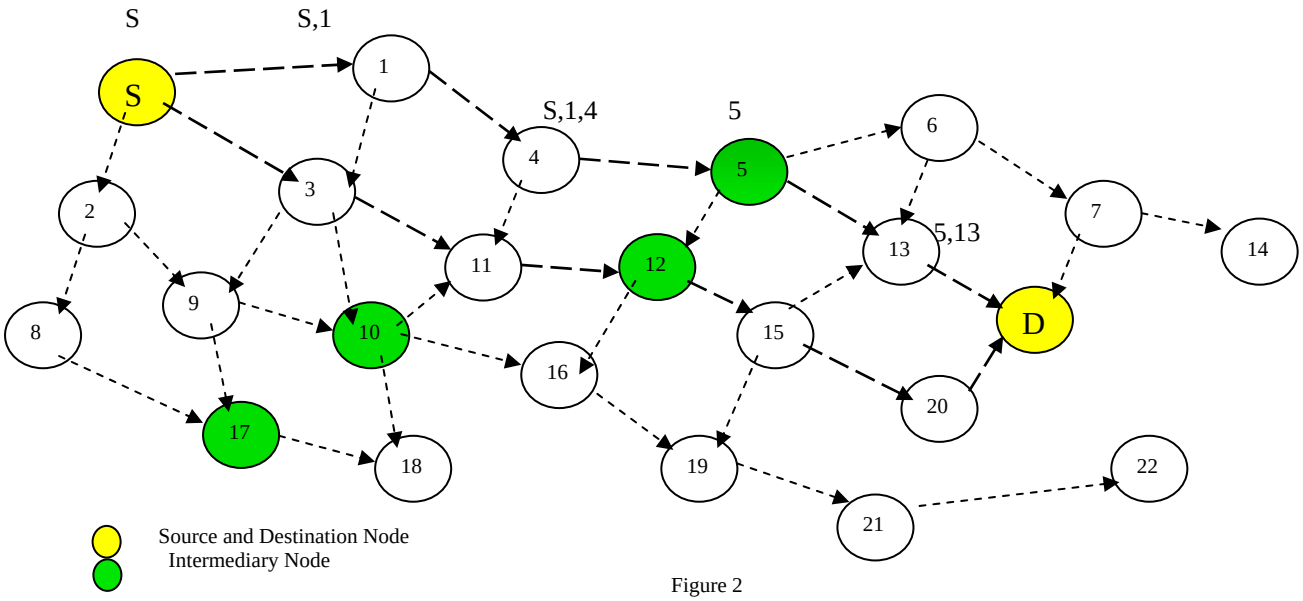

Figure 2

4. Conclusion

By the implementation of the proposed technique the packet size will be minimized hence it would be able to travel in the large network without any overhead.

This protocol does not ensure the security from malicious nodes.

5. References

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