



RESEARCH ARTICLE

A SERVE ON:-AN EFFICIENT PREDICTION BASED ROUTING FOR MOBILE AD-HOC NETWORK

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ARTICLE INFO

Article History:

Received 25th February, 2016
Received in revised form
27th March, 2016
Accepted 16th April, 2016
Published online 10th May, 2016

Key words:

MANET, Proactive routing,
Reactive routing, AODV, DSDV, DSR.

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Citation: Mr. Keshav Purswani and Mr. Arjun Jadhaw, 2016. "A serve on:-An efficient prediction based routing for mobile AD-HOC network", *International Journal of Current Research*, 8, (05), 30430-30434.

ABSTRACT

Mobile Ad-hoc Network (MANET) is a collection of wireless mobile nodes without fixed network infrastructure and centralized control, it is a type of network in which nodes are interconnected by wireless medium, it is self configure network in this network nodes automatically change its location. In this paper predictive methodology is provided which includes the genetic algorithm for improving the performance of the mobile network.

INTRODUCTION

Mobile Ad-hoc Network (MANET) is a collection of wireless mobile nodes without fixed network infrastructure and centralized control, it is a type of network in which nodes are interconnected by wireless medium, it is self configure network in this network nodes automatically change its location. Communication in MANET is done via multi-hop routing. (Harshit nigam and Neraj verma, 2014) The network is ad hoc network because it does not depend on a pre existing infrastructure, such as routers in infrastructure networks or access points in managed wireless networks. Instead, each device participates in path (routing) by forwarding data for other devices, so the determination of which nodes forward data packets is made dynamically on the basis of network connections, ad hoc networks can also use flooding for forwarding data packets. More challenges are there in this area: MANET contains different resources the line of defense is very ambiguity Nodes operate in shared wireless medium, Network topology changes unpredictably and very-dynamically; Radio link (medium) reliability is an issue connection breaks. Moreover, density of nodes number of nodes and mobility of these hosts may vary in different applications. (MANET) is non-centralized infrastructure less collection of peer-peer

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mobile nodes, it discover their route itself for communication between mobile nodes of MANET. MANET is a self creating self-organize and self administrative network. Mobile Ad hoc networks (MANET) are no configuration, self-organizing, and MANET has dynamic in nature in which nodes are free to move, networks formed by set of mobile nodes connected through wireless medium. These networks can be formed on the fly, without need any fixed infrastructure, each node should act as a router, Wireless ad hoc network is gaining its popularity day by day because the device communicate with each other using a wireless physical medium without relying on pre-existing wired infrastructure. Moreover, each node in an ad-hoc network are self-configurable in nature and takes help of "multi-hop routing" technique to communicate with those nodes which are beyond communication range. But, these features give additional vulnerabilities along with those existing in the traditional wired network. Since the advent of Defense Advanced Research Project Agency packet radio networks in the early 1970s, a number of protocols have been developed for mobile ad-hoc networks. Prediction based routing for mobile ad-hoc network or this application is used in battle field, disaster recovery, natural calamity, reuse operation, fast traffic information deliver on highways during travel, network extension, cloud computing, tactical networking, entertainment, Wireless Local Area Network (WLAN), Private Area Network (PAN), health monitoring, tracking application, managing the aquatic environment, localization application, law enforcement, emergency service, educational application,

conference/meeting/lectures, wildlife monitoring, intelligent home applications, urban areas, anywhere Internet access, delivery of location-wise information or service, entertainment, multiuser games, robotic pets and etc. In this paper predictive methodology is provided which includes the genetic algorithm for improving the performance of the mobile network. The proposed methodology is based on the traffic and the route discovery process. The solution of the proposed routing algorithm first find the mobility pattern over the network, and predict when a node can be move from their place, that helps to find the path break in the network. For that purpose genetic algorithm is used for prediction of the current path is suitable or not.

Background

Predictive Routing for mobile ad-hoc network is most important for data packets transmission from sender to receiver in mobile ad-hoc network different types of technique are available in privies research paper in mobile ad-hoc network, therefore there are mainly two approaches are available for predictive methodology and route discovery in mobile ad-hoc network first is proactive routing or table driven and reactive routing or demand driven. Deferent type of protocol are used in (Suresh Kumar and Jogendra Kumar, 2014)

Proactive Routing protocols

The Destination Sequence Distance Vector (DSDV) routing protocol: The Destination Sequence Distance Vector (DSDV) ,it is a proactive protocol at DSDV routing table node update information are save on next node towards a destination, the cost of route from sender to receiver and sequence no .of destination is created by destination. Sequence numbers are used in DSDV to avoid formation of route loops. The route updates of DSDV could be time or event-driven. Every node time to time transmits update information with route information to its neighbour's node and neighbours node can also send its change. Moreover, the DSDV has two ways when sending routing table updates. An increase update contains only those entries that with cost have been changed since the last update is sent. Additionally, the incremental update fits in one packet.

The Fisheye State Routing (FSR) (Suresh Kumar and Jogendra Kumar, 2014) The Fisheye State Routing (FSR) is a proactive based on link state routing algorithm with effectively reduced overhead to maintain network topology information. Link state updates are ex-changed periodically in FSR. In routing, the fisheye protocol translates to maintaining accurate distance and route quality information about the immediate neighborhood of nodes, with progressively less detail as the distance increases.

Wireless routing protocol (WRP)

(Rishab Jain *et al.*, 2012) The Wireless Routing Protocol (WRP) is a type of proactive or table driven unit-cast routing protocol for MANET. WRP also called route detect protocol or algorithm, WRP has to the dynamic characteristics to ensure to exchange update information and remove path loop problem.

Using WRP each nodes of MANET maintains a distance table, a routing table, each mobile device or node maintain four type of table a link-cost table and a Message Retransmission List table. Every entry contain cost of the link to the neighbour, and the number of time limit since an error free response was received from its neighbours, this protocol solve loop problem WRP protocol check consistency of its neighbours node and detect link change. That check remove loop problem.

Reactive Routing Protocols

The dynamic source routing (DSR) protocol

(Jagandha Rao *et al.*, 2012; Srinath parur *et al.*, 2013) the dynamic source routing protocol (DSR) is an on demand routing protocol. It is also known as reactive routing or on demand protocol, DSR is the simple, easy and efficient routing protocol, it is specially created for multi-hop wireless mobile ad-hoc networking (MANET) Using DSR the network is completely self-organizing and self-configuring requiring no existing network infrastructure or administration. The DSR protocol is field contains of two main techniques those work parallel or together to allow the discovery of route and maintenance of source route or path in the mobile ad hoc network (MANET). Route or path discovery is the mechanism or technique in which sender node s send a data packets to a receiver node r obtain a source route to D. Route discovery is the technique or mechanism used only when S attempts to sent a data packet to D and it is not known route to destination or in other words does not already know a route to D. Route maintenance is also the mechanism by which node S is able to detect. While there using a source route to D destination node if the network topology or node has changed its location has changed such that it route cannot used from long time, When route maintenance denoted a source route is broken. Route maintenance for this route is used only sends data packets from sender S to destination D.

The Ad Hoc On-demand Distance Vector Routing (AODV)

(Srinath parur *et al.*, 2013; On demand local repair algorithm AODV protocol IJC 2012, AODV 2012;Jagandha Rao *et al.*,2012;) AODV is an on-demand routing protocol. The AODV is also called proactive protocol the algorithm of AODV is provided or defined an easy to way get change in the link situation. If link failure occurred than notifications are sent only to the affected nodes within range in the network. Generally receiving this notification, it cancels all of the routes go through this affected node. Generally maintenance of AODV routing protocol process is completely based on session or time updates which suggest that entries into AODV process is finish or expired after timer expired. Further updated information is passed to the neighbours so that it can be updated about route breakage. Discovery of various routes from single source to various destinations is totally based on query and reply packets and intermediate nodes use logs to store the information of routes in route table. Different types of control messages or information which are used for the discovery routes and corrupted routs are as follows:

Route Request Message (RREQ), Route Reply Message (RREP), Route Error Message (RERR), Hello Message

Route request message

A route request message is sent across the network when a path is not present from sender to receiver in which send a reply.

Route reply message

(Ankur Lal *et al.*, 2012) On having a valid route to the destination or if the node is destination, a RREP message is sent to the source by the node.

Route error message

(Ankur Lal *et al.*, 2012) The neighborhood nodes are monitored. When a path is active, its link is broken or path is lost so neighbour nodes send a notification on both sides called route error message.

Residual link lifetime algorithm

Residual link lifetime is defined for a present or current link of that time duration from current time until the end time that the link breaks, residual link lifetime is also defined as the age of link, based on prediction parameter.

Related Work

In the previous paper (base paper) basic proposal can be called an ad-hoc on demand route find system; (Comparative Analysis of routing protocols based on some QoS factors in wireless Ad-hoc networks prerna rani M.Tech student of Hind college of engineering. Sonapat India 2015) Routing is one of the challenges to solve as Mobile Ad-hoc Networks have a connectivity to other nodes in its neighbourhood. No other route is available because of multi-hop routing. Each node in the network acts as a router or host and transmits the data packet to its neighbour in the route to share the information between nodes. Nodes do not have on active paths neither maintain any routing table or information nor nodes have any dynamically exchanged information with do not have any algorithm to discover and maintain a route communicate to another node. Nodes need to communicate from each other the algorithm's primary objectives are to broadcast discovery packets only when necessary to distinguish between local connectivity management, neighborhood detection and general topology maintenance to disseminate information about changes in local connectivity to those neighboring mobile nodes that are likely to need the information. It is an on-demand protocol, means that it builds path between nodes only as desired by source nodes. It maintains these routes as long as they are needed by the sources. AODV builds routes using a route request / route reply query cycle it broadcasts route request (RREQ) message across the mobile ad-hoc network. (Harshit Nigam and Neraj Verma, 2014) The Ad-hoc On-Demand Distance Vector (AODV): It is a routing protocol designed for mobile ad-hoc networks. AODV has capability of both types of routing (1) unit-cast and (2) multicast routing. (Algorithm O Prasanna Ranjith and Dr. Mary Jane Aragon, 2014) ad-hoc network can be classified in three types (a) history based mobility prediction in which two types of prediction network partition prediction and cluster change based prediction (b) physically topology based (c) logically topology based in there

prediction are information theory based and neighboring nodes based prediction (Mrinal Kanti Debbarma *et al.*, 2012) The route discovery process is initiated for a source node need to communicate to another, which it has no routing information in its table, Ad-Hoc on-Demand Distance Vector Protocol (AODV): AODV is used reactive or on-demand protocol in MANET. It maintains a route to a destination only on demand, node does not discover and maintain route until it demand. It is also called a distance-vector routing protocol. AODV used three main requests to find a route they are following RREQ, RREP, and RERR as follows: Route Request Message (RREQ): When a source node wants to connect with destination node, but does not have a path to reach that node, source node broadcasts a route request (RREQ) message to all its communicated or neighbour nodes. The sender creates an RREQ packet contains the sender node IP address, current sequence number, receiver IP address, last known receiver sequence no, broadcast id, each route request is incremented. Route reply message: If a node receives an RREQ message and it has a route to the receiver end, then it unit-cast a route acknowledgment packet (RREP) to the neighbour that sent the RREQ packet. route reply message packet for the source node IP address, sequence number & hops to source and IP of neighbour from route request received route error message When the packet is not reached to the receiver node or the link break occur then the host delete the path from the routing table and send route error message to the corresponding neighbours. Every node maintains two separate counters a node sequence number and a broadcast id the source node initiates path discovery by broadcasting a route request RREQ packet to its neighbours The RREQ contains the following:

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< Source address_ source sequence __ broadcast id_
destination address_ destination sequence __ hop count _>
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(Rishab Jain *et al.*, 2012) MANET has some limitations like limited resources and physical security, it is also hard to detect malicious nodes because it is a volatile network. (Sailja Gupta and Rajkumar Paul, ?) Congestion control & time delay is a key problem in mobile ad-hoc network the most important or significant characters are mobility that means join or leave nodes dynamically.

A reactive routing protocol such as AODV (Ad-hoc On-demand Distance Vector), While increase delay and routing overhead so route repair strategy carried out, Where in a node find a link weakening, pre-emptively hands off routing information to a suitably situated node, the technique or strategy used to degrade routing overhead there problem of counting & infinity also remove.

In the ad-hoc on demand distance vector (AODV) (On-demand local repair algorithm AODV protocol IJC 2012) protocol, routes can either be created only on demand from the source node, the node that detects the link break with the source to destination path.

Review

Table for the all previous papers in table include the
=>Year
=>Title
=>Advantages
=>Disadvantages

Title	Year	Advantages	Disadvantages
Improving The Performance of Ad hoc Network Using Hybrid Method	2014	Efficiently utilize network devices, constructing routing table very impotent for efficient routing	Asymmetric links: there in the wire network symmetric link is fixed or not change. With mobile ad-hoc networks as the nodes are mobile and constantly changing their position within network
Mobility Prediction in MANET Routing using Genetic Algorithm	2014	In these paper proposes SPGA technique overcome link break problem.	Require route rebuilding after a link breakage is currently the responsibility of the source node
A Review of Routing Protocols for Mobile Ad-Hoc Networks	2013	Purpose of this paper increase accuracy & reliability of the data packets using multiple mobility models.	Re-establishing new route, it will send RREQ message to its all neighbours so it will make delay.
Demand Local Link Repair Algorithm for AODV Protocol	2011	Require route is necessary. Reverse route also maintain.	Discussed on error prediction in location estimation of user.
Reliability of MANET protocols through the performance of AODV, DSDV, and DSR.	2012	Mobile nodes find broken link when data packets or RREQ MESSAGE travel source to destination MANET.	Most of the protocol give high performance but contains less data packets or load.

In some situations Source Repair will lead to better performance, in other situations Local Repair will be the more appropriate choice. In this work, we explore a flexible, approach which of these two route repair technique to use in the event of a link break. Definition of local repair to find link break from source to destination or path so initiates local Repair, as opposed to Source Repair, Our result so that optimal choice in terms of Packet Delivery Ratio Depends on the network load.

Ad-Hoc Routing protocol: (Alex Hind *et al.*, 2013) two types protocol are available for mobile ad-hoc routing scheme has proactive routing and reactive routing called multipath routing there several path for data packets transmission from source to destination, in this paper proposed mainly two path for routing first path has shortest delay minimize and remove traffic congestion.

As Mobile Ad-hoc Network to continues to experience increasing popularity

(Mrinal Kanti Debbarma *et al.*, 2012) In this type of networking need large number of wireless devices are interconnected to each other so will become more popular, many characteristics that may limit their scalability to large network, this paper different combination of modification that may be any on demand protocol are increase or improve its scalability. The scalability of on demand routing protocol is evaluated throws from a class protocols the performance of on demand protocol is compared against any scalability change.

Proposed Work

The proposed working model for MANET routing protocol is established on the other hand the strategy of the routing is prepared using genetic algorithm implementation. The solution leads to find the solution for the mobility based losses in MANET environment. The proposed routing protocol is implementable with the NS2 network simulator.

Problem domain

The MANET is a kind of wireless connected network organization where not any fixed infrastructure is available. In addition of that these network devices are independent to move

any direction and any speed. Due to this the losses in wireless ad hoc network are occurred. Due to these losses during the communication scenario the network performance of the network degrades considerably. Therefore, required to find the solution for the mobility in the MANET network traffic, by which the performance of the MANET can be improved in order to losses raised due to mobility.

Solution Domain

The given solution is based on the predictive methodology, which includes the genetic algorithm for improving the performance of the mobile network. The proposed methodology is based on the traffic and the route discovery process. The solution of the proposed routing algorithm first find the mobility pattern over the network, and predict when a node can be move from their place, that helps to find the path break in the network. For that purpose genetic algorithm is used for prediction of the current path is suitable or not. If the path break probability is higher than a predefined threshold value than, route discovery process is initiated using our thread of network routing protocol. Genetic algorithm in shortest routing –privies find, link prediction shortest route genetic algorithm to construct list cost of route cost for n nodes is shortest .Starting from a node A or vertex A and predicted the mobility of nodes. Step 0 (initiate) set route from A to all other nodes label B is used and all others vertex is unused, (A B) route Step 1 visit all nodes from 1 to N-1 Step 2 link expiration time finds all reachable nodes from B consider (B C1) (B c2) (B Ci).....Step 3 chose next edge or least cost edge from B to unused vertex C with min ROUTE=route + min cost (B C) etc.

Conclusion

Mobile Ad-hoc Network The MANET is a kind of wireless connected network organization where not any fixed infrastructure is available The solution leads to find the solution for the mobility based losses in MANET environment, the computational overhead is degrades using genetic algorithm in which node predict based on privies record or information about node & find shortest path. One of the global problems in MANET is link breakage and data packets losses so increasing node mobility prediction, proposed genetic algorithm. Could be overcome data packets losses in MANET. Much reduce the occurrence, RERR during travel data packets.

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