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Research Article

Link Recovery & Energy Efficient Based Routing for MANET

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Abstract

MANET in Wireless links may be broken regularly due to and power failures and nodal mobility. Such complication produces routing protocols, such as AODV, inefficient and undependable. Currently, these issues are resolved in a middle node by using local repairing mechanisms by generating a different route to the target. But it enlarges routing overhead and unnecessarily absorbs MANET resources. Furthermore, if there are no survey on the selection of nodes while generating a different route, there is a probability that a malicious node which may take its position in the path. In this paper, we suggest a technique which does a rapid local recovery from the link failures and also avoids misbehaving nodes to move slowly in the path. The merged technique increases performance and also consumes small energy of nodes in MANET. Execution analysis and simulation outcome manifest that our suggested technique attains outstanding performance development over already available AODV-based methods.

Keywords: *MANET, AODV, local recovery, power failures, routing protocols*

Introduction

A computer network is called as a network. It can be generally classified as wired networks, wireless networks. Twisted pair wire can be extensively used as a medium in telecommunication. Twisted-pair cables are made up of copper wires. Normal telephone wires are made up of two wrapped copper wires. Computer networking cables are made up of four set of copper cables which can be employed for both data and voice transmission. The utilization of two wires that are twisted together aids to minimize electromagnetic induction and crosstalk. The transmission speed span is from 2 mbps to 10 mbps. Coaxial cable is extensively used for office buildings, cable television systems, and other applications for LAN. The cables are made up of aluminum or copper wire. Optical fibre cable is manufactured by the glass fibers packed in protective layers which implements data by light pulses. It sends light that can be travelled over large distances. Fiber-optic cables are not damaged by the electromagnetic radiation. Terrestrial microwaves use Earth-based transmitter and Earth-based receiver. The apparatus looks like satellite dishes. These

microwaves utilize significantly less GHz span, which reduces every the communications to a LOS. Microwave antennas are typically situated on top of buildings, hills, towers and mountain peaks. The communication satellites utilize microwave radio as their telecommunications medium and they are unaffected by atmosphere of the Earth. The satellites are placed in space normally 35,400 km higher from the equator. The orbiting systems of the earth have an ability of relaying and receiving data, voice and TV signals. PCS systems and Cellular systems utilize many communications technologies in radio. The systems are classified to many geographical areas. Some of the issues associated with the wireless communication are path loss, multipath propagation, limited frequency spectrum and interference.

Related Work

Reference paper [1]: MANET's are self-organizing and infra-structure-less networks. Devices of a MANET have a liberty to move freely, and hence the links are dynamically changing. The main challenge in constructing a MANET is to maintaining the route traffic with dynamic topology. Those networks may be connected to the larger internet or may be worked by themselves. Reference paper [2]: AODV is used to find the route only and only if needed. It doesn't maintain by means of any topology information. This kind of protocols are called as reactive routing protocols, but the most used protocols are proactive, which means that they discover routing paths that are not dependent on the manipulation of the paths. AODV discovers route between the nodes whenever needed. It will not support the information of topology of the energy nodes exists inside the network. AODV Protocol uses flooding across the network uses simple flooding, every moment when the node starts the route realization for destination to transmit a Route Request. Energy saving is a main problem in MANETs where the nodes depend on computational resource and limited power, yet they are needed to collaborate in all kind of basic network schemes even including routing. The drawbacks of this protocol are that it absorbs a lot of energy and thus increasing the battery constraints of the node. Reference paper [3]: Failure of the link takes place when a particular node shifts from a network to another network. The first and foremost attention is to significantly increase the available routes and to provide the optimized routing procedure in order to avoid the congestion. The wireless Ad-hoc networks link failure is very high due to the fact that nodes mobility is very high, which in turn decreases the MANETS performance and this may lead to an issue in transportation layer. Issues that are experienced in transport layers are route failure and packet loss. Congestion will occur in the network when there is more amount of lost packets. When there is a critical data that are lost like video data that will carry the information that the data should be retransmitted from the source. This process will take the much bandwidth and power. When a data that should be transferred to sink. If congestion takes place in the network, delay exists for sending important data. Since the repeated failure of the links in MANETs, the cant be reached at the destination with maximum throughput. Limitation is that the congestion and packet loss and it should be eliminated at all costs. Reference paper [4]: In mobile ad-hoc networks, with limited energy the batteries are normally powered by the nodes. To increase the life of a network, the energy utilization of the routing assignment is critical. The energy-efficient routing supports many topology control techniques in previous work, while many of them are

planned for static network. Here, for mobile nodes a new topology control plan is recommended. AODV protocol is particularly modeled with minimized overhead using Expanding Ring Search method. However, because of the battery constraints, energy utilization should be examined. Dynamic topology is an important problem in ad-hoc routing because it is not persistent. Medium characteristics may change or the mobile node may move. Routing tables must divert the changes. For instance, ad hoc networks take much less time to update the routing table whereas the fixed networks takes 30sec to update routing table.

Proposed Work

A. Mechanism of E^2AODV

AODV discovers route between nodes when it is needed. In AODV, every moment the node commences the process of the route discovery for few terminus with the help of flooding technique to transmit RTS (Request To Send). As we know that energy conservation is the vital problem in ad hoc networks where all the nodes are depending on the computational resource reduced power. RREQ (Route request) packets will be sent to the neighbors via broadcasting to discover the route. TTL (Time To Live) method provides the reduced overhead in AODV.

B. Controlled flooding in E^2AODV

Link Failure, Temporary Link Recovery, Temporary Route Discovery are the few important paraments should be taken into account when we discuss the E^2AODV. There is a constant failure in the link in ad-hoc Networks, which will cause the packet loss. A new plan and mechanism are suggested to enhance to enable the raw data to reach the terminus in the absence of any loss. The procedure which is used is the propagation that is a special and it propagates the data carefully. The neighboring node will retransmit instead of the source using NS2 simulator where the gathered nodes are simulated.

Iv. Experımental Results And Analysıs

For our simulation we used NS2 simulator since it has many advantages such as (i) Debugging of errors is easy (ii) It is cheap and it does not need any equipment (iii) Even a complex scenario can be tested efficiently. The Outputs here are displayed using either Network Animator (NAM) or XGRAPH. Network simulator version-2 and Linux (Ubuntu 10.04) are the software requirements for simulation and Front End: TCL (Tool Command Language) is also used. Intel Core 2 Duo processor with minimum of 40 GB of HDD and minimum of 512 MB of RAM are the Hardware Requirements**. To evaluate different protocols, there are three performance metrices are introduced. They are** Energy Consumption, Normalized Routing Load, End-to-end Delay. Some of the screen shots are shown below for energy efficient routing. (fig.1 –fig.7).

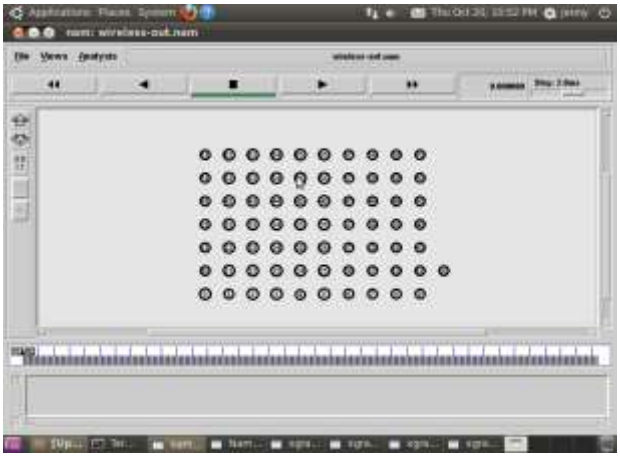

Fig.1 **NAM with 0-70 nodes**

The above network animator window shows 0-70 nodes. The source sends route request packets to its immediate neighbors and they forward it to their neighbors. This process is repeated till the path to the terminus is found out.

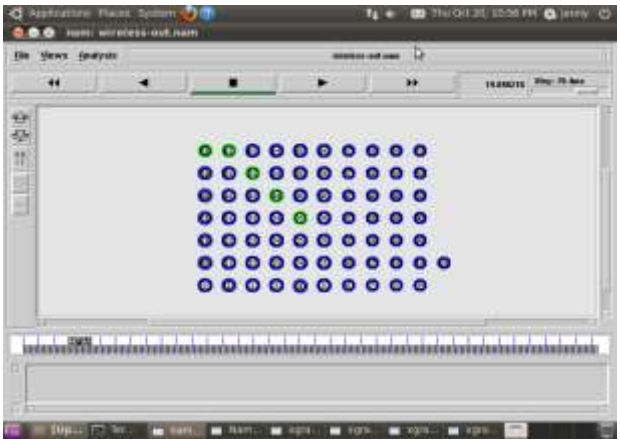

Fig.2 **Formation of the route**

The source node forwards RREQ to its immediate neighbors and they forward to their neighbors and so on.

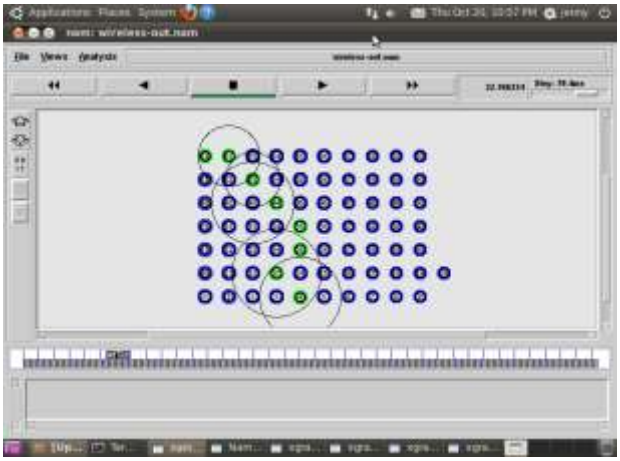

Fig.3 **Destination is reached**

Thus the requests are forwarded from one hop to another hop. Now the source takes a route which is energy efficient to get to the destination. After the path is determined, the data packets are sent to the terminus from the source.

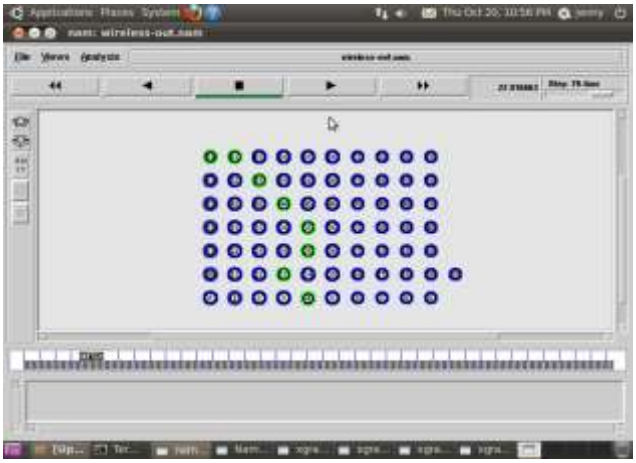

Fig.8 **Packets are forwarded**

Thus energy consumption is reduced there by increasing the life span of the nodes. Since the route request packets which are transmitted is less in number, the routing load is also reduced. When link failure occurs due to node mobility, neighbor node sends route error announcement to the source and starts route discovery process and finds an alternate temporary path to the destination. Now the neighbor node itself retransmits instead of the source thus reducing end-to-end delay considerably.

Comparison Graphs

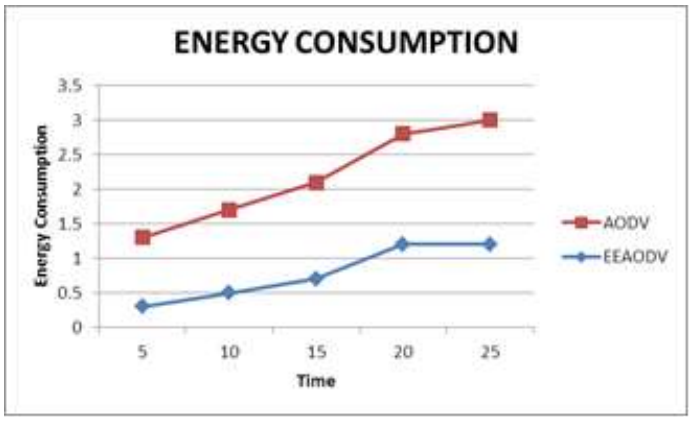

Fig. 9 **Energy consumption vs. time**

Thus the energy consumption of E^2AODV is less compared to AODV. hus the energy consumption of E^2AODV is less compared to AODV. We could achieve better results through E^2AODV comparing with AODV. E^2AODV almost saves 75-85% of energy can be saved in high density networks.

Fig. 10 **Routing load vs. time**

Fig. **7 End-to-end delay vs. time**

An end-to-end delay of the standard systems are compared with an improved version of the system in which the neighbor node initiates route discovery and retransmits to the destination thus decreasing the end-to-end delay.

Result And Dıscussıon

An advanced model has been suggested which looks after the energy features. The temporary route recovery system reduces the end-to-end delay to a considerable level compared to the standard system. The performance metrices like energy consumption ratio, end to end delay ratio and routing load ratio are used and compared with the AODV. Energy consumption is saved via E^2AODV by 75-85% and also overhead is minimized by 65-75%. The simulation results shows that the E^2AODV achieve the better results over AODV.

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