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Revamp the Power Consumption in MANET by designing EPAR-DA routing Protocol

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Abstract*: In wireless networks, the communication link between the nodes is changeable, since the qualities of the wireless links change their states heavily. Mobile ad hoc network (MANET) is an infrastructure less network; its nodes are mobile in nature. So that, the mobile device needs more battery power due to the nodes moves in a rapid form of nature, so power feeding is the major issues in MANET. The data packets transmit from root node to the terminal node through some intermediate nodes. The draining of few nodes due to power weakening might cause the entire MANETs services disconnected. So that to improve the power consumption in MANET, we improvise the EPAR-DA [Efficient Power Aware Routing with Data Aggregation] algorithm, by adding the aggregation process with EPAR algorithm. The EPAR algorithm describes the track route and chooses the path based on the energy downed to convey the data packets from source to the destination through sub-terminal nodes. EPAR estimate all lowest hop energy of the paths and then select the maximum lowest hop energy to transfer the data packet. And through the data aggregation process, data are aggregated and transmitted in certain periodic interval to reduce the power. EPAR algorithm is an on-demand source routing protocol that uses battery lifespan anticipation. By evaluating ad hoc network routing protocols, EPAR-DA consumes less energy when compare to other protocols like MTPR [Minimum Transmission Power Routing], and DSR [Dynamic Source Routing] in different network scales. The total energy using up of the MANET is reduced by EPAR-DA and achieves a good packet delivery ratio especially for high load networks.*

Keywords: MANET, DSR, EPAR-DA, Data Aggregation.

1. INTRODUCTION

Now a day's, communication plays a vital role and become very important for switching information between people from one place to anywhere at any time. Wireless network is the most important emerging field in future of communication system. Generally wireless networks are in two phase infrastructure and infrastructure less. Wireless network that mastered by the centric node are said to be the wireless ad-hoc network; they communicate with each other in a multi-hop manner. Since those movable nodes are operated by battery, they need an extended battery lifespan for their further processing.

Basically the mobile nodes are battery driven in MANETs; each node in the network performs the routing function for launching communication among different mobile nodes. If few nodes lead to the power weakening might cause the entire services in the MANETs disconnected.

Two major cause of a network link cracking

- Node breakdown due to energy step-down.
- Node moving out of the range of its connected node

2. OBJECTIVE

To revamp the power consumption in the MANET through EPAR Protocol [9] combine with data aggregation process. EPAR protocol that discover the path and prefer the path based on the energy consumed to transmit the data packets from origin node to terminal node that is destination through in-between nodes. The EPAR-DA work out all lowest hop energy of the route and then pick out the maximum lowest hop energy to transfer the data aggregated packet in particular interval time.

2.1 PREVIOUS IDEA WORKS

In MANET, the leading drawback is power expenditure. So in order to better the battery lifetime, first we have to find out the route that has low-level power to transmit the data packets to the desire destination. In the route discovery, the EPAR algorithm chooses the path based on the energy. But in the former system like DSR, the path chose based on the minimum number of hops. First, we evaluate the battery power for each route that is the most low-level hop energy of the path. The path is then picked out by choosing the path with maximum lowest hop energy. EPAR-DA algorithm selects the path and transmits the data aggregated packets in particular periodic time so that remain time they store the power energy. By debarring power congested nodes EPAR choose lightly loaded paths to achieve minimum variance in energy levels of different nodes in the network.

3. PROPOSED WORK

In the proposed work, the EPAR-DA make routing decisions to optimize performance of power or energy related equation metrics. In DSR the path was chosen by minimum number of

hops but in EPAR-DA choose the path based on the energy. First, we calculate the battery power for each path, then select the path having low-level energy hop and then in the lowest nodes select the node containing maximum lowest hop energy and transmit the aggregated data packet from source to the destination.

Advantages

- EPAR-DA protocol favors the path whose lifetime is maximum
- By avoiding power usage after the transmission the aggregated data packets in period interval time. EPAR-DA achieves maximizes the network lifetime.

The major process in the improved EPAR protocol is through the data aggregation [5]**.** After the route discovery the data are collected and bunches of aggregated data are transmitted in a periodic interval. So nodes get enormous power saving tactics when data are not transmitted.

- Route Discovery with EPAR Protocol
- EPAR with Data Aggregation
- Route Maintenance

3.1 Route Discovery through EPAR protocol

In route discovery, the source node transmits the bundle data that is path-asking packets to the terminus node through sub-terminal nodes. The packets forward the requested message to their adjoin nodes and so on. Once the route-request attains the terminal node, it reacts with their route-reply message back to the neighbor from which it first received the route-request.

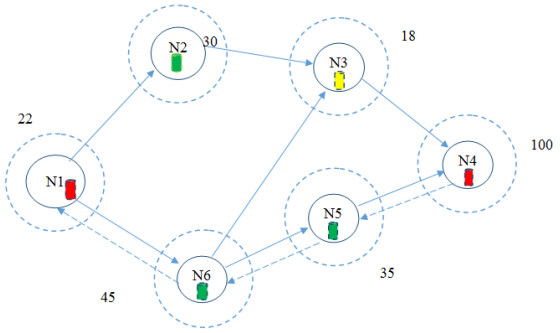

Figure 1: Route Discovery

EPAR algorithm prefers the path establishment on energy of the hop. First we compute the battery power for each path, then prefer the lowest hop energy path and then in the low-level path select the uttermost lowest hop energy to beam the data packets to the destination node.

3.2 EPAR with Data Aggregation

This is the renew EPAR protocol that the data packets transmitted to the destination from source through intermediate nodes are aggregated that is the data are collected and wait for some time and then aggregate the data and transmitted to destination periodically.

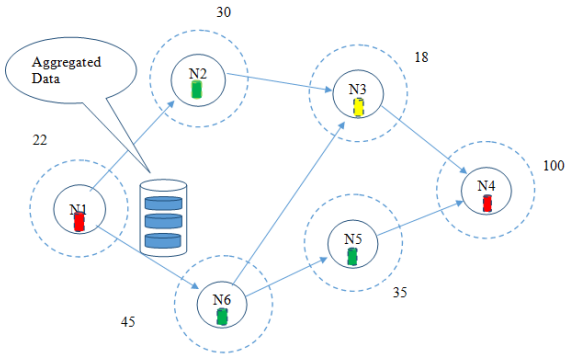

Figure 2: Data Aggregation

The reason for waiting and transmit the data packets to the destination once in a time, saves its energy.

3.3 Route Maintenance

One of the enhancement features carried out by keep-up the network from the drawbacks like node failure and node out of range. We have to maintain the network to continue the data transmission process in good manner.

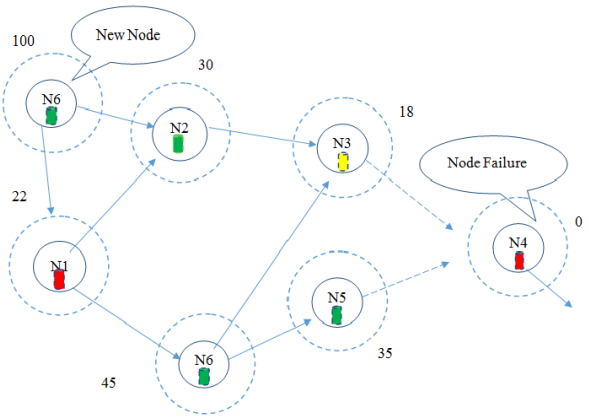

Figure 3: Route Maintenance

There are two major reasons for the network demolition

- Node dropping dead of energy exhaust.
- Nodes are travelling out of the range of scope from its neighboring node.

To overcome these problems, we ensure a backup node that is an addition node enters into the network, so that the network failure can be prevented. Once the new node entered into the network, it updated its location to all the nodes in the network.

4. SIMULATION RESULTS

A) Packet Delivery Ratio

In the EPAR-DA algorithm provide an efficient and excellent packet delivery rate when compare to former performance system as shown in the comparison table

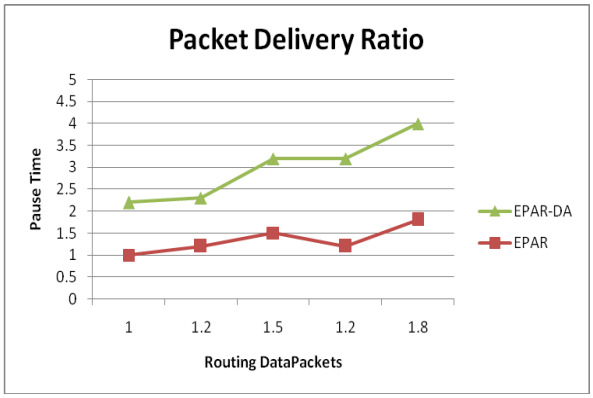

Figure 4: Packet Delivery Ratio

B) Number of Dead nodes

When evaluate the energy depletion node that is chance of node failure, EPAR-DA provide an enormous outstanding recovery credits.

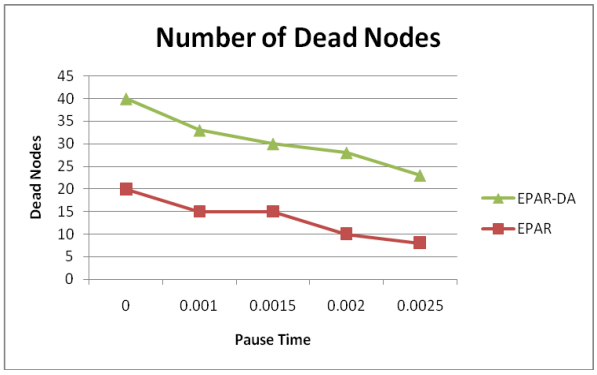

Figure 5: Number of Dead Nodes

C) Energy Consumption

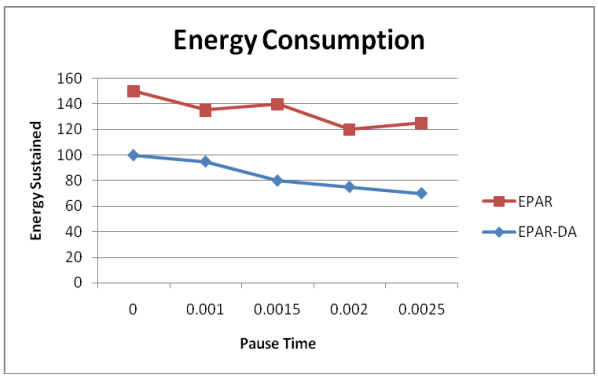

Figure 6: Energy Consumption

As the data transmissions are in particular periodic interval time, power consumption is improved certainly. The Simulator results shows how the EPAR-DA protocol score an efficient data transmission through the combination of EPAR with data aggregation ensure the packet delivery, number of dead node, and energy consumption are well manner.

5. CONCLUSION

The conclusion of this approach is to focus on to maintain network lifetime of the MANET. To maximize the power consumption in MANET, by configuring the path using EPAR protocol and aggregated data transmission from the source to the destination and the backup node for the node failure. All these ensure that the network life time of the MANET outperformed. EPAR algorithm is basically an improved DSR protocol.

Through EPAR algorithm along with data aggregation techniques, the network life time and route recovery has been performed. By evaluating ad hoc network routing protocol, EPAR-DA provide an efficient network lifetime. In addition to that data aggregation process improves the network life time more. The delivery ratio especially for high load networks, the EPAR, Data aggregation and node recovery techniques achieved a good packets transmission compare to the previous system.

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