Analysis of Energy Consumption Using Sleep and Awake Mechanism in MANETs

Pritam Kawade[1], Rahul Gaikwad[2], Aniket Shelke[3]

[1]Computer Department, University of Pune,
Pune, Maharashtra, India
[2]Computer Department, University of Pune,
Pune, Maharashtra, India
[3]Computer Department, University of Pune,
Pune, Maharashtra, India

Abstract: Energy Consumption is the most important issue in MANETs. A MANET is a mobile ad-hoc network and it is a self-configuring network where nodes, connected by wireless links, can move freely and thus the topology of the network changes constantly. In this paper, we implement how energy will be consumed and also the time will be consumed. In this paper we are going to implement sleep and awake mechanism to consume the less energy and consume less time. On the Network, traffic will be high or low, So that on demand based the topology of the network will be changed. If the traffic on the network is high then the topology will be changed to mesh topology. And the traffic on the network is low then the topology will be changed to bus, ring or star topology. So that the concept of in demand based topology we consume the energy and time.

*Keywords:*Sleep and awake mechanism, MANETs, Energy, Topology, Modules.

1. Introduction

In this paper, we are going to implement the sleep and awake mechanism for MANETs. MANET is a wireless network i.e. Mobile Ad Hoc network. The term Wireless Network means, the network is either high traffic or low traffic. Energy resource is one of the major issues in the wireless network. To overcome this energy issue we use the sleep and awake mechanism to consume the less energy in the wireless network or in the MANET. These type networks can be used in battlefields, disaster areas, military applications, mining operations and robot data acquisition.[1][2]

2. Modules Implementation

In this paper, we implement the modules of the sleep and awake mechanism,
Four modules are below
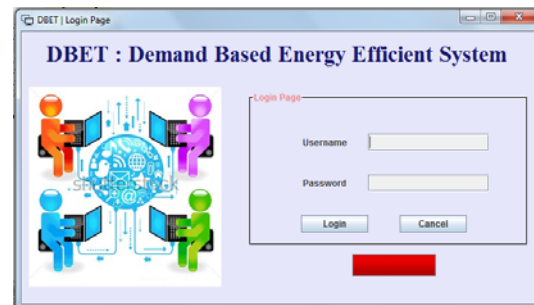
2.1] Finding Network Nodes GUI (Server). [5]
2.2] Client Application
2.3] Implementation of DBET with AODV and Energy efficiency

2.4] Comparison of Existing System AODV with DBET System. [1][2][3]

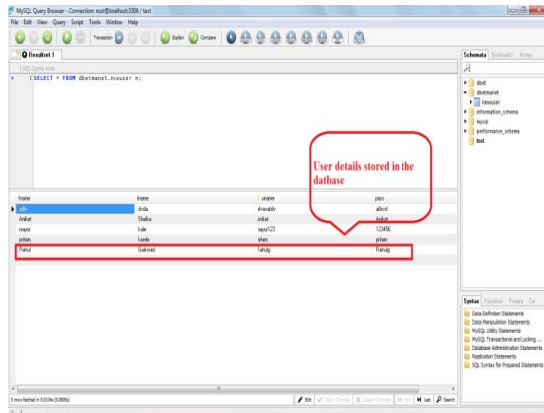2.1] Finding Network Nodes GUI (Server)

In this Module, initially user login into the system with Username and Password.


In the below page first the authentication of the user is required i.e. username and password. If the user is not registered then user will register first.
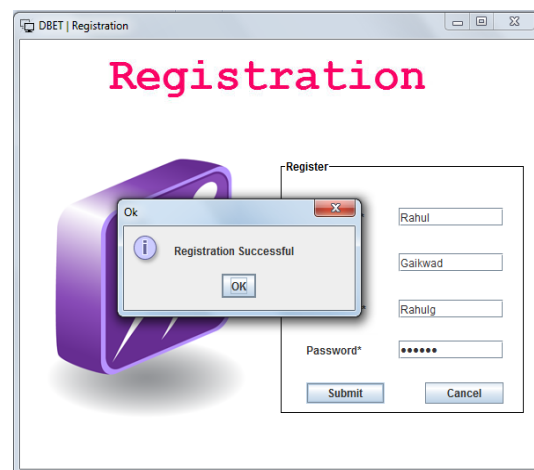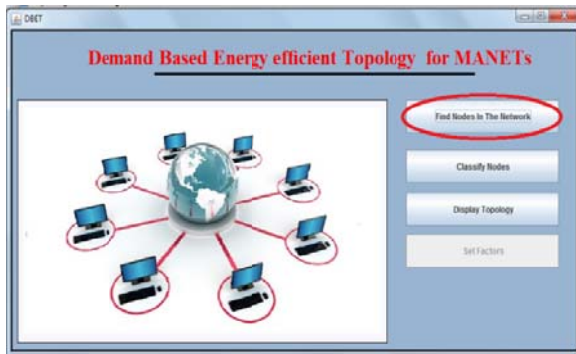
In the below page the user will register his/her details, and all these details are stored in the database. To store the details we use mySQL database.


In the below Page, the registered user entries are stored in the database.
Then user can login into the system.
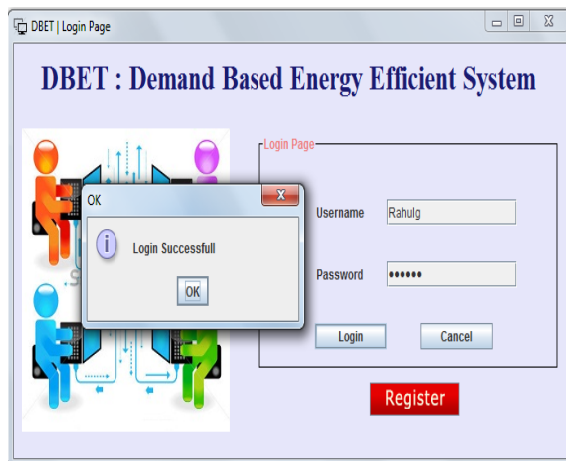
After login into the system, we seen the below page of finding network nodes GUI (Server)

In the above page of finding the nodes in the network, Red coloured eclipse symbol in the image shows the button of finding the nodes in the network. After click on the button we seen the below page.
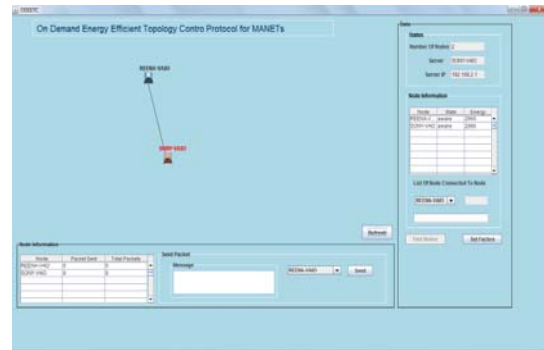
In the above page the right panel shows status of the network i.e. number of nodes in the network, name of server node and server node IP address. Node Information panel shows name of nodes in the network, state of the node and energy of the node, list of node connected to node. In the node information panel Number of packets sent is shown. [1][2]

2.2] Client Application

In this module the client application will seen in below image.
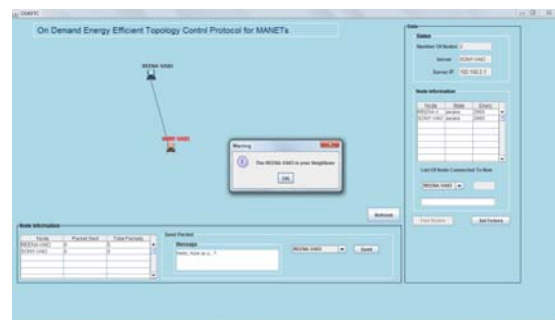
The above page is server side page. Server node will send the packet to REENA-VAIO PC. After click on the send button server shows the message The REENA-VAIO is your neighbour, because in this image for instance only one client will connected to the server in the network.

The above window shows the client side application. On the client side nodes accept the request of

whatserver send. In the above page there is a message box"I am the destination" i.e. it is the destination node of that the server wants to send packets.

In the above window, the original message will show, that will sent from server. And it will sent reply back to server.

The above window is the server side window, and reply message will show on the window. In the reply message, path of packet and time it required to back to the server will seen on the sever side.

2.3] Implementation of DBET with AODV and Energy efficiency

In this module we implement the DBET with AODV for energy consumption and time consumption. In the AODV, nodes in the network are found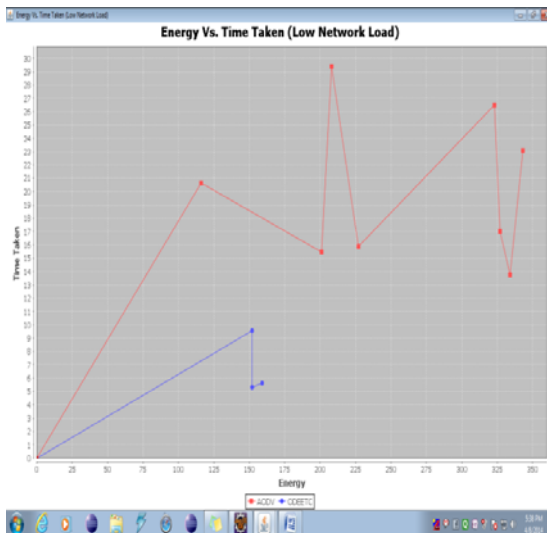 and connection established between nodes. Then request message will send from source node to destination node for sending the packets. In AODV system, for sending the each packet it will find the new path every time so that it will take large amount on time. But in DBET system, the request message will send to the destination and destination node reply back to the source. This path will store in the database for sending the whole data also it will found the shortest path for sending the data. The DBET system will use the sleep and awake mechanism to consume an energy and time. [1][2][4]

The above page is database page, it stores the all the information about the AODV and DBET system. The columns such as id number, time taken for sending the packet, what amount of energy taken to sent the packet, network status, protocol i.e. AODV or DBET and number of nodes in the network. The energy and protocol columns used to compare the system.
The implementation completed in the module 2.1 and module2.2.

2.4] Comparison of Existing System AODV with DBET System

This is the last module of project DBET. In this module finally we compare the existing system AODV with the DBET system. Graphically we compare the existing system with the AODV system.

1] Energy vs. Time taken

1.1] High Network Load

In the above page, numbers of nodes in the network are more i.e. high load on the network.

This page shows the graph of high network load. Red coloured line indicates the AODV system and blue coloured line indicates the DBET system. This graph will be generated from the values of time required i.e. time-taken column in the database and energy used for sending of packet i.e. energy column in the database. This graph shows that AODV system takes lots of time and energy to send the packet and DBET system takes less time and less energy on the high network load.[1][4]

1.2] Low Network Load

In the above page, numbers of nodes in the network are less i.e. low load on the network.

This page shows the graph of low network load. Red coloured line indicates the AODV system and blue coloured line indicates the DBET system. This graph will be generated from the values of time required i.e. time-taken column in the database and energy used for sending of packet i.e. energy columnin the database. This graph shows that AODV system takes lots of time and energy to send the packet and DBET system takes less time and less energy on the low network load.[1][4]

3. Conclusion

Here we are developing an application named as DBET i. e. demand based energy efficient topology for MANETs. In this paper we implement the sleep and awake mechanism for consumption of energy and time. In this paper we implement the Demand Based Energy Efficient Topology for MANETs that automatically adjusts its topology for various network traffic conditions.

4. References

[1] Prof.Ruta Kulkarni, PritamKawade, Rahul Gaikwad and AniketShelke "Energy Consumption Using Sleep And Awake Mechanism In MANETs", Department of Computer Engineering, 2014.

[2] Hariprabhat Gupta S. V. RAO."Demand Based Energy Efficient Topology for MANETs", Department of Computer Science and Engineering, 2011.

[3] Ian D. Chakeres and Elizabeth M. Belding- Royer. "AODV routing protocol Implementation design".Department of Electrical & Computer Engineering.Royer."AODV routing protocol Implementation design".Department of Electrical & Computer Engineering.

[4] Dr. Baruch Awerbuch&Dr. Amitabh Mishra. "Ad hoc on demand distance vector routing protocol". Department of computer science CS: 647.

[5] JailaniKadir, Osman Ghazali, Mohamed Firdhous, Suhaidi Hassan, "Node Internetworks selection Based on energy in MANET,"Research Group, School of Computing, University Utara Malaysia, Malaysia, 2011.

[6] Carlos de MoraisCordeiro and Dharma P.Agarwal,"Mobile Ad hoc networking",OBR research center for distributed and Mobile-computing.