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Novel Clustering Based Routing Approach in Manet by Flower Pollination Algorithm

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Abstract— ***In this thesis, the extra burden of the nodes that are within the neighbourhood of the base station in a cluster-based network has been modelled as extra virtual member nodes. We virtually divide the network into regions according to the proximity to the BS denoting the closest region as the front region and the farthest region as the rear region. The nodes have been classified according to the region that they fall in. Based on our model, transmission tuning algorithm for cluster-based WSNs has been proposed to balance the load among cluster heads that fall in different regions. This algorithm is applied prior to a cluster algorithm to improve the performance of the clustering algorithm without affection the performance of individual sensor nodes. As a result, the network lifetime has been prolonged.***

Keywords— ***cluster, metaheuristic, optimization.***

I. INTRODUCTION

Wireless communication between mobile users is now more popular that last time. This latest technology achievements and wireless data communication device in the laptop computer, including various wireless modem, local area network. This is the minimum price and other data rates; these mobile computing are the main reason continues to enjoy rapid growth.

Ad-Hoc network foundation not to be dependent on any pre-set and can be installed in places with no foundation. The rapid deployment of upset recovery situations and non-original or destroyed infrastructure where a broadcast transmission network is useful in places with very necessary. It can also make a non-permanent network without engrossing advertising is useful to participate in the workshop where the ad hoc network workshop serves any pre-existing network.

1.2 Wireless Ad-hoc Network

The Network [7] wired network that the network is known, such as ad hoc network of a decentralized type that is not rely on a previous basic as routers. Instead, dynamically so that each node has been sending node data on the basis of the decision of the network connection in the routing of data for other node.

1.3 Characteristics

Regular ad hoc network are represented by the fact that a dynamic geography everywhere node to change their original position by moving. These deeds routing protocols that dynamically expose routes over typical routing algorithms same as distant vector and connected condition [23].One more features are that a host/node has very restricted CPU ability, storage space ability, battery power and bandwidth; also direct the attention to as a "thin client".

1.4 Mobile Ad hoc networks

The surfaces of mobile ad-hoc networking allotment with devices dress up to perform wireless transmission and networking, but externally any existent infrastructure like access points. Wireless apparatus shaped an interconnected group of system as they come about wary of every other presence. They disclose directly in support of devices interior their radio target in an equally ranked nature. To take for granted they wish transmission in support of a device not inside their target and at the same time they can accept advantage in the middle of a range device or those devices that are within their radio target to dress up or forward transmission to the device outside their target.

1.5 MANET Features [[5]

A MANET Network having many features:

In MANET, every mobile terminal is as though autonomous nodes that are possibly intention as each a router and a host. Here is to say next to the simply processing suitableness like remote the mobile nodes are able to also carry out switching functions like a router. Generally line segments and switches are not capable of being perceived in MANET. Secondly, From there is no heritage network for the central control of the network ability, the regulation and influence over the network is pass out among the terminals.

1.6 Challenges Faced by MANETs

Efficiency of wireless links are always much lower than wired counterparts. Almost, while several are available for different Gbps, wired LAN, this time, especially around 2 Mbps commercial applications for wireless LANs. Secondly, the device battery power, which is limited in time, does not allow infinitive action for that node. Moreover, Battery power all the equipment, which does not allow nodes to the ordinary operation is limited in time [3].

II. LITERATURE REVIEW

Agarwal, Gupta and Motwani et.al [1], This paper presents a survey of the clustering algorithms, in which various weights are considering to different accomplishment factors and clustering judgements are taken after determine the values or mathematical solution the united weights of nodes.

Agarwal, Motwani and Gupta et.al [2], this paper proposes a cluster formation algorithm. In this algorithm, if the number of members of a cluster head becomes larger than the predefined threshold value, a particular method of cluster division is performed. This reviver the cluster heads from the heavy load of excessive members. Simulation revision of the proposed algorithm explains the facts by observing a growth in the performance in terms of PDF, E2E delay and throughput.

Agarwal R. et.al [3], this paper presents a survey of separated clustering schemes. The cluster head selection is call on-demand, and its goal is to reduce the calculations and communication costs. Maximum variety of approaches for ad hoc clustering especially developed by investigator which focus on various performance metrics.

Anitha and Sebastian et.al [4], this paper proposed a scenario based, distributed and adaptive clustering algorithm SCAM (Scenario-based Clustering Algorithm for Mobile ad hoc networks) and this distributed algorithm founded on (k, r) – ruled Set is used for the choosing of cluster heads and gateway nodes. This proposed algorithm intermediately calculates the quality of ruled nodes and underneath the threshold stage it replaned the job as cluster head and sends the message to every other member nodes. SCAM interested in techniques to support the cluster structure as unchanged as possible with minimum control messages.

Anupama and Sathyanarayana et.al [5], Work on clustering in MANETs' is based on the analysis in this paper. Classification is based on the work of the Neighbour, power is based, weight-based, location-based, and artificial intelligence-based and takes advantages and disadvantages of practical aspects and suggest a good clustering sentence based access mobile. Research paper is presented for identification, including a high-degree, weighted clustering algorithm (WCA) and select the cluster head in a distributed clustering algorithm mobile ad -hoc network.

Azad and Sharma et.al [6], a recently made energy efficient clustering algorithm based on the lofty residuary energy is accomplished to increase the lifetime of wireless sensor network (WSN). In every cycle, a unchanged number of cluster heads are chooses based on maximum residuary energy of the nodes. Every cluster head is accompanied with a set of nodes based on the lower limit distance amidst them. In this type of scheduling all the nodes disperse uniform energy and afterwards remain unexpired for long time. The simulation outcomes represents proposed clustering approach is much better in prolonging the network ages compared with to be protocols like Distributed hierarchical agglomerative clustering (DHAC) and Low-energy adaptive clustering hierarchy (LEACH).

Bansal et.al [7], Mobile acted as a look at the performance clustering protocol analysis in the ad hoc network. This work mainly cluster-based routing protocol (CBRP) and two demand routing protocols at different dynamic source routing (DSR) and ad hoc demand distance vector (AODV) protocol cluster method based on different for routing the

corresponding analysis do not forget to use. When an ad result address and routing protocol in this matter is important to meet the ad hoc network protocol.

III. Proposed Work

Step 1: deploy the wireless Ad-Hoc Network

Step 2: In this Step Random Dynamic Clusters are generated on the bases of Distance and Energy.

Step 3: Leach Algorithm is used for creation of Dynamic Random Clusters

Step 4: Cluster head is selected on the bases of prediction Form all number of nodes in a single cluster whose energy is higher than other nodes

Step 5: Distance and Energy is predicted in each interval of time. Cluster heads are dynamic in nature and can change on the bases of Distance and Energy based then the selection of cluster head is done by Flower pollination optimization algorithm.

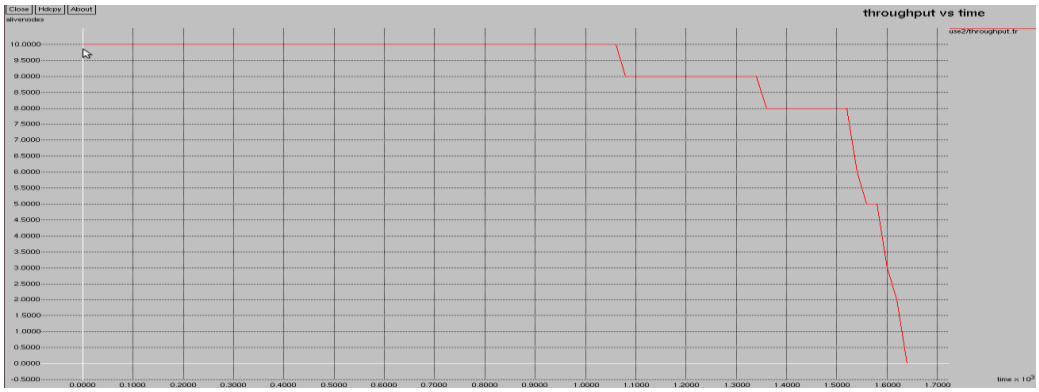
Step 6: Optimization of Cluster head If Destination is not found then go back to step 5 otherwise precede data Packet on Continues data Rounds with use of AODV (Ad-Hoc on Demand Distance Vector)

Step 7: Analyze the throughput, end to end time delay and drop packets in different set of rounds.

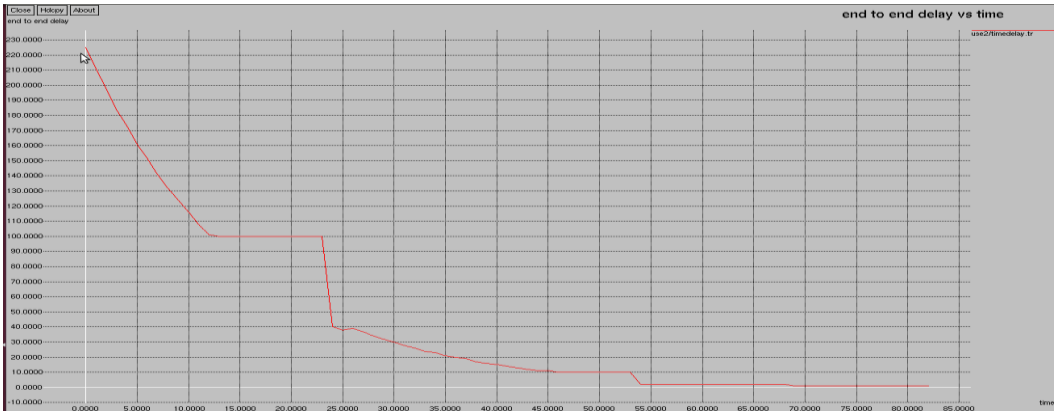
IV. Result and Discussions

3.1 Simulation Graphs of MANET with AODV (Previous approach):

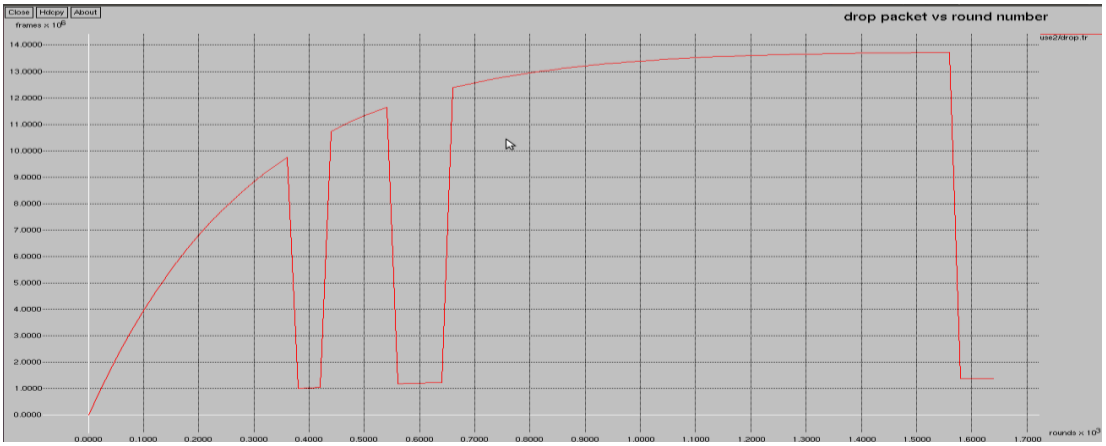
1. Throughput vs. time



2 End to End Delay vs. time

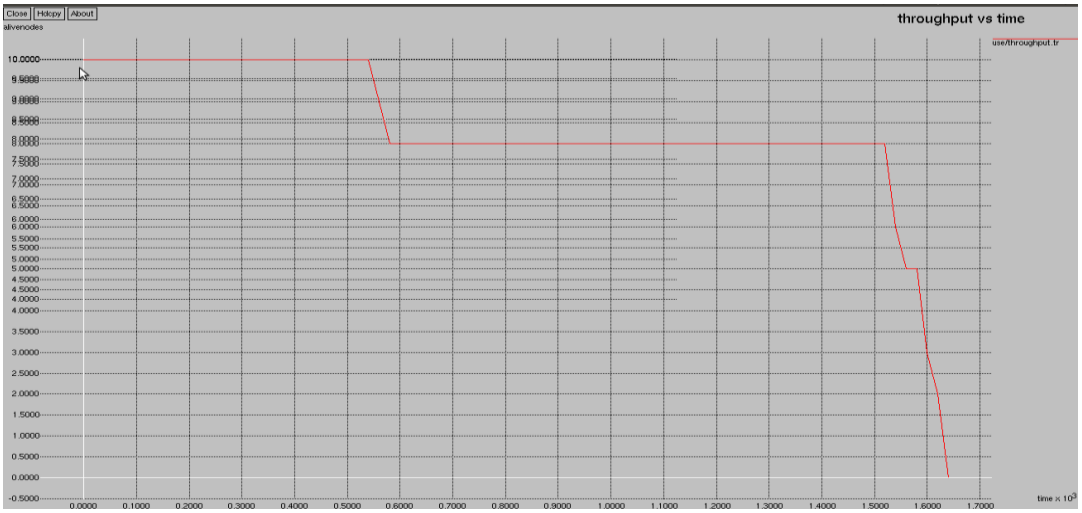


3 Drop Packets vs. Round numbers

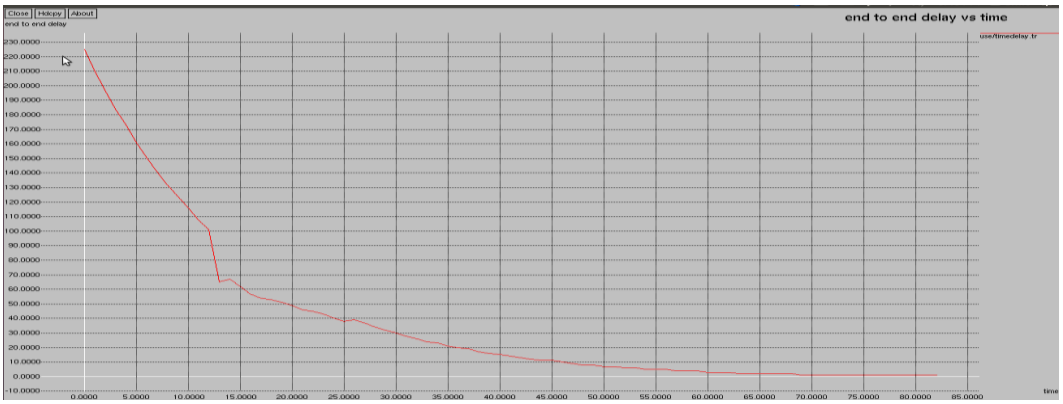


3.2 FPA_AODV Results (Proposed new approach):

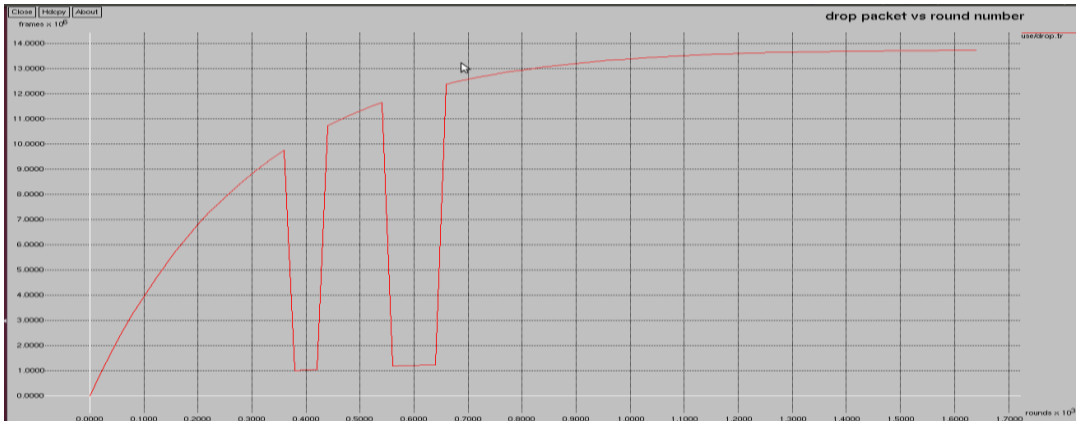
1. Throughput vs. time



2 End to End Delay vs. time



3 Drop Packets vs. Round numbers

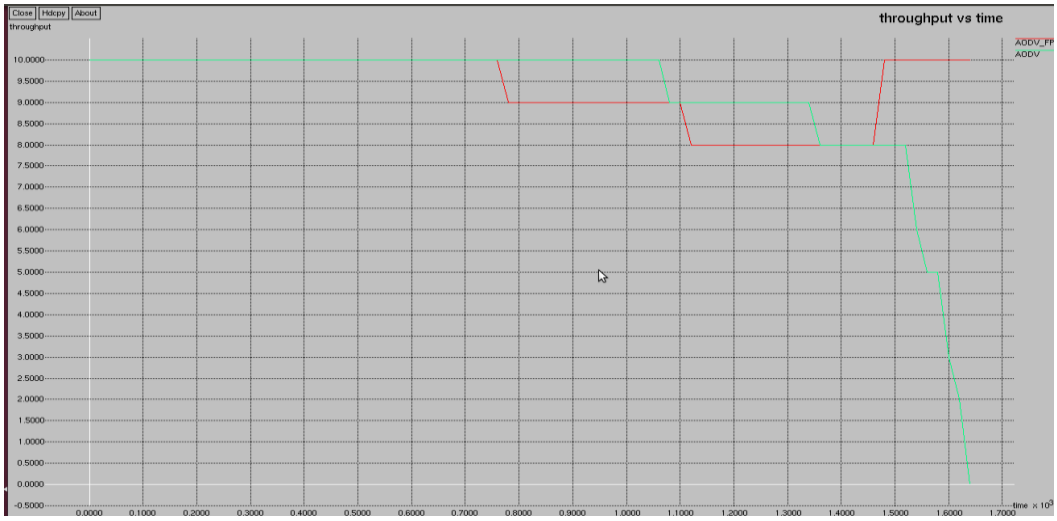


3.3 Simulation Compression Graphs: Following are the Simulation graphs of MANET with AODV and FPA_AODV)

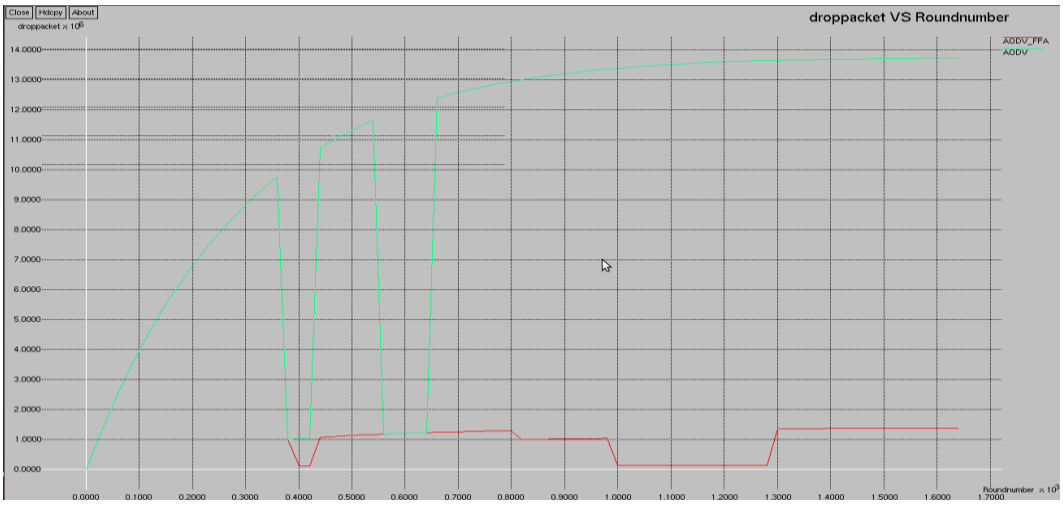
1. Throughput vs. time

Throughput value Equation:

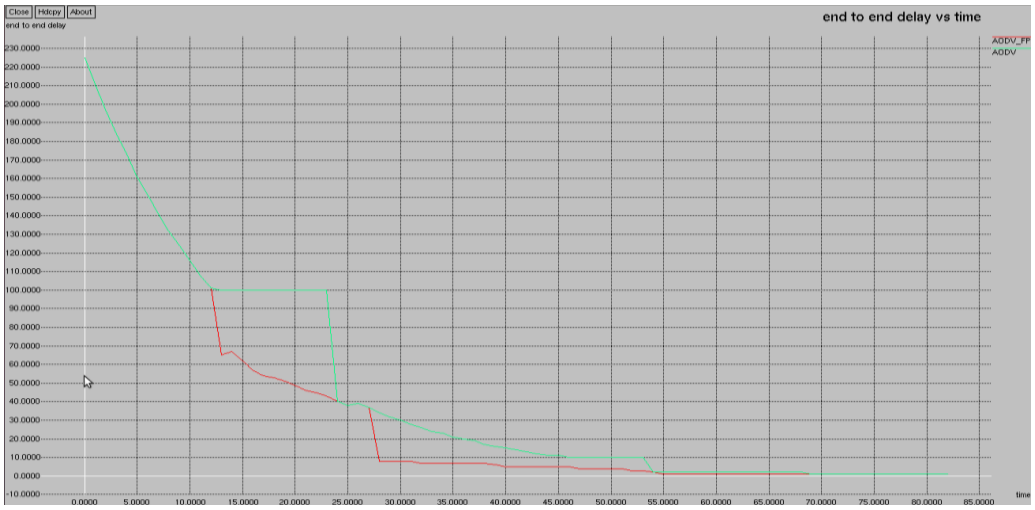
$$Throughput = \frac{\sum (\text{no. of delivered(i)}) * 8}{\text{Simulation time}}$$



2. End to End Delay vs. Time



3. Drop Packets vs. Round numbers



3.4 Analyze

By analyzing all above parameters and simulation, we can see the improvement in success rate and reliability factor when we introduce Flower pollination optimization Algorithm for cluster head selection.

V. Conclusion

In this thesis, the extra burden of the nodes that are within the neighbourhood of the base station in a cluster-based network has been modelled as extra virtual member nodes. We virtually divide the network into regions according to the proximity to the BS denoting the closest region as the front region and the farthest region as the rear region. The nodes have been classified according to the region that they fall in. Based on our model, transmission tuning algorithm for cluster-based WSNs has been proposed to balance the load among cluster heads that fall in different regions. This algorithm is applied prior to a cluster algorithm to improve the performance of the clustering algorithm without affection the performance of individual sensor nodes. As a result, the network lifetime has been prolonged. The effect of the undesired mobility is studied in another set of experiments. In these experiments each node moves according to a normal distribution model. The nodes that move out of their clusters are countered. Using our proposed metric as a flower pollination fitness function has been shown to decrease the number of the re-affiliated nodes. The proposed metric was used as a fitness function to break ties among CHs. However, it also can be combined with any other cluster head selection criteria, more research is needed to investigate the impact of such metric.

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