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Cluster-based Status Aware routing Mechanism for MANETs to Extend the performance

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Abstract:

Mobile Ad Hoc Network (MANETs) is a wireless infrastructure less network consist of mobile nodes distributed in radio communication area. The network allows its users to free to move i.e., enter anytime as well as leave the network anytime. Characteristics of network are cost effective, time effective, and self-forming. Application of network are military communication, disaster relief, and medical. Thus, communication information is very sensitive, and suitable protocol is needed to enable effective communication. One of the approaches to solve the effective communication is clustering. In this paper we propose a clustering in MANETs based on the current-status. The proposed work performance is evaluated with NS2 simulator, and results are compared with existing cluster-based mechanisms. The results show that the proposed work performance is good in terms of packet delivery, energy awareness, and delay.

Key Words: MANETs, clustering, energy.

1. Introduction

Mobile Ad Hoc Network (MANETs) [1] is a wireless infrastructure less network consist of mobile nodes distributed in radio communication area. The network allows its users to free to move i.e., enter anytime as well as leave the network anytime. Characteristics of network are cost effective, time effective, and self-forming. Application of network are military communication, disaster relief, and medical. Thus, communication information is very sensitive, and suitable protocol is needed to enable effective communication [8].

Communication [1]establishes in any network with the help of routing protocol route creating process, and future forward the information through the created route in the form of small chunks i.e., packets. In wireless infrastructure less network, if communication entities are present with in the communication range, then route establish directly between them, and they

communicate directly. In case, if they are not in communication rage of one anther then route must be created by taking help of

intermediate nodes. The selection criteria of intermediate nodes of routing purpose vary based on the application demand. The selection of intermediate nodes can be based on energy, distance, resource, and delay.

One of the problems faced by routing protocols in MANETs are packets drop by intermediate nodes during the communication [9]. The packets drop by intermediate nodes are majorly due to constrained resources problem. Thus,suitable protocol is needed to enable effective communication.

Clustering in MANETs can solve the issue of effective communicationby enabling network services locally [1]. One can use the clustering in MANETs to attain the efficient way of resources utilization.

2. Clustering

The clustering is the method of arranging the network into the set of small number of nodes, these nodes called as cluster members. These small number of nodes are headed by the one of them known as cluster head.

In literature various mechanisms have been designed to explain the clustering. These methods are majorly differed in two ways, 1). The way they divide the hole network into set of small groups of nodes i.e., cluster formation. 2). The way they select the cluster head. Other way of difference is designed for single hop or multi hop communication between cluster members and cluster head. Recent paper [2], demonstrates that the single hop based clustering procedure is not suitable for MANETs with high mobility, as MANETs allow the nodes to free to move and organize the networking activities. The problems faced by single-hop clustering mechanisms are coverage of network, and stability in communication [5-7]. On the other hand,multi-hop clustering mechanisms select the cluster head based on the mobility of the nodes, and network coverage are. However, multi-hop clustering mechanisms are suffering due to control packet overhead, and poor performance. Further, clustering mechanisms are designed based on the relative mobility of the nodes, and characteristics of neighbouring node. But these methods are having the problem of control packets overhead, which leads to network performance degradation. These problems are overcome by the hierarchical clustering approach, the aim is to use network resources effectively.Still this approach is having the problem of packet drop, which causes the effect on effective communication. To avoid the above discussed problem, the work presented the cluster head selection based on the current-status of the node regarding its buffer and energy.

The reminder of paper is organized as follows; next section designed the cluster head selection based on the current-statusof the node, further section validate the designed mechanism in terms of different measures, and the work ends with conclusion and future scope.

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3. Cluster-based Status Aware routing Mechanism

Cluster head selection is based on the current-status of the node regarding its energy and buffer. The energy current status is computed based on the following equation.

$$\boldsymbol{E_{Crt} = E - E(P_i)} \quad \textbf{(1)}$$

Where E is the initial energy of the node, $\boldsymbol{E(P_i)}$ is the node status after processing the $\boldsymbol{P_i}$ number of packets through it, and $i = 1,2,3$ ....

The buffer status is computed based on the following equation.

$$\boldsymbol{B_{Crt} = B - B(P_i)} \quad \textbf{(2)}$$

Where B is the initial buffer size of the node, $\boldsymbol{B(P_i)}$ is the node buffer status after processing the $\boldsymbol{P_i}$ number of packets through it, and $i = 1,2,3$ ....

$$\boldsymbol{CH_{Crt} = B_{Crt} * E_{Crt}} \quad \textbf{(3)}$$

Where $\boldsymbol{CH_{Crt}}$ is used to compute the current current-status of the node regarding its energy and buffer. The cluster member who is having greater $\boldsymbol{CH_{Crt}}$ value, then it becomes the cluster head.

4. Performance Analysis

Proposed mechanism i.e., Cluster-based Status Aware routing Mechanismperformance has been evaluated with the help of NS-2 with suitable extensions. The parameters for simulations are shown in Table 1. The performance evaluation parameters are lifetime, packet delivery, and delay.

Table-1: Simulation Parameters

Network, Parameters	Values
Compunction range	100-300m
No. of Road side units	3
Simulation, Time	1500 s
Mobility	10-40 m/s
Mobility Network layer Communication.	Random RCRP Two-Ray-Ground
Queue	Drop-Tail
Energy	100j
Simulation area	1000m x 1000m
Traffic	CBR

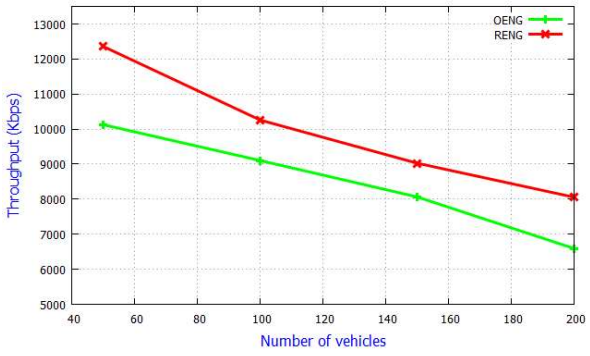

Figure 1:- Performance analysis **a** Throughput

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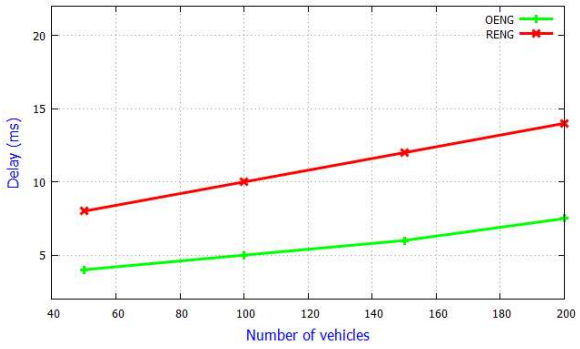

Figure 2:- Performance analysis **a** delay

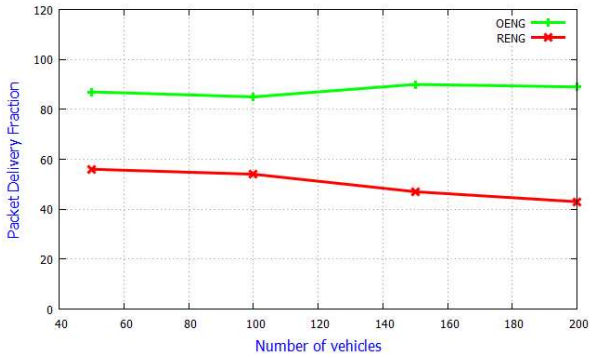

Figure 3:- Performance analysis **a** packet delivery fraction

Figures 1 to 3 describes the performances evaluation results of existing cluster forming and proposed cluster forming in terms of throughput, delay, PDF. The results are clearly indicating that the enhanced performance with proposed cluster mechanism. Just considering the node residual status in not sufficient to enhance the network performance in MANET but need to consider the its residual status regarding packet processing ability.

5. Conclusion

Mobile Ad Hoc Network (MANETs) is a wireless infrastructure less network consist of mobile nodes distributed in radio communication area. The network allows its users to free to move i.e., enter anytime as well as leave the network anytime. Characteristics of network are cost effective, time effective, and self-forming. Application of network are military communication, disaster relief, and medical. Thus, communication information is very sensitive, and suitable protocol is needed to enable effective communication. One of the approaches to solve the effective communication is clustering. In this paper we propose a clustering in MANETs based on the current-status. The proposed work performance is evaluated with NS2 simulator, and results are compared with existing cluster-based mechanisms. The results showed that the proposed work performance is good in terms of packet delivery, energy awareness, and delay.

References

1. Mohammad, Arshad Ahmad Khan, Ali Mirza, and Srikanth Vemuru. "Cluster based mutual authenticated key agreement based on chaotic maps for mobile ad hoc networks." *Indian Journal of Science and Technology* 9.26 (2016).
2. Dutta, Ashit Kumar, et al. "An efficient hierarchical clustering protocol for multihop Internet of vehicles communication." *Transactions on Emerging Telecommunications Technologies* 31.5 (2020): e3690.
3. Elhoseny, Mohamed, and K. Shankar. "Energy efficient optimal routing for communication in VANETs via clustering model." *Emerging Technologies for Connected Internet of Vehicles and Intelligent Transportation System*

Networks. Springer, Cham, 2020. 1-14.

4. Schoch, Elmar, et al. "Communication patterns in VANETs." *IEEE Communications Magazine* 46.11 (2008): 119-125.
5. Zhang Z, Boukerche A, Pazzi R. A novel multi-hop clustering scheme for vehicular ad-hoc networks. In: Proceedings of the 9th ACM International Symposium on Mobility Management and Wireless Access; 2011; Miami, FL.
6. Chen Y, Fang M, Shi S,Guo W, Zheng X.Distributed multi-hop clustering algorithm for VANETs based on neighborhood follow. EURASIP JWirel Commun Netw. 2015.
7. Ucar S, Ergen SC, Ozkasap O. VMaSC: vehicular multi-hop algorithm for stable clustering in vehicular ad hoc networks. Paper presented at: 2013 IEEE Wireless Communications and Networking Conference (WCNC); 2013; Shanghai, China..
8. Siddiqua, Ayesha, Kotari Sridevi, and Arshad Ahmad Khan Mohammed. "Preventing black hole attacks in MANETs using secure knowledge algorithm." *2015 International Conference on Signal Processing and Communication Engineering Systems*. IEEE, 2015.
9. Sana, Afreen Begum, Farheen Iqbal, and Arshad Ahmad Khan Mohammad. "Quality of service routing for multipath manets." *2015 International Conference on Signal Processing and Communication Engineering Systems*. IEEE, 2015