International Journal of Current Trends in Engineering & Technology
ISSN: 2395-3152
Volume: 01, Issue: 07 (November – December, 2015)

Weighted Clustering Algorithms for Mobile Adhoc Network: A Survey

Sandeep Monga
Research Scholar, Department of Information Technology
UIT, RGPV, Bhopal, Madhya Pradesh, India
smongaphd6@gmail.com

Abstract: This paper recognizes different ideas required in Quality of Clustering. We concentrate on the different strategies that can be useful for establish the quality of the mobile ad hoc networks, as MANETs haven't any fixed infrastructure; all communication has to be routed through the nodes within the network. Many clustering and routing algorithms are developed for MANETs. Clustering method involves in grouping network nodes and facilitates in reducing the overhead massages that help in establishing routs. Moreover, third's a trade-off between providing security and preserving the ability of a node. In existing approaches, clustering and routing algorithms are designed explicitly for either providing security or protective power. It's terribly tough to boost each security and minimize power consumption, as usually on is achieved at the expense of the opposite. In this paper we survey about different weight based clustering algorithms designed so far.

Keywords: Clustering, MANETs, Mobility, Weight Based clustering

I INTRODUCTION

MANET Stands for "Versatile Ad Hoc Network." A MANET is a kind of ad hoc network that can change areas and design itself. Since MANETS are mobile, they utilize wireless connection to interface with different networks. This cans be a standard Wi-Fi connection, or another medium, for example, a cellular or satellite transmission. A few MANETs are confined to a local area of wireless devices (for example, a cluster of laptop), while others might be associated with the Internet. For instance, A VANET (Vehicular Ad Hoc System) is a sort of MANET that permits vehicles to communicate with roadside device. While the vehicles might not have an Internet connection; the remote roadside device might be associated with the Web, permitting information from the vehicles to be sent over the Internet. The vehicle information might be utilized to gauge traffic conditions or monitor truck fleets. As a result due dynamic nature of MANETs, they are not very scurf, so it is essential, to be vigilant, while sanding the over a MANET.

II CLUSTERING IN MOBILE AD HOC NETWORK

Clustering is a technique which will optimize resource management in MANET. Clustering is to attain scalability in hug networks and high mobility. Very portable device in the cluster advertises the massages to setup the connection. If any device changes its cluster, than just that device which are in corresponding clusters are required to update the information, thru is no need to refresh the complot network. Different parts of clusters are Cluster Head (CH), Cluster Members (CM) and, Cluster Gateway (CG), CH node is a coordinator of its own cluster. CM is an ordinary node that communicates only with its cluster head. CG is a node which works like a bridge to forward information between clusters.

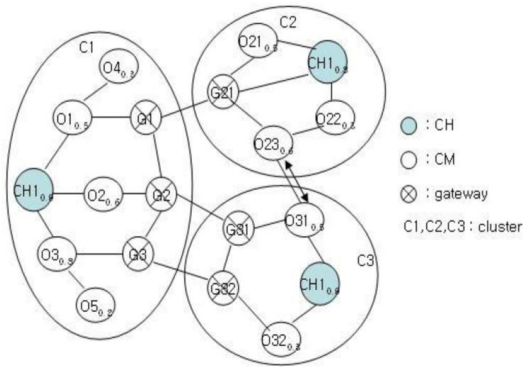

Figure 1 Clustering of Nodes

The cluster design ensures wall ordered performance with respect to hug dens ad hoc networks. The benefit of cluster is as follows: It permits the protocol for the better execution at MAC layer by enhancing the throughput and versatility. It decreases the scald of routing table, and enhanced the routing. Updating the routing tables due to topological changes will result in reduce of transmission overheads. It helps to reduce the bandwidth and energy consumption in ad-hoc networks. Clustering related data interchange increases overhead on the network. Reconstruct of Cluster Structure in Case of Network Structure change is resource consuming. Communication Complexity increases due to Control Massages exchange. There is no general solution for clustering.

III COST OF CLUSTERING

Developing and keeping up a cluster structure requires extra cost compared to normal (flat) MANETs. The analysis of cost of clustering schema is completed quantitatively or qualitatively to plot the advantages and disadvantage of the clustering technique [2]. The cost related with clustering is clarified as beneath: - In a progressively changing of cluster structure because of continuous change in network topology the data related to cluster vary drastically. The resulting exchange of massage packets consumes generous bandwidth and drains

the energy possessed by mobile nodes. Re-clustering may occur in some clustering plans because of sudden local instance, for example, movement of mobile node to another cluster or death of a mobile node or van closes down of cluster heads, in this manner prompting to or election of cluster heads. This is known as ripple effect of or-clustering which stimulates this effect of or-clustering over the entire network. Clustering plan is separated into two phases: Cluster formation and maintenance. The formation stag assumes that the mobile nodes are static. With a frozen period of motion, each mobile node can obtain accurate information from neighbouring nodes, which may not be applicable in real time scenario

IV RELATED WORKS

A lot of research has been don on weight based clustering algorithms in MANET. Blow shows few algorithms based on weighted mechanism to make clusters

WCA: **A Weighted Clustering Algorithm for Mobile Ad Hoc Networks** Maniac chatterjee et al, proposed weight-based distributed clustering algorithm takes into consideration the ideal degree, transmission power, mobility, and battery power of mobile nodes. The time required to identify the cluster heads depends on the diameter of the underlying graph. We try to keep the number of nodes in a cluster around a pre-defined threshold to facilitate the optimal operation of the medium access control (MAC) protocol. The non-periodic procedure for cluster head election is invoked on-demand, and is aimed to reduce the computation and communication costs. The cluster heads, operating in "dual" power mode, connects the clusters which help in routing massages from a node to any other node. [1]. a Efficient Weight-based Clustering Algorithm for MANET**,** Mohammad Raze Mons fatal, proposed a efficient weight-base clustering algorithm (EWBCA) for mobile Ad-hoc networks (MANETs) [2]. It aims to improve the usage of limited resources such as bandwidth and energy, protect currant cluster structure as much as possible, minimize routing overhead, and increase and-to-and throughput. In our algorithm, each node has a quality that indicates its suitability as a cluster head. This quality is calculated according to following four parameters: Number of Neighbours, Residual Power of Battery, Stability, and Variance of distance with all neighbours.

A Hierarchical Weighted Clustering Algorithm optimized for Mobile Hybrid Networks Matthias R. Burst et al., investigations focus on the problem of minimizing cluster head re-elections by considering stability criteria. These criteria are based on topological characteristics as well as on device parameters. This paper presents a weighted clustering algorithm optimized to avoid needless cluster head re-elections for stable clusters in mobile ad-hoc networks. The proposed localized algorithm deals with mobility, but do's not require geographical, speed or distances information. [3]

A Robust Clustering Algorithm for Mobile Ad Hoc Networks Zhaowen Xing et al, presents a robust weighted clustering algorithm, called PMW (Power, Mobility and Workload), to form and maintain more stable clusters. In PMW, the weight of each node is calculated by its power, mobility and workload, which can be easily collected and computed locally and cover the major factors that cause or-clustering. Clustering overhead of PMW is analyzed. The simulation results confirm that PMW prolongs lifetime of MANETs and has a lower cluster head change rate and or-affiliation rate than other existing algorithms. [4]

A Load-Balancing and Weighted Clustering Algorithm in Mobile Ad-Hoc Network Abdel Raman H. Hussein et al, proposed that the enhancement on weighted clustering algorithm (EWCA), lads to a high degree of stability in the network and improves the load balancing. In this simulation study, a comparison was conducted to measure the performance of our algorithm with original WCA in terms of numbers of clusters formed with satisfy load balancing , topology stability, and number of cluster head change.[5]

An Innovative Clustering Algorithm for MANETs Based on Cluster Stability Mohammad Shayesteh and Nima Karimi, presented a new clustering algorithm in Mobile Ad Hoc Network based on nodes weight. For calculating node weight we present four new parameters are Relative speed, Stability, Number of nodes moving towards a node, Remaining Battery. The goal of this algorithm is to decrease the number of cluster forming; maintain stable clustering structure and maximize lifespan of mobile nodes in the system. [6]

V CONCLUSION

In this paper the overview of different weight based clustering schema have been finished. The techniques adopted in finding the cluster head are different in these algorithms. This paper exhibits a review of clustering algorithm in which various measurements have been utilized to discover cluster head based on the weight values of the node with other essential parameters are taken into consideration. The review presented in this paper will be useful to researchers and give a platform for choosing the correct weight based clustering algorithm for their work in future. The summary of all the algorithms is being shown in table

Table 1: Comparison of different weight-based algorithms

Name of the paper	Resource	Selection of Cluster head	Network lifetime	Stability	Transmission range	Result
An Efficient Weight-based clustering algorithm for MANET	Journal of computing	Node with highest weight			Minimum	Uses less energy and throughput has increased
Stable and Flexible Weight based Clustering Algorithm in Mobile Ad hoc Networks	International Journal of Computer Science and Information Technologies	Node with largest weight		More stable	Minimum	Performance is much better
WACA: A Hierarchical Weighted Clustering Algorithm optimized for Mobile Hybrid Networks		Node wit highest weight		Increased	Minimum	Optimized clusterheads n formation of clusters
A Robust Clustering Algorithm for Mobile Ad Hoc Networks	Handbook of Research on Next Generation Networks and Ubiquitous Computing	Based on new formula of weight (PMW)	9% to 42 % increased	More stable	10m-250m	Increases lifetime of network and has lower cluster head election rate
A Load Balancing and Weighted Clustering Algorithm in Mobile AdHoc Network		Node with smallest weight	Improves lifetime	Higher degree of stability	0m-200m	Less clusterheads formed more stable and balanced
WCA: A Weighted Clustering Algorithm for Mobile Ad Hoc Networks	Cluster Computing 5	Node with smallest weight		Little Stable	0m -70m	Number of reaffiliations had increased
An Innovative Clustering Algorithm for MANETs Based on Cluster Stability	International Journal of Modeling and Optimization	Node with highest weight	Increased	Most stable	Maximum	Decrease the number of cluster forming, maintain stable clustering structure and maximize lifespan of mobile nodes

REFERENCES

[1]. Mainak Chatterjee, Sajal K. Das And Damla Turgut, "Wca: A Weighted Clustering Algorithm For Mobile Ad Hoc Networks", Cluster Computing 5, 193–204, 2002.

[2]. Mohammad Reza Monsef, Samjabbehdari And Farshadsafaei, "A Efficient Weight-Based Clustering Algorithm For Manet", Journal Of Computing, Volume 3, Issue 1, January 2011, Issn 2151-9617

[3]. Matthias R. Brust, Adrian Andronache And Steffen Rothkugel, "Waca: A Hierarchical Weighted Clustering Algorithm Optimized For Mobile Hybrid Networks".

[4]. Zhaowen Xing, Le Gruenwald And K.K. Phang, "A Robust Clustering Algorithm For Mobile Ad Hoc Networks", Handbook Of Research On Next Generation Networks And Ubiquitous Computing, December 2008.

[5]. Abdel Rahman H. Hussein, Sufian Yousef, And Omar Arabiyat, "A Load-Balancing And Weighted Clustering Algorithm In Mobile Ad-Hoc Network".

[6]. Mohammad Shayesteh And Nima Karimi, "An Innovative Clustering Algorithm For Manets Based On Cluster Stability", International Journal Of Modeling And Optimization, Vol. 2, No. 3, June 2012

[7]. Suchismita Chinara, Santanu Kumar Rath. A Survey On One-Hop Clustering Algorithms In Mobile Ad Hoc Networks. Journal Network System Management 2009; 17:183–207.

[8]. Mohamed Aissa Quality Of Clustering In Mobile Ad Hoc Networks 5th International Conference On Ambient Systems. Networks And Technologies (Ant-2014)

[9]. Ismail Ghazi Shayeb, Abdelrahman Hamza Hussein And Ayman Bassam Nasoura (2011). A Survey Of Clustering Schemes For Mobile Ad-Hoc Network (Manet), American Journal Of Scientific Research, 20, (Pp. 135-151).