



Survey on Clustering Approaches on Sensor Networks

Indu¹ & Mrs. Sunita Bhardwaj²

¹Student, M.Tech., ²Asstt. Professor,

Department of Computer Science, P.D.Memorial College of Engineering for Women (PDMCEW),
Bahadurgarh, Haryana, India.

Abstract: Clustering in sensor network is one of the most important Sensor Network architecture to divide the network in smaller segments so that the low distance and low cost communication will be performed over the network. This Clustering process includes the location based node analysis so that effective clustering model will be implemented over the network. This paper includes the study on different Clustering approaches such. Paper also discussed the contribution of earlier authors in the area of Sensor Network Clustering.

Keywords: Clustering, Network Decomposition.

I. INTRODUCTION

Sensor Network Processing is one of the most required forms of Sensor Network processing to extract the information effectively and to conclude some valuable information from it. Some of the information is integrated in Sensor Network in different forms. To extract this kind of information from Sensor Network, the feature extraction is applied over the Sensor Network. There are different methods to retrieve the information from Sensor Network under different aspects, applications and Sensor Network types. Some of such information representation or extraction approaches includes the segmentation, Clustering etc. The information retrieval process from Sensor Network is shown in figure 1. Sensor Network Clustering is one of the most required tasks to extract information from Sensor Network. It is used in different contexts to perform the Network or pattern communication as well as to perform the categorization of the Networks based on information analysis. It is actually defined in a hybrid scenario that itself covers the concept of Network categorization, Network communication as well as enable the Network search. Clustering is about to characterize the Sensor Network under the visual part analysis with view analysis. There are number of application areas where the Clustering plays an important role. These application areas include the disease Clustering in medical Sensor Network, Network Clustering in real time Sensor Network etc. Sensor Network Clustering is actually to define a tag or the annotation to the Sensor Network based on the feature based analysis. The Clustering process is applied on a set of arbitrary Sensor Network collected from any primary or secondary source. These Sensor Networks belong to specific domain such as medical Sensor Network, geographic Sensor Network, handwritten characters, biometric Sensor Network etc. The Clustering procedure is divided in two broader approaches called Generalized Clustering and Rule Based Clustering.

A. Generalized Clustering

Generalized Clustering perform the analysis on the pre-classified Sensor Network and represent it as the training Sensor Network. The descriptors are applied on these Sensor Network Sensor Network to represent different classes. These annotations are applied on each training Sensor Network manually without performing any analysis. When Clustering process is applied, at the earlier stage, the training Sensor Network analysis is performed. This analysis is performed to identify the descriptive features for each class. Now when some Sensor Network is accepted from the user and the feature analysis is performed on it. Now these extracted features will be compared with the training set features. The Sensor Network with the maximum feature match will be elected as the matched Sensor Network and the class of that matched Sensor Network will be considered as the class of input Sensor Network.

B. Rule Based Clustering

This kind of Clustering approach does not require any training set. These methods rely on the clustering process that performs the distance based analysis between the input Sensor Network and the available Sensor Network Sensor Network. This distance measure can be performed on complete Sensor Network or the featured Sensor Network extracted from the Sensor Network itself. Based on this distance based analysis, the Sensor Network with minimum distance match will be elected as the matched Sensor Network and its class annotation is placed on input Sensor Network. In this paper, the exploration to the Clustering process is been defined. This paper includes the study of different Clustering approaches. In this section, the exploration of the Sensor Network Clustering model is defined along with the major categorization of Clustering process. In section II, the work

done in the area of Sensor Network Clustering is defined. In section III, different Sensor Network Clustering approaches are discussed. In section IV, the conclusion obtained from the work is presented.

II. EXISTING WORK

In this section, the work done by the earlier researchers in the area of Sensor Network Clustering is discussed and presented. In Year 1997, K. S. Chen [1] has defined the filtering effect based analysis on Sensor Network Clustering. This paper exams its effects on the Sensor Network Clustering by a generalized fuzzy dynamic Clustering neural network trained by a Kalman filter technique. Based on the available ground truth, the Clustering performances were evaluated using the original and filtered Sensor Network. In Year 1998, A.T. Shuen[2] has improve the Clustering approach using region fusion on spotted Sensor Network. This paper investigates various digital filtering techniques to remove speckles for Sensor Network Clustering using fused SAR and SPOT XS Sensor Network. The fused Sensor Network Clustering is then compared with the classified SPOT XS Sensor Network. In Year 2003, N. Abbadeni [3] presented work on texture and the content based approach for the similarity analysis on Sensor Network. This paper addresses the fundamental issues of visual content representation and similarity matching in content-based Sensor Network retrieval and Sensor Network Sensor Network bases in general. In this paper, a new similarity model is introduced based on the Gower coefficient of similarity. This similarity model is flexible and can be declined in several versions: non-weighted, weighted and hierarchical versions. This model was applied to a sample of homogeneous textured Sensor Network considering two representation models: the autoregressive model, a purely statistical model, and an empirical perceptual model based on perceptual features such as coarseness and directionality. In Year 2003, Kentaro Toyama [4] defined the Geographic tag placement in digital Sensor Network. Author described an end-to-end system that capitalizes on geographic location tags for digital photographs. This paper brings all of these issues together, explores different options, and offers novel solutions where necessary. Topics include acquisition of location tags for Sensor Network media, Sensor Network structures for location tags on photos, Sensor Networkbase optimization for location-tagged Sensor Network media, and an intuitive UI for browsing a massive location-tagged Sensor Network Sensor Networkbase. In Year 2006, L. Yuan [5] performed a work on the Clustering of Sensor Network using MAP based algorithm. Presented main work is to select a Gaussian mixture model and then use it in a MAP Clustering algorithm. The model is assumed that the whole distribution could be separated into finite parametric density distributions, and then the maximum likelihood parameters of each proportional distribution can be estimated by EM iterative computation. In Year 2006, Lan Gao [6] performed a fuzzy based analysis for SAR Sensor Network Clustering. This paper is to investigate a new Rule Based approach for extracted the Networks based on Sensor Network using improving fuzzy clustering method. The traditional Fuzzy c-means clustering (FCM) is very sensitive to the initial value and the number of clusters. This paper employs the textural feature in Sensor Network to extract the transition and propose a new fuzzy Rule Based Clustering method for SAR Sensor Network using the transition region to define the initial value and the number of cluster adaptively. In Year 2006, R. Lorenzo [7] defined Generalized Clustering approach for communication using spiking neurons. In this paper Author propose a three-layered neural network for binary pattern communication and memorization. Unlike the classic approach to pattern communication, presented net works organizing itself in a Rule Based way, to distinguish between different patterns or to recognize similar ones. In Year 2006, Q. Wu [8] performed the knowledge representation on the spiking neuron based analysis. Knowledge representation is very important in intelligent systems - e.g. for knowledge discovery, Sensor Network mining, and machine Clustering. The human brain, a significant intelligent system, works with a huge number of spiking neurons. Based on spiking neuron models a new generation of spiking neural networks (SNNs) has been developed for artificial intelligence systems. SNNs are computationally more powerful than conventional artificial neural networks. In this paper, the spiking neuron model is applied to represent logic rules and fuzzy rules. Based on the STDP (Spike Timing Dependent Plasticity) principle, a new SNN model is proposed for pattern communication. In Year 2007, M.R. Peterson [9] defined work on the evolution of satellite Sensor Network. A Satellite Sensor Network Set for the Evolution of Sensor Network Transforms for Defense Applications". Author present a set of fifty satellite Sensor Network used to evolve Sensor Network transforms appropriate for satellite and unmanned aerial vehicle (UAV) reconnaissance applications. Author identified the best training and test Sensor Network. In Year 2007, F. Chen [10] defined a work on Clustering on SAR Sensor Network using cased based reasoning. In this paper, Author investigated a case-based reasoning (CBR) method for the Clustering of multi-temporal SAR Sensor Network with the aid of ancillary information. Author proposed a similarity assessment and uses it for the case-based matching. After that, Author investigate an Network-oriented post-Clustering method which takes the shape of land use region into account, as a result, it leads to a more meaningful Clustering, and the regenerate land use Sensor Network or map can be easier compared and combined with usual GIS Sensor Network.

III. CLUSTERING TECHNIQUES

In this section, Sensor Network Clustering process is defined with the exploration of Sensor Network Clustering model. There are parametric and non-parametric Clustering approaches to divide the available Sensor Network

set in various categories based on feature analysis. The Clustering process is actually the mapping between the input Network to featured set and then to label class. These basic models of clustering process. This model is defined respective to the Generalized Clustering process. This Clustering process is applied with two Sensor Networks called training set and the testing set. This is one of the simplest Clustering techniques that based on the computation process to achieve the accurate result. In most of the Clustering implementation, it gives more accurate results. This method is processed on the feature vector and perform the distance based analysis between the input Network and the training Networks. Here k represents the number of classes in the training set. Now when the distance analysis is performed, based on the best-fit analysis the nearest neighbor is identified. The featured classes are differentiated based on the analytical distance based. In this paper, an effective reliable, efficient and energy effective routing approach is suggested in this work. The presented work is defined on a smart sensor network in which each node is defined with some smart capabilities. The most effective properties of these sensors are the storage capability and the ability to take the decision making along with integrated processing. The main base of the presented work is to provide the energy balanced communication over the network. To provide this balancing, instead of communicating the data over a fixed static path, an array of the network paths is defined in this work. As the nodes are defined with memory specification, at the earlier stage, all the possible paths are generated and stored in the available memory. These paths include the shortest path as well as alternate paths under the energy effectiveness and the load effective analysis. These paths are generated in such a way that the intermediate nodes of a path will not be included in other path. Now these paths get activated in a sequence so that each time a separate path will be elected for the communication. A time-slicing approach is suggested in this work to activate these stored paths. The main objective of the work is improve the network life and to provide the reliable communication over the network. In this section, the assumption, working and the algorithmic approach of the presented work is explained in detail

A. Assumptions

- a) All the network nodes are defined at static location.
- b) The base station is placed at one end of the network.
- c) Single source and destination points are described so that effective route will be generated.
- d) Nodes are defined with energy specification and with each participation some energy loss will be done.
- e) All the sensor nodes are homogenous but they are having different congestion factor and the energy level.
- f) All nodes are having some memory to store the associated paths.
- g) Nodes are defined with decision capability about the next hop selection.
- h) Each node is defined with a bit as the route participation node.

IV CONCLUSION

In this presented work, an effective alternate path based energy balanced routing is suggested. This work is based on the smart sensor network where each node is capable to store the possible paths and these nodes get activated under the scheduling machismo. The work is expected to improve the network life by providing the effective routing.

REFERENCES

- [1] Chao Gui, "SHORT: Self-Healing and Optimizing Routing Techniques for Mobile Ad Hoc Networks", MobiHoc'03, June 1–3, 2003, Annapolis, Maryland, USA. ACM 1-58113-684-6/03/0006
- [2] Hao Wen, "RENA: Region-based Routing in Intermittently Connected Mobile Network", MSWiM'09, October 26–29, 2009, Tenerife, Canary Islands, Spain. ACM 978-1-60558-616-9/09/10
- [3] Jiejun Kong, "ANODR: ANonymous On Demand Routing with Untraceable Routes for Mobile Adhoc Networks", MobiHoc'03, June 1–3, 2003, Annapolis, Maryland, USA ACM 1-58113-684-6/03/0006
- [4] Kyu-Hwan Lee, "Routing based Authentication for Mobile Ad hoc Network in Home Environment".
- [5] Athanasios Bami, "A Mobility Sensitive Approach for Efficient Routing in Ad Hoc Mobile Networks", MSWiM'06, October 2–6, 2006, Torremolinos, Malaga, Spain. ACM 1-59593-477-4/06/0010
- [6] Khaleel Ur Rahman Khan, "An Efficient Integrated Routing Protocol for Interconnecting Mobile Ad Hoc Networks and the Internet", International Conference on Advances in Computing, Communication and Control (ICAC3'09) ICAC3'09, January 23–24, 2009, Mumbai, Maharashtra, India. ACM 978-1-60558-351-8
- [7] S. Sathish, "Cache Based Ant Colony Routing Algorithm for Mobile Ad hoc Networks".
- [8] Giovanni Comarella, "Robot Routing in Sparse Wireless Sensor Networks with Continuous Ant Colony Optimization", GECCO'11, July 12–16, 2011, Dublin, Ireland. Copyright 2011 ACM 978-1-4503-0690-4/11/07
- [39] C D'Souza, "Implementation of Particle Swarm Optimization Based Methodology for Node Placement in Wireless Sensor Networks", International Conference and Workshop on Emerging Trends in Technology (ICWET 2011) – TCET, Mumbai, India ICWET'11, February 25–26, 2011, Mumbai, Maharashtra, India. ACM 978-1-4503-0449-8/11/02
- [10] Taesoo Jun, "Automated Routing Protocol Selection in Mobile Ad Hoc Networks", SAC'07 March 1115, 2007, Seoul, Korea ACM 1-59593-480-4/07/0003
- [11] Jing-hui Zhong, "Ant Colony Optimization Algorithm for Lifetime Maximization in Wireless Sensor Network with Mobile Sink", GECCO'12, July 7–11, 2012, Philadelphia, Pennsylvania, USA. ACM 978-1-4503-1177-9/12/07
- [12] Mohsen Saffarian, "A Novel Protocol to Prevent Malicious Nodes from Misdirecting Forward Ants in AntNet Algorithm", SAC'08, March 16–20, 2008, Fortaleza, Ceará, Brazil. ACM 978-1-59593-753-7/08/0003