RESEARCH ARTICLE

A Study on Different Routing Approaches on Sensor Network

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Abstract: To optimization of sensor network is based on the route optimization. Routing in sensor network is adaptive to the energy constraint and communication parameters. To perform the optimize and low cost communication over the network, it is required to optimize the communication. To achieve the effective outcome from network, effective selection of routing constraints, parameters and algorithmic approach is required. The routing is also based on the associated problem statement. In this work, different constraints relative to the routing are discussed. The paper has also presented a study on algorithmic approaches adapted in sensor network.

Keywords: Optimized Routing, Sensor Network, Energy Specific, Constraint Specific

I. INTRODUCTION

Sensor network is the specialized network architecture defined for real time scenario and to derive the environmental parameters over the network. These kinds of network, sensor nodes are directly connected to the environment to adapt the valuable information and convert it to the required form. Once the information is converted, it is communicated over the network so that the network specific decision will be taken. There are different associated constraints that affect the communication in such kind of networks. These network parameters are related to communication operations performed over the network. Routing and clustering are such kind of associated communication operations. Some of the important aspect of sensor network includes the topology specification, communication architecture, energy specification, resource limitation, memory limitation etc.

Because of these constraints and limitation, some adaptive communication mechanism is required in such network so that reliable and effective communication will be drawn. The sensor network architecture is shown in figure 1
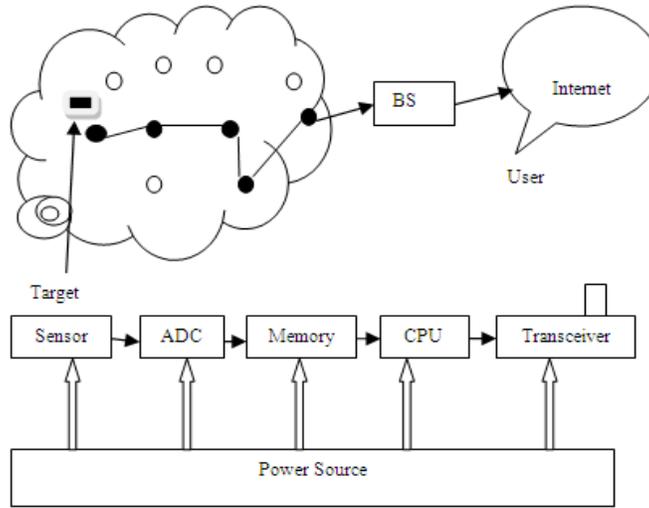

Figure 1 : Sensor Network Architecture

A) Challenges in Sensor Network

There are some associated challenges in sensor network. These challenges itself considered as the network limitation such as the lesser computation power, low battery, lesser memory etc. Depending on the application, the criticality of these limitation increases. There are some applications where the battery backup or the recharging of battery is not possible. In such war or rescue scenario network, there is the requirement to deal with such challenges more significantly. The capacity specification for nodes along with measurement analysis is performed to provide the adaptive communication in environment integrated sensor network.

B) Mobile Sensor Network

Generally most of the sensor networks are architecture specific static networks. But there also exist some specialized network in which nodes are dynamic and having the mobility feature. The personal area network is such kind of network. The network established by the PDA devices or the smart sensor in a hospital comes under mobility adaptive sensor network. In these networks, the nodes can move randomly or under specific model with own control as well as under central control. These networks are the most advanced type of communication network defined under the computational control and the computational capabilities. Such kind of network is defined under the physical environment with the computational capability representation. The computation control in such network is defined with network capability specification and network component specification. The network capabilities are identified under the control and computation specification so that the more effective communication will be drawn. These kind of network having the capabilities to extend itself. A key difference between a mobile sensor network and a static sensor network is how information is distributed over the network. Under static nodes, a new task or data can be flooded across the network in a very predictable way. Under mobility this kind of flooding is more complex. Under natural mobility this depends on the mobility model of the nodes in the system.

C) Other Network Types

Wireless Sensor Networks (WSNs) are widely used network. These days, there are many researches running on in this field and many protocols have been designed for the Wireless Sensor Network. All these algorithms consider the Static Sensor Networks (SSNs). The Static Sensor Networks (SSNs) have various disadvantages such as first, less energy

efficient, most of the gateway nodes loss their energy first means these nodes are die thus the whole network goes to die. Second, Static Sensor Networks (SSNs), the sensor nodes are static so its cannot move to other places but in Mobile Sensor Networks (MSNs) the sensor node can move and reach the places where event is fired. Mostly the sensors are deployed randomly, as opposed to precisely, therefore there is often a requirement to move the sensor node for better sight or for close proximity. Also mobility helps in better quality of communication between sensor nodes.

In this paper, a study on different routing approaches and routing constraints is defined. In this section, the sensor network architecture is defined along with the specification of different kind of sensor networks and associated challenges. In section II, the work defined by the earlier researchers is discussed. In section III, The routing approaches defined by earlier researchers are presented. In section IV, the conclusion obtained from the work is discussed.

II.   EXISTING WORK

In this section, the work done by the earlier researchers in the area of Sensor Network Routing is discussed and presented. Edward J. Coyle [1] defined a work on the sensor network analysis to generate the effective route over the network. The routing approach is here defined under fuzzy adaptive approach and with fuzzy approach. The kalman filter based statistical approach is defined to generate the effective route over the network. The work is defined under the statistical parametric analysis so that the dynamic route will be generated. Author also performed the performance analysis on filtered network and provided the evaluation under different parameters. H. Chen [2] presented an improved routing approach for fusion adaptive sensor network. Author defined the work to optimize the routing for SPOT analysis and SAR network analysis under filtration analysis. N. Yuan, et al [3] has defined a content similarity analysis approach for sensor network. The sensor network is defined with content similarity analysis and network architecture analysis under different parameters. Author discussed the similarity analysis based model under similarity analysis to obtain the similarity coefficient. Author defined the non weighted and weighted model analysis with specification of homogenous constraint so that the effective route will be generated over the network. Author also defined the statistical analysis under different parameters to generate the feature and to optimize the communication under defined scenario and architecture.

Deb, et al [4] has presented a geometric architecture based communication architecture to resolve the associated issues and to provide the communication solution for the network. Author discussed the network under the associated problems such as data acquisition under sensing capability, location tag specification, network media specification based network generation and communication. The communication scenario is here defined to optimize the communication under the network communication analysis. Author defined the location specific communication so that the network path will be generated. Author defined the location generated network with media location specification and optimization. Ganesan, et al. [5] presented a work on the disjoint path generation to resolve the failure chances over the network and to improve the network capabilities. Author defined the work for braided path specification and generation of alternate path so that the network specification and generation will be done. Tao Shu, et al. [6] has presented a randomized route based multipath route generation mechanism to design the communication path and to share the packets under the defined time schedule. Author defined a route cross mechanism for effective packet specific path generation and to over the irregularities over the generated path. Author defined the opponent specific route generation mechanism for routing algorithm so that the effective route will be generated and the optimization over the network will be achieved. Author defined the routing algorithm under the specification of component under security features. Author defined the optimization to improve the network communication without changing the architecture parameters. Author defined the multipath architecture to obtain the arbitrary path each time the information packet is sent over the network. The route specification is done under the packet formation and changing communication over the time. Author defined the route specification under route optimization so that the optimized route will be generated in jammed network. The large number of routes will be obtained under the different source and destination specification. Rezavi, et al. [7] work on the macro programming based query generation under the diverse functionality analysis in sensor network in adaptive technology. Author defined a query adaptive scheme under macro programming architecture to improve the network communication and to provide the optimized communication in sensor network.

W. Hong, et al.[8] presented an improved energy adaptive communication in sensor network. Author defined a processor adaptive communication system under application specification. The dynamic communication analysis is defined by the

author to save the energy communication and to improve the network life. Author defined the protocol adaptive communication over the network. Author specified the broadcasting messages to improve the packet communication and to reduce the communication cost in adaptive network. Author defined the aggregative communication to improve the network effectiveness. Y.-C. Tseng, et al.[9] has presented the aggregative process based communication under topology specific network. Author defined a controller node to track the communication path and to derive the network communication over the network construction with adaptive communication specification. Author defined a chain based network under the sink node specification and final destination network. Author defined the data communication in network with effective communication parameters.

T. Oates, et al.[10] presented the direct diffusion mechanism to improve the energy effectiveness over the network. Author analyzes the network under energy constraint so that the energy consumption with sensing range will be improved. Author defined the energy adaptive communication so that the network communication analysis will be performed under network constraints so that the network throughput will be improved along with network life. Q. Wu, et al. [11] defined a genetic improved routing approach to generate the optimize path over the sensor network. Author defined the two level encoding mechanism to optimize the communication and to improve the network throughput in sensor network. Author presented an analytical model to identify the effective objective function under constraint specification so that the improved signal strength based communication will be performed over the network. Author defined the energy adaptive communication over the network. Hanieh Alipour, et al. [12] presented an aggregative path provide secure and reliable communication over the clustered network. Author defined the optimization in terms of route identification and packet reduction over the network. Author defined the reliable packet transmission based scheme to optimize the reliable communication over the network.

III.   ROUTING APPROACHES

In this section, some of the most adaptive routing approaches are discussed based on which the communication is carried on over the sensor network. These approaches are divided in two major categories called statistical and non-parametric routing approaches.
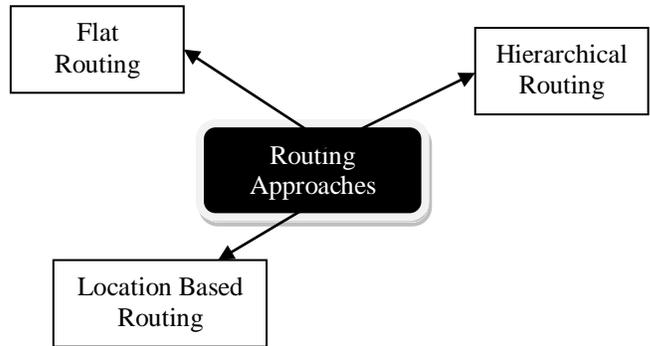The approaches defined to provide the effective sensor specific routing are listed here under in figure 2.

Figure 2 : Routing Approaches

A)   Flat Based Routing

This kind of routing approach is adaptive to the homogenous networks. In case of sensor network, the homogeneity exist in terms of node type, node criticality and communication capabilities. The network is defined is under data centric communication and the multihop communication is performed over the network. The information is transmitted over the network in the form of queries. These queries are executed by the sender as the request is submitted. This routing approach is defined under data diffusion to improve the network communication and to reduce the network energy consumption. The network is defined under adaptive communication analysis so that the redundant information will be removed and the effective information transmission will be performed. There are number of exiting protocols that

support such kind of communication. One of such protocol is SPIN protocol. This protocol is query adaptive routing protocol with resource and data adaptive communication specification. The node is defined to converse the lesser energy and to provide the energy adaptive communication over the network. These kinds of network perform the intelligent network communication so that the redundancy over the communication will be reduced. The neighbor node selection and broadcasting is performed to improve the communication effectiveness.

B)   Hierarchical Routing

This routing approach support clustered communication over the network. According to the network type, the network is divided in smaller segments called clusters and each cluster is controlled by a cluster head. The clustered communication is performed under the hierarchical communication specification so that the network node distribution and the energy adaptive communication will be performed. The routing approach defined here includes the scalability vector adaptive communication so that the small distance communication will be performed over the network. LEACH protocol provides such kind of network architecture and communication routing. This routing protocol uses the concept of data fusion along with the specification of aggregative communication over the network so that the packet communication will be reduced. The routing type defined by the network includes the data collection on the centralized node and the communication is done periodically. The improvement over the network is defined to optimize the communication and routing so that the network communication will be improved. Communication is defined under the LEACH and PEGASIS protocol specification under the clustered communication analysis.

C)   Location Based Routing

This routing approach is defined the node tracking and sensor node specification under localization of nodes. The distance analysis over the network is performed for neighbor node generation. The effective routing depends on the signal strength analysis so that the distance communication will be performed. This routing approach is handled through the satellite communication under GPS. The location demand analysis is performed to identify the communication activity. In mobile network the GPS system is very important such as for vehicular area network. The geographic adaptive fidelity protocol is defined under GPS system to perform the communication and to perform effective node election and responsible node generation. As the nodes are mobile, the criticality of the routing approach is also increased because of node trackig. A zoing sensor is applied with each node to track the neighboring nodes so that the location tracking will be effective. This kind of protocol uses the aggrerative routing along with data fusion so that the redudent information transmission will be reduced and the communication throughput will be improved.

IV.   CONCLUSION

In this paper, a study on different routing approaches in sensor network is defined. The work includes the specification of sensor network under different network architectures as well as the adaptive routing performed in these networks. The paper has discussed various routing approaches to perform the reliable and effective communication over the network.

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