

DESIGN ISSUES HOMOGENEOUS NETWORKS

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ABSTRACT

WSN has evolved thanks to availability of sensors that are cheaper and intelligent but these are having battery support. So, one among the main issues in WSN is maximization of network life. Homogeneous WSNs have the potential to enhance network lifetime and also provide higher quality networking and system services than the homogeneous WSN. Routing is that the main concern of energy consumption in WSN. Previous research shows that performance of the network are often improve significantly using protocol of hierarchical HWSN. However, the appropriateness of a specific routing protocol mainly depends on the capabilities of the nodes and on the appliance requirements. This study presents different features of the homogeneous wireless sensor network and the style issues for routing in a homogeneous environment. Different perspectives from different authors regarding energy efficiency supported resource Homogeneous for Homogeneous wireless sensor networks are presented.

KEYWORDS

WSN, HWSN

1. INTRODUCTION

Due to many real world applications of the Wireless Sensor Networks (WSNs) like health monitoring, aircrafts, disaster management, defense security, researchers gives attentions towards WSN. As we all know that homogeneous Wireless Sensor Network aren't suitable for real world application because rechargeable battery support and really limited and fewer energy resources are available that's why researchers tries to enhancing or increasing the lifetime of Wireless Sensor Networks. But just in case of Homogeneous wireless sensor network, by using differing types of sensor which having different capabilities can prolong the network life time.

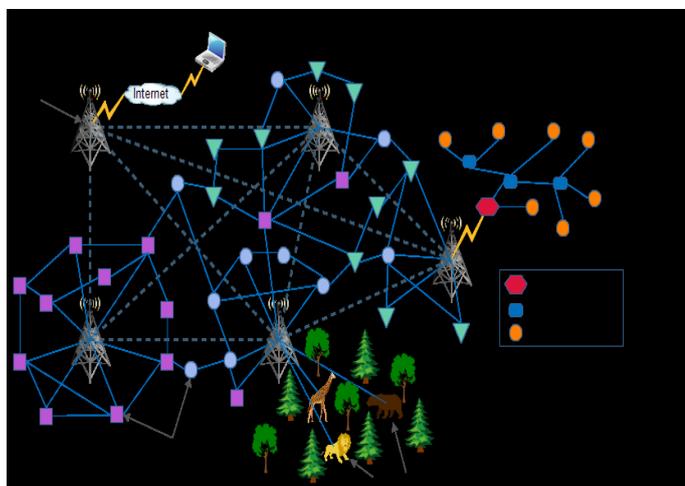
To style energy efficient protocols in HWSN, most of the researchers considered routing is that the main concern. In routing, clustering is that the main method for Homogeneous WSN. Clustering improves the scalability and extends the lifetime of WSNs. In WSN sensors are battery supported and mostly unattended, thanks to these reasons minimization of energy consumption must be taken into consideration to prolong the network lifetime from all aspects. The contribution of the paper is organized as follows: gives overview of Homogeneous WSN. Section 3 discusses classification of Homogeneous WSN.

Focuses on performance of Homogeneous sensor network. Presents design problems with routing

in homogeneous wireless sensor network Section 6 classifies and compares the proposed routing methods in Homogeneous wireless network, Section 7 conclude this paper.

2. OVERVIEW OF HOMOGENEOUS WIRELESS SENSOR NETWORK

A Homogeneous wireless sensor network (HWSN) is that the network of sensors having wireless link with dissimilar communication range for instance, as shown in Figure 1 we will have different communication technology like IEEE 802.3, IEEE 802.11 and ZigBee. Similarly we will have different node with different sensing range or different computational capabilities or we will construct WSN during which, nodes are equipped with different sensors to supply various sensing services. If there are two sorts of sensors one is high end, which has high process throughput and longer communication or sensing range and low end sensors having low process throughput and short communication or sensing range then while deployment if we use mixer of those two types we will achieve balance between cost and performance of WSN.



Homogeneous Wireless Sensor Networks

In a distributed HWSN, different parts of HWSN may adapt different network configurations as shown in Figure 1. Homogeneous WSN topology control and deployment is more complex as compared to homogeneous WSN. But then also Homogeneous WSN is more popular than homogeneous because lifetime of WSN is extremely important, which may be improved using HWSN. Recently, Homogeneous sensor networks are widely utilized in multimedia application like environment monitoring of nature, online monitoring of high voltage cable etc.

A notable feature of this type of network is that it's small data volume scalar sensors like temperature, humidity, acceleration sensors etc, also as large data volume vector sensors like image, voice sensors etc. With large data to transmit, conventional low rate wireless sensor network technology (such as Zigbee) can't meet the demand of knowledge transmission that's why Homogeneous in communication technology is introduced which supports all kinds of knowledge. To use resources effectively, WSNs are generally hierarchical. consistent with survey Homogeneous WSNs have the potential to supply higher quality networking and system services than the homogeneous counterparts.

3. CLASSIFICATION OF HOMOGENEOUS WIRELESS SENSOR NETWORK

The Homogeneous wireless sensor network are often divided into the subsequent types supported sensing capability, computing power,

transmission link ability, communication ability and energy.

3.1. Link homogeneity

In this sort of network some nodes are high-speed network link node, like network interface having 802.3 Ethernet or some nodes having 802.11 WLAN as a network interface. In other words the Homogeneous node has long distance network transceiver and high bandwidth than the traditional node. thanks to Link Homogeneous a more reliable data transmission is feasible because high speed network link or high bandwidth provides less chance of knowledge loss during transmission. Average number of hops that data packets travel from each sensor to the sink is reduces using Link Homogeneous. These high speed links provide a highway bypass throughout the network, and also increasing the end-to-end delivery rate and decreasing energy consumption.

3.2. Energy homogeneity

This means that the network contains energy homogeneous nodes, some line running or its battery replaceable. The energy homogeneous feature is universal because different types of transmission sensor nodes with different types of energy, although the sensor network has an equivalent sensor, its node cannot be adequate to use its energy, due to influence that the communications link temporary failure or terrain features and other random event. Sensor network also will show Homogeneous characteristics. In HWSN, an outsized number of nodes perform sensing which are inexpensive, while some nodes having more energy perform data filtering,

fusion and transport. This results in the research on Homogeneous networks where energy Homogeneous nodes are considered. The lifetime of network are often improved by energy Homogeneous nodes in wireless sensor networks. Computational Homogeneous and link Homogeneous consume more battery energy resource hence Energy Homogeneous is most vital. Computational Homogeneous and link Homogeneous will bring negative impact to the sensor network if there's no energy Homogeneous.

3.3. Computational Homogeneous

In this sort of network some nodes are having a more rapid microprocessor or micro controller unit (MCU) and more space for storing than normal node. Homogeneous nodes with the powerful computational resources, complex processing and more temporary data storage are possible.

3.4. Sensor Homogeneous

It means network contains nodes having different perceptual range; perceptual range is especially applied to sensor network node covering aspects of the research.

3.5. Communications Homogeneous

It refers to the various communication range of sensor nodes, which is especially utilized in network design and connectivity analysis. it's assumed that the communication range is 2 times the sensing range. Connectivity and coverage problems are supported limited communication and sensing range. the answer to those problems depends on how the sensors are positioned with reference to each others. So good sensor

deployment algorithm maximizes the entire area covered by sensors.

3.6. Deployment Homogeneous

Deployment of nodes also introduces Homogeneous within the network, like Random, mobility model. In random model allows us to stay average number of nodes under a given threshold. Nodes are always deployed over a two dimensional plane. the amount of sinks could also be one or more counting on the precise scenario. Self-deployment and relocation of sensors are often achieved using mobility model, because sensors find their own position and placed themselves after initial sensor distribution.

3.7 Sensing Homogeneous

Sensitivity In a homogeneous network, different sensors may perceive different physical phenomena that generate traffic with different characteristics such as temperature, pressure and humidity. Multiple traffic sources with different characteristics.

4.BENIFITS OF HOMOGENEOUS ON PERFORMANCE OF WIRELESS SENSOR NETWORK

The effect of using few Homogeneous nodes within the WSN can bring the subsequent benefits.

4.1. Prolonging Network Lifetime

In the Homogeneous WSN, the typical energy required for forwarding a packet from the sensing nodes to the sink are going to be much but the energy required consumed in homogeneous WSN. the facility consumption is reduced by decreasing the transmission power or

by working over duty cycle which is feasible with communication and computational Homogeneous.

Main lifetime limiting factor is restricted energy supply which are often minimized by energy Homogeneous. Different techniques like clustering and data aggregation have already been proposed to enhance energy consumption rate and network's lifetime. Clustering may be a key technique where sensor nodes are organized into clusters for that energy Homogeneous is beneficial, which extends the lifetime of WSN. Details of clustering will discuss in section IV. If we use Homogeneous properly then the response of the network is increased 3 times and therefore the network's lifetime are often increased by five times.

4.2. Reliability Improvement of knowledge Transmission

Each hop significantly reduces end-to-end delivery rate due to low reliability connections.

But with Homogeneous nodes; there'll be fewer hops between sensing sensor nodes and therefore the sink. So the Homogeneous WSN are able to do higher end-to-end delivery rate than the homogeneous WSN. The reliability is maintained by using energy Homogeneous because it'll not let the node to die shortly and therefore the computation Homogeneous is employed to form the report fast.

4.3. Decreasing Latency of knowledge Transportation

Using some more rapid micro controller, Computational Homogeneous can decrease the processing latency in immediate nodes and using some high speed link, link Homogeneous can

decrease the waiting time. Hence reaction time is decreased and fewer number of hops between sensor nodes and sink node also mean fewer forwarding latency. Using channel Homogeneous we will decrease the time at which the report is send or any event detection report.

5. EFFECTIVE NETWORK SERVICES PROVIDED

BY HOMOGENEOUS WIRELESS NETWORK

In this section a number of network services are focused which having high impact of Homogeneous

5.1. Coverage

To evaluate WSN's effectiveness, determining sensor coverage for a delegated area is extremely important. The coverage is defined because the probability that any target point within the sensed area is within the sensing range of any nearby sensors. Some applications like target tracking may require a better degree of coverage to trace the target and other applications like environmental monitoring can tolerate a lower degree of coverage.

A better degree of coverage requires multiple sensors monitoring an equivalent location to supply more reliable results. Due to Homogeneous nodes with better capability, namely longer sensing range and transmission range, high energy capacity can dramatically increase the network coverage and broadcast reachability and network lifetime also.

On the opposite hand, higher capabilities would increase the value of the device. Hence, under prescribed cost constraints, increasing the amount of high-cost devices may reduce an outsized number of low-capacity devices, which might affect sensing coverage performance like sensor node density, coverage degree, or coverage area.

An optimal Homogeneous deployment are able to do lifetime sensing coverage by several times the maximum amount as that with homogeneous deployment. Coverage and connectivity depends on sensors. Coverage is employed to see if the world which is of interest to the appliance , is roofed or not properly. If the world of interest is not any more covered then we are saying that the network lifetime is decreasing. WSNs achieve better balance between cost of sensors and performance if degree of Homogeneous is involved into the network by placing high-end and low-end sensors which having different sensing capabilities.

5.2. Security

A WSN is susceptible to differing types of attacks or threats and risks thanks to the character of the transmission medium, remote and hostile deployment location, and therefore the lack of physical security in each node. Main obstacle in security of WSN is restricted resources like ,

a. Limited memory and space for storing – Sensor devices only have a limited capacity for storing code and cryptographic keys. an efficient security mechanism must limit the dimensions of keys and code for the safety algorithm.

b. Limited processing capability - Sensors and gateways are (to a lesser extent) less capable of performing the processing required for cryptographic operations.

c. Limited power – Once sensors (and gateways) are deployed, they can't be easily replaced or recharged.

From above security discussion it's clear that computing power, storage, and battery power, collectively as security capacity. generally, the upper the safety capacity, the higher equipped the device within the WSN is for incorporating security.

5.3. Data Aggregation

Data aggregation reduces communication cost and increase reliability of knowledge transfer. Data aggregation is important for WSN applications because when great deal of knowledge to send across the network there's problem data redundancy. Data collection involves collecting data from multiple sensors and linking them together to a lower station. In this case, integrated data is more important than individual measurements. This method is feasible with cluster-based approach, For this approach communication between the nodes is important, and there's large consumption of energy of the entire energy consumption of the WSNs for communication. In Homogeneous networks, a number of the nodes are more powerful than the opposite ones nodes which is extremely useful for hierarchical routing protocol because it reduces the hardware cost of the network.

6. DESIGN ISSUES OF HOMOGENEOUS ROUTING PROTOCOLS

Due to bit of computing, radio and battery resources of sensors, while designing routing protocols for Homogeneous wireless sensor network following requirements got to be considered.

6.1. Network Dynamics

Events in which the sensor nodes are immersed and monitored are three key components in the sensor network. Some networks use mobile sensors. So routing protocol should support mobility of sinks or cluster-heads (gateways). Routing messages to or from moving nodes is tougher because route stability, energy and bandwidth are a crucial optimization factors. The sensed event are often dynamic or static which is depends on the appliance. for instance fire detection where static events generate traffic when reporting is required and target detection or tracking application where the event is dynamic which needs periodic reporting.

6.2. Node Deployment

Another issue is that the topological deployment of nodes. it's application dependent and affects the performance of the routing protocol. Deployment is either deterministic or self-organizing. In deterministic method sensors are manually placed and data is travelled through pre-determined paths. In self-organizing sensor nodes are scattered randomly and creating route in an adhoc manner. Optimal clustering becomes a critical issue when the distribution of nodes isn't uniform.

6.3. Energy Considerations

The process of fixing the routes during the info transmission is greatly influenced by energy

considerations. Because the transmission power of a wireless radio is proportional to squared distance or maybe higher order within the presence of obstacles. In multihop routing there's significant overhead thanks to topology management and medium access control otherwise it consumes less energy. On the opposite hand direct routing would perform tolerably if all the nodes were very on the brink of the sink but consume more memory.

6.4. Data Delivery Models

There are three data delivery models continuous, event-driven, and query-driven and hybrid to the sink. Each sensor sends data from time to time in a continuous distribution pattern. On the opposite hand event-driven and query driven models sends data when an occasion occurs or a question is fired by the sink. Some networks use a hybrid model employing a combination of above data delivery models. Minimization of energy consumption and route stability in routing protocol is very influenced by the info delivery model.

7. CONCLUSION

This paper presents in-depth design problems with routing in Homogeneous wireless sensor network. The wireless sensor network has strict restrictions such as lifetime and calculation. Many researchers' are working during this domain to evolve a way which may increase the general lifetime of the system. As per the survey done here, if Homogeneous nodes are taken on account and therefore the appropriate scheme is taken for the sleep - awake

REFERENCES

and data transfer, then it'll definitely have an enormous impact on overall lifetime of WSN as compared to homogeneous system. As noted during this study, this homogeneous cluster-based routing protocol has the potential to balance the power consumption of nodes across the entire network and the multiHop path from cluster head to sink may be a vital concern to save lots of energy during data transmission. Through the study, it's deduced that the optimal way of Homogeneous with reference to extending lifetime of the network, is to possess node battery Homogeneous, instead of of link or computational Homogeneous. This survey will help the longer term researchers to style energy efficient routing algorithm for Homogeneous wireless sensor network.

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