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A dynamic cluster head selection for secure and energy conservation on WSN

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ABSTRACT

The design of efficient medium access control (Weighted Clustering) protocols, which have an essential role for the reliability, latency, throughput, and energy efficiency of communication. In this project, we propose a generic framework for modeling Secure Weighted Clustering algorithm, which focuses on energy consumption, latency, and reliability.

INTRODUCTION

A WSN (Wireless Sensor Network) consists of a large number of sensors, each of which are physically small devices, and are equipped with the capability of sensing the physical environment, data processing, and communicating wirelessly with other sensors. Generally, we assume that each IT offering better performance in terms of the number of re-affiliations which enables to generate a reduced number of balanced and homogeneous clusters. We concern adaptive clustering approaches to extended the life time of sensor nodes and increases the network lifetime To implement this approach we used cluster head mechanism in computing of the weight of each node in the network is one of the proposed techniques to deal with this problem.

Sensor in a WSN has certain constraints with respect to its energy source, power, memory, and computational capabilities. The communication paradigm of WSN has its root in wireless ad hoc networks, where network nodes self-organize in an ad hoc fashion, usually on a temporary basis. In a wireless ad hoc network, a group of wireless nodes spontaneously form a network without any fixed and centralized infrastructure. When two nodes wish to communicate, intermediate nodes are called upon to forward packets and to form a multi-hop wireless route.

Due to possibilities of node mobility, the topology is dynamic and routing protocols are proposed to search for end-to-end paths. The network nodes rely on peers for all or most of the services needed and for basic needs of communications. Due to the lack of centralized control and management, nodes rely on fully distributed and self-organizing protocols to coordinate their activities.

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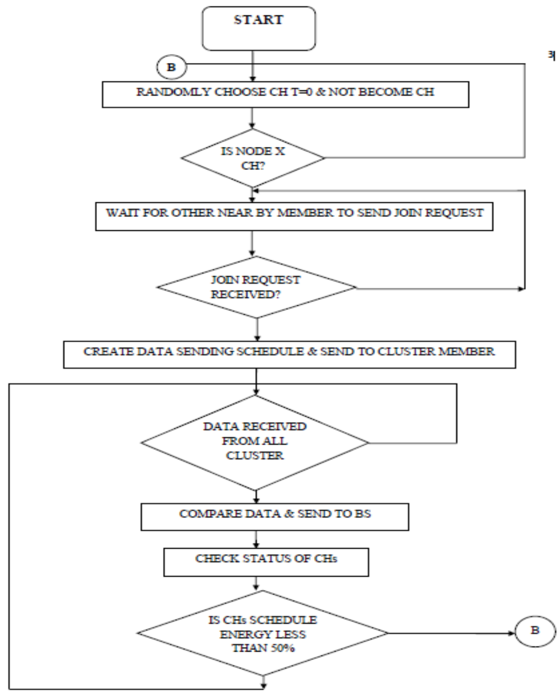
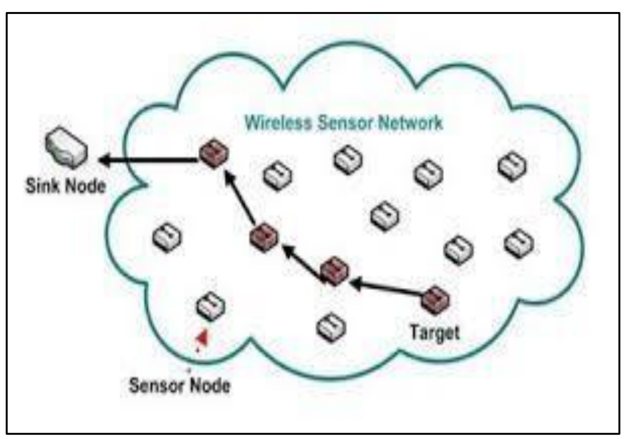
FLOW DIAGRAM



UNIQUE CHARACTERISTICS OF SENSOR NETWORKS

The number of the nodes in a sensor network is significantly larger than that in a typical wireless ad hoc network. The difference can be of several orders of magnitude. Sensors are usually low-cost devices with severe constraints with respect to energy source, power, computation capabilities and memory. Sensors are usually densely deployed.



Challenges in wireless sensor networks

Energy Constraint

Wireless sensor nodes are battery-powered and often deployed in remote and inhospitable locations. As such, battery replacement or any other human intervention is either not possible or extremely difficult. Therefore, these nodes are required to function for months or years at a time on the same power source to maintain the application Quality of Service (QOS). As a result, energy conservation is of the utmost importance in WSNs, and much research has been done on the development of energy efficient protocols and hardware for WSNs.

Fault Tolerance

Often a sensor node may be destroyed or stop functioning, such as when a sensor node is destroyed in a forest fire or by the enemy in a battlefield. The remaining nodes must adapt dynamically in real time and convey the data to the base stations or sinks. Thus, WSN protocols for the MAC and routing layers must have a certain level of robustness.

Computation Capability

Sensor nodes are small devices with very limited memory and processing power. Thus, often at times large scale processing is not possible in sensor nodes, and the data must be transmitted to a base station to be processed. However with the advancement of semiconductor technology, this drawback has been greatly reduced.

Security

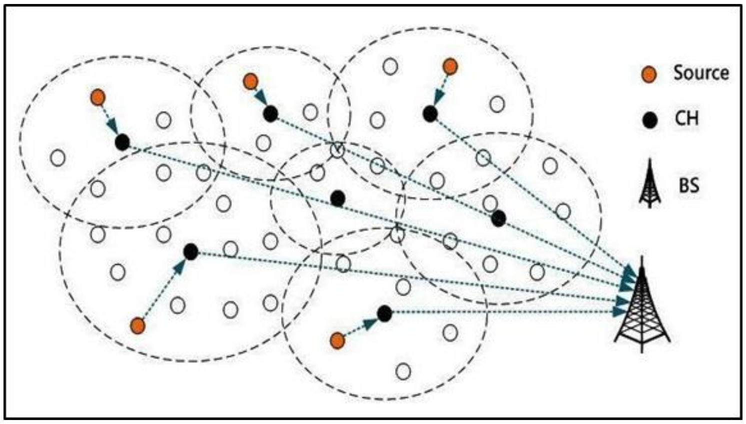
WSNs are lightweight networks with limits on the transmitting data rate and capacity. Thus, conventional security measures such as private keys are not readily applicable to such networks, as these may increase the network overhead and in turn decrease the network lifetime. However, security is an important requirement in applications such as surveillance. Thus, another area of research in WSNs is providing security and privacy.

WORKING OF WSNS

WSN mechanism is quite easy, simple and applicable to a variety of fields. It is based on smaller nodes, controller, radio transceiver, and battery. The system is totally dependent on the nodes and the harmony established between them through proper frequency. These nodes are of different sizes according to the function they perform.

To activate the monitoring or tracking function of these nodes a radio transmitter is attached to forward the information signals in the form of waves. They are controlled by the microcontroller according to the function and device in which they are used. All the system remains in working condition with the help of energy supply which is in the form of battery.

The WSNs perform function concurrently where nodes are autonomous bodies incorporated in the field spatially for the accurate results. The information transmits through proper channel taking the information collecting it in the form of data and send to the base.



Depending to their types WSNs are used by different organizations and fields to monitor a specific task. WSN are incorporated at different point to monitor a specific area a common known example is that of military communication either land or water. Major issues which are becoming a possible threat to life are environmental and industrial issues. WSNs are doing great job in the relevant fields to sense to temperature for greenhouse gasses and similarly earthquake detectors are implanted to detect the land sliding phenomenon for precautionary measurements etc.

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- BEHAVIORAL FEASIBILITY

Economical feasibility

The economic feasibility study (EFS) should demonstrate the net benefit of the proposed application in light of the benefits and costs to the agency, other state agencies and the general public as a whole. The agency must submit its EFS and request for approval to the Office of Financial Management (OFM) prior to accepting or disbursing electronic funds/benefits. Approval from OFM is required for pilot and permanent applications, and both Internet and retail applications.

Technical feasibility

Technical feasibility is the process of proving that the concept is technically possible. The objective of the technical feasibility step is to confirm that the product will perform and to verify that there are no production barriers. Technical Information: The technical feasibility step generates knowledge about the product or process's design, performance, production requirements, and preliminary production costs.

Behavioral feasibility

Behavioral feasibility pertains, in part, to the degree to which public attitudes and beliefs about restoration of wildlife species are shaped by the abilities of local residents and other stakeholders to identify and build on restoration-related opportunities and to overcome or mitigate potential restoration-related problems

CONCLUSION

In this paper, we proposed a new algorithm called "MACWWSN" is proposed for the specificities and constraints of sensor networks. Using MACWWSN we aimed at creating a virtual topology to minimize frequent re-election and avoid overall restructuring of the entire network. Our first objective is to reduce energy consumption in all levels. As a result of this work, we plan to exploit the concept of redundancy to enhance results that are related to energy conservation. Another interesting work that remains to do is to provide in-network processing by aggregating correlated data in the routing protocol and reduces the amount of data that are transported in the network.

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