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A SURVEY ON DEVELOPMENT OF A NEW ALGORITHM TO DETECT RESOURCES IN WIRELESS SENSOR NETWORKS

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ABSTRACT

One of the important operations of wireless sensor networks is to detect resources within the wireless sensor nodes. Created data by the sensor networks should also present a node geographical situation. So, having one reliable resources detection algorithm is always necessary. Most presented algorithms for detecting sensor networks resources have taken into account a method in which resources detection perform in one step and there is no changes within resources data, and if any changes has been occurred, they don't have been considered in nodes. In this method a Multi-Layer Perceptron or the other wireless sensor networks have been used to improve the resources detection operation.

INTRODUCTION

Today, a life is not imaginable without wireless communications. Technology development and creating small and smaller circuits has made possible using the wireless circuits through most current electronic devices. This improvement has also led to sub-sensors development (Figueiredo, 2004). Wireless sensor networks have quickly become important because of sensors costs and size decrease (Baran, 1989). Wireless sensor networks are networks based on small nodes collaboration. These nodes substantially are identified by their low energy consumption, little cost, and wireless communications and can be used for light, humidity, pressure, and temperature measurement (Chakravarty *et al*, 2005). These networks dispatch data to one central unit through the network. Nowadays, the more modern networks are bilateral and have made possible sensors activities control. Unlike the traditional networks which are multi-purpose, sensor networks typically are single-purpose (Chen *et al*, 2014). In any case, sensor networks have various applications that some of them are as follows:

- ***Military:*** for example, tracking objects
- ***Health:*** for example, controlling vital signs
- ***Environment:*** for example, analyzing natural settlements
- ***Industrial:*** for example, finding production line defects
- ***Entertainment:*** for example, virtual games
- ***Object tracking:*** For example, tracking the parking location.

Wireless sensor networks development first began within military force and was tested in some cases like control over a battle field. These networks today have many functional and industrial applications. We can refer to factorial production control, machine safety, etc. among these applications.

It should be also mentioned that sensor unit consists of a series of sensor and analogue to digital convertor which receives analogue data from sensor and then delivers it to processor in digital form. Energy supply unit provides consumption power of all sections which is often a battery with limited energy.

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Energy resource constraint is one of the basic bottlenecks that influence everything within sensor networks design.

In fact, the connection mode of these nodes and data routing approach are very important to achieve the main nourishing node, because are effective in some factors such as energy consumption, end to end dispatch delay, successful package dispatch rate, and network lifetime. Therefore, the most important issue in wireless sensor networks is applying the wireless sensor networks in a way that network lifetime maximize. Many of these routing networks like neural network attempt to increase network lifetime through selecting routes with the lowest energy consumption on the route links and/or selecting routes with the most energy that is available for route nodes. Lower delay in each node indicates that package receipt has occurred through better route. So, the best route from sink to every resource is a route in which propagation delay on the route node is the least.

Related works

Among recent works, there were some research projects which had used neural network for some sensor networks issues. Researchers studied harmony searching in informed energy routing in neural network using the neural network. This study aim is to introduce harmony searching neural network as a successful ultra-detective network to route in the neural network and in turn lifetime increase in these networks type. So two measures, energy consumption decrease and proper distribution of energy consumption among sensor nodes, were considered to customize this neural network for routing that were led to network lifetime increase. Simulations results indicated this algorithm capability to find optimum route and establishment of proper balance between two mentioned measures as well. Also, one genetic algorithm implementation was done to compare a proposed method to other methods. Comparison results showed a better performance of harmony searching neural network in lifetime increasing, than the genetic algorithm. Writers studied ant colony-based wireless sensor networks to decrease energy consumption in routing protocol. This paper provides a distributed routing protocol based on previous approach of ant colony routing in order to improve the mentioned parameters. This routing protocol has measured by NS-2 simulator whose results showed about 40% energy consumption decrease and 3 times increase of network lifetime more than previous methods (Figueiredo, 2004).

Writers investigated unreliable relationships in order to maximize wireless sensor networks lifetime. This main study aim is to provide a new energy-informed routing protocol and efficient energy consumption so that multi-steps wireless sensor networks lifetime with unreliable relationships will decrease. This protocol also considers problem of using shared nodes through calculating propagation delay, so that simulation results indicates significant improvement of wireless sensor network lifetime (Aslam *et al*, 2010).

METHOD

Proposed Algorithm

By increasing development of sensor networks, these networks play an important and inevitable role, because these network types are intermediate between digital and physical worlds. Unlike current sensor networks which have special application and are only for limited users, the heterogeneous sensor networks will be used dynamically by users in their around environment. The existing sensors are likely dynamic (because of being mobile) and heterogeneous in terms of software elements and their capabilities. They may provide various kinds of services and make possible different availabilities and settings. One critical element in realizing such an insight is called dynamic resource detection. It is a used architecture in which sensors organize themselves in the form of cluster. The cluster is a set of sensors displayed by a single cluster head relevantly. This organization traces purposes to detect the dynamic resources: 1- the cluster head is an indicator of a logic point for maintaining complex characteristics, 2- the cluster head receives requests of the dynamic resource detection. It is able to reply them and keeps free the other sensors until their force inactivity lowers, 3- if hierarchical naming is considered, the cluster can changed to bigger clusters to provide a condition for pre-sending more optimum request for structured particular clusters. It should be noted that using clusters is usual within sensor networks, in order to permit data reduction/aggregation (like complex characteristics) and resource intermediating led to more measurable and more productive solutions in terms of energy.

In used cluster algorithm such as GAF[1], the protocol is energy-informed and GAF is energy-based. It inquires energy consumption that is due to sending and receiving packages. GAF is based on mechanism that turns off unnecessary sensors, while maintenance a constant level on routing, or on the other hand keeps route valid or stable. Membership of cluster has been determined geographically. The standard structure of resource description format/XML is not used in the proposed algorithm, but it can be used for this algorithm evolution. MLP network was used in this study.

The figure 1 shows the throughput of the proposed method compare with other known methods.

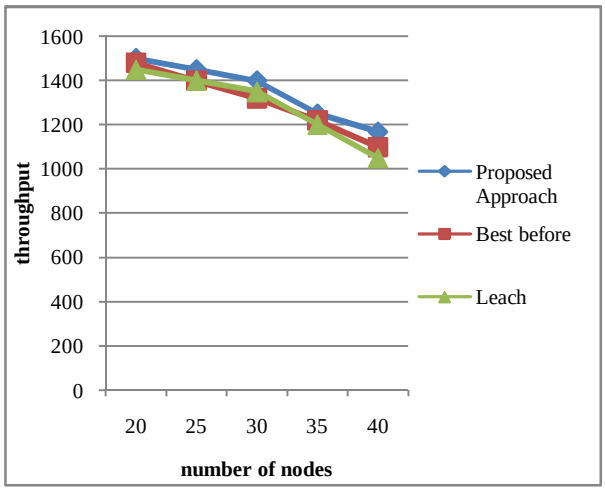

Fig 1. A comparison of the proposed method with other known method

[1] ***Global Assessment Functioning***

X axis shows number of nodes and the y axis depicts the throughput of WSN in bytes. As we can see it presents better performance than the others. For future works, we can use XML.

A comparison

For evaluation of the proposed method with others we have to use QOS, through put and that refers to a broad collection of networking technologies and techniques. The goal of QoS is to provide guarantees on the ability of a network to deliver predictable results. Elements of network performance within the scope of QoS often include availability (uptime), bandwidth (throughput), latency (delay), and error rate. We have been comparing the proposed method with others.
Fig2 shows the average of steps:

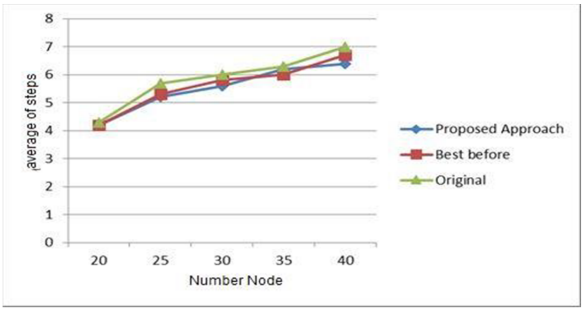

Fig2 Average of steps

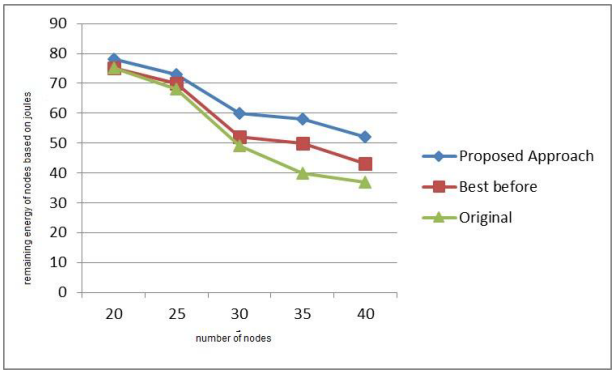

Fig3 Average of remaining energy

As we can see the proposed that uses neural network, in latency has a significant Reduction and the average of steps totally.

CONCLUSION

The wireless sensor network is considered as a network architecture in which nodes (like sensor router) are able to communicate with each other via routing system or have multi directional dispatch. This is possible due to dynamic self-organizing of such a network and parameters like self-configuration and self-correlation are included in this issue which has led to a desired environment with proper population, flexibility, quick implementation, easy maintenance, low cost, relative reliable services and its ability to enhance capacity, connect ability, optimum performance as well as lower energy consumption. This study describes the framework for the issues subject to providing new system of resources detection for next generation using an artificial intelligence and specially an artificial wireless sensor networks algorithm.

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