

APPLICATION AND RESEARCH STUDY OF WIRELESS SENSOR NETWORK

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Abstract

WSNs assume a significant part in altering the world by its detecting innovation. WSNs has arisen as that amazing innovation which has various applications, for example, like military tasks, reconnaissance framework, Intelligent Transport Systems (ITS) and so forth WSNs contains different sensor hubs, which catches the information from the encompassing close by checking the outside climate. A significant part of the exploration work is centered around making the sensor network working with least utilization of energy, so it can get by for longer span. The essential worry toward saving energy has been because of the releasing of those batteries on which sensor hubs are worked. What's more, WSNs are likewise taken advantage of for its security angles with the goal that it very well may be utilized in some private areas like military front line. This paper, presents the WSN in various perspectives like applications, directing and information assortment, security viewpoints and furthermore briefs about reenactment stage that can be utilized in WSNs. This paper contributes in a manner about presenting the WSNs in various areas of its activity and mirroring its importance.

Keywords: Introduction to WSN, Routing, Simulation platform in WSN, security aspects in WSN, applications of WSN.

1. INTRODUCTION TO WSN

Advancement in wireless communication has made possible the development of wireless sensor networks comprising of devices called sensor nodes. Sensor nodes are

low power, small size & cheap devices, capable of sensing, wireless communication and computation. As soon as the sensors are deployed in the network they configure themselves and connect with each other for data collection and thereby forwarding the data to the Base Station.

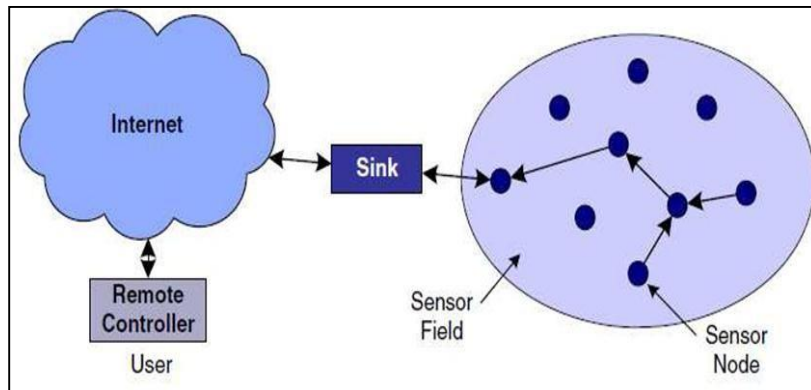


Fig.1 Architecture of a typical WSN [1]

WSN can also be defined as a network comprising of possibly low-size and low-complexity devices termed as nodes which are capable of sensing the environment and communicating gathered information from the monitored area; the gathered data can be transmitted directly or through multi-hops to sink, which can then use it locally or is connected to other networks (e.g. internet) through gateway nodes [1].

2. SECURITY ASPECTS OF WSN

The popularity of WSN has been tremendously on a peak with respect to different applications like climate change, environmental monitoring, traffic monitoring and home automation. Therefore keeping the WSN has always been a challenging task. Cryptography provides security through symmetric key techniques, asymmetric key techniques and hash function. Since WSN are very constrained in terms of computing, communication and battery power, it requires a light weight cryptographic algorithm. Due to constraints of sensor nodes, the selection of cryptographic technique is vital in WSN. Cryptography in WSN can be explained in the following three aspects: symmetric, asymmetric and hash function [4].

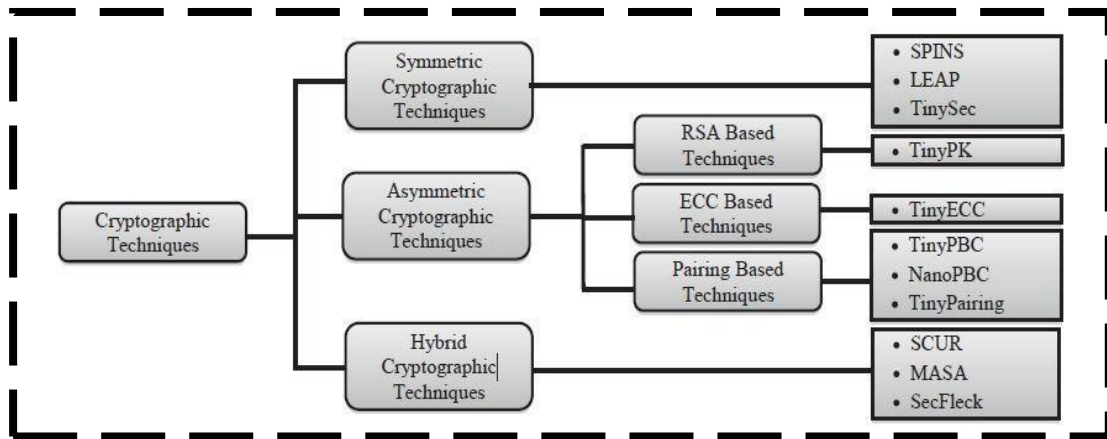


Fig.5 Security in WSN [4]

3. SIMULATION PLATFORM IN WSN

In WSNs, simulation is one of the most predominant evaluation methodologies for the development of new communication architectures, and network protocols as well as to test and validate the existing one in various scenarios. Simulation helps researchers to get significant information on feasibility and practicability crucial to the implementation of the system prior to investing significant time and money. In WSNs, simulation based testing and validation has many advantages, such as: ease of implementation, lower cost, flexibility and possibility of testing large-scale networks. The availability of a large number of simulation tools and specific requirement (e.g. energy-constraints, large-scale deployment) of WSNs makes it difficult for a user to choose a nearly perfect tool for his evaluation. To address this issue, survey is presented [] some of the most widely-used and state-of-the-art simulation tools for WSNs. The aim is to help researchers in the selection of an appropriate simulation tool to evaluate their work, and to acquire reliable results for large-scale WSNs [5].

Table 1: Comparison table of the reviewed simulation tools

Tools Features	Interface	Accessibility & User Support	Availability of WSNs Modules	Scalability
NS-2	C++/OTcl with limited visual support	Open source with Good user support	Excellent	Limited
OMNeT++	C++/NED with good GUI and debugging support	Free for academic use, licence for commercial use with Good user support	Excellent	Large-scale
GloMoSim	Parsec (C-Based) with limited visual support	Open source with Poor user support	Good	Large-scale

OPNET	C or C++/Java with Excellent GUI and debugging support	Free for academic use, licence for commercial use with Excellent user support	Excellent	Moderate
SENSE	C++ with good GUI support	Open source with Poor user support	Excellent	Large-scale
TOSSIM	C++/Python with good GUI support	Open source (BSD) with Excellent user support	Good	Large-scale
GTSNetS	C++ with good user interface & visual support	Open source with good user support	Excellent	Very Large-scale

4. CONCLUSION

WSNs have been profoundly used in various sectors of human life. The sensing technology has made it possible for any sensor node to communicate and respond to the different attributes. This paper has briefed about various aspects in WSN. With the brief introduction to the WSN, the special issues have been discussed. Applications have been highlighted along with the security aspects in WSN. Thereafter the tabular comparison of different simulation software's has been given. It can be concluded from the study done in this paper, that WSN has revolutionized almost every sector of modern era. It has huge scope of research in handling different aspects of human life.

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