A General Study on Recent Challenge of Wireless Sensor Network

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Abstract—Researchers and scientists are trying to improve in functioning of wireless sensor technology time to time; but as time passes the load of data transmission with integrity and security become a challenge. So many algorithms and technologies were implemented on wireless sensor network to take best outcomes at destination point. As like the Bluetooth used for wireless transmission of data and after that a ZigBee protocol with database used by researcher Aamir Saikh and Siraj Pathan [1]. This provides many advantages like low cost, low power consumption and low date rate. They use a composition of ZigBee RF chip, sensor and MCU for general life applications and industries. As we have studied this research work then an idea hits in mind that the result of performance is good then why not we use this new method for our military purposes as low power consumption. Because in the hilly areas to provide continues power is a big challenge in itself. So in this paper we proposed a new security algorithm like neural network with existing composition of ZigBee protocol to make secure transmission over wireless network.

Keywords— WSN, ZigBee protocol, Data packet, Neural network.

I. INTRODUCTION

Wireless Sensor networks emerged by using some electronic devices with combination of wireless network for transmission of data from one end point to another end point. The future can be changed in perfect by using this technology which play a vital role in our general life. A small battery powered is used to make the network live and each sensor node is combination of three subtypes which senses the circumstances.

This subtype make some computation on the data packet which have to be transmitted over the network. This communication system is overall responsible for success transmission of data packets. This type of advance technology opened the advance way in the field of healthcare and military activities. Sensor-based technology has upgraded medical equipment’s to replace thousands of wires connected to this equipment’s found in hospitals. The feature of mobility may be improved by using this sensor network. In coming time, we will face the combination of an enormous array of wireless networks into existing specialized military and medical fields.

In this paper we will investigate some application and challenges of current state-of-the-art of wireless sensor networks in health care systems and also represent how these challenges are tackled in our computer engineering program [1]. The basic diagram of wireless network is as following:

Figure 1: Basic Diagram of Wireless Network

Wireless Sensor Networks are mainly used in following applications:

1. Environment: Main part of this field is like Habitat preservation and Agriculture.
2. Healthcare: This is vast field for use of WSN and make our life secure with providing a new era of technology in field of Home monitoring, Health monitoring, Biomedical, Food safety.
3. Industry: The third wide field that follow the concept of WSN is Industry. Industry may be of any type like Factory, Corporation, Networking Chain System, and any type of production.
4. Infrastructure: In building the home, apartments, school, college this technology play a vital role for better connectivity in water distribution, Traffic or flood etc.
5. Military: This is main and important field for any country in the world. So WSN provides services where the touching possibility for human being is very less.

II. CHALLENGES

There are many challenges which a researcher or scientist face during the applications of wireless network. Some of major challenges which we are going to discuss as following:

- **Price of Hardware:** It is a big challenge as many hardware used for implementation of sensor based network in comparison to wired network. The researcher has to try to build a network with low cost. This is challenge in recent days so some work can be performed on the hardware like MEMS.

- **Safety of Data Packets:** As we have discussed that there is no wire connectivity in WSN so a data packet has to travel through open network from one node to destination node. Insertion of false information by compromised nodes within the networks is way of disturbing integrity of real information.

- **Battery Power:** The life of battery is directly proportional to the life of network. If any node lost its battery power then it disconnect from network and cannot transmit any data from its side and cannot receive data sent by another node from other side. So this is a big challenge to increase life of network.

- **Real World Protocols:** protocols need to be developed for real world problems considering the theoretical concepts and synthesizing novel solutions into a complete system wide protocol for real world application.

III. IDEA TO FACE CHALLENGES

There are some ideas that can face these challenges to make network more reliable. The proposed ideas are as following:

- Try to use micro hardware that can perform well as compared to existing hardware. The use of integrated chips makes the size and cost of Hardware less.

- During the transmission of data over network we have to use any encryption technique. This encryption technique will work before the data send over network. This will help to forge the real information by any hacker.

- As the first point discussed that micro/integrated chips should be used in network so these devices consume low power due to which the life of network increase.
IV. NETWORK DESIGN CHALLENGES

There are some design challenges [4]:

- Limited energy constraints.
- Hardware resources constraints.
- Enormous and Random Deployment.
- Dynamic and Unreliable Environment.
- Diverse Applications.

V. ADVANTAGES OF WSN

There are some advantages of WSN in our life as following:

1. Easy to implement: It is easy to implement the sensor based network in any place which reduce the cost and time and this will increasing the flexibility of deployment.
2. Large range: A big wired network can be replaced by some smaller wireless sensors in the same cost.
3. Tolerance: If any node of network dead due to some technical fault then there is no effect on the remaining nodes of network and network will perform as like a fresh network.
4. Battery Power: The use of battery power with a sensor network will make it a mobile network.

VI. LIMITATION OF WSN

There are some limitations of wireless sensor network that try to decrease the popularity of sensor nodes. Some limitations are as following:

1. Energy: A sensor node can only use the power as supplied by battery attached with it. So there is limited power of power that’s why the life of network is less as compared to wired network.
2. Calculation capabilities: As we have discussed that there is use of battery power supply. Sensor nodes have low backup to make much computation for finding best route for transmission. Finally nodes flow simple algorithm for transmission to save energy.
3. Range of Network: Wireless sensor network use small bandwidth as compared to wired network.
4. Quality of Services: In defence applications, the data should be transmitted within a fix period of time from the moment it is sensed.

VII. CONCLUSION

This paper have represented some challenges that are faced during the implementation and functioning of wireless sensor network in our general life and defense areas. The network can be used everywhere like on roads, in our homes and offices, forests, battlefields, disaster struck areas, and even underwater in oceans. The study has done about the basics of wireless sensor network with its advantages and disadvantages. Our study about the challenges will provide a bright way of research for researcher/scientist. The advantages and limitations of WSN will help to any organization/institution/individual to decide about installation or not. These application fields are being investigated extensively by many people through the industry and academician.

REFERENCES


