

Review on the current techniques to Increase the lifetime of WSN

Bhumika Yadav¹, Ram Neresh Sharma²

¹Computer Science Engineering Department, Maharana Pratap College of Technology, Madhya Pradesh, India

²Assistant Professor, Computer Science Engineering Department, Maharana Pratap College of Technology, Madhya Pradesh, India

ABSTRACT

Wireless Sensor Network is now growing very fast in normal life of common human beings. Today wireless sensor network is everywhere like in home security, monitoring the environment, automation etc. Wireless Sensor Network is very useful in those places where human accessibility is very less. WSN do incredible things in remote areas like North Pole, South Pole Some Sea Parts etc where WSN can play an important role like it can sense any kind of unwanted thing which can destroy human life but WSN need energy to do these things. So to increase the lifetime of a sensor network energy management is the best way. In this paper we are studying the current technologies by which we can improve the energy management in WSN. In this paper we are focuses on energy conservation, harvesting and transfer.

Keywords : Wireless Sensor Network, Energy Harvesting, Energy Conservation, Energy Transfer.

I. INTRODUCTION

In current world researchers have a hot topic ENERGY EFFICIENT DEVICES. Energy is the basis requirement for every electronic device like mobile, television, laptops, and computers etc. Just like ordinary devices WSN nodes also need energy to work. These nodes can work those places too where a normal human being cannot survive like in forest for wildlife security, at border for country security, at volcanoes which are alive for human security etc . Currently these nodes have batteries which have lot of power backup but that power will not work for lifetime so researchers need to improve the energy management of these nodes so they can work for more time. So the lifetime of WSN nodes is usually a very serious issue. Many researchers proposed so many things to improve the lifetime of the wireless sensor network but never die method is yet to come.

In this paper we are making an effort to study the techniques which reduce the energy consumption. In this paper we are distributed energy conservation mainly in 3 categories which are mentioned below

1. Mobility Driven – It considered sink mobility which effect the energy consumption.
2. Duty Cycle – It is basically used to reduce the ideal listening when the node is overhearing and when uninterested frame occur and node is active and when node is wait for frame.
3. Data Driven – Data has some specific parameters while communication data driven make themselves decision to reduce the energy consumption.

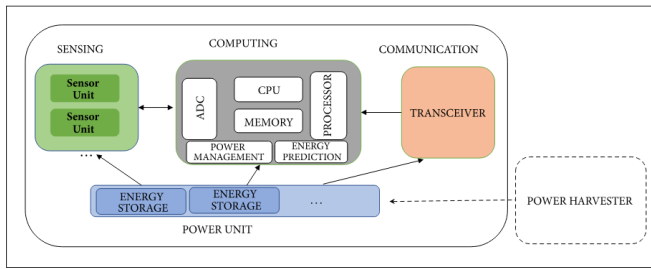


Fig 1 Architecture of Wireless Sensor Network Node
Energy of WSN node will work long in two ways first the node will consume less energy or we provide another source of energy to node. But external supply of energy source is difficult to provide at node end. So we use Energy Harvesting at node end.

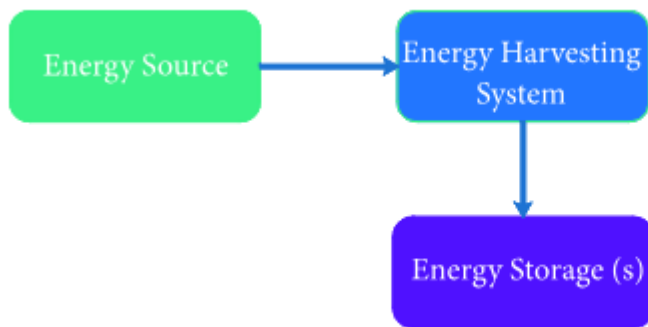


Fig 2 – Energy Harvesting to store and use



Fig 3 – Energy Harvesting for Direct Use

II. METHODS AND MATERIAL

Energy Harvesting –

Energy Harvesting is a method to generate energy from the natural resources like wind energy and solar energy and then converted to electrical energy and provide to the WSN nodes to increase the lifetime so it can work more time in compare to normal time. This will not give a continuous support or not give immortal nodes due to nature/climate changes but it will defiantly increase the lifetime of the node.

Sources of Energy Harvesting –

1. Solar Energy

In today's world Sun is the most powerful and never ending source of energy. Most of the electronic devices support solar charging. It is a very clean and environment friendly source of energy. Some places of earth are very useful for energy harvesting from sun but some place where sunlight is very low or not coming so we cannot use sun as a source of energy harvesting.

2. Vibration Energy

This energy is obtained from those activities which produce vibrations like vehicles, industrial machinery, subways etc. From this source we can harvest approximately 100W using mechanical to electrical energy generators. These generators contain piezoelectric and magnetostrictive materials.

3. Thermal Energy

This energy is based on the difference of heat in atmosphere. With the use of Carnot Cycle we can find out the amount of energy obtained in harvesting.

4. Radio Frequency Energy

Today every country working on urbanization and we all know how much quantity of radio frequency we use in our urban area so harvesting of energy from this source is a very good idea. The devices which can harvest energy from this source also consume very less amount of energy.

5. Wind Energy – Wind is a natural source of energy and we are using this as a energy source from a very long time. It is everywhere on earth and best source of energy harvesting.

When we use energy harvesting as a external source of energy to increase the lifetime of WSN nodes we

also need to change in our technologies at node end like we need –

1. Energy Storage
2. Rechargeable Batteries
3. Super Capacitors
4. Wireless energy transfer Technologies

III. CONCLUSION

As we all know wireless sensor network plays an important role in our life. Over the years many research are working on energy management to increase and improve the life of a wireless sensor network. In this paper we have studied the method by which we can improve the lifetime of wireless sensor network or if we can implement these method then we can make always alive the wireless sensor nodes.

IV. REFERENCES

- [1]. S. Soro and W. B. Heinzelman, "Cluster head election techniques for coverage preservation in wireless sensor networks," *Ad Hoc Networks*, vol. 7, no. 5, pp. 955-972, 2009.
- [2]. C. Wang, J. Li, Y. Yang, and F. Ye, "Combining solar energy harvesting with wireless charging for hybrid wireless sensor networks," *IEEE Transactions on Mobile Computing*, vol. 17, no. 3, pp. 560-576, 2017.
- [3]. G. Anastasi, M. Conti, M. Di Francesco, and A. Passarella, "Energy conservation in wireless sensor networks: a survey," *Ad Hoc Networks*, vol. 7, no. 3, pp. 537-568, 2009.
- [4]. I. F. Akyildiz, W. Su, Y. Sankarasubramaniam, and E. Cayirci, "Wireless sensor networks: a survey," *Computer Networks*, vol. 38, no. 4, pp. 393-422, 2002.
- [5]. W. K. G. Seah, Z. A. Eu, and H.-P. Tan, "Wireless sensor networks powered by ambient energy harvesting (WSN-HEAP) survey and challenges," in *Proceedings of the 1st International Conference on Wireless Communication, Vehicular Technology, Information Theory and Aerospace & Electronic Systems Technology (Wireless VITAE '09)*, pp. 1-5, Aalborg, Denmark, May 2009.
- [6]. L. J. Chien, M. Drieberg, P. Sebastian, and L. H. Hiung, "A simple solar energy harvester for wireless sensor networks," in *Proceedings of the 6th International Conference on Intelligent and Advanced Systems (ICIAS '16)*, pp. 1-6, August 2016.
- [7]. S. Soro and W. B. Heinzelman, "Prolonging the lifetime of wireless sensor networks via unequal clustering," in *Proceedings of the 19th IEEE International Parallel and Distributed Processing Symposium (IPDPS '05)*, pp. 236-243, Washington, DC, USA, April 2005.
- [8]. L. Xie, Y. Shi, Y. T. Hou, and A. Lou, "Wireless power transfer and applications to sensor networks," *IEEE Wireless Communications Magazine*, vol. 20, no. 4, pp. 140-145, 2013.