

A Review Paper On

Study Of Mobile Nodes Communication In Wireless Sensor Network Using UAV

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ABSTRACT

Current research proposes the Scheduling Based Energy Efficient Mobile Node Communication in Wireless Sensor Networks Unmanned Aerial Vehicle. In this work, hybrid network consists of two types of nodes one is static nodes and other are moving nodes. We will consider these mobile nodes as mobile sink. Each static sensor has fixed or low energy. They have limited memory buffer. According the size of the buffer we will fix the interval of movement of the mobile sink. After each time interval mobile sink go at fixed location and send the signal to static nodes. Such that will represent their arrival. Immediately static sensor will start transmitting to the mobile sink. We will subdivide the total network into equal sized grid. Various grid cells will collectively be considered as cluster. Each cluster has equal geometry. Such that mobile sink movement cluster by cluster is having equals amount of energy dissipation. Each mobile sink burn energy in movement and transmission. Now we will schedule the movement of the mobile sink such that they can be energy efficient. At base location this mobile sink will collectively transmit the signal to UAV. It will save the time and energy of UAV and in result total network.

Keywords: Cluster head, Mobile, Sink, UAV, WSN

I. INTRODUCTION

Today it is possible to build very small hardware devices with wireless communication for monitoring and measuring miscellaneous values of the environment. There are a lot of application areas. One is monitoring buildings and their surrounding terrain. A common solution is to install wired sensors. Wired solutions have a continuous energy supply, but it is very expensive to lay or Replace cables for them. Therefore a wireless solution with a battery which can be completely exchanged periodically is more eligible, but only if the exchange period is not too small. Utilization for wireless sensors is medical observation. Patients, who have for example a pacemaker or comparable medical devices, want to move as free as possible, but the medical devices have to exchange information about their health status.

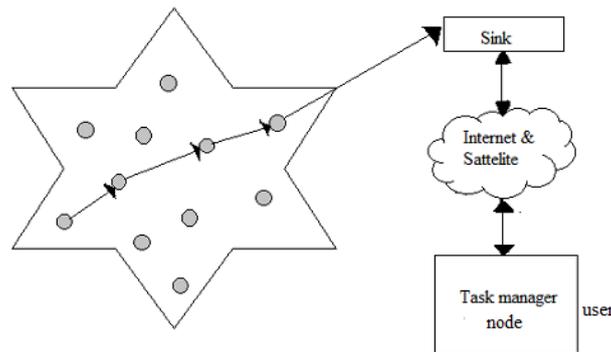


Figure 1 Architecture of Wireless Sensor network

A small wireless sensor can realize this task. It could send an emergency signal in case and with a long battery lifetime it needs less servicing. That seems more useful than a large or even wired device. Other applications can report position or traffic flow information. This may be helpful for congestion prevention and accident warnings. There are a lot of possible applications for the General concept of wireless sensor nodes, but they are limited by the technical specifications

1.1. Classification of Wireless Sensor Networks

Wireless sensor networks are application specific. The sensor nodes are deployed in the region of interest for accomplishment of some application. The design requirement for different application should be different. In accordance of different design criteria WSN can be divided into following categories.

1.1.1 Static and Mobile Network In accordance to movement of sensor nodes WSN may be mobile and static. When the sensor nodes does not move the network is called static. It is the requirement for many areas which uses sensor networks. Similarly, when there is movement among sensor nodes the network is called mobile network. In contrast with static network the mobile networks are complex to implement.

1.1.2 Deterministic & Non-deterministic Network As per deployment of sensor nodes the network should be deterministic and non-deterministic. When the deployment of the network is pre-planned the network is called deterministic network but it is in limited applications where it is possible to pre-plan the infrastructure. On the other hand, when it is quite impossible to pre-plan the deployment and the sensor nodes are deployed randomly the network is called non-deterministic.

1.1.3 Static Sink and Mobile Sink Network The sink in the network can be mobile or static. The network with static sink, the sink is positioned into fixed position in the region or close to the region. The sensor nodes send their data to sink. The nodes near to the sink sends their own data and transmit the data come from other nodes. This may cause the hot spot problem. In case of mobile sink, the sink can be moved around the region to collect the data [Mohammad Abo-Zahhad, Sabah M. Ahmed, Nabil Sabor and Shigenobu Sasaki, 2015].. With the mobile sink the problem of hotspot can be mitigated.

1.1.4 Single - Sink and Multi-sink Network The sensor network can have single sink and multiple sink. In case of single sink there is only one sink in the network to which all the sensor nodes send their data. In case of multiple sinks there are multiple sinks deployed in the network and the sensor nodes send their data to their nearest sink [Guanhua Wang, Kaishun Wu and Lionel M. Ni, 2014].This may give the solution to load balancing among sensor nodes and hotspot problem can be removed.

1.1.5 Single Hop and Multi-hop Network In accordance with number of hops present between sensor nodes and the sink the sensor network can be single hop or multi-hop. In single hop network all the sensor nodes send their own data to the sink. It requires long range transmission and the node farther from the sink die earlier. This network is easy to implement but is costly in energy consumption as well as hardware implementation. In multi-hop network the nodes send their data via intermediate nodes and from shortest path [Cosmina Illes, Cristian Vasar, Ioan Filip and Iosif Szeidert, 2015]. The intermediate nodes perform the routing. Single hop network is having simple architecture and easy to control but it is applied to the limited number of applications. In multi-hop network the architecture is complex and control mechanism is higher but it has huge areas of applications.

1.2 Applications of Wireless Sensor Networks

Wireless sensor networks have remarkable advantages over traditional wired sensor networks. These networks minimize the cost and reduce the delay in deployment. Wireless networks can be applied to environment where it is impossible to deploy wired networks such as deep oceans, battle-field surveillance, outer space and inhospitable terrains. Wireless sensor networks were originally encouraged from military applications these systems range from large systems like acoustic surveillance for ocean checking to small systems like unattended ground areas for ground detection [Curt Schurgers, Mani B. Srivastava, 2001]. The availability of inexpensive sensor nodes and wireless communication leads to the application of WSN in both civilian and military applications.

Sensors are mainly used to detect various kinds of physical parameters as following:

- Light
- Sound
- Humidity
- Pressure
- Temperature
- Soil composition
- Air/water quality
- Attributes of object like direction, size, position, weight and speed.

II. LITERATURE REVIEW

[1] **Say Sotheara et al. (2014)** presented -Effective Data Gathering and Energy Efficient Communication Protocol in WSN employing UAV- Author propose the process of gathering the data from stationary WSN nodes. It is the frameworks provide the ability to make system energy efficient [1].

[2] **Nichalos N.Karekwaivanane et al. (2014)** presented -Reliability in MAC Protocols for Wireless Sensor Networks – The system of providing wireless sensor network type of network and also provide the applications of this type of network [2].

[3] **Nilesh Kumar et al. (2014)** design -Energy Efficient Routing Protocol for improving Lifetime of Wide Area Wireless Sensor Networks- Ability to send and receive the signals with high efficiency. It is one of the network has transmit the data with less battery power consumption [3].

[4]Eleftherios I.Amoiralis et al. (2014) presented Energy Efficiency Optimization in Unmanned Aerial Vehicle- In recent years, development of UAV has become a significant growing segment of the global aviation industry. The present work provides an overview of the research conducted on the field of UAV energy efficiency optimization [4].

[5] Selvadurai Selvakennedy (2014) presented an -Energy-Efficient Clustering Algorithm for Multihop Data Gathering in Wireless Sensor Networks- Author say that wireless sensor network afford a new opportunity to observe and interact with physical phenomena at an unprecedented fidelity. To fully realize this vision these networks have to be self-organizing, self-healing, economical and energy efficient simultaneously. Since the communication task is a significant power consumer there are various attempts to introduce energy awareness within the communication task [5]

III.PROPOSED WORK

According to our research work we will keep hybrid type of sensor network. This hybrid network consists of two types of nodes one is static nodes and other are moving nodes. We will consider these mobile nodes as mobile sink. Each static sensor has fixed or low energy. They have limited memory buffer. According the size of the buffer we will fixes the interval of movement of the mobile sink. After each time interval mobile sink go at fixed location and send the signal to static nodes. Such that will represents their arrival immediately static sensor will starts transmitting to the mobile sink. We will subdivide the total network into equal sized grid. Various grid cells will collectively be considered as cluster. Each cluster has equal geometry. Such that mobile sink movement cluster by cluster is having equals amount of energy dissipation. Each mobile sink burn energy in movement and transmission. Now we will schedule the movement of the mobile sink such that they can be energy efficient. At base location this mobile sink will collectively transmit the signal to UAV. It will save the time and energy of UAV and in result total network

Current research will be having UAV as one of the receiving node. Whose basic work is to collect the data from the wireless sensor nodes. This process is done only to increase the energy efficiency. As UAV can be represented as base sink can be shown moving. This type of network is for those networks where wireless sensor nodes are stationary. They do not move. Also they have less power. Compare to the base node. Also there be energy harvesting scheme of the UAV. At regular interval it can go on to the specific path. And collect the data. And returns back to the original position in the base paper they have considered this UAV as mobile node moves on to the fixed path.

IV.CONCLUSION

This work proposes the Scheduling Based Energy Efficient Mobile Node Communication in Wireless Sensor Networks Unmanned Aerial Vehicle. In this work, hybrid network consists of two types of nodes one is static nodes and other are moving nodes. We will consider these mobile nodes as mobile sink. Each static sensor has fixed or low energy. They have limited memory buffer. According the size of the buffer we will fixes the interval of movement of the mobile sink. After each time interval mobile sink go at fixed location and send the signal to static nodes. Such that will represent their arrival immediately static sensor will start transmitting to the

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REFERENCES

- [1.] Say Sotheara, Kento Aso, Naoto Aomi, and Shigeru Shimamoto, “ Effective Data Gathering and Energy Efficient Communication Protocol in Wireless Sensor Networks employing UAV”, IEEE WCNC'14 Track 3,2014.
- [2.] Nicholas N. Karekwaivanane, Wilson Bakasa, Kudakwashe Zvarevashe, “Reliability in MAC
- [3.] Protocols for Wireless Sensor Networks: A Survey”, IJIRCCE Vol. 2, Issue 7, July 2014.
- [4.] Nilesh Kumar, Mamta Katiyar, “An Energy Efficiency Routing Protocol for Improving Lifetime of Wide Area Wireless Sensor Networks”, IJETT Volume 11 Number 2 - May 2014.
- [5.] Eleftherios, Amoiralis, Marina A.Tsili, Vassilios Spathopoulos, and Antonios Hatziefremidis , “Energy Efficiency Optimization in UAVs”, Materials Science Forum Vol. 792, pp 281-286,2014.
- [6.] Sandhya Rachamalla, Dr. Anitha Sheela Kancharla,” A Survey of Real-Time Routing Protocols For Wireless Sensor Networks”, IJCSES Vol.4, No.3, June 2013.
- [7.] Monjur Ahmed , “ Wireless Sensor Network: An Emerging Technology”, ISSN volume 2,pp 01-04 october 2012.
- [8.] Ravi Luchmun, Redit Mauritius ,Madeven Pyanee , Kavi Kumar Khedo , “ Hierarchical Hybrid Energy Efficient Distributed Clustering Algorithm”, International Journal of Computers and Distributed Systems Vol. No.2, Issue 1, December 2012.
- [9.] B.Jaya Laxshmi , M.Neelima, “Maximising Wireless Sensor Network Life Time Through Cluster Head selection using Hit sets”, IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 2, No3, March 2012
- [10.] R.A.Roseline, Dr.P.Sumathi , “Energy Efficient Routing Protocols and Algorithms for Wireless Sensor Networks”, A Survey Global Journal of Computer Science and Technology Volume 11, Issue 21 , December 2011.
- [11.] Per-Magnus Olsson, Jonas Kvarnström, Patrick Doherty, “Generating UAV Communication
- [12.] Networks for Monitoring and Surveillance”, 11th Int. Conf. Control, Automation, Robotics and
- [13.] Vision, December 2010.
- [14.] Beakcheol lang, lun Bum Lim, Mihail L. Sichitiu, “ AS-MAC: An Asynchronous Scheduled MAC Protocol for Wireless Sensor Networks” IEEE 2008.
- [15.] S. Lindsey, C. Raghavendra, and K. M. Sivalingam, “Data Gathering Algorithms in Sensor
- [16.] Networks Using Energy Metrics,” in IEEE Trans. On Parallel and Distributed Systems, vol. 13, pp. 924-935, Sep. 2002.