Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X
IMPACT FACTOR: 7.056

IJCSMC, Vol. 10, Issue. 2, February 2021, pg.86 – 93

ENHANCE NETWORK LIFETIME WIRELESS SENSOR WITH MULTIPLE SINK VERSATILITY

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DOI: 10.47760/ijcsmc.2021.v10i02.014

Abstract– Wireless Sensor Networks (WNS) is essential for ubiquitous computing. Sensor networks with variable sensing capabilities have seen applications in a broad range of regulators where correlations with the physical environment are relevant. Thus, the efforts have been made in attempt to detect atmosphere mainly by investigating sensor networks that integrates single wireless collector (i.e., sink). Many examples of WSNs' use are illustrated. It also has a variety of daunting problems such as topology parsing, routing and power management. The research focuses on solution to energy loss in WSN. This is a technical overview of a sensor system and a wireless network. There are still several challenges facing the WSNs.

Wireless Sensor Networks (WSN) - consists of a large number of incredibly small computers known as sensor nodes often measuring no bigger than a credit card. The main goal of the wireless sensor network is to gather valuable information from the surroundings and transfer them to a data receiver known as a drain. In WSNs, each sensor identifies its own environment independently involving informative collection and propagation tasks. Wireless sensors are used to collect information and act as data reporting devices. Any sensor nodes such as on-chip, transceiver, low CPU, limited memory, and power unit. Figure 1.1 displays a diagram of the sensor node (adopted from ref 2).

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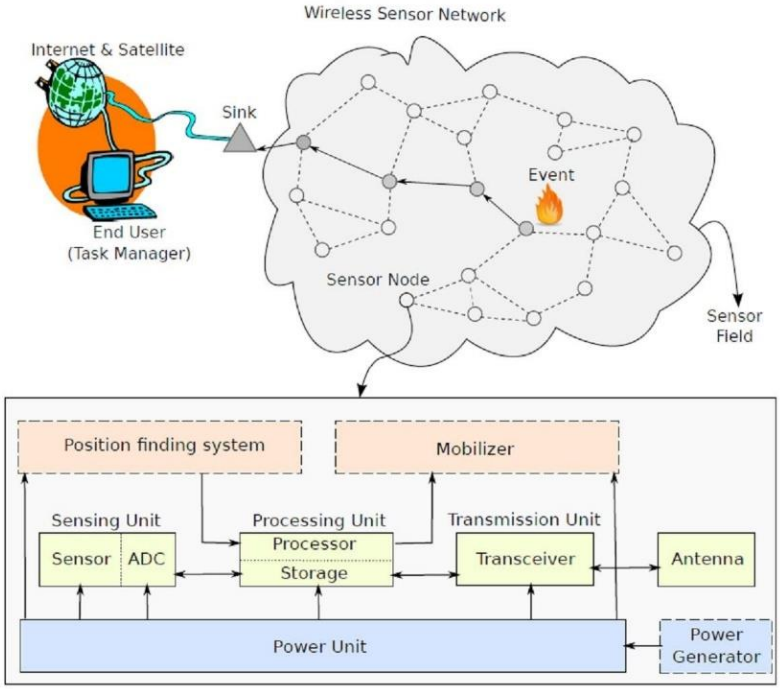

Fig-1.1 A sensor node and WSN

Sensor is a tiny unit used to detect physical phenomenon. A sensor is essential for repetitive and regular computation. There are a number of sensors available in the marketplace. Sensors such as pressure sensors, sound sensors, temperature sensors, vibration sensors, humidity sensors, light chemical such as CO-sensor, and body sensors are even more widespread these days. Both these signals are produced by sensor nodes on this mechanism." The Analog to Digital Converter is used for the conversion of analog signal to digital signal and moved to the processing unit for further processing.

Transceiver transmits and absorbs wireless signals. If there are three transmitting techniques, the half-duplex system can be used in both of them. More power is required for transmitting than for standby or receiving. There are different bands for WSN applications. These frequencies are 433MHz, 868MHz, 915MHz and 2.4GHz. Signal-to-noise ratio ranges from 0 to 13 dB, bit rate from 41 to 1151 kilobits per second and carrier-to-noise ratio varies from -108 to -92 db.

A processor is an integral function of a computer system used to interpret the information and make relevant decisions. The 8-bit or 16-bit processors are the most widely used sort for information processing. The functions of LUCC can be conveniently inserted into computer chips (ASICs). Architecture is a realistic alternative since it is flexible in nature. When resources are minimal, special operating system such as Tiny OS are added, or Ambient RT.

Memory/Storage Software for Processor with No Room for Storage Flash memory has an issue of low capacity. One of the benefits of flash memory is that it can be rewritten several times and it can even remember details. Variable memory in sensors is also available so that the data can be stored persistently for retrieval.

Sensor node working is dependent on the power supply called the battery which involves chemicals combined in the bottle. These chemicals react and produce an ample supply of electricity. The theory was born from tracking resources expended on communications. Depending on the application-type, there are extra optional components that are included in the sensor node.

Place locating device indicates a specific location of the sensor node. To determine the true position of sensor node is crucial for certain applications. To find the physical positions of sensor nodes uses the network analysis technique. GPS system is based on applications and global satellite system. It relates to sensor nodes position.

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Power generators are required to supply power to sensor nodes as well as cells/batteries for sensor nodes. There are similar cases where the use of photovoltaic systems in open air applications. Energy scavenging is the most useful solution because of energy scarcity. The performance of a lot of applications have still unclear. Mobility provides mobility, which allows nodes to travel around if desired. Mobility is the power needed to allow the movement of machinery and this power could be obtained by electromotility? Interaction with the processor for the operation of the light [5] is also useful in his work. The attributes of a WSN are calculated by the characteristics of sensor and sink nodes as and when appropriate. The sensor and sink properties can be understood in an example below.

Sink node are more involved compared to sensor node having small power supply. S cable length can impact the efficiency of wireless sensor networks (WSN).

Generally, only one or two sinks are used, but when gathering data makes it possible to use more than one sink, it is counted twice. This project raises the network lifetime and decreases the network latency.

WSN may have both static and mobile sensor nodes. There are examples in usage where multiple sinks and computers are linked over a virtual network with further data to be collected. It is important to include methods to enter the section of sewerage system where the mobile node is deployed. Mobile sink has the potential to be resourceful in gathering data and information and has created quite an impact in its application.

The sink has a persistent or sporadic access to the network. Last resort algorithm for increased long-term reliability. Alternatively, the source produces data packets all the time before a solution to satisfy the data need needs to arise.

Properties of Sensor Nodes vary according to different application. Actual properties may be controlled or conditioned by the actions of the networks themselves.

Deployment of nodes either to be achieved systematically or arbitrarily. Indoor implementation for public speaking requires manual interpretation instead of randomly. They are set at their places until their service life expires. The implementation of random creation is a very helpful tool in many fields that humans are not able to access manually. The sensors can be deployed from the helicopters or aero planes by falling.

For starters, the sensor devices may travel through a variety of moving animals. Since wireless sensor network is heterogeneous, the motion of the sensor nodes is unique and distinctive. Mobility is based on the positioning data and connection information.

Secondly, the question is being transmitted and an answer in form of reply message is received at the drain.

Quest addressing is important in WSN and is used for determining the temperature based on the radius from the center of the sink (center) or the region covered by the sink.

The reply came back from the same direction as where the question followed it. This question relies upon the sink at which the sentence begins.

In WSNS. - The radio contact is primarily achieved through the use of aerial (a device used to produce and capture the radio signals). Microwave techniques are still viable, so are several other contact strategies. Radio frequency has been used in WSNs for the connectivity of sensor networks' information in the field. The range of the sensor node should not be too wide. This device allows knowledge transfer jumping from one node to the other. Sensor nodes in multi-hop communication method often send their data packets to the receiving devices in addition to their own data. In the last portion of this chapter, we briefly illustrated two main forms of sensor-to-sensor data transmission. The normal mode of sensor-to-sink contact is two-to-one where input comes from the sensor as well as the receiver. If there are two or more sink nodes, all the sink nodes have to know the data messages from the sensor nodes and each node passes the data packets to the actual sensor nodes. The information about the movement can be conveyed from the sensor to any sink present in the WSN. These are used for submitting questions. There are two widely used forms of contact

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namely local broadcast and unicast. The above is introduced so that intelligence is not compromised from anyone.

To reflect the critical WSN request, transmission protocols of different models of WSN is tremendously needed. This acts as a step by way of re-emergence of networks for inventing networking protocols.

Power saving – The power usage of the sensor nodes is another big problem. Reducing energy depletion by sensor node by reducing the power usage would be a very challenging task. This function can be efficiently exploited by introducing an energy-efficient transmission protocol.

The scalability of sensor network will improve as there will be large number of sensors in the area. One should launch a very limited number of surveillance applications in WSN and make sure that it's functioning as expected.

Readability – Because of loss of sensors, the topology of sensors in the wireless network changes due to power depletion, destruction, additions, or channel declination. Topology shifts trigger problems on internet around the globe. Hence, the transmission protocols should be versatile. A protocol can be modified very differently to accommodate particular facilities. There are several factors that need to be tested including fault-tolerance, durability, responsiveness and latency.

The sink node initially needs plenty of voltage and energy. If we use electricity more efficiently, we will reduce our energy use. Degradation in three stages occurs in sensor nodes: detecting, transmitting, and processing information. When the sensor node transmits large amount of information, its power consumption is the highest among all three segments. This is an indication of desire in the information transportation from sensor network engineering culture to reduce transmitting cost of information to reach maximum in energy efficiency. In multi-hop coordination

Message communication packets or packets moves from the source to its final destination by branching. For this sensor node closest to the sink to collect the huge volume of data from the local environment. This implies that it is expensive to retrieve data from sensors and communicate this information to sink node. This allows the animals to deplete their power supplies rapidly [7]. This is the reason that these sensor nodes along with direct information relay along with the data of each remote sensor node. This kind of hardware would reduce energy lifetime of sensor network.

My goal is to use various sensors which are motorized and movable in order to cope with power failures. The velocity of the flow through the pipeline varies with respect to time. First, the area with more sensors will be chosen. This process would increase lifetime of sensor network.

The main problem with WSN is the persistence of knowledge in the network. Battery power should be supplied for sensor nodes since they are battery driven. The primary goal for optimizing the lifetime of a sensor network is to limit battery usage as much as possible. Sensor network energy was declining due to the many factors such as information exchange, signal computing, and operation of hardware. Furthermore, 70% of electricity output is absorbed by information and connectivity. The key problem of sensor network is the protection of sensor nodes. The most critical action in the network is to track the atmosphere and reports the information to the sink. A fixed type of sensor networks where all sensors are fixed to a drain. When the sensors receive the input from neighboring sensor nodes, the information is sent to the sink node located a distance from the sensor nodes.

There are several leading factors that can decrease the power dissipation. One of them is to focus on moving load from sensors to sinks. Otherwise, the classic position of the sink in any spot that still collects the input from the sensor nodes. The drain of knowledge and resources has been taken from a sensor to a sink node in order to extend the lifetime of a network. As language is one of the most critical variables to determine a state of power crises, closer sensors operating in motion leads to decreased contact gaps, and limited

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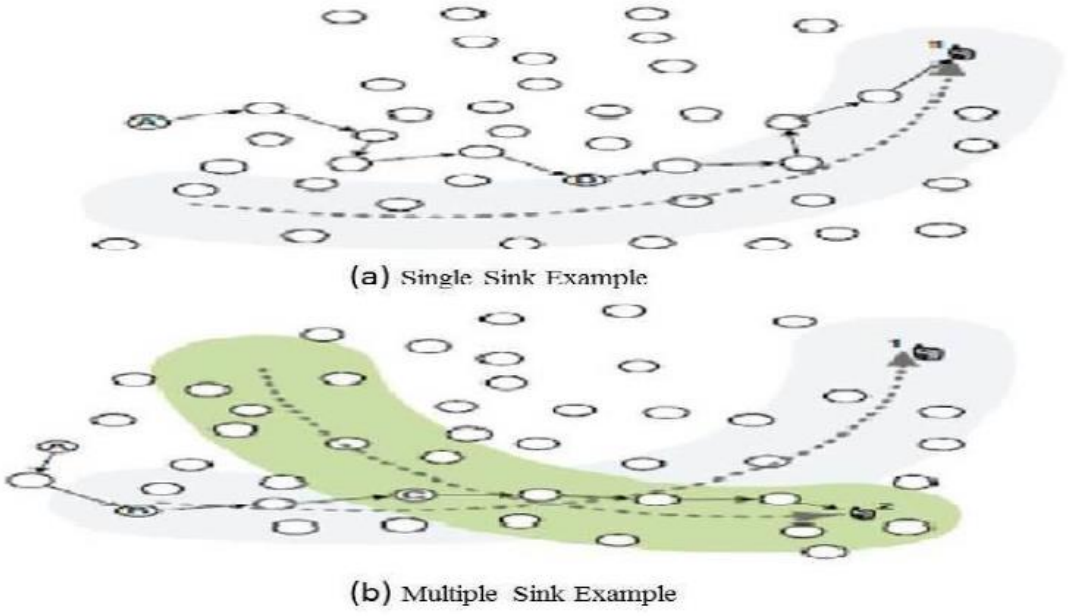
distance of in between sensors to transmit information. Thus, the power depletion is spread equally and decreases the "hotspot" problem, so that service efficiency is improved and can last longer. It is necessary to boost mobility for wireless sensor networks (WSNs) so as to be able to thrive. But the option of connection would depend on the capacity of network. As sink node chooses to travel, how it is accepted to some occurrence or change in the sensor network topology, the current location of the sink node is taken into account according to the direction of a selected route. The movement of the mobile sink is also considered. Sensor nodes situated at a single hop distance from the sink nodes, will forward sensor data to the sink nodes. That's not a good choice for the energy efficiency. These sensors just stop functioning at some point and begins weakening the sensor network. This condition occurs due to a large number of sensor nodes which die quickly in proximity to the sink node. Because of this, the system is unable to transmit information and the network is seriously affected.

The idea of employing sink mobility pattern in a wireless sensor network is to maintain the total network lifespan.

Organization of the article- This chapter outlines the intent and analysis of the literature and related work that have been used. Our suggested approach consists of four parts: Data collection, sink movement, locate best position and backbone. In this Chapter addressed different approaches employed in using SPSS to collect data.



(a) Single Sink Example

(b) Multiple Sink Example

Sensor Input Routing.

Energy-efficiency is a key problem in the portrayal of sensor networks. To start with, the power drain is because of knowledge flow. This will encourage better use of the electricity in the entire system. Authors suggest choosing nodes that are further apart or have lower energy load to minimize routing time in routing **Network.** A comprehensive mathematical approach is taken in computing the sink node rate of motile sink network systems with fast restoration feature. In [21], the researchers present their groundbreaking energy-efficient routing protocol Reversing LEACH-C, LEACH declares that these two-classic routing methods cannot always elect the cluster head to ensure the interpretation sureties are fulfilled. Partially relies on LEACH-C, LEACH the authors suggested their routing protocol whereby the sensor network can mount the cluster head into itself in enhancing the efficiency of being effective. The conventional protocol can be divided into two approaches: "routing approach" and "pre-evaluate scheduling." In the Routing method, the wireless sensor network identified by the wireless sensor network uses LEACH and assigns random tracks to the mobile sink for the first time.

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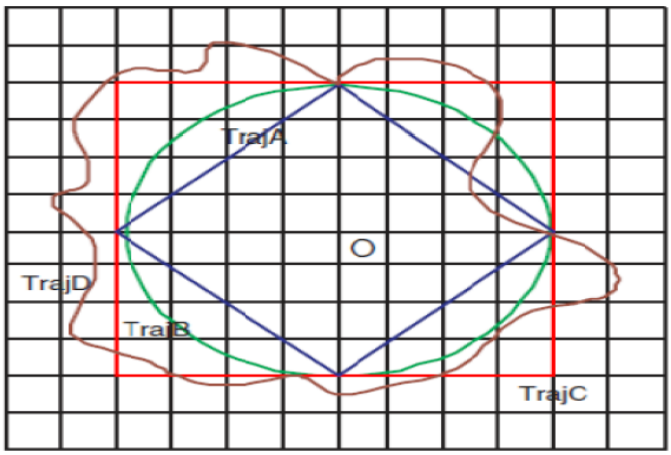

Figure 1.2 Optimal mobility trajectory

As typical power decrease, the protocol takes into account the time span. After the protocols have been recycled, the previous guidelines are once again replicated. In [10], the authors present another star topology routing protocol that is called as "mobile sink-based routing protocol". To solve the hotspot dilemma, the sensor network registers data clustering based on the surviving energy knowledge. The dynamic sink agility architecture in MSRP increases energy efficiency and robustness in a wireless sensor network. MSRP also incorporates a web solution for the sink. Depends how much energy in a wasted degree is unused.

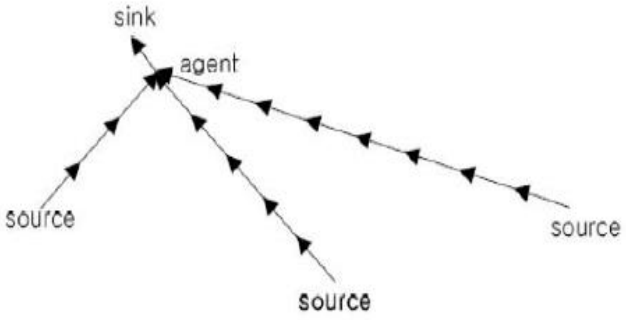

Figure 2.4 Agent based data gathering in [26]

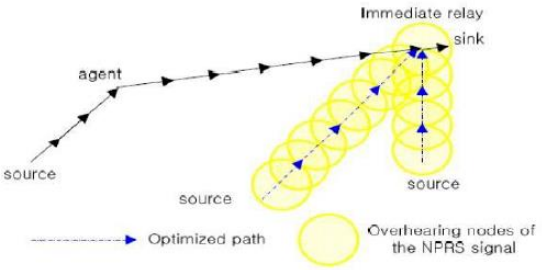

Figure 1.4 Optimal path selections

Scheduling techniques mitigate wastage of capital using scheduling algorithms that avoid cluster heads from being displaced. All data is contained in the sink nodes routing table.

1.5 Power performance. In [34], the authors conclude that the energy efficient approach in a wireless sensor network system has better. Random events cannot be expected because they aren't understood in advance. So, an incident boundary is generated every time a new event happens. Only the nearest one working node is responsible to send the data. (for this event). Energy-Efficient-Strategy is an algorithm to automatically optimize the propagation range of a wire. Energy Efficiency-Strategy determines where to transfer and when to sink.

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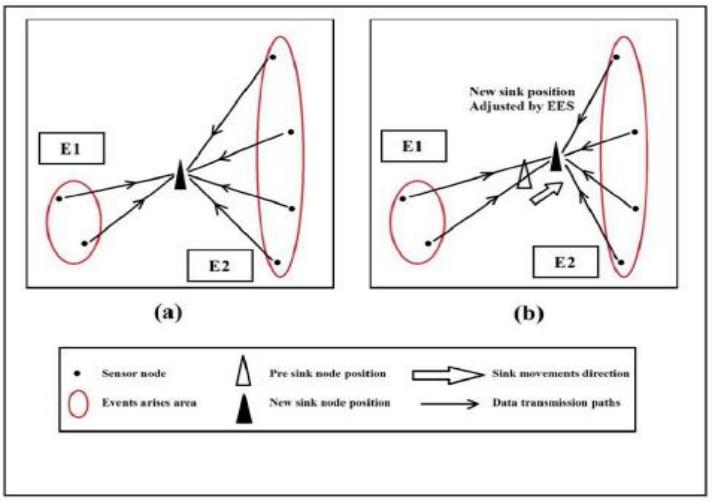

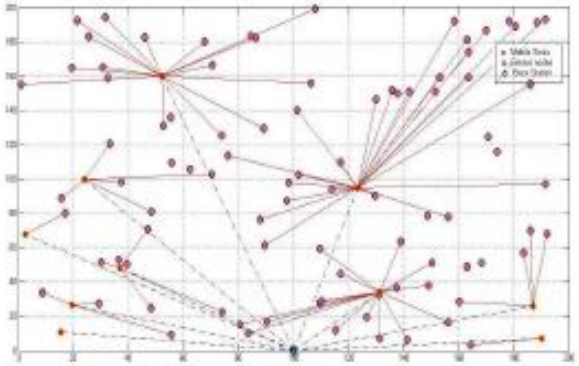

Figure 1.5WSN area with mobile sink initial phase

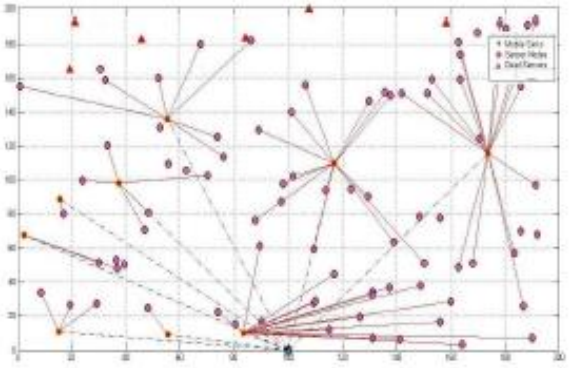

Figure 1.6 WSN area when sensor nodes start dying

How the program works.

1.1. Tools used are tools called MATLAB for incorporating the concept of multiple sink versatility to improve the wireless sensor network lifetime.

MATLAB is a kind of computer software which means "matrix laboratory" which is used for technical calculations. It began as linear code where the corresponding diagram flow was introduced. We can program the solution in MATLAB conveniently using several programming languages. MATLAB is famous because of its capability to promote the programming of even the smallest of projects.

1.1.1 Features of MATLAB.

MATLAB features are given below:- It is a high-level language for arithmetic calculation, interpretation and power. The calculators are used for applying arithmetic, numerical, computational, algebraic and geometric functions.

Via MATLAB's, we will strengthen our program's consistency and boost its presentation through the graphs and figures. The OS has a wide variety of graphical interface options.

It contributes for combining MATLAB with extra programs and languages such as C, .NET, Java, etc.

Conclusion- Ultimately this paper concludes that applying sink agility improves accuracy of knowledge gathered. Static sink electrical network suffers the dilemma of unbalanced energy utilization. One of the strategies to achieve steady power consumption in WSN is to render WSN nodes mobile. It has been shown that it is potentially feasible for one sink form to have a free mobility by going outside the outer boundary of the sink sheet. Results demonstrate that the planned scheme would improve Wireless Sensor Network lifespan.

Evaluation of multiple sink mobility to fixed mobility route is expected in future work. There is a serious possibility for the improvement of operations in both zones. This problem consists of how information can be redirected to the sink when sink is going from one stage to another. It is important to increase the suggested point of view on how the hierarchical network architecture can be progressed further. Future

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studies may also look at how sink nodes can travel on a fixed or pre-established path like a rectangle, pentagon or hexagon. Similarly, the sink nodes share synchronization are also targeted at. All the pipes are still wired together and are set in place.

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