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A LITERATURE SURVEY ON ENERGY CONSERVATION AND TO MINIMIZE LATENCY IN WIRELESS SENSOR NETWORKS

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ABSTRACT

Wireless sensor networks can be defined as a collection of devices, denoted as nodes, which can sense the environment and communicate the information gathered from the monitored field through wireless links. The data is forwarded through multiple hops to a sink which can use it locally and a gateway is used to get connected to networks. In WSNs where each device can sense, process and talk to its peers. WSNs have been used in many applications including military survey applications, health and wellness monitoring etc. In these applications Energy consumption is the major issue for past years, various techniques have been used for energy consumption as it had consumed only up to certain constraints. By using Zigbee-IRS technique, which is used to design nodes on WSNs to achieve a very low energy consumption and latency.

Keywords- Wireless Sensor Networks (WSNs), Low Energy, Energy consumption, ZigBee design, IRS protocol.

I. INTRODUCTION

Wireless sensor network is a collection of nodes that sense and control the environment which enables interaction between persons or computers and the surrounding environment. It consists of devices that operate usually on battery powered to work for long period of time.

Minimizing the energy consumption is an important design consideration and Wireless energy efficient transmission of data between nodes with low-power. The radio has been used to transmit and receive the data but it consumes lot of power and data is not transmitted completely.

Multiple sensors form a network to cooperatively monitor large or complex physical environments. Acquired information is wirelessly communicated to a base station (BS), which propagates the information to remote devices for storage, analysis, and processing.

Experimental measurements had shown that generally data transmission is very expensive in energy consumption, while data processing consumes less energy . To transmit a single bit of information or a thousand of information will take a same energy cost in a sensor node .

Energy consumption is carried out by various schemes they are

1)*Duty cycling* is the fraction of time taken by nodes during their lifetime , the task take place in node depending on their sleep/wakeup times.

2)*Data driven approach* uses unneeded samples and power consumption by sensing subsystem .

3)*Mobility* is the main concept of this paper ,mobility[8] is defined as a sensor nodes following a multihop transmissions for transfer of data from source to destination within the particular lifetime.

Sensors are typically powered through batteries, They replace battery and discard sensor nodes when battery gets depleted. For batteries that cannot be recharged, sensor node should be able to operate during its entire mission time or until battery can be replaced.

In the rest of our paper, section II says about the related work carried on ,section III says about the existing system ,section IV says about proposed work and section V says about the mechanishm finally the conclusion and references related to it.

II. LITERATURE SURVEY

Sensor nodes are usually battery powered in wireless sensor networks . The major causes of energy loss are packet collision, idle mode consumption and protocol overhead .

A. Energy consumption Techniques

1) Comparison Of S-Mac And T-Mac

In [7], G.P. Halkes et al. compared S-MAC and T- MAC, which try to save energy by introducing a duty- cycle to mitigate idle listening time, with CSMA/CA. Communication is not continuous between nodes this is the main cause of energy consumption in a sensor network. The MAC protocols provide the combination of low-power listening, which is effective in idle listening and optimization of a physical layer. In this S-MAC suffers from overload provisioning and T-MAC suffers from high cost.

2)Gossip-Based Sleep Protocol (GSP) In [5], The energy consumption rate for sensors in a wireless sensor network varies greatly based on the protocols. In this they have used GSP to consume energy to implement routing and MAC Functions and also to increase the lifetime. In this paper Motes used to sleep and wakeup in a timely basis to transmit data. To increase the sensor lifetime, energy storage capacity must be limited, energy consumption rate measurements were taken for Mica2 motes using GSP for routing and a CSMA.

3) Localization techniques: In [1] Localization technique have been used to reduce the energy consumption, in this they use TDOA technique (Time Differential Of Arrival) applied on the context of mobility and compare their performance by using the localizing sensors**.** In order to improve the quality of service and communication, protocols and communication technology on those wireless area are applied to sensor networks. The localization problem as node localization, target localization and location service have been analysed over here inorder to improve the quality of service.

4) Geocast approach: In[2] Geocast approach have been used to overcome the failure and data loss, they use directed diffusion routing protocol by construction of routing tree for damaged paths and the result show that energy consumption is reduced upto certain constraints. The routing protocols, provides a way for transferring the information, with delivery assurance and with minimum energy consumption, among the nodes that compose the network. This approach is used to reduce the energy consumption in the network when there is an occurrence of failures by providing modification of the Directed Diffusion routing protocol and by a Geocast approach is used to repair broken paths by constructing a new routing tree.

5) Transmission power control technique In [4] Transmission Power Control (TPC) technique has been used to dynamically adjust the transmission power and used to improve the reliability of link and Nodes which share the same space to access the medium by decreasing the collisions in the network and also improve the performance of the network in several aspects. Hidden and exposed terminals problems have been reduced over here. Therefore it increases the bandwidth and decreases the energy.

6)Mobile Robots In [9] Mobile robots can be used in energy consumption .The main task of mobile robots is to transmit the data completely within the lifetime of nodes. A power model is build for mobile robots that includes motor power , microcontrollers and sensors. A speed management method is said to be proposed here to reduce energy consumption ,in this it maximize the travelling distance by considering energy and timing constraints.

7)*Mobile Elements* In [11], Mobile elements have been used to carry the data in a mechanical manner to reduce the energy. A speed of mobile elements which is low have their constraints in applications. Rendezvous points have been used to address this issue,a set of nodes is used to buffer data from sources to Mobile Elements only on arrival.Rendezvous points uses two algorithms,to find optimal points when finding routing tree and reducing energy over here. A reliable data transfer from Rendezvous points to mobile elements is based on Data Collection protocol.An Energy consumption is reduced by having network communication

8) Optimal Velocity Schedule. In [10] the problem of optimizing sensor movement for energy e ciency has been addressed. To characterize the entire energy consumption in movement has been modeled. An optimal velocity

schedule model is used for minimizing energy consumption by considering the road condition uniform and a near optimal velocity schedule. A dynamic programming schedule have been used for the variable road condition by using continuous state. The entire actuation energy consumption is the main problem in mobile sensors. A complete energy model is used, to characterize the energy consumption the mechanical energy includes for accomplishing the movement command and it consists of various energy dissipation such as heating , acceleration viscous internal motor friction ,damping,etc.A method is proposed here to minimize the computation complexity to achieve the desired approximation.

9) C-MAC. In [9] C-MAC, a new MAC protocol is used for empirical power control and physical interference models access.The level of interference is estimated based on nodes running and the physical Signal to Interference plus NoiseRatio (SINR) model. and adjust the transmission power accordingly for concurrent channel access. C-MAC employs A block based communication model is used to reduce the overhead of channel assessment.The probability of improving the multiple nodes within the interference range of each other can transmit concurrently. C-MAC has been implemented in TinyOS- 1.x and it is evaluvated by using Tmote nodes. The negative impact of increased interference is mitigated by using concurrent transmissions.C-MAC carefully chooses the transmit power of senders and the local throughput of active links within the interference range is maximized by carefully chosing of nodes.

10)Mobile Relays Mobile relays have been used in energy consumption ,Relay node have been efficiently used to move to different locations in a network and transmit data from one node to another node[3].Optimization of each node is carried out by construction of topology for data size and transmitting data in a network.

Techniques in Mobile Relays

A.Source Nodes

The source nodes act as a storage points in which the data can be collected by other nodes and they transmit periodically to the sink, with response to the queries generated by the user.

B.Data Mules

Data mules are another form of base station it transmit data from sensor nodes to access point. They use the mule architecture in order to reduce the mobility energy consumption. It improves data delivery by using higher level protocols that is incorporated in the architecture.

C.Tree Optimization

A topology is constructed for the optimal positions of relay nodes by a routing tree.

Routing tree is constructed based on the amount of data to be transmitted to particular node and it follows different topology.

Node insertions and tree optimizations follow the local pos algorithm that solves optimally the mobile relay configuration problem.

The centralized and distributed algorithms have been used to reduce energy consumption and solves the problem of mobile relay configuration.

Energy consumption in WSNs had been reduced here through certain constraint but the optimization of each and every node is not possible.

III. PROPOSED WORK

The proposed work is energy consumption in wireless sensor networks by using Zigbee technique with IRS protocol.

A.Zigbee Technique

Zigbee is a low-cost technique that is widely deployed in wireless sensor network .It allows longer life for nodes with smaller batteries and provides high reliability.

Zigbee protocol support both beacon and non-beacon enabled networks

In beacon enabled enabled networks. The special routers called Zigbee routers transmit periodic beacons to conform their presence to other nodes. Nodes may sleep during their duty cycle by extending their battery life ,the intervals depend on their data rates. In non-beacon enabled networks ,The receivers will be continuously active for the requirement of robust power supply and allows for heterogeneous networks [4]. ZigBee has a defined rate of 250 kbit/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device.

ZigBee technique is simpler and less expensive while comparing with wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi.

Zigbee routers can be used in tree and mesh networks to extend the communication of the network.

B. Increasing Ray Search Protocol(IRS)

Increasing ray search protocol is designed to achieve an energy efficient and scalability.

IRS protocol goals:

1.Designed to achieve the efficiency of energy and latency.

2.The packet route along the set of tracks which are called Rays, The packets are sent along all rays where the whole area is allocated to it and it minimizes the overlap of transmissions.

3.IRS protocol consumes the least amount of energy to attain the maximum probability by discovering the target information.

To achieve the good node placement we have two algorithms

1.Reliable data transport (ESRT)algorithm.

In this algorithm it focuses on reliable transfer of data from source to destination.

2.Generic routing algorithm(Flooding) .

In this algorithm congestion has been reduced.

These algorithms have been used to improve the performance of wireless sensor networks by using the multiple paths as alternative paths in order to forward the traffic from source to sink .

IV. MECHANISHM

A Logical WSN network is formed by cooperation of sensor nodes. Sinks are used to collect data packets that are routed from logical network. These data packets are routed through multi hop transmission. Thus, WSNs consist of a large set of nodes which are distributed within a wide environmental area to perform two specific functions that is sensing and monitoring of nodes within logical area in order to achieve traffic and environmental monitoring, efficient industry production, and security at home. Hence, WSNs nodes response quickly to the detected events (or) monitored events.

The energy of each node in WSNs is affected by heavy traffic load.This problem worsens in low powered WSNs.

In this technique an optimized path is created for a sink node with a use of a channel that is commonly assigned to CSMA and TDMA Scheme. A first and second nodes use a CSMA Scheme for sending and receiving data by the

corresponding channel slots. By using TDMA scheme ,a data is sent to the second node during first set amount of time. If a data is not received from the second node then an inactive offer is send to the transition of first received slot and the further process takes place and correspondingly we can reduce the energy consumed at each node.

V. CONCLUSION

In this Paper, the problem of minimizing the energy consumption in WSNs has been addressed by, including energy consumption for hardware. This is done by adding the ZigBee technique to design nodes on WSN so that it will make the nodes of WSN able to wake up and turn to active mode in only 15ms or less. ZigBee is designed for low power consumption as it is designed with abilities that make the nodes able to sleep most of the time and hence making in the battery lasting longer. IRS protocol is designed with the ZigBee technique, as this protocol would be used for discovering information of unaware locations and achieving efficiency of energy. The algorithms used are ESRT and Flooding. ESRT algorithm represents a congestion control with the placement of nodes, thus it is a routing algorithm. Flooding algorithm worked with the fact that each node always tries to send every message to every neighbour node. Thus, The power issues of WSN presents the role of ZigBee and IRS protocol to reduce the energy consumption on WSN.

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