A Review of Tree Routing in ZigBee Wireless Network

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ABSTRACT
In current scenario ZigBee wireless sensor network suffered from distribution of power and route cost for the selection of root tree node and communicating node. The utilization of power factor in sensor network is limited due to this reason most of authors used the process of energy consumption for the increasing the life of network. The power supply process of wireless sensor network is fixed type. The process of power used battery. Now most of authors followed the location based and heretical based protocol for minimization process of energy factor in wireless sensor network. In consequence of efficient energy and route cost minimization one is very famous routing protocol is shortcut tree routing protocol. In the process of improvement of ZTR protocol one protocol are available such are called as STR protocol. Basically STR protocol is a combination of two different routing protocols for the processing of energy saving mode and cost. In this paper we review the techniques about wireless sensor networks.

Keywords: - ZTR, STR, CH, LEACH, MWSN.

INTRODUCTION
A wireless sensor network (WSN) is a group of sensor nodes which are deployed in a field to monitor physical conditions autonomously. WSNs can measure various physical conditions like sound, temperature, pressure, humidity, load, speed etc [4]. After sensing the data sensor nodes pass this information to a base station or sink following a particular routing pattern. The number of sensor nodes in a WSN can vary from a few to hundreds or thousands in numbers depending on the application. A sensor node consists of many components, a microprocessor or a microcontroller to control the operation of node, a radio transceiver to transmit and receive information, an ADC converter to convert analog information to digital and vice versa and a power source [2]. In wireless sensor network, the network structure can be divided into three main protocols; flat-based routing, hierarchical-based routing and location-based routing. Flat-based routing usually involves sensor nodes that has equal roles that works together to perform sensing task. In this protocol, data centric routing and attribute-based naming are used in most routing protocols in order to create a more efficient communication. Hierarchical-based routing provides more efficient routing where the sensor nodes are usually clustered and led by cluster heads which can process and aggregate more with the sensor nodes senses data [1]. In order to support data aggregation through efficient network organization, nodes can be partitioned into a number of small groups called clusters. This phenomenon of grouping sensor nodes into clusters is called clustering [26]. Every cluster would have a leader, commonly referred to as cluster-head (CH). A CH may be elected by the sensor nodes in the cluster or pre-assigned by the network designer [7]. A CH may also be just one of the sensors or a node that is generally richer in resources. The cluster membership may be fixed or variable. There are several advantages in clustering phenomenon. The basic advantage is that, it supports network scalability. It can localize the route setup within the cluster [6]. Clustering can also conserve communication bandwidth. Moreover, clustering can stabilize the network topology at the level of sensors and thus cuts on topology maintenance overhead [8]. The CH can also implement optimized management strategies to prolong the battery life of the individual sensors and to maximize the network lifetime [14]. A CH can schedule activities in the cluster so that the nodes can switch to the low-power sleep mode most of the time and reduce the rate of energy consumption. Furthermore, a CH can aggregate the data collected by the sensors in its cluster.

In MWSNs, the number of leaving nodes that moves away from the current cluster head before the next new cluster head selection process affects the accurate data aggregation and causes transmission delay for the collected information [17]. Due to the difference of mobility between the cluster head and its members, a time-critical data may not be accurately transmitted to sink. In addition, the transmission delay and unnecessary energy consumption may occur to each sensor node as the result of searching for a new cluster head and being allocated a slot for data transmission. For example, if a cluster head moves in a different direction or different speed from its members, a number of member nodes will move away from their cluster head. Hence, in a mobile environment, it is desirable that a sensor node which has a similar mobility as its members and has high energy should be selected as a cluster head to reduce the number of leaving nodes and prolong the network lifetime [20]. The leaving rate increases as the similarity of the mobility between the cluster head and its members is low. Section II discusses about related work, Section III discusses about the problem statement. Finally, concluded in section IV.

II RELATED WORK

This chapter gives an extensive literature survey on the existing routing protocol for increase the efficiency of energy used in a communication and also gives the secured communication and increase the range of communication area. The aim of this survey to find the work guidance of efficient reliable routing protocol.

[1] Here they propose an algorithm design based on what wireless sensor network is initially created for. The design of the algorithm will focus on the sensor network's quality of service (QoS), emergency awareness, and energy efficiency. The designed algorithm is intended for wireless sensor networks that needs a period and event-driven approach and can adapt to the situation the sensor faces. Their motivation is to expand the solution of problems found in routing protocol specifically in the quality of service issue. In terms of quality of service, data must be delivered in an accurate amount of time for it to be useful.

[2] This paper proposes a new routing strategy based on hierarchical routing protocol LEACH where clusters are refreshed periodically based on residual energy and distance. Re-clustering distributes the workload among different nodes and in turn enhances the network lifetime by rotating the cluster head. The sensor nodes remain in active state only during its transmission slot. Rest of the time it remains in sleep state to save energy. LEACH, MOD-LEACH and the proposed protocol are simulated in MATLAB. The result shows that our proposed algorithm performs better than the LEACH and also MOD-LEACH protocol in terms of network lifetime. The proposed algorithm also gives more throughput than LEACH.

[4] In this paper, They propose an emergency adaptive communication protocol, which treats the data packet in a discriminatory manner by investigating whether it is emergency or not. Hence, the proposed protocol defines an emergency factor for each data packet and exploits it for both route establishment and channel access procedures. In route establishment, the proposed protocol chooses a route with low delay and high reliability among the candidates by periodic calculation of emergency factor. Then, it dynamically adjusts back-off parameters before participating in the channel contention among the neighbors. In addition, an emergency aware queue management scheme and packet drop policy are proposed to improve the reliability of emergency data traffic during transmission.

[5] In this work the classical cluster routing protocol LEACH and improvement of LEACH (LEACH-E) are analyzed and improved (LEACH-EX). In LEACH-E energy depletion of nodes is balanced by two methods; first by considering the current energy of nodes when electing them as cluster heads, another is by limiting the number of nodes in each cluster. In LEACH-EX the threshold formula for election of cluster heads is simplified and simulation results show the effectiveness of the formula (LEACH-EX) and prove that LEACH-EX is much better than LEACH and LEACH-E in energy consumption and lifetime of network. Sensor networks can contain hundreds or thousands of sensing nodes. It is desirable to make these nodes as cheap and energy-efficient as possible and rely on their large numbers to obtain high quality results.

[6] In this paper, they propose adaptive Time Division Multiple Access (TDMA) scheduling and round free cluster head protocol called Cluster Based Routing (CBR) protocol for Mobile Nodes in Wireless Sensor Network (CBR Mobile-WSN). In this protocol the cluster head receive data from not only its member during the TDMA allocated time slot but also other sensor nodes that just enter the cluster when it has free time slots, each cluster head takes turn to be the free cluster head in the network. CBR Mobile-WSN change TDMA scheduling adaptively according to traffic and mobility characteristics. The proposed protocol sends data to cluster heads in an efficient manner based on received signal strength.

[7] In this paper author presents an efficient clustering scheme for data aggregation considering mobility to reduce the network lifetime in Mobile Wireless Sensor Networks (MWSNs). In MWSNs, an accurate data aggregation is affected by failure in time-critical data transmission due to the differences of mobility between cluster head and its members. Consequently, selecting a node with dissimilar mobility from members as a cluster head can lead to unstable clustering. Hence, they propose a clustering scheme considering the mobility and energy to minimize the number of nodes that moves away from the current cluster head before the next cluster formation. The proposed scheme is processed in two-stages. During the first phase of clustering, all nodes calculate their potential score based on the similarity of movement, residual energy and density in distributed manner.

[8] In this paper, we proposed a LEACH-based key management scheme for wireless sensor networks based on Exclusion Basis Systems and μ TESLA. They use EBS for key generation and distribution, and use μ TESLA to guarantee the cluster head can update security key after the first round. The proposed algorithm decreases the storage requirements of keys, and the network communications load for updating cluster keys. The key management scheme can enhance the survivability and ensure the security of WSNs.

[9] In this paper author presents a comprehensive survey and comparison of routing protocols in WSNs. The first part of the paper surveys state-of-the-art routing protocols in WSNs from classical routing protocols to swarm intelligence based protocols. The routing protocols are categorized based on their computational complexity, network structure, energy efficiency and path establishment. The second part of the paper presents a comparison of a representative number of classical and swarm based protocols. Comparing routing protocols in WSNs is currently a very challenging task for protocol designers. Often, much time is required to re-create and re-simulate algorithms from descriptions in published papers to perform the comparison. Compounding the difficulty is that some simulation parameters and performance metrics may not be mentioned.

[10] In this paper, they survey the state of the art on the routing protocols used in WSNs. They demonstrate different security issues to be taken into consideration when deploying WSNs indicating their security requirements for such networks and demonstrating different types of attacks that may face. They also summarize the state-of the art secure routing protocols proposed for WSNs. Finally, they present the future directions and open research issues or problems in the field of routing protocols of WSNs. Wireless Sensor Networks (WSNs) have been deployed into a variety of applications including homeland security, military systems, and health care. Sensor nodes deployed in such networks are subject to several attacks such as sinkhole and select forwarding, wormhole, Hello flood, and replication attacks.

[11] In this paper, they propose efficient and secure routing protocol based on encryption and authentication for WSNs: BEARP, which consists of three phases: neighbor discovery phase, routing discovery phase, and routing maintenance phase. BEARP encrypts all communication packets and authenticates the source nodes and the base station (BS), and it ensures the four security features including routing information confidentiality, authentication, integrity, and freshness. Furthermore, they still design routing path selection system, intrusion detection system, and the multiple-threaded process mechanism for BEARP. Thus, all the secure mechanisms are united together to effectively resist some typical attacks including selective forwarding attack, wormhole attacks, sinkhole attacks, and even a node captured.

III PROBLEM STATEMENT

The purpose of this dissertation is to minimize the power consumption of wireless sensor network during the selection of tree node during the process of routing. Wireless sensor nodes which are battery operated are used for detecting and collecting information from the areas where there is very little scope for manual handling to recharge or change batteries. These sensing nodes collect the information and pass them on to the network towards the sink for further actions. For a better functioning and a longer lifetime for a sensing node within the network, we need to consider its energy consumption as a major factor of concern. In the process of survey found that some protocol are very efficient such as ZTR and STR. The shortcut tree routing protocol is version of AODV protocol. Wireless sensor networks consist of a number of sensing nodes which are distributed in a wide area. They sense an event occurring in the environment and these sensing nodes are distributed or placed according to the requirements of the application.

- The base station (sink), which collects data from other nodes, interacts with a user (someone interested in monitoring the activity). Data can be collected in many ways from a sensing node to a sink node like using hopping techniques or transmitting data at certain frequencies. Sinks have more advanced features than sensing nodes in terms of data transmissions and processing capabilities, memory size and energy reserves. There can be multiple sinks for a network so that there is no single point of failure.
- Energy dissipation is a major factor in WSNs during communication among the nodes. Energy should be saved, so that the batteries do not get depleted or drained quickly as these are not easily replaceable in applications such as surveillance.
- Quality of service ensures the effective communication within the given or bounded delay time. Protocols should check for network stability, redundant data should be transmitted over the network for any type of traffic distribution. It also needs to maintain certain resource limiting factors, such as bandwidth, memory buffer size and processing capabilities.
- The transmission mode plays an important role in WSNs. Nodes can take single-hop or multi-hop depending upon the type of network topology chosen for communicating or transmitting data to other nodes within the network.
- The sensor nodes can be mobile or static depending on the application. In surveillance applications, sensor nodes are placed in unattended areas so it should be self-organizing and self-creating.
- The STR protocol gives the efficient routing protocol but it is faced a problem of multi-request join communication.
- The consumption of power is increase due to large number of sensor node in active mode.

IV CONCLUSION AND FUTURE WORK

ISTR is a hybrid model of very famous reference node model and STR protocol for energy saving and minimum route cost for communication in wireless sensor network. Basically ISTR work as a route filter, because in modern trend traffic apply by the flooding a power that power is consumed by sensor node. Flooding blocks a provided bandwidth of communication and our network are jam without generation of any interference attack and jamming attack. So we design strong filter for unknown control request power on the time of node mobility. In this process our methods generate a link for connecting a mobile node with their respective speed and all nodes connect our base node, basically base node is a nothing, this is a control section of ISTR and maintains all links from mobile node. Link of synchronization provided by clock. Clock maintains network ability for all nodes during communication. If unknown mobile node sends a request to any node, node not reply, node transfer that message to chock section chock scan their power and find this is normal or abnormal and take action for blocking and generating a security alarm for all node. The diversity of network and service oriented traffic in wireless ZigBee sensor network further explored our research work in term of calculation of power node assignment, for the process as base node for controlling a message request of all mobile sensor node in communicating network. The filtration process used huge amount of power for the process of selection, now need some extra memory segment for the process of reference node. Now exploding of this works and optimized the process of

reference node allocation and reduces the capacity of memory for the expanding of power allocation.

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