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Energy Efficient Mapping of Wireless Body Area Networks Using Secure Trust -Optimized link state routing (ST-OLSR) Protocol

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ABSTRACT

Traffics in Wireless Sensor Networks is a multi-hop network by transmitting data among themselves, which is composed of large number of nodes. The routing in wireless sensor networks is a process to select suitable path for the data to travel from source to destination. The data sensed by the sensor nodes in a wireless sensor network is typically forwarded to the base station that connects the sensor network with the other networks where the data is collected, analysed and action is taken accordingly. A developed routing protocol named as STOLSR is proposed. The STOLSR protocol cluster head election considers residual energy of nodes, distance from node to the base station and neighbor nodes, which makes cluster head election reasonable and node energy consumption balance.

Keywords: STOLSR, WSN, SENSOR NODES

INTRODUCTION

A Wireless Sensor Network (WSN) is a distributed network and it comprises a large number of distributed, self-directed, tiny, low powered devices called sensor nodes that monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to co-operatively pass their data through the network to a main location. Recent modern networks are bi-directional, & also enabling control of sensor activity. In many real time applications the sensor nodes are performing different tasks like neighbor node discovery, smart sensing, data storage and processing, data aggregation, target tracking, control and monitoring, node localization, synchronization and efficient routing between nodes and base station. The development of Traffics in Wireless Sensor Networks was motivated by military application like battlefield surveillance, temperature control, inventory management, physiological monitoring, habitat monitoring, precision 10 agriculture, forest fire detection, nuclear, chemical, and biological attack detection, military, transportation, disaster relief, and environmental monitoring. Now a days wireless network is the most popular services utilized in industrial and commercial applications, because of its technical advancement in processor, communication, and usage of low power embedded computing devices. The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and communications bandwidth. The topology of the WSNs can vary from a simple star network to an advanced multi-hop wireless mesh network. The propagation technique between the hops of the network can be routing or flooding. In computer science and telecommunications, Traffics in Wireless Sensor Networks are an active research area with numerous workshops and conferences arranged each year.

A sensor node consumes battery power in the following four operations: sensing data, receiving data, sending data, and processing data. Generally, the most energy consuming component is the RF module that provides wireless communications. Consequently, out of all the sensor node operations, sending/receiving data consumes more energy than any other operations. The energy consumption for transmitting 1 bit of data on the wireless channel is

equivalent to the energy required to execute thousands of cycles of CPU instructions. Therefore, efficient use of energy in WSN communication protocols extends the network lifetime. Hence, any MAC, network, and transport layer protocols designed for WSN should give due consideration to the efficient use of RF module by minimizing MAC collision, control message overhead in routing, efficient sleep/wake scheduling and so on. In addition, during protocol design, the limited resources of sensor nodes should also be considered, which includes low processing power, less memory, short-range communication, and low sensing power.

Bellman Ford algorithm is the existing algorithm which is based on centrality measures such as degree, between ness and closeness. It is reliable based on these centrality measures. Bellman Ford algorithm is suitable when number of nodes is minimum but if nodes count is increased step by step, it won't be that much efficient and hence it provides unreliable solution.

In the proposed system, STOLSR algorithm is compared with existing Bellman ford algorithm with additional two metrics such as packet delivery ratio and congestion level in network. By adding these two metrics shortest path could be easily found and it is much efficient and also energy level gets reduced. Because of the minimization of energy level, network lifetime gets increased and reliable solutions could be achieved.

L. Zhu, F. R. Yu, Communication-Based Train Control (CBTC) system is an automated train control system using bidirectional train-ground communications to ensure the safe operation of rail vehicles. Handoff design has significant impacts on the train control performance in CBTC systems based on multi-input and multi-output (MIMO)-enabled WLANs. Most of previous works use traditional design criteria, such as network capacity and communication latency, in handoff designs. However, these designs do not necessarily benefit the train control performance. In this paper, we take an integrated design approach to jointly optimize handoff decisions and physical layer parameters to improve the train control performance in CBTC systems

C.-S. Li, Y.-C. Tseng, Seamless handover in IEEE 802.11 for quality of service (QoS) demanding applications is one of the critical issues because of handover latency. In this paper, we proposed the neighbor graph cache (NGC) mechanism to reduce scanning latency while a mobile station tries to make a link-layer handover. The handoff latency can be greatly reduced through NGC algorithm.

EXISTING WORK

LEACH to an energy efficient multi-hop routing algorithm. LEACH in the cluster creation, data transmission, the update phase of the cluster was modified in proposed algorithm. The algorithm updates the cluster head reasonably and adjusts the structure of the cluster to reduce the energy consumption in cluster establishment phrase. In data transmission, it lowers energy consumption by inter-cluster and intra-cluster multi-hop transmission

DISADVANTAGE

- Discovered routes by these algorithms may neither be energy-efficient nor be reliable.
- Shortest path algorithm is not implemented
- System security is low
- No improved Energy Efficiency
- Discovered routes by these algorithms may neither be energy-efficient nor be reliable.

PROPOSED SYSTEM

New hybrid routing protocol called STOLSR protocol has been discussed. This protocol aids in prolonging the network lifetime by using double cluster head node for data transmission that reduces the energy of the individual nodes.Each cluster head directly transmit data to the Sink node, which correspondingly increases the cluster nodes energy consumption especially in large networks. To solve this problem, this paper puts forward a kind of hierarchical double routing algorithm. It chose level-one cluster head from all members of the node, who is responsible for receiving data send from member nodes and sorting data fusion to level-two cluster heads. Then level-two cluster heads is selected in all non-head nodes, who is responsible for forward the packet to the Sink node. Such as cluster head responsibilities assigned to the two levels of cluster heads to complete can greatly reduce the cluster heads energy consumption and improve the network survival time.

ADVANTAGES

- Algorithms that consider the Algorithms that consider the reliability of links to find more reliable routes.
- Algorithms that aim at finding energy-efficient routes
- Throughput and packet delivery ratio can be improved significantly.
- Reduced average end-to-end delay and Routing overhead of messages

WORKING

The trust is always present implicitly in the protocols based on cooperation, in particular, between the entities involved in routing operations in WSN Networks. WSN Networks continues to grow, they become vulnerable to attacks and hence the need for an effective security mechanisms. Identification of suitable cryptography for wireless sensor networks is an important challenge due to limitation of an energy, computation capability and storage resources of the sensor nodes. Novel energy-aware routing algorithms to be proposed for Adhoc networks, called reliable minimum Trust Secure Energy Optimized Aggregation Protocol . FPA addresses important requirements of WSN-Energy-Efficiency, reliability, Data Aggregation and attacker's detection. FPA is an energy-efficient routing algorithm which finds routes minimizing the total energy required for end-to- end packet traversal and enhanced malicious nodes detection.

MODULES

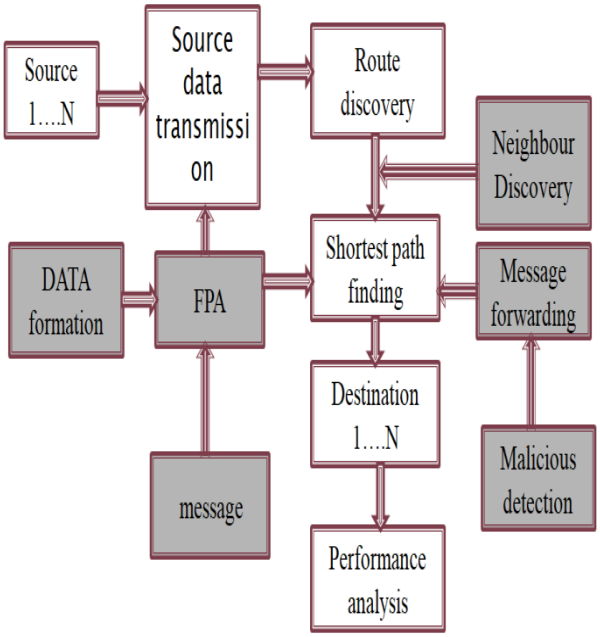
- WSN Network Deployment
- Data Communication
- Trust Computation
- STOLSR implementation
- Performance Analysis Result

Network simulator

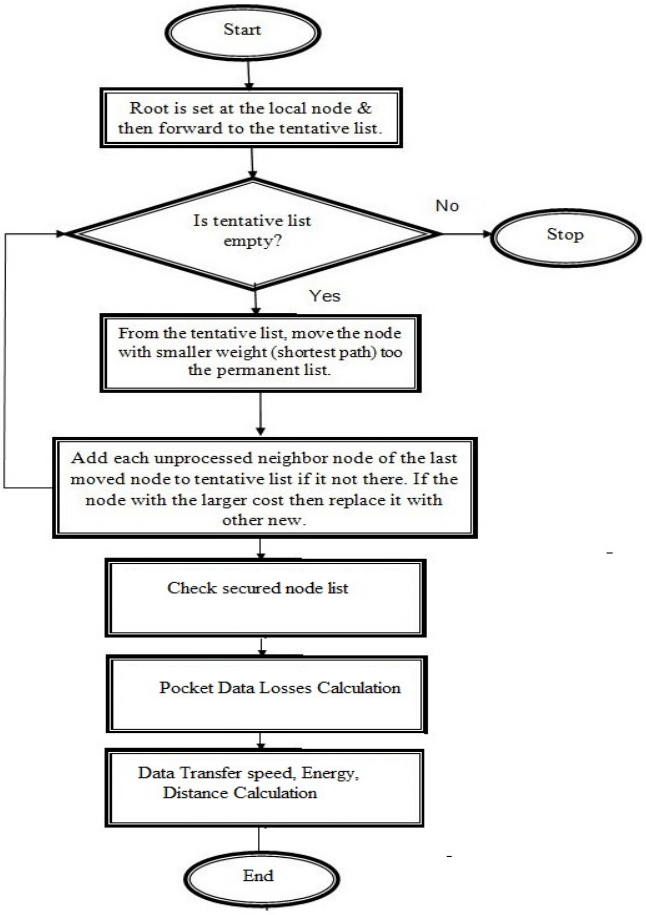
A network simulator is a software program that imitates the working of a computer network. In simulators, the computer network is typically modelled with devices, traffic etc and

the performance is analysed. Typically, users can then customize the simulator to fulfill their specific analysis needs. Simulators typically come with support for the most popular protocols in use today, such as WLAN, Wi-Max, UDP, and TCP.

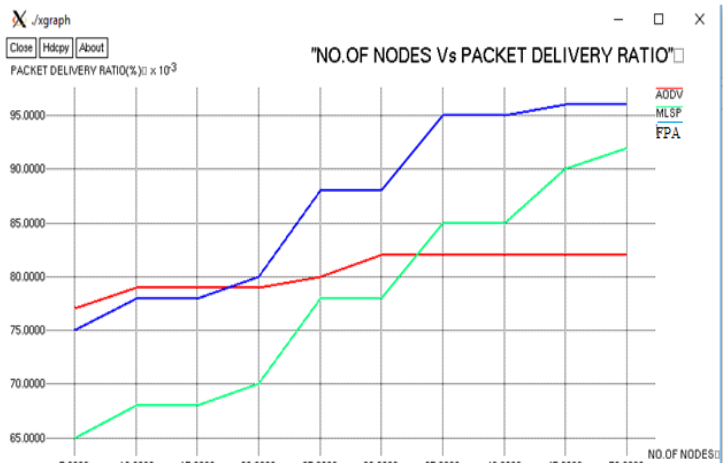
BLOCK DIAGRAM

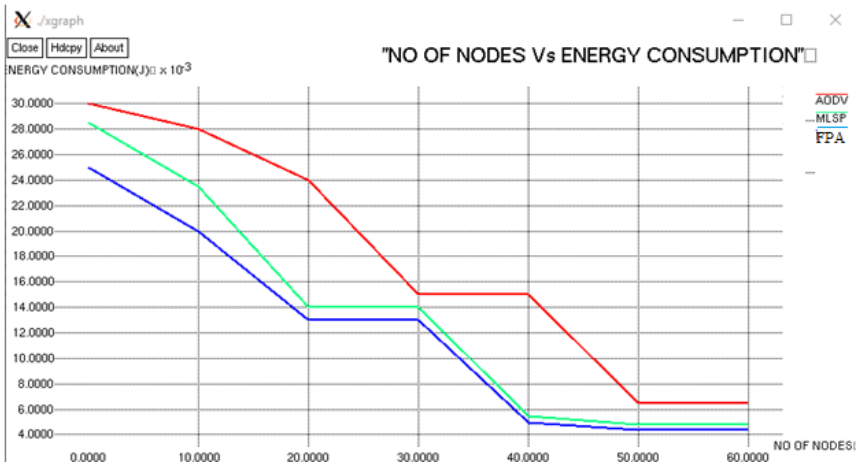


FLOW DIAGRAM



SIMULATION OUTPUT





CONCLUSION

New hybrid routing protocol called ST-OLSR protocol has been discussed. This protocol aids in prolonging the network lifetime by using double cluster head node for data transmission that reduces the energy of the individual nodes. ST-OLSR ROUTING selected double hierarchical cluster heads from network, respectively responsible for collecting data and forwarding packets, which greatly reduce the burden of cluster heads. At the same time, it introduced the factors that influence the cluster head election and revised the cluster head threshold, and the number of cluster heads under control.

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