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Survey on Secure Routing Method in Wireless Sensor Networks Based Pso

M.Tech. Scholar Anamika Kumari Asst. Professor Niresh Sharma Dr. Varsha Namdeo
Department of Computer Science and Engineering
SRK University, MP India, Bhopal

Abstract **- Some trust-based methods have been proposed for consideration by guaranteeing the security routing of wireless sensor networks (WSN) recently. However, Most of the current research work usually consumes a lot of energy resources and computing resources or only performs well for specific types of attacks. Nowadays, most of current research works are only targeted at specific types of attacks, so they cannot cope with dynamically changing security environments. Therefore, it is extremely important to design an effective security routing algorithm to ensure data security.**

Keywords- **lightweight, efficient, q-learning, trust, wireless sensor networks.**

I. INTRODUCTION

Wireless Sensor Network (WSN) consists of a cluster of Sensor Nodes (SNs) distributed in certain areas. It consists of various nodes which may monitor the atmosphere environment and collects different datas. The collected datas are transmitted to the remote sink node through direct or multi hop transmission. WSNs have attracted scores of attention in recent years and it leads to wide variety of applications like police investigation, inventory and life observation, and sensible home etc. Every node has sensor, radio, memory battery and process capability. Since the device nodes are typically operated by a restricted battery power and they cannot be standardized once deployed. It is very important that the network should be energy balanced in order to contribute the extended network time period and economical knowledge gathering.

In several WSN applications, the device nodes are arranged in an ad hoc fashion that can sense the environment and communicate the information through wireless links. Once deployed, the device nodes should be ready to autonomously organize themselves into a wireless communication network. Sensor nodes are powered and are expected to control while not attending for a comparatively long amount of time. In most cases it is terribly tough and even not possible to vary or recharge batteries for the device nodes.WSNs are characterized with various levels of device node arrangement, high responsibility of device nodes, more power, computation, and memory constraints. Thus the major characteristics and constraints limit the application of WSNs.

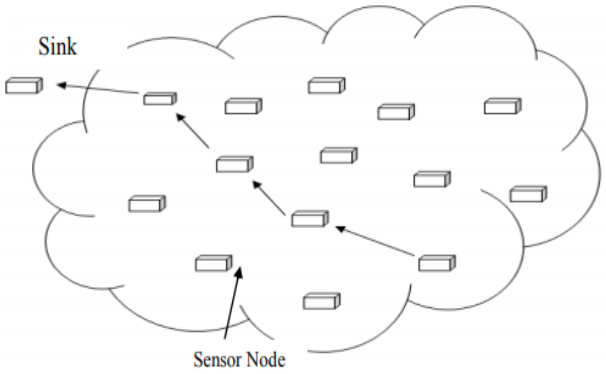

Fig .1. Wireless Sensor Networks Scenario.

II. LITERATURE SURVEY

Subhasis Dash et al.(2015) analyzed that the time and energy needed for constructing a sequential manner is always high. To tackle this difficulty, a distributed algorithm is introduced to build the hierarchical structure with balanced consumption of energy in sensor networks in which every node possess two parent nodes with the exception of the root node. The in-between nodes of the produced tree remain wakeful as they are chosen as parent node depends on its level of energy, and other nodes are to be maintained in the sleep mode with the aim of conservation of energy. The distributed tree structure is regularly recreated taking into account the left over energy of every node with a view to balance energy consumption of nodes in the complete sensor networks. This method greatly minimizes the average energy consumption rate of every node as we are capable to put many number of nodes in the sleep mode in a disseminated manner when compared with other existing approaches.

Samira Chouikhiet al.(2015) studied the issues in sensor networks which deteriorates the network performance. The interference in between the concurrent

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communications can influence the network efficiency that affects the performance. The utilization of the numerous channels presented in sensor technology and the growth of protocols for sensor networks can be a solution to lessen this interference. In this case, the manner the channels are allocated possess an important impact on the performance of multi-channel communication. In the other hand, the faults occurred in sensor networks are an additional factor that degrades the WSN performance. Therefore, a distributed energy-efficient solution is presented for multi-channel allocation based on the routing. This solution executes a fault recovery mechanism in order to re-organize the network after the failure of articulation node. The important job of this method is to reduce the number of interferences while allocating the finite number of available channels. Another important task is defining the strategy of sleeping or activity to reduce the consumption of energy. The approach of fault recovery seeks to re-establish the network connectivity and rearrange channels without affecting the complete sensor networks.

Sounak Paul and Tapan Kumar Dey (2015) presented energy efficient method for cluster based WSN namely MER (Minimum Energy Route) to reduce the consumption of energy and to improvise the network active lifetime. This method utilizes the minimum energy path for data transmission from the node to a fixed BS throughout the CH. In this, multi-hop architecture is practiced for transmission of data. The routing‟s initial step is clustering in which the complete network is split into few disjoint clusters having few member nodes and a particular node which is called CH (Cluster Head). Every CH for a specific cluster performs data aggregation and essential computation. The CHs are answerable for routing received data to the base station. The distance in between the adjacent clusters is estimated by means of Hausdorff distance. The energy utilized is estimated to broadcast a „k‟ bit message to all the nearby nodes from source cluster. The complete routes are compared and the minimum energy route is chosen to send the data to the base station.

Fahad Khan et al.(2016) introduced a topology based protocol namely STEED (Stable Topology based Energy Efficient Protocol for Distributed Network) for applications of heterogeneous wireless sensor networks. This protocol possesses hierarchical structure, hybrid topology and adaptive transmission power control method to improve the reliability of communication of data and progresses the QoS metrics. The utilization of topology limit the mobility of sensing nodes; though, it offer the effective coverage and more control over network management. This makes the network flexible towards faults by providing efficient traffic load balancing. The instability period of sensing nodes, dead head nodes and priority nodes is also estimated. This protocol is not only capable to handle resources of nodes in heterogeneous environments but it is also capable to sustain desired QoS.

Zain-ul-Abidin et al.(2016) presented an energy effective routing in two-tiered wireless sensor networks based on the enhanced genetic algorithm. In this, sensor nodes forward the data packets to its linked relay nodes that are CHs. Every sensor nodes are connected with as a minimum one relay node in the network. The proposed scheme decides the finest set of relay nodes for upper-tier communication. These relay nodes are regularly selected again based on the remaining energy information of sensor nodes. Re- election scheme of relay node balances the energy consumption of sensor nodes in a network. Additionally, greedy algorithm is employed to produce a set of possible routing solutions. By using the GA (Genetic Algorithm), it finds the finest routing path from a group of possible routing solutions.

Suneet Kumar Gupta et al. (2016) suggested an algorithm for multipath routing in sensor networks and it is based on the well-liked metaheuristic method called Genetic Algorithm, and it is also energy efficient. In this suggested algorithm, the schedule for routing is arranged at the BS (Base Station) that shares it with every node of the complete network. This algorithm possess the well-organized fitness function and it is obtained with a variety of parameters, for instance, the distance among the sender and receiver nodes, the distance among the succeeding hop node to the Base Station and also on the number of hop to forward data from next hop node to the BS. This is validated with the simulation and estimated with number of performance measures.

KorhanCengiz and Tamer Dag (2016) tries to maximize the lifetime of sensor networks by using the algorithm namely MESA (Maximum Energy Selection Algorithm) which is a fixed clustering routing algorithm that chooses the node that exist with higher left over energy for the subsequent rounds according to the level of threshold. This algorithm increase the network lifetime and it greatly minimizes the depletion of energy. It gains for the lifetime more when compared to LEACH, and LEACH based algorithms, for instance ModLEACH and DEEC. With the predetermined number of clusters and minimizing the amount of variations in cluster head, MESA reduces the overhead in formation of cluster. It is noted that in this algorithm clusters are outermost from the base station and it is vulnerable to expend high energy because of distance factor. A system of smart CH selection can be employed in the set-up phase of the algorithm. It also increases the lifetime by putting some percentage of the nodes in every cluster into sleep mode.

Sicong Liu et al.(2016) investigates about the well-organized technique to set up the information gradient is to resolve the discrete approximation to the harmonic function namely IPF (Information Potential Field). Though, the methods of quick convergence and energy-efficient to build the IPF can be entirely examined to trade off the energy efficiency and the quality of the IPF, particularly in the large-scale networks with high dynamics. Therefore, there are two algorithms are

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introduced to effectively build the IPF, that includes, HSCA (Hierarchical Skeleton-based Construction Algorithm) and VESA (Value Estimating Substitution Algorithm). These two algorithms follow the characteristic hypotheses on sensor network settings and the gossip-styled propagation principle. Furthermore, more superior methods are presented to deal with the issues of its sensible applications, for instance, sensor energy budget and task priority.

Xia Li et al.(2013) studied the problem of imbalance of energy of CHs in the single-hop communication in between the clusters. In order to tackle these problems, an integrated scheme of enhanced particle swarm clustering algorithm and inter-cluster routing algorithm is presented to construct an routing protocol namely AECRP (Adaptive Energy-Efficient Clustering Routing Protocol). This makes enhancements mainly in two features. Initial one is, network clustering is a type of NP problem to optimize the separation of network topology. This issue can be solved by particle swarm algorithm. Though the particle swarm algorithm‟s convergence speed is slow, hence an adaptive inertia weight depends on various dimensions to increase the convergence speed of the particles. On the basis of enhanced PSO (Particle Swarm Optimization), particle swarm clustering algorithm is presented that regards node‟s leftover energy, the distribution among clusters and the distribution within a cluster. Second is inter-cluster routing algorithm that uniting single-hop along with multi-hop is considered to keep away from long distance transmission in between the CH and the sink node, in meantime it implements the „threshold detection‟ method to release the CHs load near the sink node. At last, it forms the AECRP.

Liu Mengyao et al.(2014) evolved a lightweight trust evaluation algorithm along with high trustworthiness and ring-based clustering algorithm. With this mixture and the inter-clusters routing algorithm, a secured clusterrouting protocol is produced with energy-efficient. Initially, it regards the ring clustering in which the clusters are even and efficient load balance; hence it can improve the network lifetime. After that, a new computation model of node trust is introduced, it selects CH based on the trust and the leftover energy and it possess the capability of resisting inner attack. Then a new computational method of nodes trust degree is presented that makes use of CH to cache data and it greatly minimize the consumption of energy in the computation of node trust. At last, an algorithm of inter-cluster multi hop routing is developed based on the ant colony algorithm; this regards the left over energy and trust value of CH, keeps away from extended distance direct transmission in between the CH and sink node, meanwhile, it decreases the consumption of energy and assures the security of routing.

III. CONCLUSION

This survey mainly focuses on the existing challenges, threats and the earlier methodologies followed to overcome certain problems. WSN is an emerging information acquisition technology integrating the latest technological advancements in micro-electronics and network communications. It forms an intelligent network application system consisting of thousands of tiny energy limited and low cost sensor nodes. These nodes autonomously sense, process and communicate via the radio medium forming a self-organized network pattern. Typically, sensors report sensed data to an external base station for further processing. They are equipped with low-cost and small-size batteries which are mostly non-rechargeable and irreplaceable.

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