An Analysis of Manet Energy Management Using Optimization Techniques

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Abstract- Energy Efficiency is the major requirement of any MANET application, as the network with minimal lifetime cannot serve the purpose. On analysis, it is observed that the process of routing consumes more energy. In spite of the presence of numerous routing algorithms, they are not suitable for MANET application due to its mobility. In this paper to discover the energy management of MANET based on Optimization Technique. Understanding the importance of energy efficiency, this work presents six different energy conserving research solutions meant for routing process. The main theme of this research is to conserve energy and thereby increasing the network lifetime. The first phase of the research presents a multipath algorithm for improving the lifetime of MANET.

Keywords: MANET, Energy Management, Routing, Optimization Algorithm

1. INTRODUCTION

MANET is a special type of network, which is composed of numerous mobile wireless sensor nodes without any central management. The mobility of nodes does not follow any standard principle and the network topology is not static. MANET faces numerous challenges and one of the most crucial challenges is the energy efficiency and network lifetime. The Mobile Ad Hoc Network (MANET) is characterized by multichip communication between mobile nodes by wireless links. There are also no infrastructures and routing paths are established by routing algorithms. The demanding of designing network protocols for MANET comes from link break which caused network performance degradation.

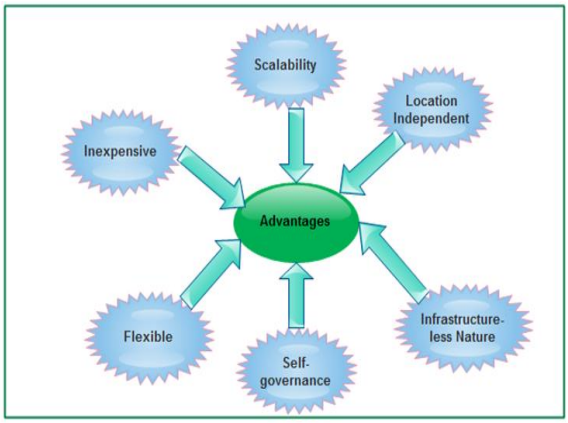

Fig 1: Advantage of MANET

The route rebuilding of link takes major challenge of routing protocols task can be lost making QoS (Quality of Service) of connections depending on the state of networks. A number of MANET routing protocol becomes efficient and correct. There are three types of routing in MANETs float routing versus non-flat or hierarchical routing which benefits of proactive (e.g.DSDV,OLSR), reactive(e.g. AODV,DSR), and hybrid(e.g. ZRP,TORA) mechanism for routing . The proactive routing protocols attempt to maintain all the possible routes from a corresponding node to all the other nodes throughout the lifetime of the network. This consumes more memory space and suffers from computational complexity as well. As the proactive protocols attempt to maintain all the routes, continuous tracking of nodes irrespective of the varying mobility degree is quintessential, but it is quite difficult to manage, achieve and may involve inefficiency.

This work considers the trust parameters of every sensor node such as energy backup, packet forwarding rate and loyalty. The routes are detected and the most optimal route is selected by clubbing the Swarm Intelligent using Feature selection methods. This

proposal used to choosing the best optimal route for every data transmission and ensures security, energy efficiency.

2. LITERATUREREVIEW

Ant colony optimization [1] sources from the optimization mode of ant foraging. Ant colony system (ACS) is a distributed biological system. By collaboration, the ants can complete the arduous task that a single individual is incapable of completing, which is the manifestation of biological swarm intelligence. When ants leave the residence to find food, they release the chemicals called pheromones on the path.

Ad hoc On-demand Multipath Distance Vector which is an extension of Ad hoc On-demand Distance Vector and it's also establish the multiple loop-free and link-disjoint paths A starting place node floods a Route Request to the entire network in order to find routes to the destination and when the destination node receives the Route Request via different neighbors, it transmits multiple Route Reply packets to the source node. Lee proposed a multiple routing protocol considering the residual battery capacity of route candidate nodes based on AOMDV [2].

Wireless sensor networks have gained worldwide attention, academically as well as industrially, because of its great potential for many applications in various scenarios such as military target tracking and surveillance, natural disaster relief, biomedical health monitoring, hazardous environment exploration, and seismic sensing [3].

There are many works seen to make progress the network life span by maximizing power competent protocols and most of them have incorporated conventional layer approach. There are many mechanisms are available for dropping power utilization such as period listening and sleeping, collision and overhearing avoidance and message passing etc[4,5]

In [6], a Smooth Mobility and Link Reliability (SMLR) based optimized link state routing scheme is proposed for MANET. This work proposes a novel Optimized Link State Routing (OLSR) scheme by exploiting semi-markov smooth and complexity restricted mobility model. The reliability of the work is tackled by the multi-point relay selection technique

In [7] Modern society utilizes computer networks continuously for all purpose. Feature selection is the technique which is selecting a subset of features. Feature selection can be considered an important asset in building classification models as large number of useless features. MANET using effective classification based on cross validation of tuned classifiers .

It employs relied on better accuracy by PSO, it generates weigh to enable best classifier. Energy efficient routing algorithms for WSN based on Improved HS algorithms [8]. It employs convergence speed of routing algorithm and improvisation of New Harmony has been improved. Produce better performance energy consumption and save.

3. ANALYSIS

To analyze and improve the energy efficiency of MANET and obtain the optimized routing algorithms are proposed. There are three important phase and structured for implement such as establish routing, Maintain routing information, optimal route selection.

Table 1: Current Optimization Techniques

Routing Techniques	Efficiency in Energy	Complexity	Scalability	Merits	De-Merits
Ant Colony Optimization	Lower	Poor	Lower	not demand knowledge of the world network	consume a lot of power ineffective speed of transmitting data
Particle Swarm Optimiation	Lower	Poor	Lower	chooses CHs that have a lower mobility ratio	Use more energy to determine each SN's speed ratio.
ACO-WOC	Better	Better	Lower	Utilizing Remaining Power and Mobility to Choose CHs	Ignore the issue with the crucial network that leads to connection failure and packet loss.
Lion Optimization Algorithm	Better	Poor	Higher	Distribute the energy usage between SNs to extend the network's lifespan.	Limited Scalability

The main reason of energy expenditure in MANET is data transmission, where routing comes into picture. When the routing algorithm is effective, the energy consumption can be reduced, which could contribute in enhancing the lifetime of the network. Recognizing the validity of this point, this work proposes six energy efficient routing algorithms based on bio-inspired algorithms that ensure energy efficiency with better performance

CONCLUSIONS

MANET is one of the most popular forms of Wireless Sensor Networks (WSN), as this kind of network can be easily deployed in any environment. MANET is highly suitable for emergency based applications and the maintenance of this network is considerably low, provided the sensor nodes are managed properly. However, MANET is confronted by several challenges and the main issue faced is energy consumption, network lifetime, reliability, QoS and so on. The time consumption of the works can be reduced. Different bio-inspired algorithms can be employed and the performance of the works can be analysed.

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