Multi objective trust optimization for efficient communication in wireless M learning applications

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Abstract Mobile learning (M learning) supports ubiquitous learning thus is a strong contender in distance learning. One of the challenge faced in development of m learning is an efficient and secure communication network. Mobile ad hoc network (MANET) refers to a set of wireless mobile nodes possessing no centralized architecture as well as a dynamic topology. One of the fast evolving application in MANET is mobile-learning (m learning). Security in MANET's is a challenge due to its open medium. The routing assumes that all the nodes in the network are trustworthy which leaves the network vulnerable to attacks. Trust management schemes are popularly used for secure routing, verification, interruption location, and access control. In this work, clustering and trust is used for mitigating maliciousness and formation of clusters is optimized using heuristic method. Swarm intelligence (SI) is an efficient option for optimizing routing in a complex network situation, where traditional routing strategies come up short. Particle swarm optimization (PSO) employs the concept of social interactions to get optimal solutions. Simulation results proved that the proposed PSO with weighted trust model achieves better performance for packet delivery ratio, end to end delays as well as cluster formation in malicious environment.

1 Introduction

Adhoc networks perform communications across wireless media between stations in a direct as well as distributed manner without the assistance of wired base station. MANETs are an autonomous collection of the users of mobile for communicating over the relatively "slow" wireless links. As the nodes are mobile the topology of network can change rapidly over time. The network is duly decentralized and all the activities of the network including that of topology discovery as well as delivery of messages need to be executed by the respective nodes. Therefore, the functionality of routing has to be incorporated within the mobile nodes. As these nodes communicate over the links they may have to contend with the radio communication effects. These may be noise, interference and fading and in addition to this, the links can have a lower bandwidth than that of a wired network [1].

Each of the nodes in an ad hoc network function works as a router as well as a host and the network topology is normally dynamic as the node connectivity can vary from time to time with the arrival of the new nodes and the chances of having other mobile nodes.

Another ad hoc wireless network must be able to handle the chances of having more nodes and this is likely to increase the chances of the changes that can take place inside the network topology. According to this the network may have to adapt itself to the changes and this indicates an efficient

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