Turkish Journal of Computer and Mathematics Education Vol.12 No.10 (2021), 2932-2940
Research Article

Srtsabc Based Self-Regulating Routing Algorithm (Sr3ta(R))

D.Gopinath*, Dr.K.K.Savitha#

*Research Scholar, Bharathiar University PG Extension and Research Centre, Erode, Tamilnadu, India. Email: kascgopinath@gmail.com
#Assistant Professor, Department of Computer Application, Bharathiar University PG Extension and Research Centre, Erode, Tamilnadu, India. Email: savitha.gopinath@gmail.com

Article History: Received: 10 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 28 April 2021

Abstract: MANETs (Mobile Ad Hoc Networks) are unique types of decentralised wireless networks that do not need any pre-existing communication infrastructure between the nodes. In Mobile Ad Hoc Networks, each node is involved in routing by forwarding data packets to other nodes, and thereby determining the nodes are dynamically forwarded on the basis of network connectivity. The establishment of an efficient routing mechanism for communication between nodes as these nodes move freely with constantly changing topology is one of the important issues in MANETs. In order to keep track of the constantly changing topology of the network, successful optimised techniques are needed. In this paper, hereby propose a SRTSABC Based Self-Regulating Routing Algorithm SR3TA(R) by considering a random set of source and destination nodes and exchanges between them by the Bees. The pheromone tables and data structures are produced during the movement of bees to record the trip time of the nodes. Extensive simulations are conducted to assess the efficacy of the proposed algorithm by manipulating various parameters. The final results obtained are compared with two well known algorithms namely as ZBMRP, DCFP and FF-AOMDV. SR3TA(R) Algorithm with regard to different performance metrics such as the number of data packets sent, Throughput End-to - End delay and Latency. The final results obtained show that the performance of the proposed SR3TA(R) algorithm is greater than the ZBMRP, DCFP and FF-AOMDV algorithms.

Keywords: MANET, SRTSABC, SR3TA(R), Bees.

1. INTRODUCTION

MANETs are groups of mobile devices that are dynamic, self-configuring, and infrastructureless. They are typically designed for a particular purpose. Every device inside the MANET is known as a node and has to assume a client and a router role. Communication across the network is accomplished by forwarding packets to a destination node; intermediate nodes are used as routers when a direct source-destination connection becomes unavailable. To route messages between distant nodes, MANETs depend on intermediate nodes. Lack of infrastructure for handling the direction packets are routed to their destinations; Instead, MANET routing protocols use routing tables on every node in the network which contain either complete or partial topology information. Reactive protocols including such as Ad hoc On-Demand Distance Vector (AODV) [1], schedule routes when it is necessary to send messages, poll nearby nodes in an effort to find the shortest path to the destination node.

Optimised Link State Routing (OLSR) [2] adopts a proactive approach, flooding the network regularly to produce routing table entries that survive until the next update. Both methods are motion-tolerant and were used in UAV MANETs [3] [4]. Motion tolerance and the characteristics of cooperative communication make those protocols suitable for use in UAVs. Communication by MANET is usually wireless. Any node within the range of the transmitter will trivially intercept wireless communication. It might leave MANETs open to a variety of attacks, such as the attack on Sybil and path manipulation attacks that can compromise network integrity[5].

As there are several solutions to solve routing problem in MANETs are proposed, none of the solutions have considered random source and destination along with the highest pheromone value to explore the best global for the formulation of data structures such as pheromone table, memory, packet and traffic model (explained in the next sections). This work will be the first approach towards this direction.

In this proposed work, a SRTSABC Based Self-Regulating RouTing Algorithm (SR3TA(R)) which considers the random collection of destination nodes and exchanges the bees from source node to destination node. The pheromone table and data structures are generated during the movement of bees, which record the trip time of the nodes from which bees migrate. The efficacy of the proposed method is measured by the selection of various parameters using different scenarios. Test results shows that the proposed scheme is very efficient with respect to the selected parameters when compared to the various other schemes. The rest of the work is organized as follows:

Section 2 describes the system model which includes network model and problem formulation. Section 3 illustrates the phases of Proposed Work – SR3TA(R) in detail. Section 4 provides the simulation results and detailed analysis of proposed work.

2. SYSTEM MODEL

This portion describes the model of the network used in the designing of the proposed algorithm, along with the formulation of problems and the notations involved.

2.1 NETWORK MODEL