Department of Computer Science and Engineering

Report on

ARA – The Ant-Colony Based Routing Algorithm for MANETs

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Contents

Abstract

1 Introduction

Introduction of the report goes here.

2 Context and Problem Statement

3 Idea

4 Evaluation Metrics

According to the Authors, the main feature of ARA is its low routing overhead and easy maintainability of routes between nodes in the topology. So, The evaluation metrics considered to measure the performance of ARA are:

- Delivery rate
- Routing overhead in terms of bits
- Routing overhead in terms of packets

5 Evaluation Process

The performance of ARA was evaluated using simulation in terms of evaluation metrics mentioned earlier. The simulation was implemented in ns-2. Some important parameters of the simulation environment are:

- Simulation area 1500m×300m
- Maximum velocity of nodes 10 m/s
- Simulation time 900 seconds
- 10 Constant bit rate(CBR) connections
- 7 different pause times[1] 0,30, 60, 120, 300, 600 and 900 seconds

[1]pause time indicates the mobility of the nodes

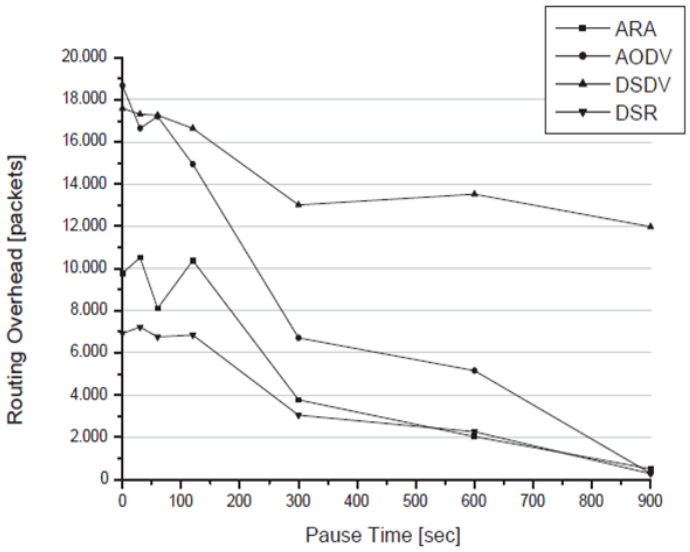

Figure 1: Successful delivered packets as a function of pause time.

6 Evaluation Results

Multiple simulations were run and the results were collected for evaluation.

6.1 Comparison with existing routing protocols in delivery rate

The best way to evaluate the performance of a new algorithm is to compare the performance with the existing algorithms. So, the performance of ARA was compared with AODV,DSR and DSDV in terms of delivery rate. The observed results are shown in Figure 1. With high mobility both DSR and ARA has more than 95% delivery rate. Throughout the simulations ARA performed better than DSDV and AODV in this criteria. Figure 2 shows the delivery rate of ARA within the confidence interval of 95%. As we can see All results are above 85% and most results are within the range 90% and 100% throughout the 10 simulation runs.

Remarks: ARA is a good choice for mobile networks in terms of data delivery.

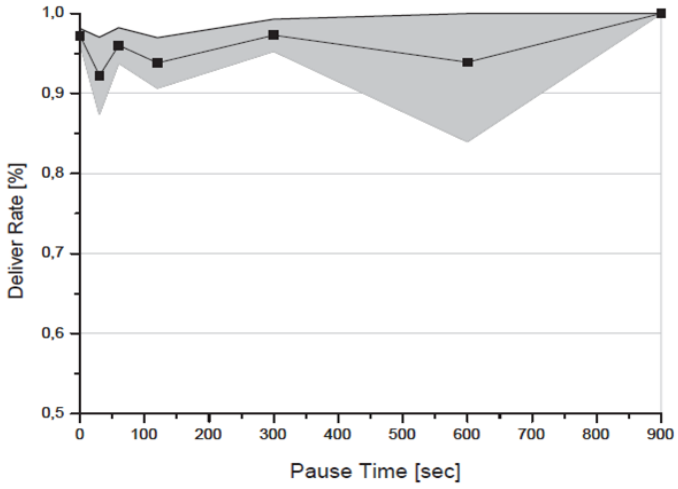

Figure 2: Delivery rate of ARA. Confidence interval of 95%

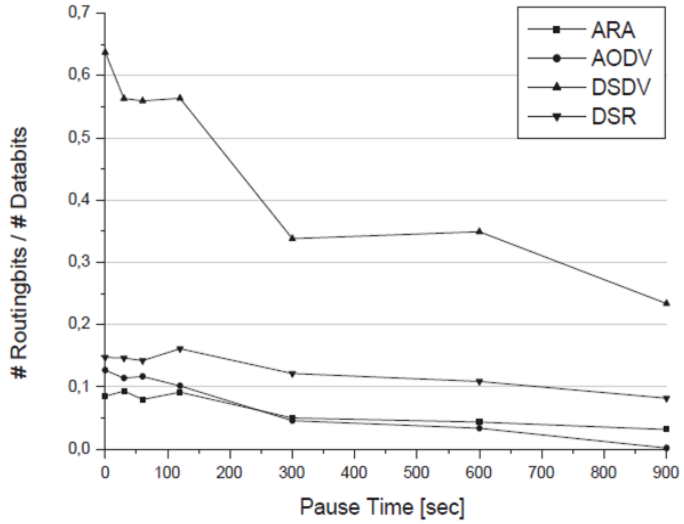

Figure 3: Pause time vs Fraction of successfully send bits and the needed bits

6.2 Routing Overhead Comparison

6.2.1 Routing Overhead in terms of databits

6.2.2 Routing Overhead in terms of packets

7 Limitations of ARA

8 Future Works

9 Conclusion

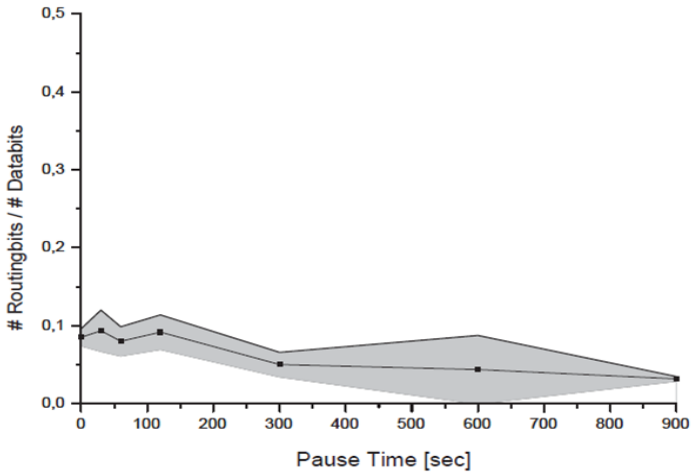

Figure 4: Overhead of ARA in bits. Confidence interval of 95%

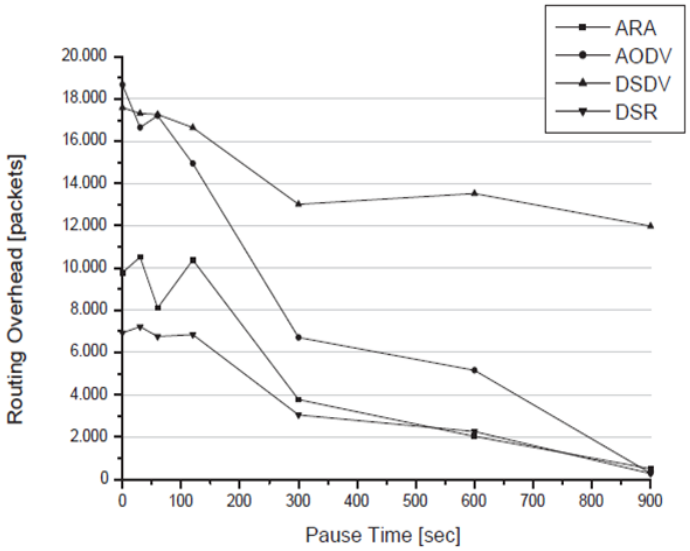

Figure 5: Pause time vs Fraction of successfully send bits and the needed bits

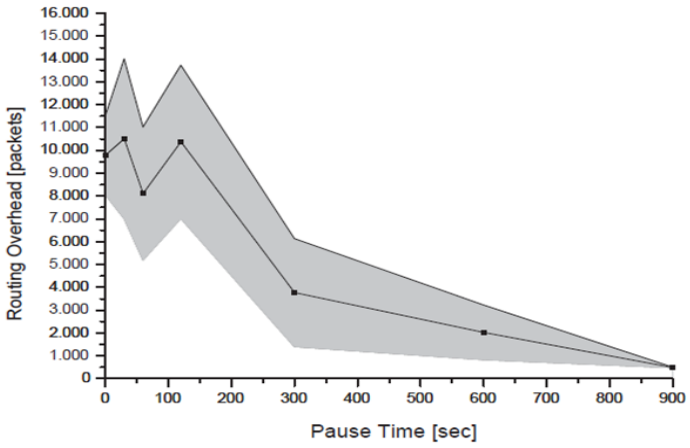

Figure 6: Overhead of ARA in packets. Confidence interval of 95%