EE299 Project Course

Vehicular Ad Hoc Networks (VANET)

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Table of Contents

[Routing in Sparse Vehicular Ad Hoc Wireless Networks 3](#_Toc336809862)

[Describe Problem 3](#_Toc336809863)

[Solution 4](#_Toc336809864)

[Analysis 4](#_Toc336809865)

[Performance Results 4](#_Toc336809866)

[Discuss Results 4](#_Toc336809867)

[Suggestion 4](#_Toc336809868)

# Routing in Sparse Vehicular Ad Hoc Wireless Networks

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## Describe Problem

From the Abstract statement: Study of disconnected network phenomena and its network characteristics. Average time taken to propagate a packet to disconnected nodes (i.e., the re-healing time ). For safety applications need something better than Dynamic Source Routing (DSR) and Ad Hoc On-Demand Distance Vector Routing (AODV) which have long re-healing times.

Introduction:

* Problem with VANET is wireless links and strengths constantly changing. Example: Bumper to bumper highway traffic has highly dense networks, night time and rural area experience network fragmentation.
* Focusing on “disconnected network” situation which deserves more attention.
* Three questions straight from the paper:
  + Is the network disconnection problem a severe problem prohibiting vehicles from successfully delivering safety messages to other vehicles?
  + What are the key characteristics of the network disconnection in VANETs and how do they affect the network performance?
  + How can we solve or mitigate this disconnected VANET problem?
* Will show that network fragmentation is a real issue, but will show some solutions (“store-carry-forward” mechanism)
* Look at some traffic models (inter-arrival time and inter-vehicle spacing between roads and vehicles) from I-80 freeway on June 27, 2006.
* Stats: Inter-vehicle spacing is exponential distribution when effective traffic volume is less than 1000 veh/hr. Even with 100% market penetration, network disconnection is 35% during night but well connected network during rush hour. Small market penetration then network disconnection is a problem during rush hour too.
* Characteristics to analyze:
  + Probability of disconnection from another vehicle
  + Cluster size
  + Cluster lengths
  + Intra- and inter-cluster spacing
* Show how re-healing time affects safety applications based on how well connected a network is.
* Key Contributions:
  + Observed that inter-arrival time and inter-vehicle spacing can be approximated by exponential distributions. Validates network fragmentation conjecture about VANETs.
  + Quantify metric of re-healing time, quantifying average delay needed to deliver messages between disconnected vehicles.
  + Potential Solution: “store-carry-forward” for disconnected VANETs. Use Monte Carlo simulations. Use store-carry-forward with broadcast mechanisms in disconnected VANET then the average re-healing time is on the order of a few to several seconds.

II: Related Work

* The data is collected in real-world setting

## Solution

## Analysis

## Performance Results

## Discuss Results

## Suggestion