Mobile Networks

2018/2019

Laboratory project

Universidade do Minho

Adriano J. C. Moreira

Dept. de Sistemas de Informação

Universidade do Minho

adriano.moreira@dsi.uminho.pt

Context (i)

In the near future, vehicles, including cars, buses, motorcicles and trams, will communicate directly to transmit information, namely information about the road conditions and road traffic.

Vehicles will be equiped with network interfaces (e.g. based on the WAVE technology), enabling them to Exchange messages when close to each other; vehicles will act as nodes in vehicular networks.

Context (ii)

Among other information, vehicules will exchange information about road accidents in order to avoid other accidents.

Challenge

The goal of this project is to assess the potential of vehicular networks to distribute information about road accidents.

One important metric in this context is the time it takes for a message announcing a road accident to reach other vehicles.

Approach

The proposed approach is to resort to simulation to assess the performance of the system.

The ONE is an open-source simulator that can be used to simulate opportunist networks, namely vehicular networks.

(http://www.netlab.tkk.fi/tutkimus/dtn/theone/)

Technical details (i)

- Road accidents should be simulated by fixed nodes (beacons) generating one message every 2 minutes
- The total number of beacons is 10
- This messages should be 1 kByte long and, if possible, they should include the geographic coordinates of the accident.
- The total number of vehicles is 200.
- Both beacons and vehicles must use Bluetooth network interfaces.

Technical details (ii)

- The variables to consider in the simulation, in order to look for a good solution, include:
  - the data rate in the Bluetooth interfaces
  - the range of the Bluetooth interfaces
  - the routing protocol
  - the size of the buffers used by the Bluetooth interfaces
- Since the most relevant metric is the delay, the solution must assess:
  - the mean and maximum time it takes for a vehicle to be informed about a road accident

Millestones (i)

- 19.03.2019 – first presentation:
  - prepare a presentation (set of slides) with:
    - the approach used to create the road map
    - the strategy used to place the beacons within the simulation area
    - the mobility model selected for the vehicles
    - the list of ongoing task
    - identification of the current difficulties

Millestones (ii)

- 25.05.2019 – final report:
  - the final report should include:
    - a detailed description of the configuration used for the network interfaces
    - the used mobility models
    - a description of the approach used for traffic generation
    - the list of routing protocols that have been tried
    - the simulation results
  - the report is limited to 20 pages (cover included)
  - the report should include photos of the group members
  - the report should be submitted in PDF format

Millestones (iii)

- 28.05.2019 – final presentation:
  - the final presentation must include:
    - a brief description of the final simulation scenario and configuration
    - a detailed description of the simulation results
    - a discussion of the obtained results
  - the final presentation must include a live demonstration of the simulation working