

2011 Paper 7 Question 8

Mobile and Sensor Systems

Consider a vehicular network where cars are equipped with a Wi-Fi radio (802.11) interface. Assume a number of Wi-Fi basestations scattered around an area. The basestations provide only very sparse coverage of the area, but are connected to the Internet through a backbone network.

- (a) Explain what effects the mobility of the vehicles can have on communication. In particular, describe short- and long-term fading effects. [3 marks]
- (b) Illustrate the essential aspects of the MAC layer of 802.11. [3 marks]
- (c) Consider RTS and CTS packets used in 802.11. Describe what problem they solve and indicate where this approach is incomplete. [2 marks]
- (d) Assume that information about traffic needs to be disseminated from the basestations to all vehicles. Explain what routing protocol(s) would be suitable for a vehicular scenario like the one described (do not consider GPSR): justify your selection and the trade-offs of your choices. [6 marks]
- (e) Now assume that vehicles collect traffic information (such as their speed and position) and want to forward this information to a server. Also assume that nodes adopt GPSR to route messages geographically to the closest basestation (position known). Explain how GPSR can be used for this purpose and under what conditions it would not work. [6 marks]