Vehicular Networks for Collision avoidance using V2R communication

Abstract for topic presentation:

Vehicular networks are an important area that can be harnessed for critical applications. The topic of interest for us is “collision avoidance”. An ad-hoc network of the vehicles approaching road intersections can form a network managed by a roadside infrastructure. The infrastructure on roadside is suitable because of the limited necessity of having the nodes/vehicles under consideration at each intersection. The nodes/vehicles form a semi-fixed network topology since only a small subset go into and come out at a particular short span of time. We will use the roadside installation to track the traffic within its range. Depending on the locations of each node (vehicle), the calculation is done.

The location co-ordinates is obtained from a GPS system in the car while connection. In this we assume GPS systems are available on all cars needed to be in this network. Another idea for location retrieval is DSRC. Dedicated Short Range Communications protocol uses separate prioritized channel for short range communication with high data rate. So based on the gps co-ordinates, the velocity of the incoming vehicles are calculated for decision purposes. The topology is also updated to include this node efficiently. We will use the delay tolerant capability of the vehicular networks for transmitting special broadcast information to all vehicles approaching a certain direction. The roadside infrastructure works by maintaining a direct connection of all the nodes(vehicles) starting at all. Since the critical ones needs real-time communication, one-one connection is necessary for efficient routing. Similarly, with the same idea in mind, the other cars which are in the less critical area (say behind the critical ones or far behind the critical but within the range), then we can use delay tolerant way of forwarding packets and information to those from the critical nodes.

References:

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2) A Message Propagation Model for Hybrid Vehicular Communication Protocols
Anna Maria Vegni (1), and Thomas D.C. Little (2)
(1) Department of Applied Electronics
University of Roma Tre, Rome, Italy
(2) Department of Electrical and Computer Engineering
Boston University, Boston, Massachusetts

3) Vehicular ad hoc networks (VANETS): status, results,
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4) Evaluation of VANET-based Advanced Intelligent Transportation Systems- Yi Yang, Rajive Bagrodia
5) Architecture of the dedicated short-range communications (DSRC) protocol