RUTGERS
WINLAB | Wireless Information Network Laboratory

CITIZEN V2V

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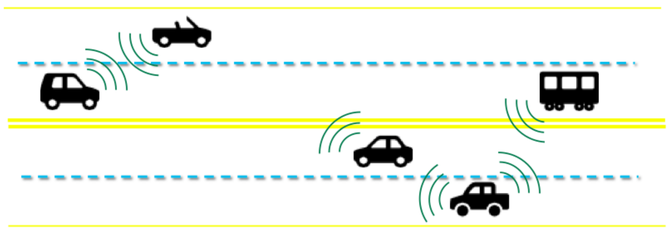
Overview

- Citizen V2V - an application on smartphones for assisting drivers on roadways, by alerting them about dangerous traffic situations.
- Wide-scale deployment of Intervehicular communication far away (equipped vehicles not available)
- Drivers have smartphones (i.e. either iOS and Android), & can assist in V2V (Vehicle to Vehicle) communication.

Block Diagram for iOS

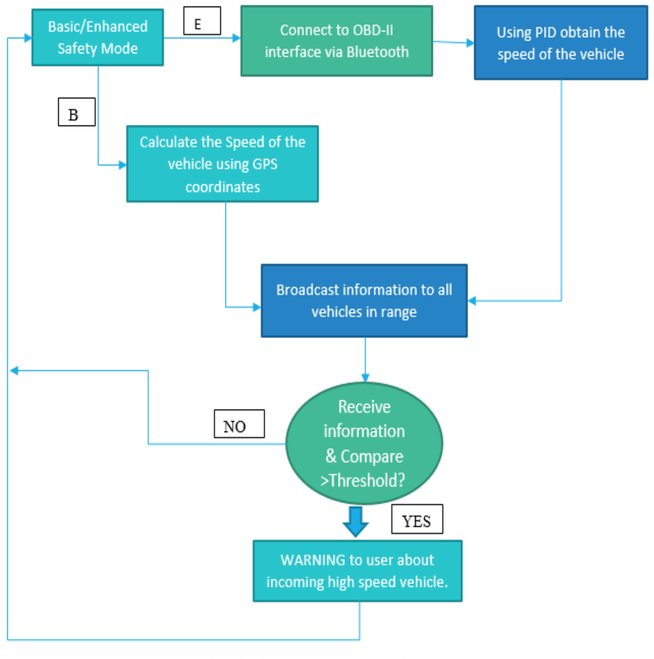
Working of the system

ASSUMPTION: All drivers have the application



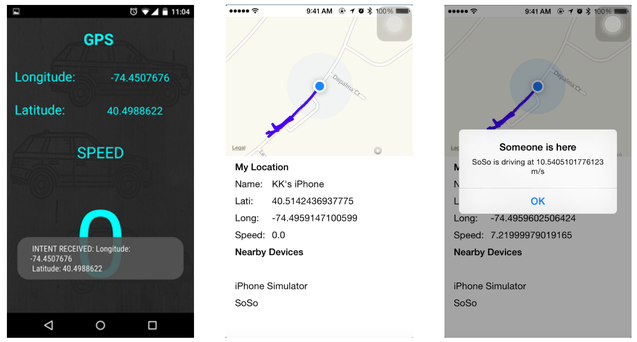
- 2.4GHz wifi adapter on smartphones for communication
- Basic principle:
  - Periodic broadcast
  - Promiscuous reception of messages
- iOS uses combination of Bluetooth & Wifi in the Multipeer Connectivity Framework used for discovering nearby nodes
- Android doesn't support multipeer connectivity or ad-hoc mode. (requires rooted access)
- Linux boxes (ORBIT Nodes) used for implementing wireless communication.

Potential Warning Messages: Vehicle approaching at high speed on same roadway

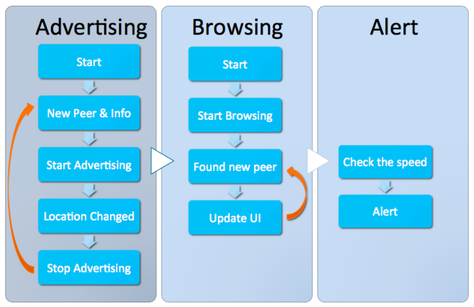


Block Diagram for alerts

Test



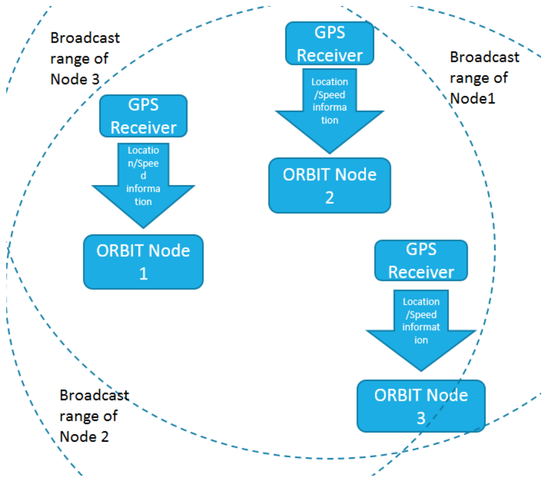
Android and iOS App Screenshots



Results:

- Range for reception of messages (iPhone 5 & iPhone 5C): Approx 100ft (with one node mobile)
  - Varies with iPhone version;
- Root permissions necessary for implementing application on Android devices.
- Tests on orbit sandboxes not conclusive (because nodes are indoor and immobile)

Future Work



Implementation diagram in the near future for ORBIT Testbed

- Test and verify on outdoor orbit nodes (as per above arrangement)
- Implement Enhanced mode with OBD-2 (OnBoard Diagnostic) dongle
- Additional features: Find out path of nearby erratic driver; Ping/SOS mode—notify for help from friends driving in same direction about personal vehicular situation.

References

- D. Raychaudhari, et al. "Overview of the ORBIT Radio Grid Testbed for Evaluation of Next-Generation Wireless Network Protocols." IEEE Wireless Communications and Networking Conference, New Orleans.
- Paul Hegarty. "Developing iOS 8 Apps with Swift." Stanford University. iTunes U, January 2015.
- http:\\developer.android.com

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