Building a Better Network for Connected Cars

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CS 35L Lab 5
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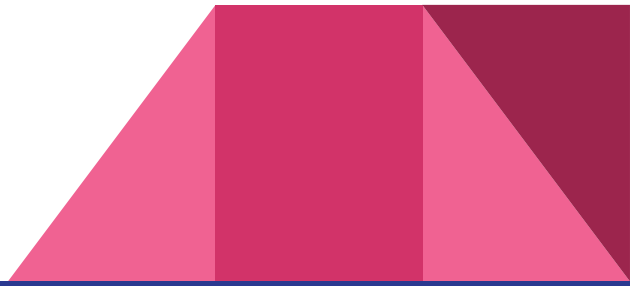
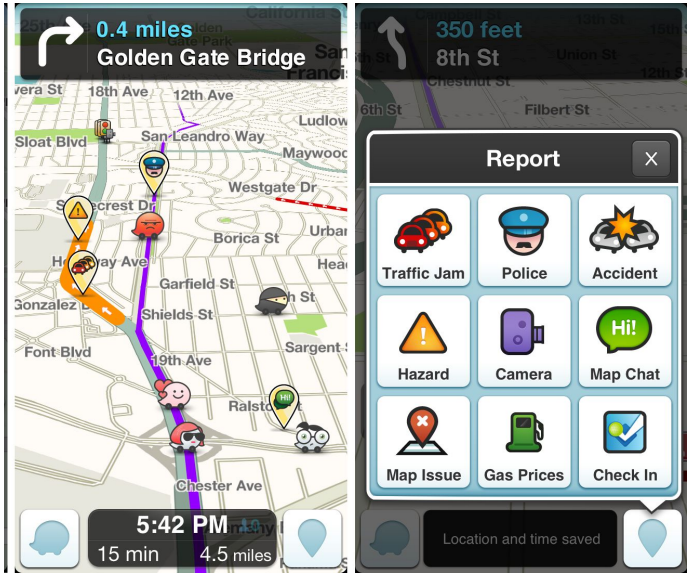
Reasons

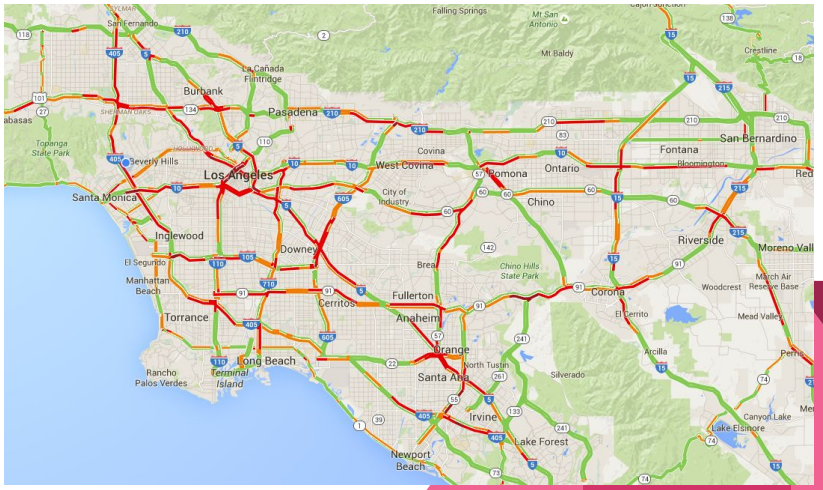
- Safety
  - 1.2 million die in traffic accidents every year around the world
  - Leading cause of death for ages 15-29
  - Crashes cost the United States a total of $242 billion in 2010
- Traffic
  - Use data to find alternate routes
  - Avoiding congestion saves time and fuel



Early technologies

- OnStar
  - GPS tracking and emergency services provided over cell phone networks
- Traffic crowdsourcing
  - Google Maps - Android phones automatically send location data to Google servers
  - Waze - Users report accidents, traffic, map errors, etc.



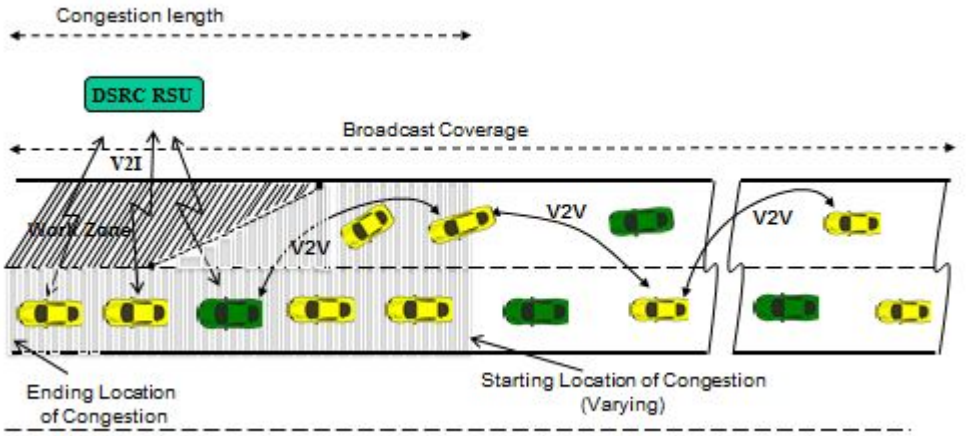


Current progress

- Automakers working on vehicle-to-vehicle (V2V) technology
  - DSRC (Dedicated Short Range Communications)
  - Mesh network - each car is a node that relays signals
- NHTSA is testing V2V
  - Successful trial in Michigan in 2012
- DOT hopes to draft a standard by 2017

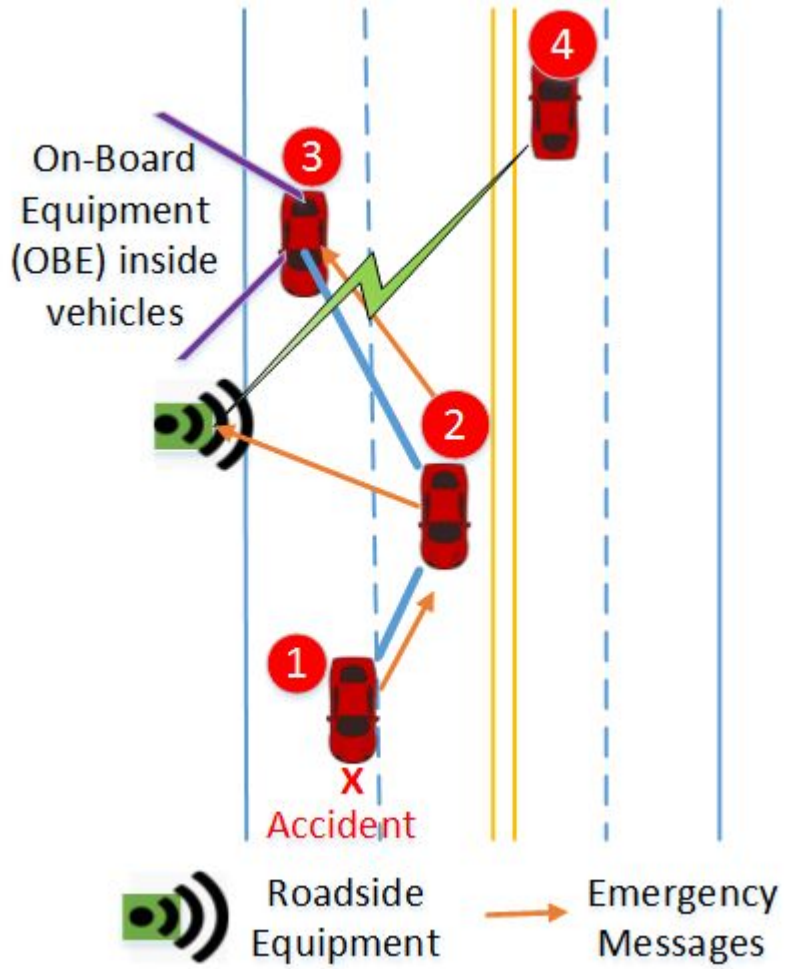
Emerging problems

- DSRC equipment must be installed on vehicles and along roads
- Very few cars equipped at first
- Signal has a range of only 300 meters
- Latency between nodes
- Security



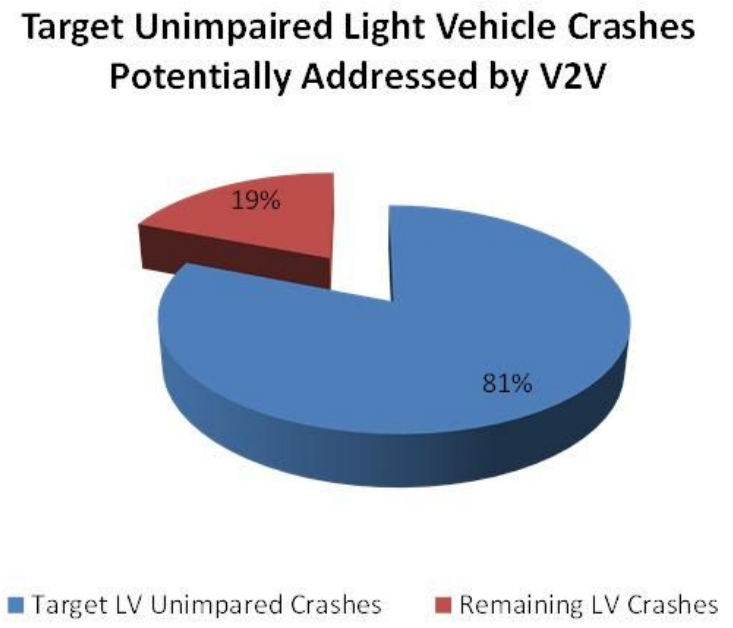
Proposed fixes

- Use other network technologies to supplement DSRC
- Wi-Fi and LTE can provide more bandwidth and coverage
  - Increases overall reliability
- Public key infrastructure



Future

- Study predicts that 79% of all crashes can be prevented by V2V
- Self-driving cars will include this technology to improve their AI
- DOT hopes to make it a requirement in the next several years
- Prove the system is secure



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