Women in Transportation Seminar

Session 3: Where We Are Heading – Technology and Policy Implications

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Automated Vehicles / Intelligent Transportation Systems

- With the development of emerging technologies associated with Automated Vehicles and Intelligent Transportation Systems (ITS), the increased complexity of optimizing all the interfaces and interactions makes it more efficient, and practical to develop models (including executable/simulated) which show the dynamics, expected operation or performance of the modeled system.

- Distraction now being addressed under the larger umbrella of the emerging technologies associated with Automated Vehicles and Intelligent Transportation Systems (ITS)
  - Control transition strategies
  - Driver attention, inattention, and fatigue
  - Physical and cognitive workload of nomadic and OEM/supplier safety systems and automation
  - Pedestrians and other vulnerable road users
  - Etc......
Automated Vehicles: Human-Digital Interface Design

- Digital = artificial intelligence (AI)/deep (machine) learning systems: neural networks, queuing network driver models, etc.)
  - Intelligent vehicles try to copy human behavior and strategies to make their way in public traffic.
- So intelligent behavior seems to be an important basis for the migration towards automated driving
  - AI precursor to self driving vehicles
  - Use in automated vehicles to develop control transition strategies.
Automated Vehicles: Human-Digital Interface Design

- Neural networks: learning systems that operate analogously to networks of connected brain cells
  - Example
  - Use in image analysis: they are seeing and allow self-driving cars to predict pedestrians’ movements (learning “intent”)

![Image of neural network application in automated vehicles](image-url)
Does AI = Driver?

- US National Highway Traffic Safety Administration (NHTSA) rules that AI can be sole driver of Google’s self-driving cars
- "NHTSA will interpret 'driver' in the context of Google's described motor vehicle design as referring to the (self-driving system), and not to any of the vehicle occupants.
  - Autonomous driving software itself would be the vehicle's legal "driver"
  - none of the human passengers would require a driving license.
Legislation and Regulation

- Technological innovations are known to rise and mature more rapidly than legislation and regulations
  - So societal acceptance and regulation need to follow pace in order for real deployment of autonomous vehicles to be viable.

- Legislation
  - Will the market have enough confidence in a software-based algorithm, and in artificial intelligence, to allow them to substitute for human judgment concerning the value of human life or physical assets?
Legislation and Regulation

• Product Liability
  – Experts said the issue of liability, if not solved, could delay or even stop the vision of driverless vehicles
  – When autonomous vehicles become involved in accidents, how to resolve the question of fault
  – Theories of Liability
    • Negligence
    • Strict liability
    • Misrepresentation
    • Breach of warranty
    • Defects (mfg & design)
    • Failure to warn
Legislation and Regulation

- Regulations
  - Review of Federal Motor Vehicle Safety Standards (FMVSS) for Automated Vehicles
    (http://ntl.bts.gov/lib/57000/57000/57076/Review_FMVSS_AV_Scan.pdf)
  - Report that identifies instances where the existing Federal Motor Vehicle Safety Standards may pose challenges to the introduction of automated vehicles.
THANK YOU