Older Driver Support System

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Driving and the Lifespan

Motor vehicle crash deaths per 100,000 people by age and gender, 2013

FARS, 2013
How can we help seniors drive more safely?

Understand Senior Drivers

Understand Crash Problem

Solution Concepts

Develop and Test Solution
# Older Driver Challenges

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Older Driver Crashes

Research  Staplin, Lococo, Martell, & Stutts, 2012

- **Turning left** at an intersection with stop-sign control, where cross traffic does not stop
- **Turning left** at an intersection with signal control, where the permissive (not protected) green phase was displayed during the driver’s approach
- **Turning right** at an intersection controlled by a yield sign, in a channelized right-turn lane, merging with traffic approaching from the left on a principal arterial with operating speeds of 40-45 mph
- **Merging** onto a limited access highway, in a ramp/acceleration lane controlled by a yield sign
- **Changing lanes** on a multilane roadway (4+ lanes).
Potential Solutions

Strategies for Vehicle-Based Technology

Driver Feedback
- Real time info to driver about errors/unsafe behavior

Vehicle Adaptation
- Alter some aspect of vehicle performance based on driver behavior or situation

Reporting
- Record, summarize, and transmit for later review

Coaching
- Intermediary interprets and provides explicit guidance

External Motivation
- Formal incentives based on monitored behavior

(Lerner, Jenness, Singer, Klauer, Lee, Donath, Manser & Ward, 2010)
But how do we do this in an inexpensive, easy to deploy, readily available package that can be used easily by seniors?
Primary Variables
• Participant Number
• Date, Time
• GPS - Lat, Long, Alt
• GPS - Bearing
• GPS - Velocity
• IMU - g force X, Y, Z

Secondary/Calculated Variables
• Distance, Elapsed Time
• Lat, Long, Vert acceleration
• Accel/Decel point
• Accel/Decel rate
• Max Accel/Decel X, Y, Z
• Incline/Decline
• Variability in X, Y, Z
• etc
How do we drive?

- What speeds do drivers select?
- Where do drivers begin to slow?
- Decel/accel rates?
- Minimum speed?
- Maximum speed?
- Time in speed zone?
Speed and Speed x g, Three Trials

Are drivers braking for a stop sign at an appropriate distance? Are they surprised…quick response braking?

What additional signage/sight distance/geometrics could support improved stopping profiles?
Should curve speed be partly determined by a g force that is acceptable to a driver?
ODSS Development Model

Understand the Problem

Major and Minor Crash Types

Senior Driver Limitations

Assistance Needed

Driver Support System

Information Source
- Information Location
- Type of Message
  - Pre programmed
  - Real Time

Potential Solution

PROCESS

SOURCE OF INFORMATION

CDRS

Previous Research

CDRS

Research Team
ODSS

Speed Subsystem
Maneuver Subsystem
Lane Control Subsystem
Driving Context Subsystem
  • Stop sign, TOD, weather
Reminder Subsystem
  • Awareness/SA (check mirrors, check blind spots, speed limit awareness, scan before change lanes, complex interchange)
  • Technique (space between vehicles, lane position)
Current Status

- Identify Crash Types
- Identify Senior Driver Limitations and Capabilities
- Interview CDRS
- Identify Tentative System Information and Feedback
- Design System

Done

Current

- Program Older Driver Support System

Future

- Test with Drivers
- Test with CDRS
- Expand System – Roadway Database
THE HUMAN FACTORS PROGRAM

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