Affordable Simulator-based Truck Driver Training Challenges and Opportunities

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NATIONAL ADVANCED DRIVING SIMULATOR, U. OF IOWA
What is it?

Take a look...

(video here)
Why did we create it?

Crashes
- In 2008, 380,000 crashes involving large trucks
- 1 in 9 traffic fatalities resulted from a collision involving a large truck (NHTSA crash statistics)
- Human error is a major factor in many of these crashes

Simulator Training
- Simulator training at least once a year has shown
  - 64% reduction in preventable accidents
  - 44% decrease in overall accidents (PATS driver study)
- Fewer crashes means lower costs for truck fleets
How did we do it?

• Leverages NADS-1 software
  – Wide range of data collection variables
  – Cross platform portability

• Realistic and configurable cab
  – Digital dashboard
  – Multiple transmissions
Driving Simulators

Advantages

• Repeated exposure to situations that are too difficult or dangerous to re-create on the road
  – A lifetime of experience in a day
• Objective assessments of human behavior and performance
  – Available immediately for constructive feedback
• Successful training technique
• Portable

Disadvantages

• Driver acceptance
• Simulator sickness
• Difficulty with some maneuvers
Current and Potential Uses

- **Novice drivers**
  - Drivers’ Education

- **Experienced drivers**
  - On-going safety training
  - Specific situations that warrant attention

- **CSA requirements**
  - Address high risk behaviors
  - Retain experienced drivers

- **Vercipia Biofuels**
- **CSU San Bernardino training center**
- **United Tribes**
- **Iowa Truck Companies**
- **Insurance Agencies**
- **Outreach and Safety Demonstrations**
Features & Functionality

• Environment
  – Urban
  – Rural
  – Interstate
  – Any time of day
    • Day, Dawn, Dusk, Nighttime
  – Any road condition
    • Wet, Dry, Ice

• Existing Scenarios
• Over 100 variables
• Feedback immediately following drive
  • 14 Heavy Truck Specific
  • 11 General Driving

• Custom scenario development
  – Specific road and traffic conditions
  – Geo-specific locations
Future Enhancements

• Enhanced training scenarios & curriculum
• Assessment using objective measures of performance
• Specialized Views
  – GOAL inspections
  – Backing
• Geo-specific location modeling
Limitations

- Field of View
- Driver Acceptance
- Simulator Sickness

What can be done

- Eye point based on eye tracking data
- Change eye point on demand
- Small details that increase realism
- Screening and monitoring environmental conditions
Applications

• Training and Assessment
  – Novice Drivers
  – Older Drivers
  – Experienced Drivers
• In-vehicle system evaluation
• Outreach and Safety Demonstrations
• Research data collection
Thank you

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