Research Problem

• Driver distraction is a topic of significant interest to the research community

• Large SHRP2 dataset -> lots of secondary task engagement. But...
  • Non-trivial to ID, extract & reduce relevant epochs
  • Current reductions limited in scope

• Project goal: Create a dataset of reduced C/NC events that include secondary task engagement
  • + Baselines
Approach

1) Identify crashes & near-crashes that include secondary task engagement as a potential contributing factor

2) For each event, select ~4 baseline events at random from SHRP2 baseline pool

3) Expand duration & type of existing reductions for C/NC & Baseline events
   • Plus high-level full-trip reductions
C/NC Event Data Reduction Process

- **Main SHRP2 Database**
  - Triggers for Crash/Near Crash; Initial reduction

- **Expanded Reduction**
  - Identify C/NC that include secondary task engagement as potential contributing factor

- **Reduced Distraction Dataset**
  - Frame-by-Frame (20s prior, 10s after precipitating event):
    - Secondary Task
    - Hands-on-Wheel
    - Question Reduction
    - Full trips:
      - High-Level Task Engagement

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Current SHRP2 Event Reduction

- 5 seconds
- 10 seconds
- 20 seconds

Basic Event Reduction
Onset of Precipitating Event
Eyeglance Reduction

Virginia Tech
Transportation Institute
Expanded C/NC Event Reduction

- Secondary Task
- Hands-on-Wheel
- Question Reduction

Onset of Precipitating Event

20 seconds

10 seconds

20 seconds

10 seconds

PLUS: Full-Trip High-Level Reduction
**Baseline Epoch Data Reduction Process**

- **SHRP2 Baseline Database**
  - Initial baseline reduction (~30k)

- **Expanded Reduction**
  - Identify ~4 baselines epochs* at random per driver (without adverse events)

- **Reduced Baseline dataset**
  - Frame-by-Frame (20s):
    - Secondary Task
    - Hands-on-Wheel
    - Question Reduction
    - Full trips:
      - High-Level Task Engagement

*Dependent on availability of SHRP2 reduced baselines

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Current SHRP2 Baseline Reduction

Basic Event Reduction (6 seconds)

Eyeglance Reduction (20 seconds)
Expanded C/NC Baseline Reduction

- Secondary Task
- Hands-on-Wheel
- Question Reduction

20 seconds

Eyeglance Reduction (20 seconds)

PLUS: Full-Trip High-Level Reduction
Reduction Example

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Hands-on-Wheel

Secondary Task
Secondary Task Reduction (Frame-by-Frame)

- Manipulating Object
- Holding Object
- Talking: Handheld
- Talking: Hands-Free
- Reading
- Writing
- Reaching For Non-OEM object

- Dancing
- Steering Wheel Buttons
- Center Stack Controls
- Adjusting Other Devices
- Looking: Internal
- Looking: External
- More...
Question Reduction
(Situation/Environmental Info; 1-3x per)

- Worst Weather
- Traffic Density
- # Travel Lanes
- Locality
- Lighting
- Road Grade
- Road Alignment
- Road Surface Condition
- Intersections

- Traffic Control
- Driver Control Behavior
- Secondary Task
- Impairment
- Number Passengers
- Seat Belt Use
- Final Narrative
Trip-Length, High-Level Reduction

**Simple**
- Talking/Singing
- Dancing
- Holding Object
- Talk Hands-free
- Quick Adjust of Controls
- Steering Wheel Buttons
- Reach/Search Object

**Moderate**
- Eating/Drinking
- Look External
- Look Internal
- Long Adjustments
- 2 Simple Tasks
- Talk Handheld

**Complex**
- Reading
- Writing
- Manipulating Object
- 2+ Moderate
- 3+ Simple

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Project Scope

1) Goal is ~1,000 reduced events in final dataset
   a) ~200 C/NC events; ~40 each:
      • Level 1 (Most Severe)
      • Level 2 (Police-Reportable)
      • Level 3 (Minor Crash)
      • Level 4 (Tire Strike)
      • Level 5 (Near-Crash)
   b) ~800 Baselines

2) Projected end date is December 2014

3) In future, provide reduced datasets back to SHRP2 community
(Brief) Questions?

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