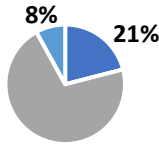


YoonHo Kim, Suzan Ayas, Birsen Donmez

Department of Mechanical and Industrial Engineering, Human Factors and Applied Statistics Laboratory

1 MOTIVATION

- Estimated **96000** drowsy-driving related crashes, with **52000+** injuries and **800+** fatalities in two-year span [1]
- Drowsy-driving crashes make up **21% of all fatal crashes**, in comparison to 8% by distracted driving [1]
- Significant gap in the literature exists** for designing and evaluating system-initiated interventions that utilize driver state detection systems [2] [3] [4]
- Variations in ground truths, lack of standardization in evaluation process, and sensor and modelling issues indicate the **need for further research** in this area [2] [3] [4]



2 OBJECTIVE

Developing an accessible research tool to allow others to reliably test their own interventions

Designing a system-initiated in-vehicle intervention and to evaluate its effectiveness in positively changing driver behavior through a driving simulation experiment

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3 METHODOLOGY

Experiment will be conducted on a **NADS miniSim™ driving simulator** and **Drowsiness Rating and Intervention Verification (DRIVE) System**.

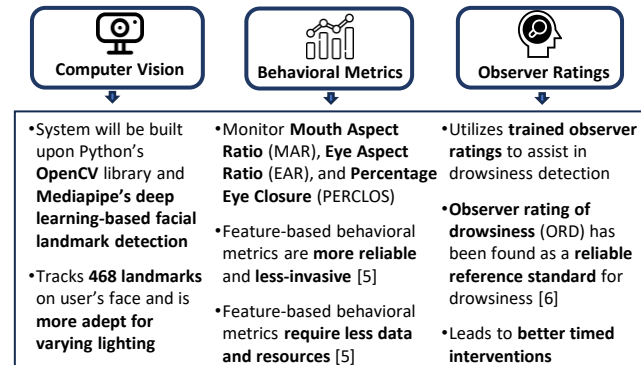
- Monotonous driving scenario in rural highway setting** to induce drowsiness
- Begin rating drowsiness after 20 minutes, in regular intervals
- Interventions will be activated and evaluated upon drowsiness detection



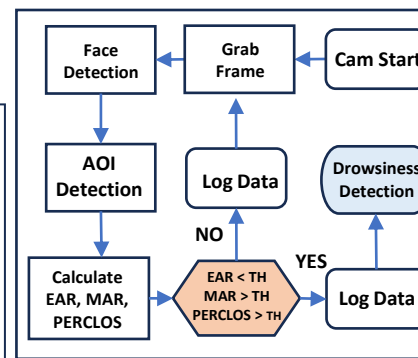
DRIVE System Overview



Drowsiness Measures



DRIVE System Flowchart



4 FUTURE STEPS

Driver Drowsiness

- Test system for reliability in accurately detecting driver drowsiness and intervening at appropriate times

Drowsiness Intervention

- Testing two different types of interventions to test their effectiveness



1. Assistance



2. Cognitive task

Data Collection

- Finish data collection; statistical analysis on the before and after effects of the interventions

Increase Flexibility

- Moving the DRIVE system out from a controlled setting to a less controlled, real-world situation

5 PLANNED ANALYSIS

After data collection, will be analyzing:

- Drowsiness Levels Measures** (EAR, PERCLOS)
 - Vehicle Measures** (Speed, Steering Wheel Movement, Lane Deviation)
 - Physiological Data** (Heart Rate, Galvanic Skin Response)
- Numerical data will undergo quantitative and statistical analysis. Specific methods will be determined based on experimental results.



Drowsiness Data



Vehicular Data



Physiological Data

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