Driver/vehicle diagnostics

Motivation

• Cutting edge driver assistance systems have to consider personal characteristics of the driver to improve safety and comfort
• Modeling of driver and vehicle allows anticipating driver’s intentions for short and long-term time intervals
• There is no effective method of reducing the impact of human factors in accidents

Approach

• Utilize driving performance measurements: speed, acceleration, relative distance to other vehicles etc.
• Focus on vehicle following driving task
• Observe and learn characteristics of the driver and the car
• Compare current driver/vehicle response with expected one from trained model

System overview

• Driver/vehicle is represented by Gaussian Mixture and probability distribution models
• Take into account factors like rain and illumination level
• Assess current road situation and long-term driver behavior
• System is implemented as a real-time application on the dash-board of the car

Experiments

• Three drivers with similar background participated. The system noticed driving style difference between them
• Focus was on urban driving in downtown LA
• Driver/vehicle model fit accuracy is 92% in average
• The system is able to recognized potentially dangerous situations and driver behavior deviation from normal

Future work

• Expand system to lane changing and other driving tasks
• Provide driver style information to GPS unit to improve routing accuracy prediction
• Augment system with its complimentary part based on visual data developed at UCSD