One of the most representative human-machine systems in daily life is a driver-vehicle system. To achieve a safer, more comfortable, and more efficient traffic environment, we have to optimize the whole system including driver-vehicle-road in addition to improving vehicle performance. Consequently, my current research goal is to establish a design methodology of the driver-vehicle system to improve QOM (Quality Of Moving).

**Vehicle Dynamic Control**

- Control System Design Robust to Disturbances and Modeling Errors
  - Automatic Path Tracking Control for Four-Wheel Steering Vehicle
  - Active Four-Wheel Steering Control

**HMS (Human-Machine System)**

- Advanced Driver-Assistance System (ADAS)
  - Eco-Driving Support System
  - Safe Driving Evaluation System
  - Wakefulness-Keeping Support System
  - Smooth Driving Assist System
  - Expressway Driving Game

- Analysis of Interaction between Driver and AD (Automated Driving)/ ADAS
  - Modeling of Trust Generation Mechanism for AD/ADAS
  - Impact of Trust in AD/ADAS on Driving Behavior
  - Countermeasures to prevent over-trust in AD/ADAS

- Haptic Shared Control
  - Direct HSC (D-HSC)
  - Indirect HSC (I-HSC)

- Collision Risk Indices
  - Deceleration for Collision Avoidance (DCA)
  - Lateral Acceleration for Collision (LACA)

**Adventure of Driver**

- Deceleration for Collision Avoidance (DCA)
- Lateral Acceleration for Collision (LACA)

- Control System Design Robust to Disturbances and Modeling Errors
- Automatic Path Tracking Control for Four-Wheel Steering Vehicle
- Active Four-Wheel Steering Control

**ADAS concept to encourage spontaneous behavioral change**

- Modeling of Trust Generation Mechanism for AD/ADAS
- Impact of Trust in AD/ADAS on Driving Behavior
- Countermeasures to prevent over-trust in AD/ADAS

**Analysis of Interaction between Driver and AD (Automated Driving)/ ADAS**

- Trust generation mechanism model for AD/ADAS

**Haptic Seat (example of I-HSC)**

- Upper: to encourage deceleration
- Lower: to encourage collision avoidance steering

**Expressway Driving Game**

- Upper: to encourage deceleration
- Lower: to encourage collision avoidance steering

**Smart Drive for better QOM**

- (Quality Of Moving)

**Safe**

- Driving skill evaluation
- Encourage behavioral change
- Decrease target risk level

**Green**

- Driving skill evaluation
- Encourage behavioral change
- Decrease target risk level

**Smooth flow**

- Driving skill evaluation
- Encourage behavioral change
- Decrease target risk level