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
  - Active Pitch Control by Driving/Braking Force Distribution

**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)
  - Direct HSC (D-HSC)
  - Indirect HSC (I-HSC)

**Smart Drive for better QOM**
- **Safe**
- **Green**
- **Smooth flow**

**Haptic Seat (example of I-HSC)**
Upper: to encourage deceleration
Lower: to encourage collision avoidance steering

**Expressway Driving Game**
- **Driving skill evaluation**
- **Situation awareness**
- **Subjective risk**
- **Target risk**
- **Reliability of DAS**
- **Driving automation system (DAS)**
- **Driving behavior controller**
- **HMI of DAS**

**Design to prevent over-trust and dependence**
Encourage behavioral change = Decrease target risk level

**Driving environment**
- **Traffic conditions**
- **Control signal**
- **System state information**
- **Environment identification**
- **Vehicle**
  - Speed limit data
  - Direct speed limit
  - Nominal speed limit
  - Danger signal
  - Haptic guide
  - Green bar expands as driver attends super radius
  - Driver can obtain medals at time when the bar reaches maximum

**Trust generation mechanism model for AD/ADAS**

**Background Photo was Designed by fanjianhua / Freepik**