Sensor Emulation with Physiologic Data in Immersive Virtual Reality Driving Simulator

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Material
The immersive virtual reality driving simulator has several components:

- **Oculus Rift**
  - The Virtual Reality headset that allows tracking of rotation and position of head
  - Provides realistic feedback for visual system
  - Full control of participant’s visual perception

- **Logitech G920**
  - A wheel, pedals, and a shift provide realistic driving control
  - Tactile feedback from the road

- **DOF Reality 3D**
  - Motorized platform with 3 degrees of freedom (pitch, roll, and yaw)
  - Mimics vestibular feedback for acceleration, braking, and turning

**Introduction**
**Autonomous vehicles (AV)**
- Reduces road accidents
- Reduces driving related stress
- Became possible with advances in sensor technology and machine learning

**Machine Learning**
- Uses various sensors to read the surrounding environment as data.
- The data is used to train NN offline.
- NN makes driving decisions in real time.

**Question**
Can we enhance the safety and comfort of AVs by training AVs with physiological data of human drivers?

**Goal**
Train and compare AV algorithm with/without physiological data.

**CARLA environment**

**Sensor Types**
- (1.) Lidar Visualization
- (2.) RGB Camera Feed
- (3.) Depth Camera Feed
- (4.) Semantic Segmentation

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IRB#: IRB-19-40