

# SIP-Adus Workshop 2020



## Toward Acceptable Social Distancing between Human and Mobility Systems

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# Coexistence of Human and Automated Driving

## ◆ Shared Space

Parks become Roads



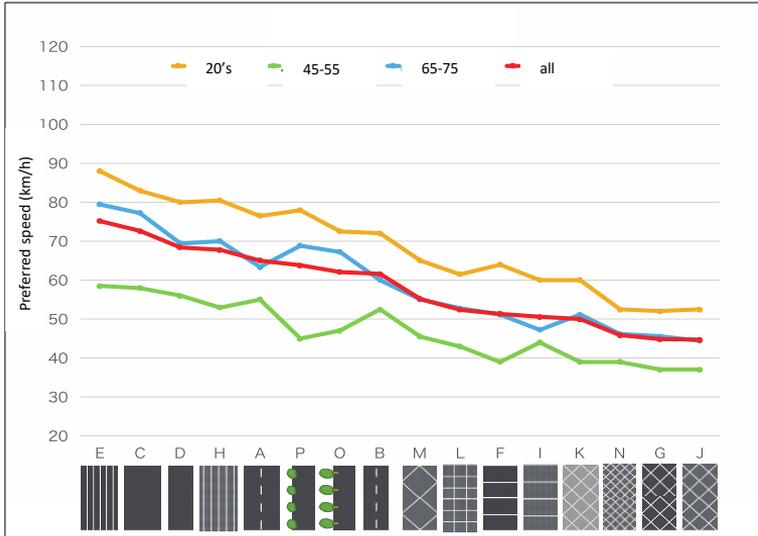
Roads become Parks



# Research Questions

- ◆ How to assure social distancing between the human and the mobility?
  - Road to Park: How to reduce the vehicle speed smoothly?
  - Park to Road: How to maintain the appropriate distance?
  
- ◆ How to assess risk? How to assure safety?

# Road surface design (Prof. S. Yamamoto)



Ozaki, Yamakoto, Itoh, et al. (2017)



# Experiment



# Simulation (Tsukuba Station)



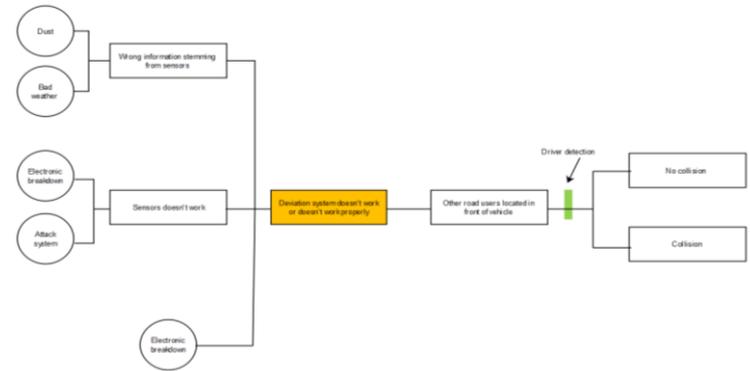
# Risk Assessment

## Bow-tie diagram

- Do FTA(Fault Tree Analysis) to clarify how a risky event occurs
- Do ETA(Event Tree Analysis) to clarify how the situation changes

Evidence is needed to model the human behavior in the analysis.

(Human behavior in shared space is so far unclear)



(Bernardot, 2019)

# Test in real?



# Do VR test



# Experiment

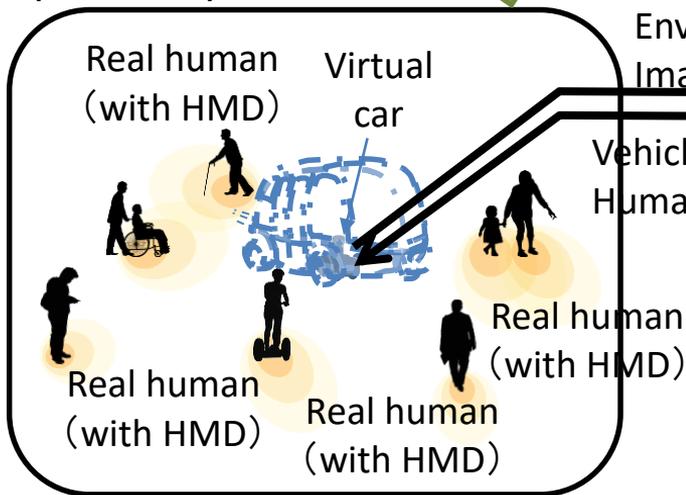


# Sharing VR (Prof. Yano)

Integrated space



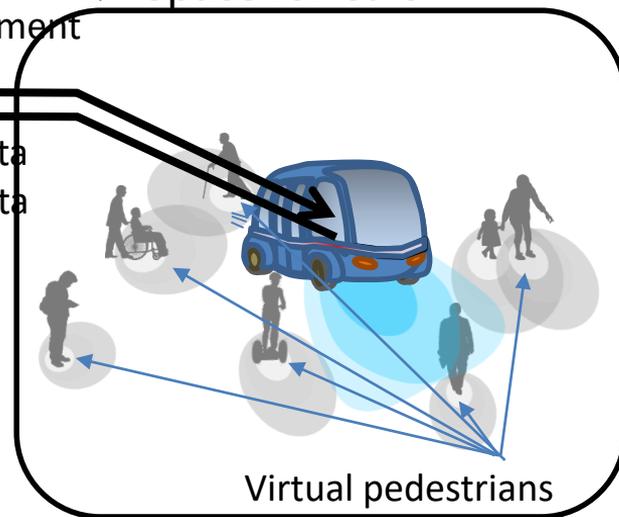
Space for pedestrians



Environment Image

Vehicle data  
Human data

Space for Cars



Virtual pedestrians

# Prototype

Pedestrian space



Vehicle space



View from driver

## ◆ VR setup

- Pedestrians and vehicle can move freely.

## ◆ Human behavior analysis

- Collect the “naturalistic” data in the environment
- Analyze the characteristics of human behavior in such shared space.

## ◆ Risk assessment

- To let stakeholders discuss whether the shared space is acceptable or not.

**Thank you**

