



A Video-Based Automated Driving Simulator for Automotive UI Prototyping, UX and Behaviour Research

Michael A. Gerber, Ronald Schroeter and Julia Vehns

Paper Session 1: Designing Spaces and Interfaces
ACM Automotive User Interfaces 2019

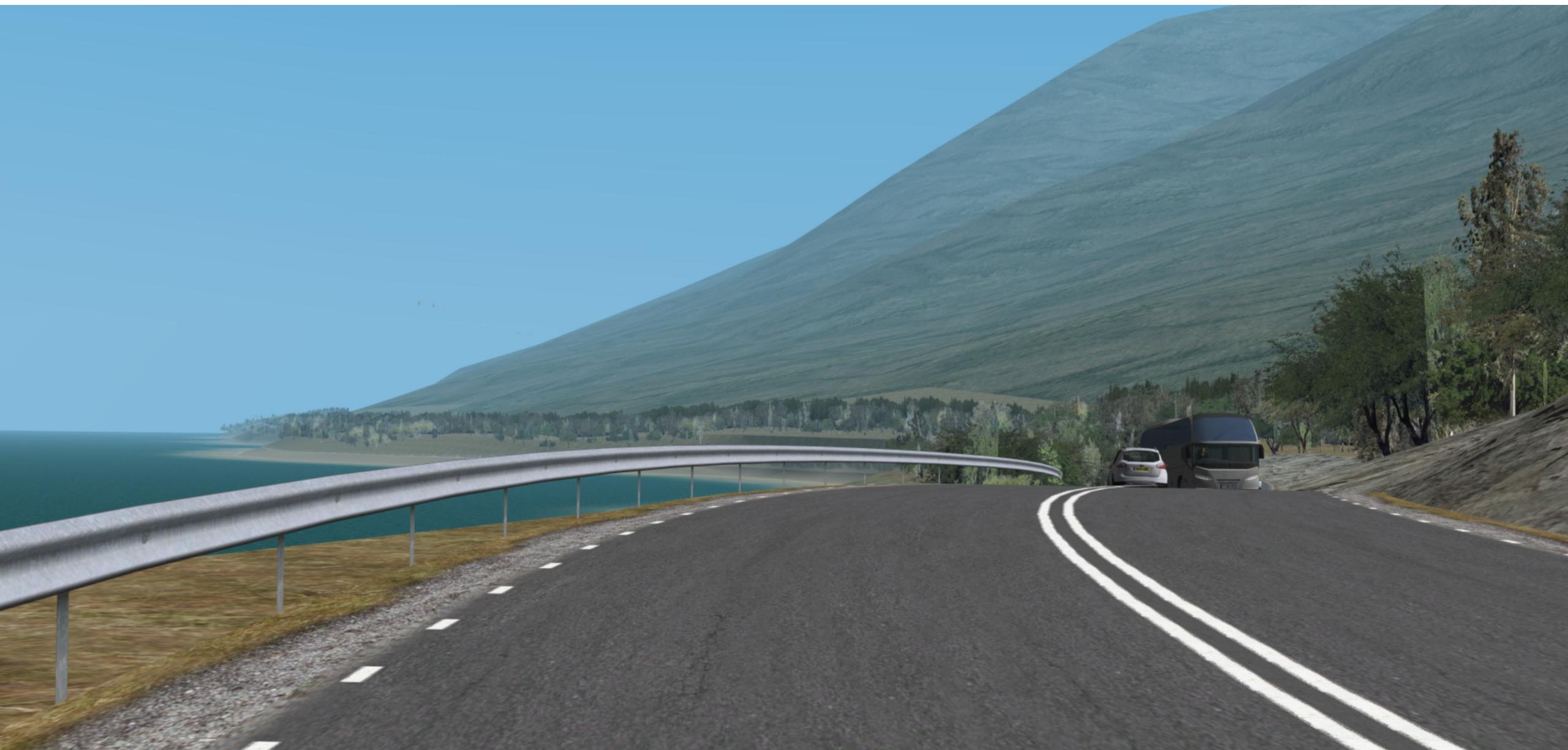


Centre for Accident Research and Road Safety – Queensland
Queensland University of Technology
Ludwig Maximilian University of Munich

Immersive Video Automated Driving Simulation



Motivation



Setup

Simulation Computer



Setup

Simulation Computer



Virtual Reality

Setup

Simulation Computer



Virtual Reality

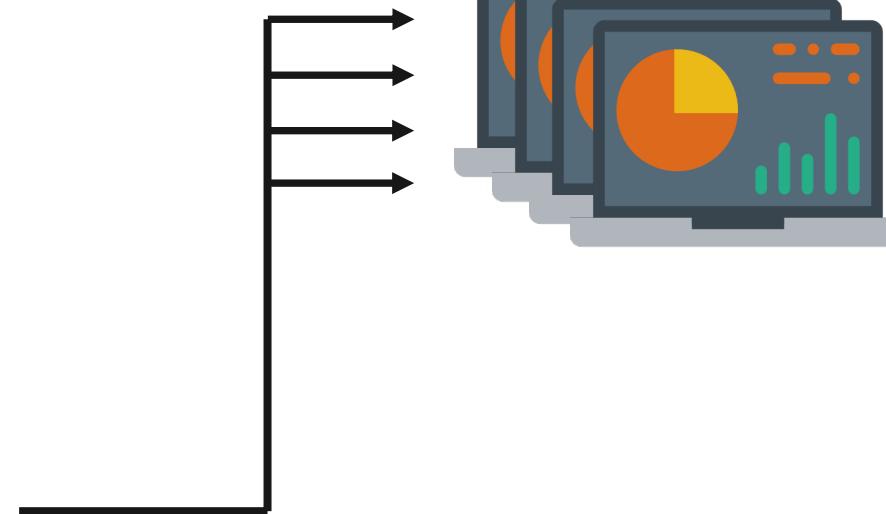
Simulator Environment

Main Simulator



Setup - Main Simulator

Simulation Computer



Left Projector

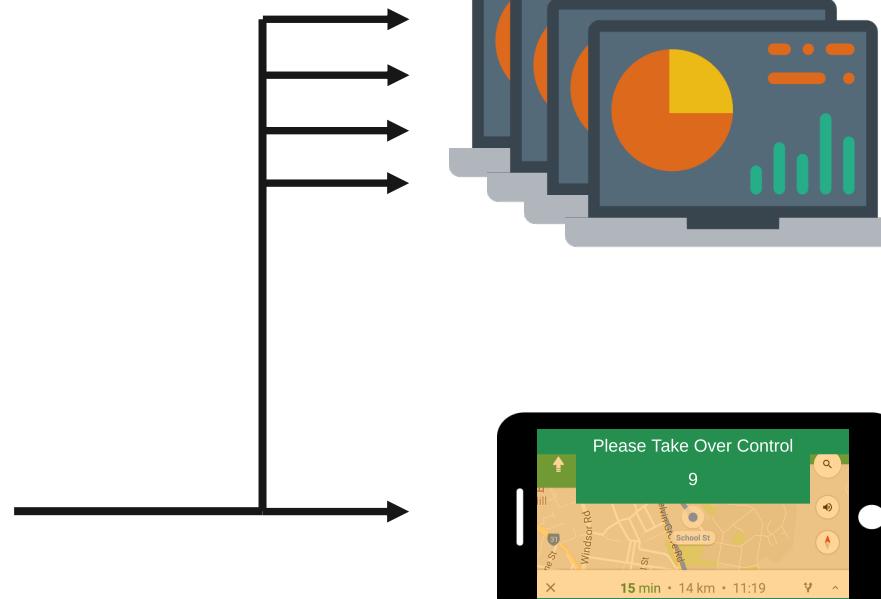
Front Projector

Right Projector

Mirror Displays

Setup - Main Simulator

Simulation Computer



Left Projector

Front Projector

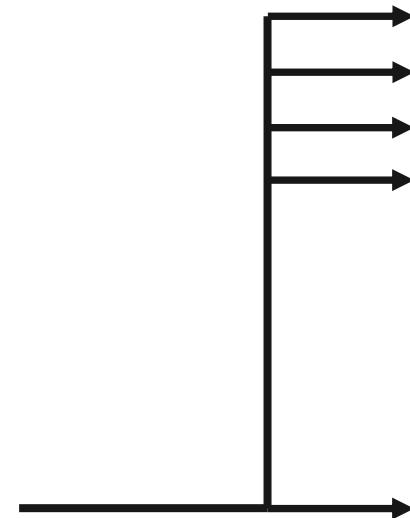
Right Projector

Mirror Displays

HUD or GPS

Setup - Main Simulator

Simulation Computer



Left Projector

Front Projector

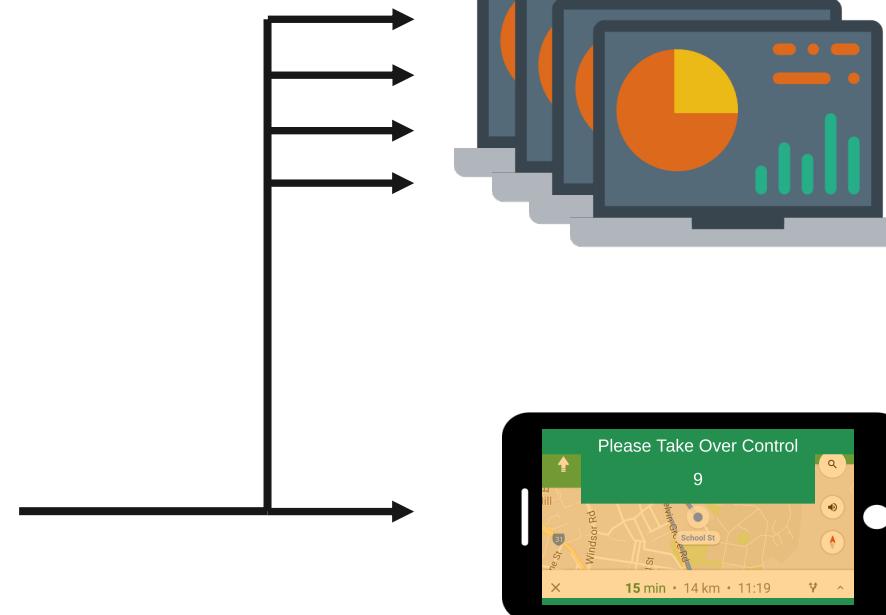
Right Projector

Mirror Displays



Setup - Main Simulator

Simulation Computer



Left Projector

Front Projector

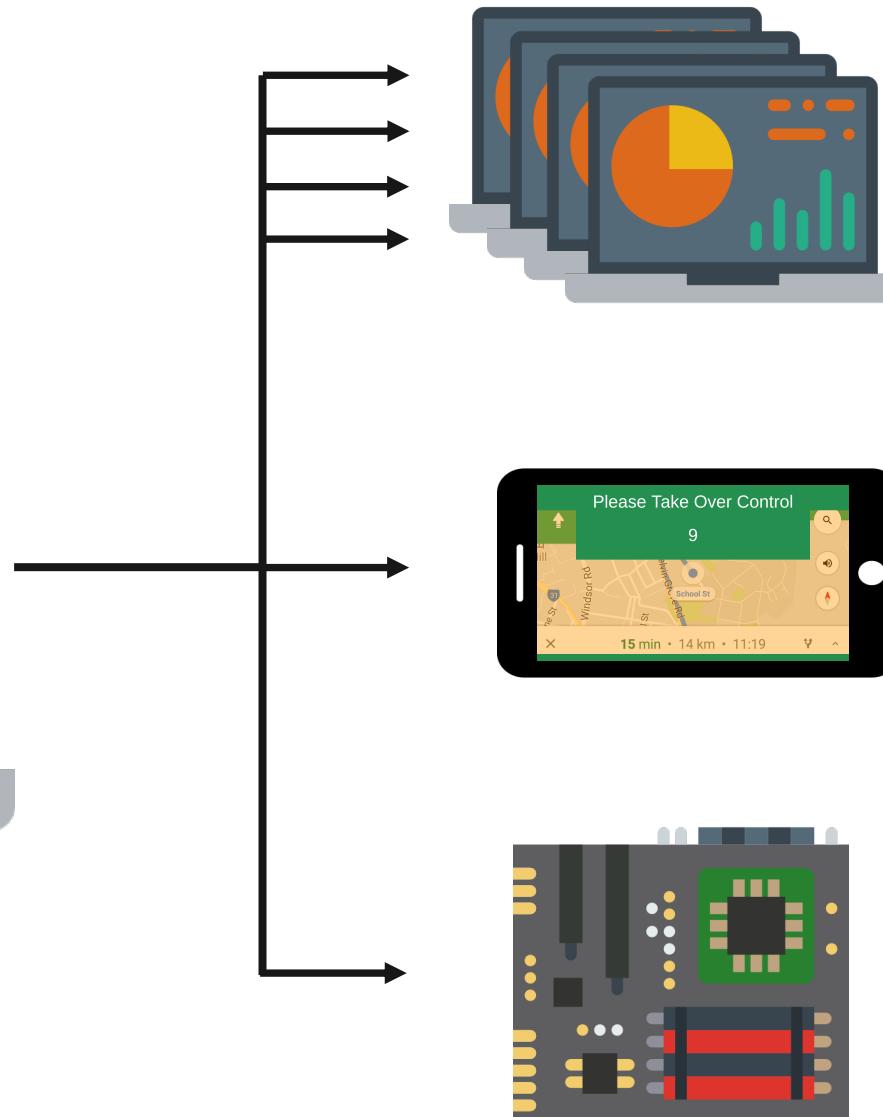
Right Projector

Mirror Displays

HUD or GPS

Setup - Main Simulator

Simulation Computer



Left Projector

Front Projector

Right Projector

Mirror Displays

HUD or GPS

Micro Computer

- BioPac
- IR-Trigger
- Protocol
- GoPro remote

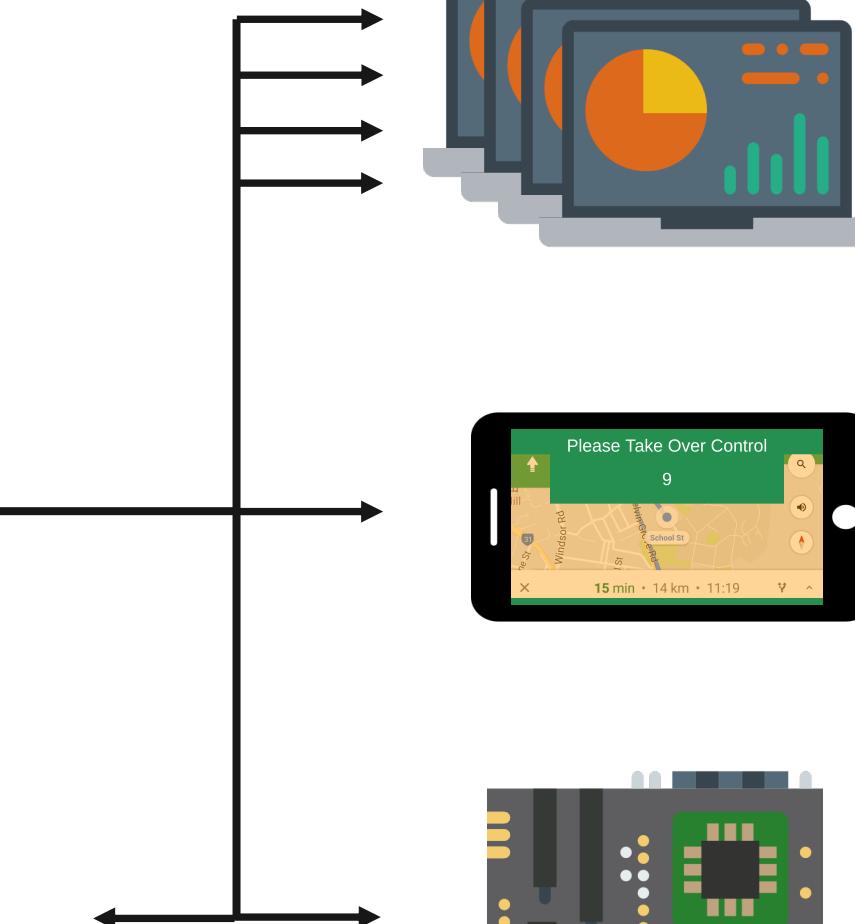
Setup - Main Simulator

Simulation Computer



Future Work

- Steering Wheel
- Motion
- Dashboard



Left Projector

Front Projector

Right Projector

Mirror Displays

HUD or GPS

Micro Computer

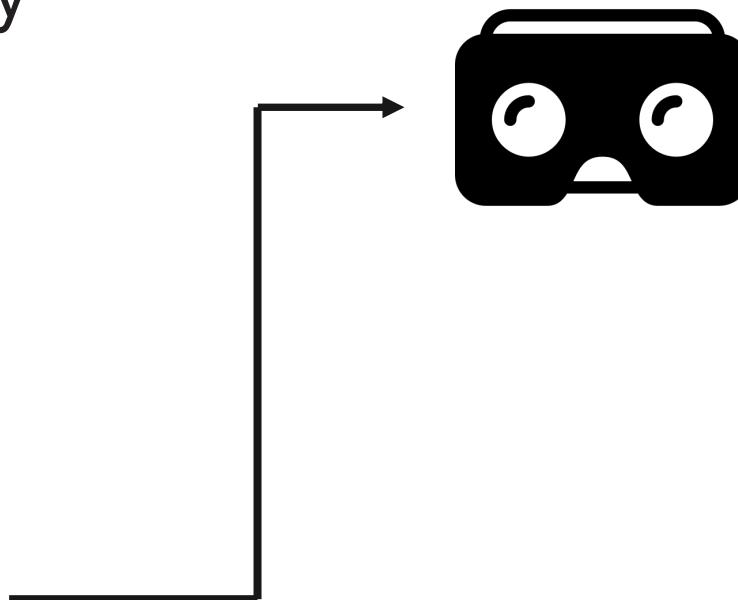
- BioPac
- IR-Trigger
- Protocol
- GoPro remote

Virtual Reality



Setup – Virtual Reality

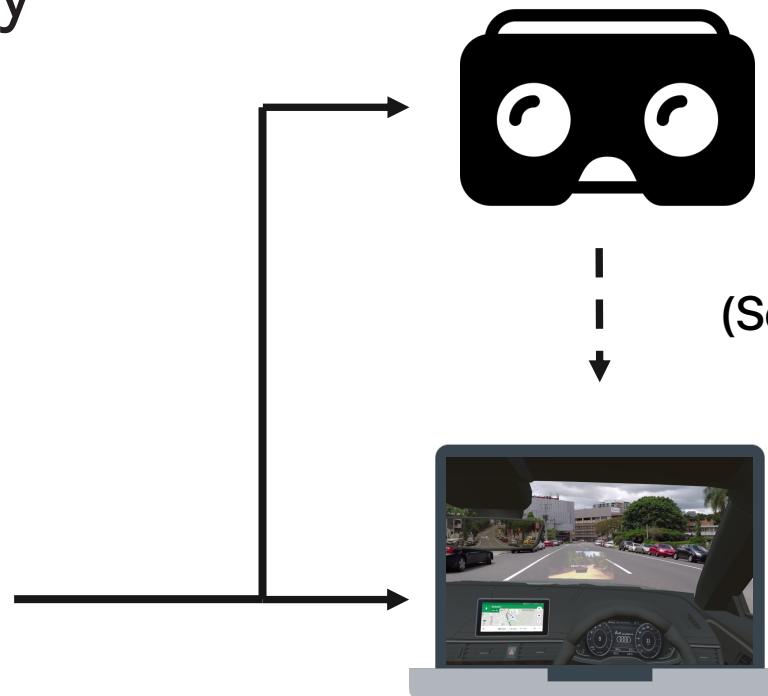
Simulation Computer



Virtual Reality Glasses
(in our case Oculus Rift 1 or 2)

Setup – Virtual Reality

Simulation Computer



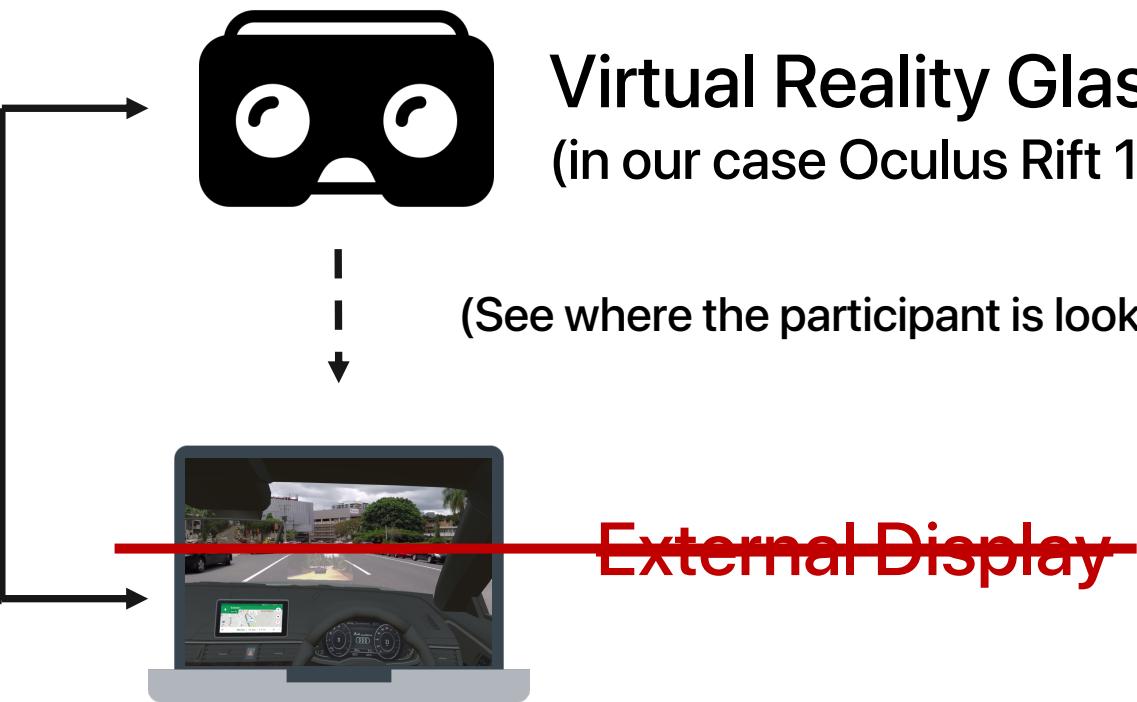
Virtual Reality Glasses
(in our case Oculus Rift 1 or 2)

(See where the participant is looking at)

External Display

Setup – Virtual Reality

Simulation Computer



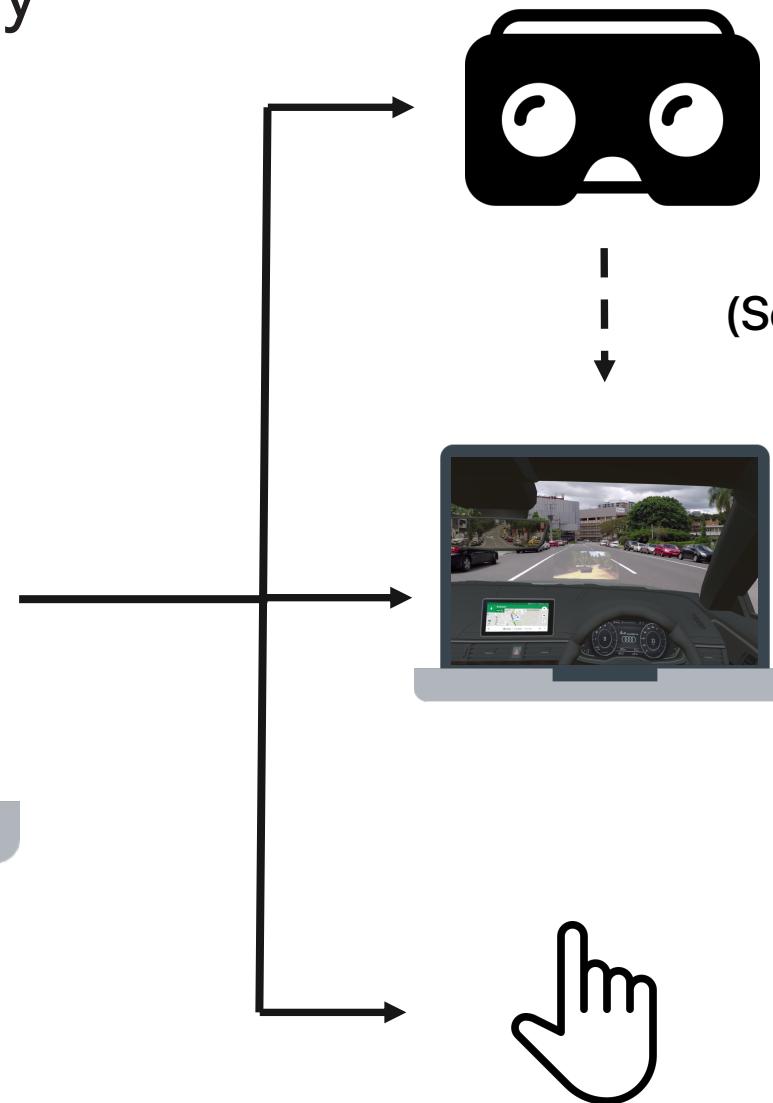
Virtual Reality Glasses
(in our case Oculus Rift 1 or 2)

(See where the participant is looking at)

External Display

Setup – Virtual Reality

Simulation Computer



Virtual Reality Glasses
(in our case Oculus Rift 1 or 2)

(See where the participant is looking at)

External Display

Hand Tracker (currently in dev)

- LeapMotion
- Pointing and intractability
- Fake-body

Control Interface



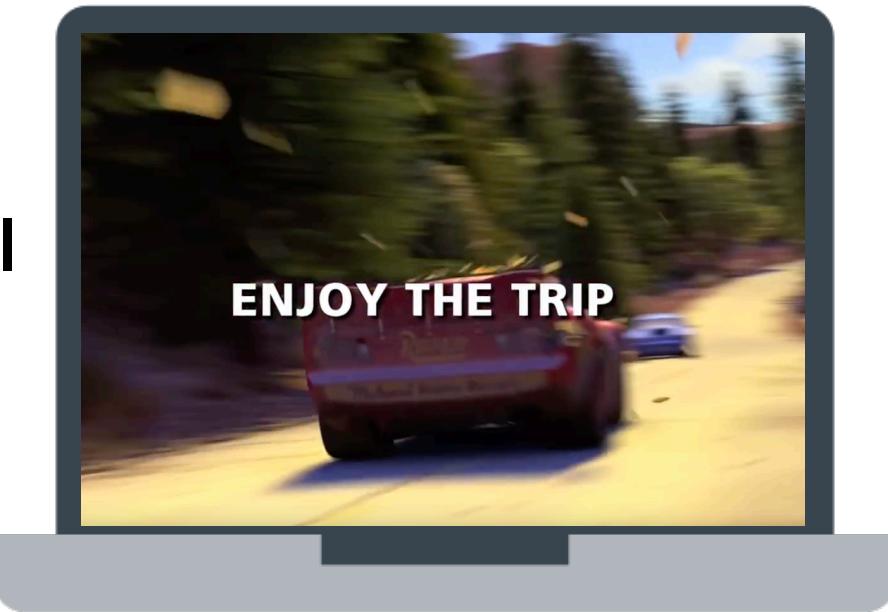
Prototyping

Simulation Computer

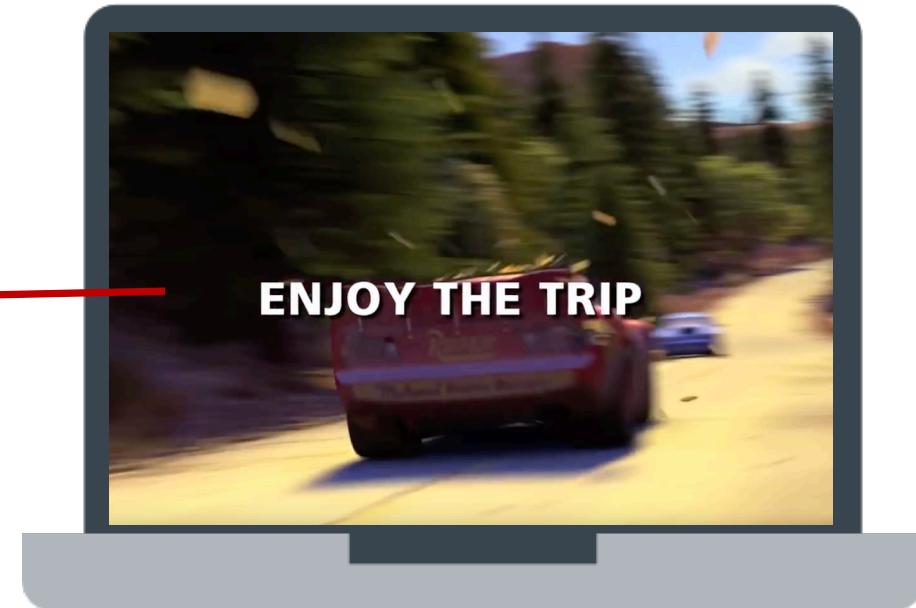


USB ← HDMI

UI - Computer

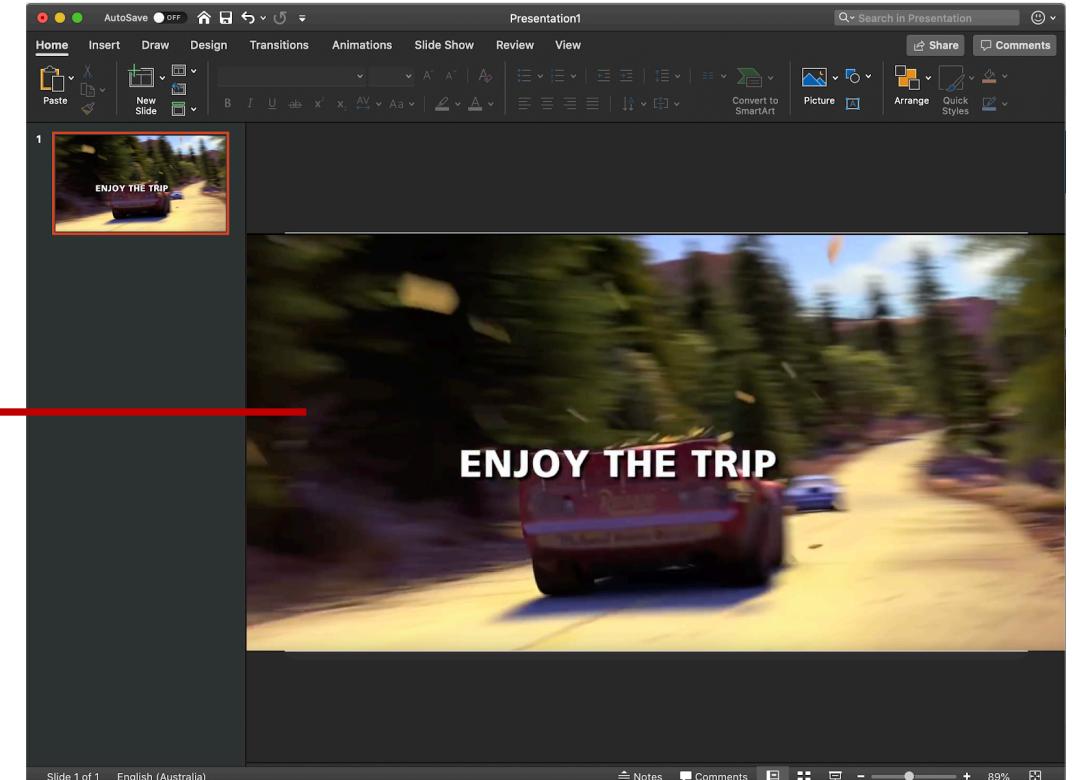


Prototyping

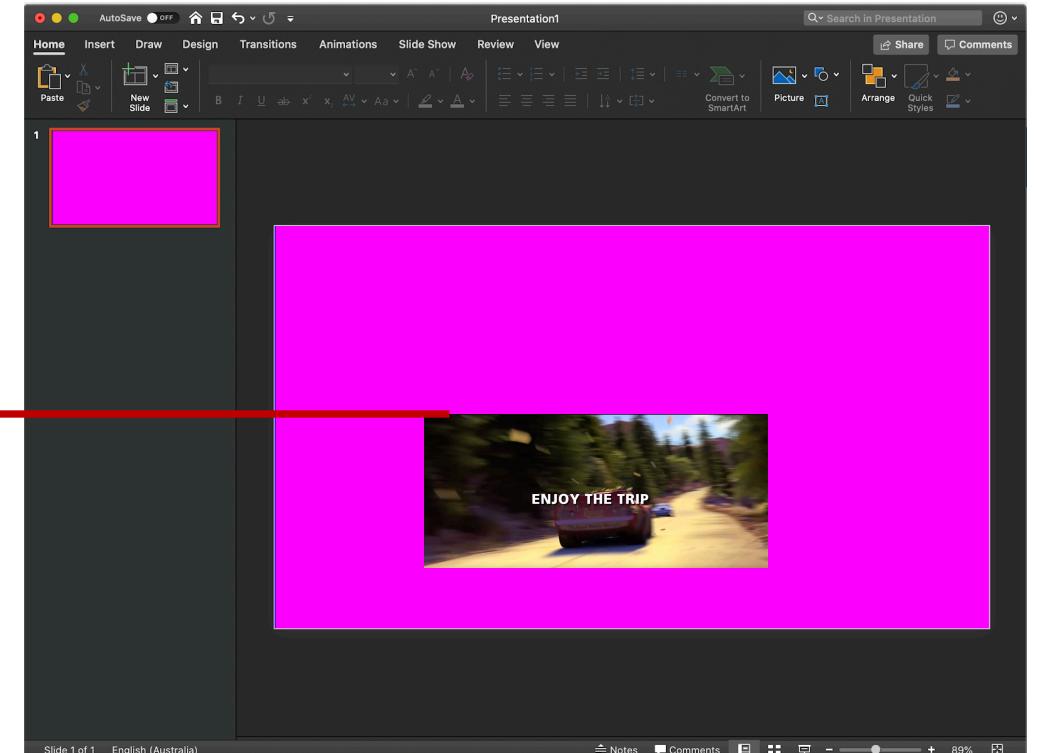


Prototyping

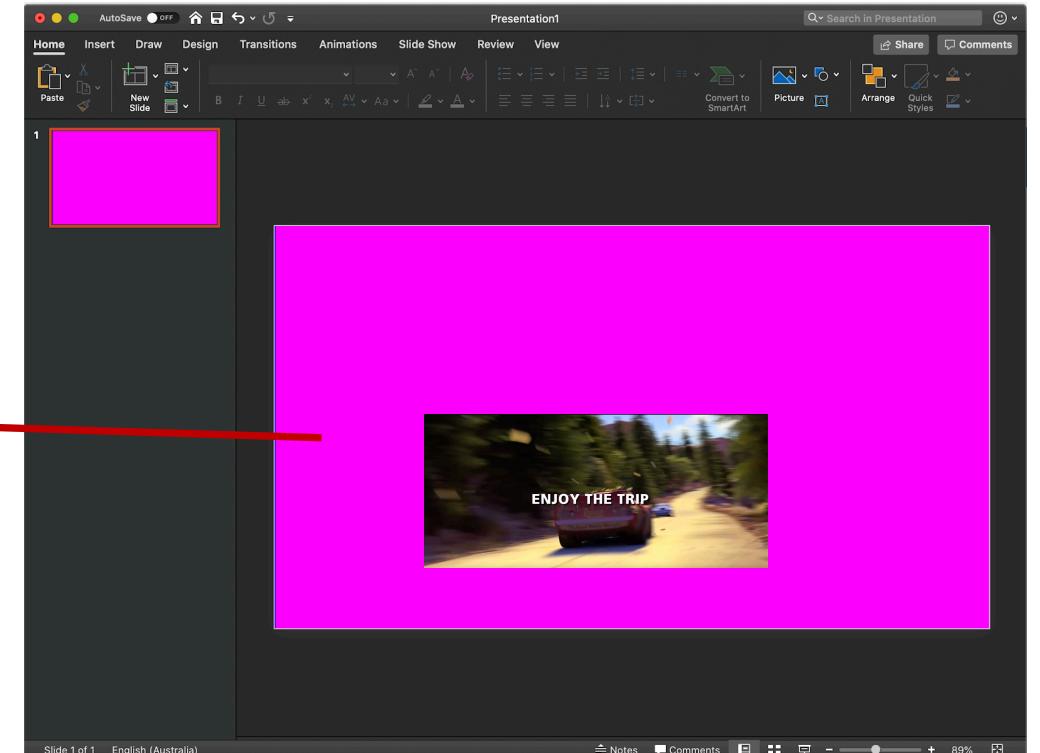
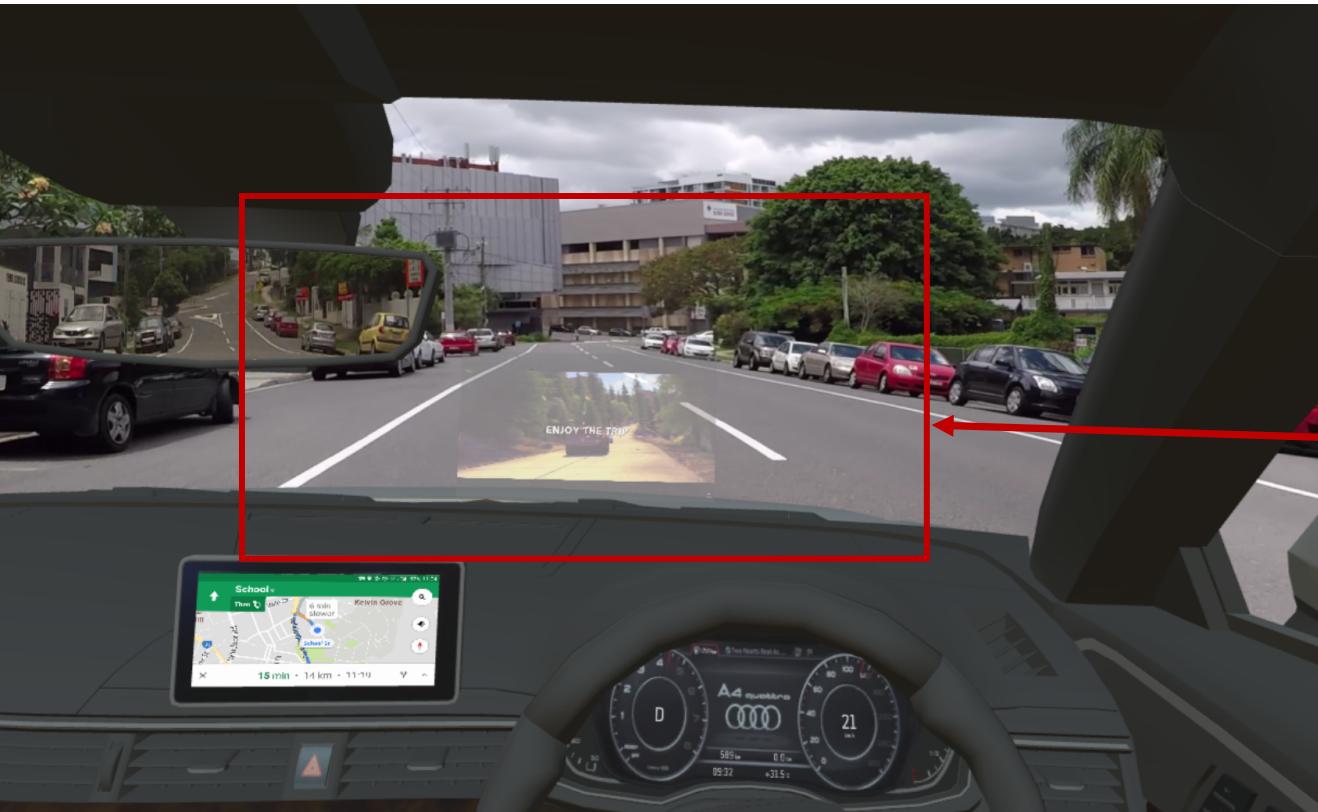
e.g. presentation software



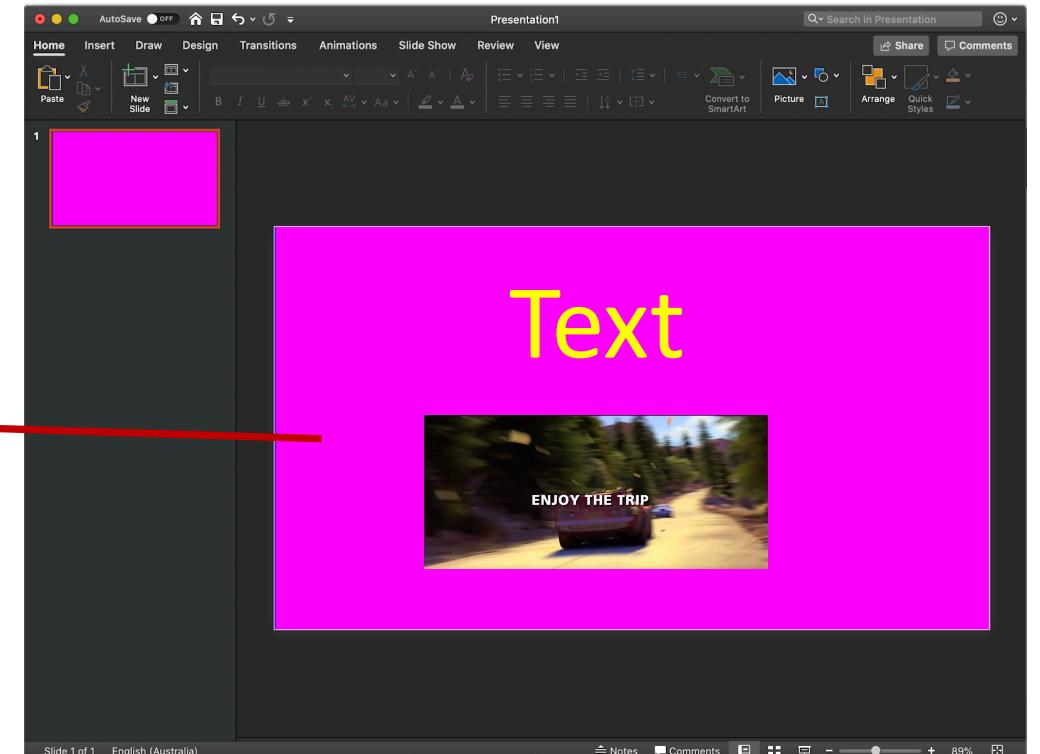
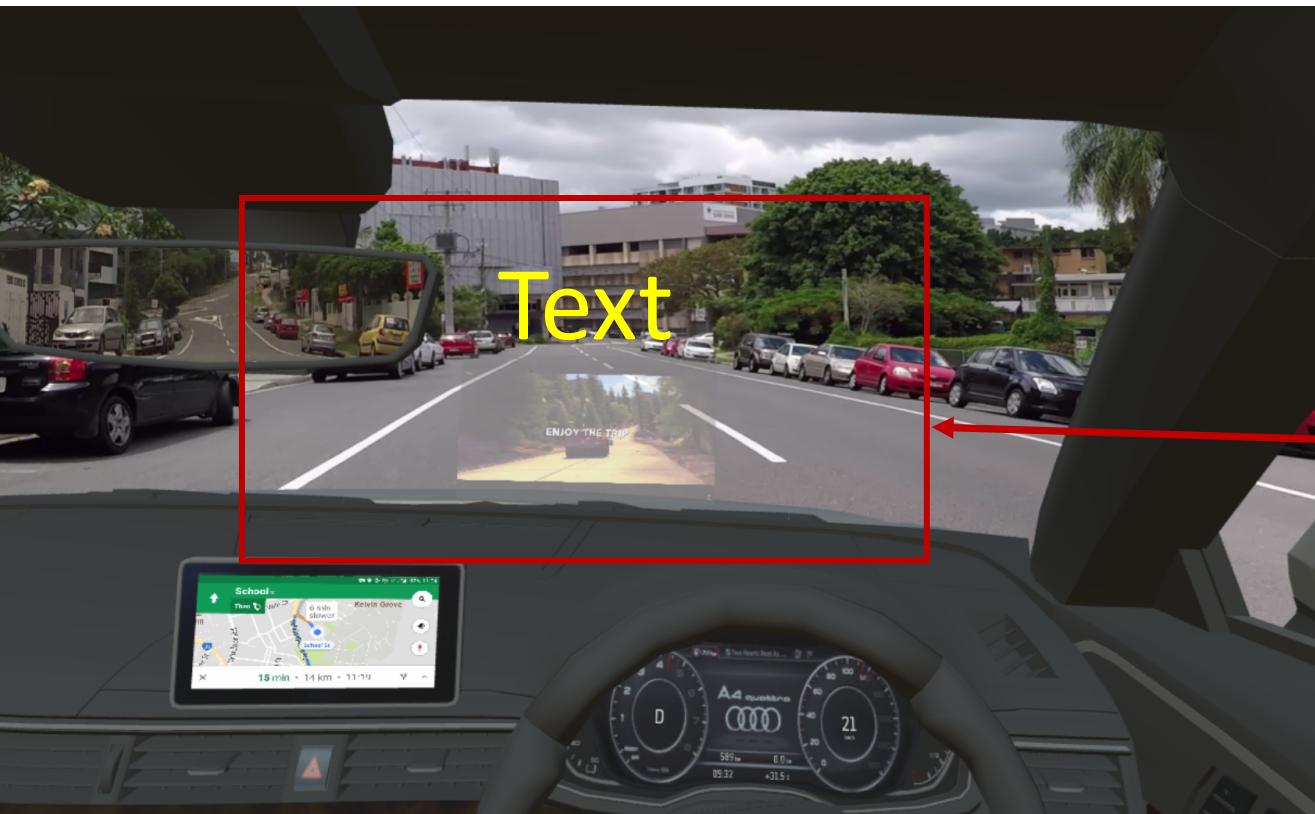
Prototyping



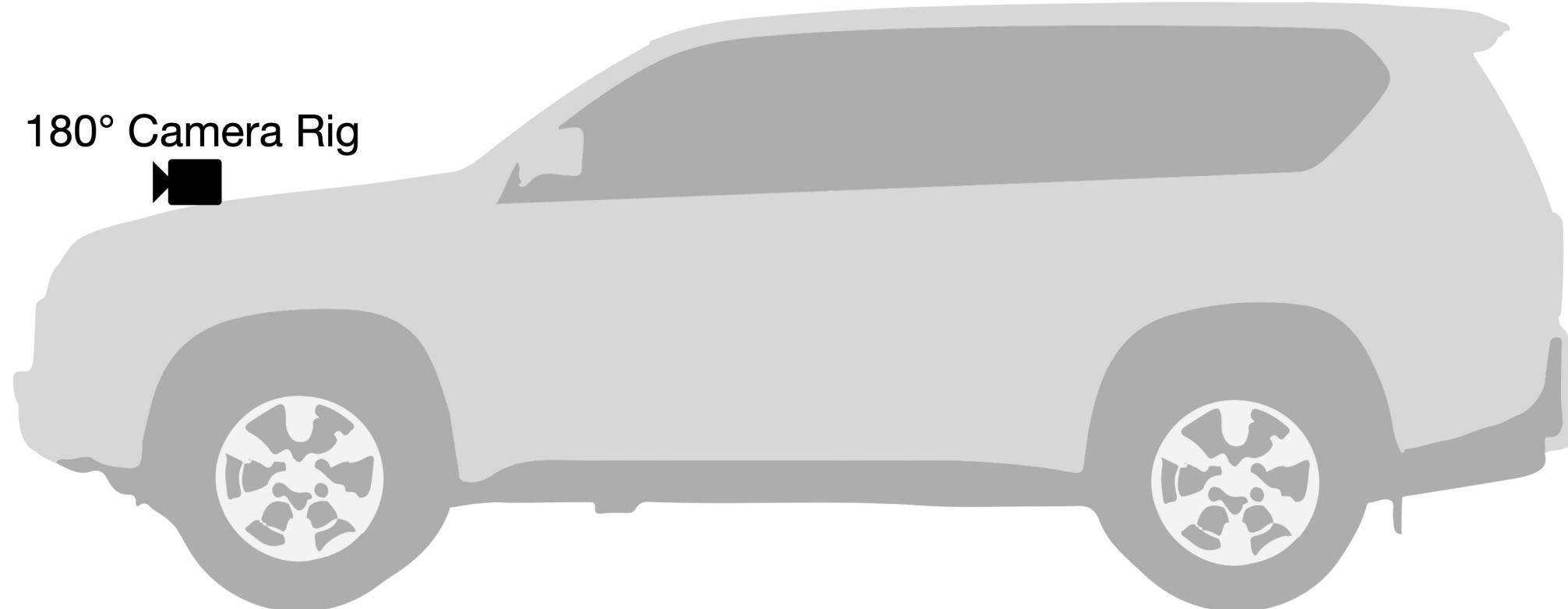
Prototyping



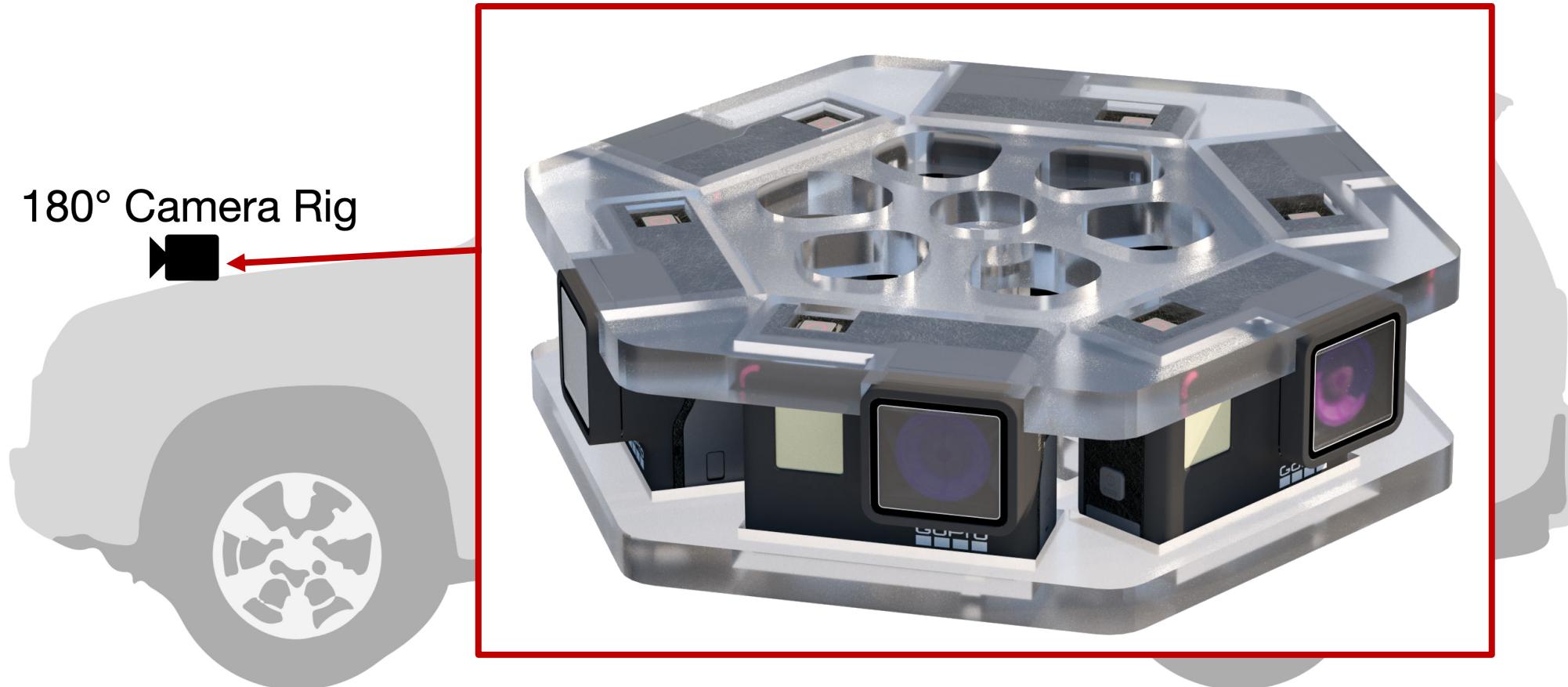
Prototyping



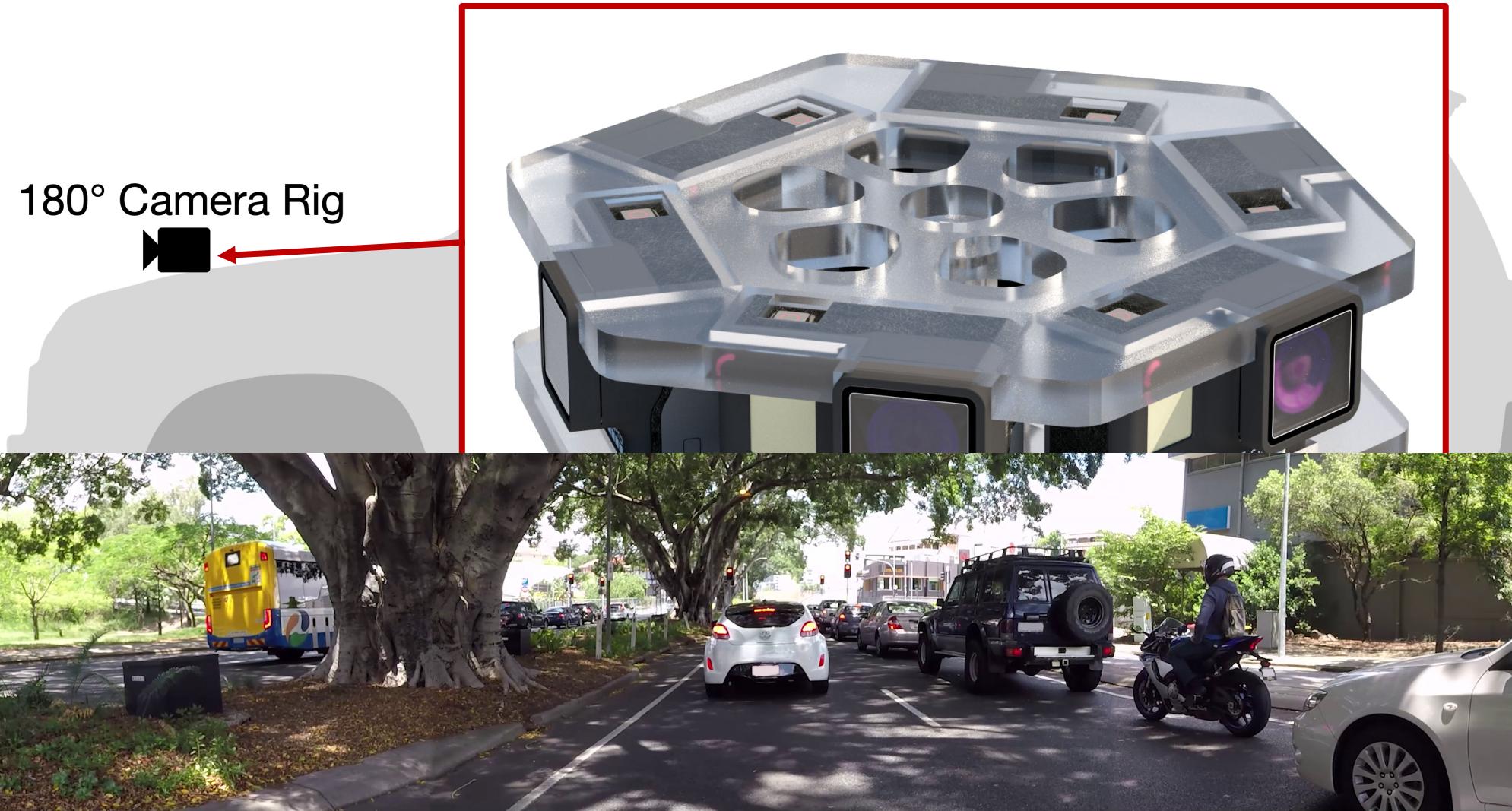
Content Development



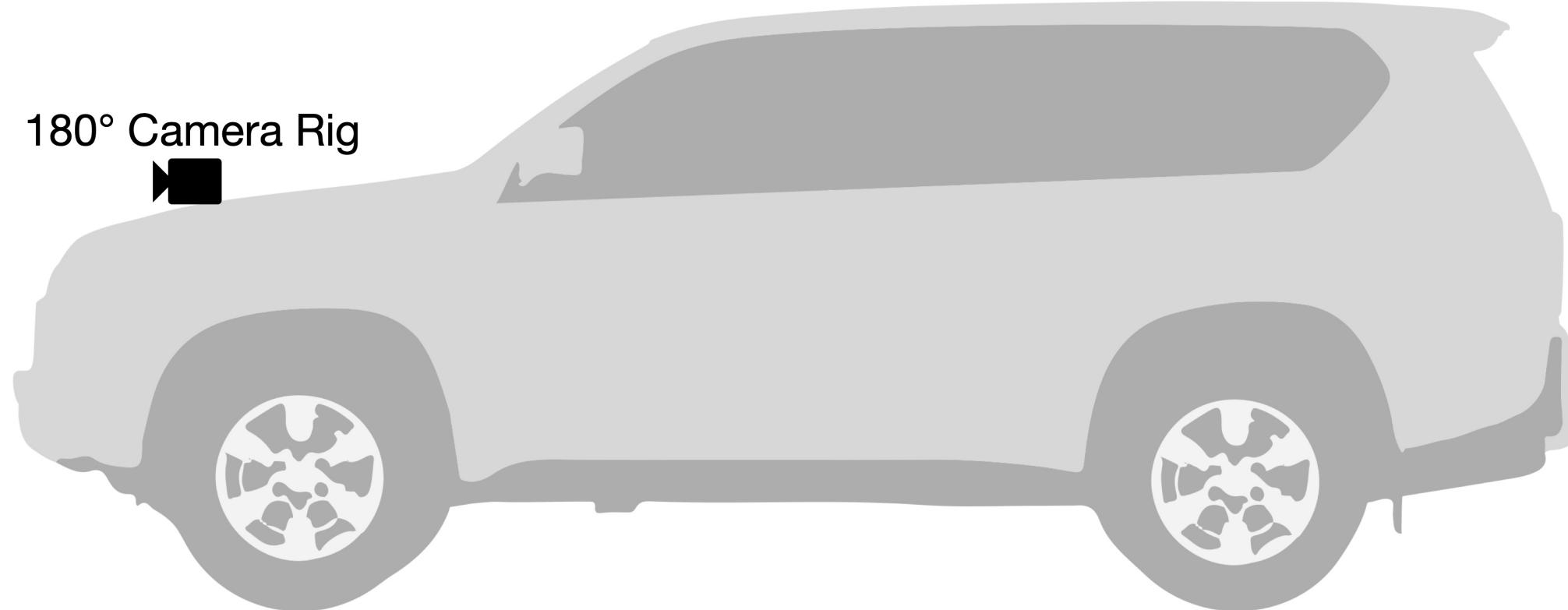
Content Development



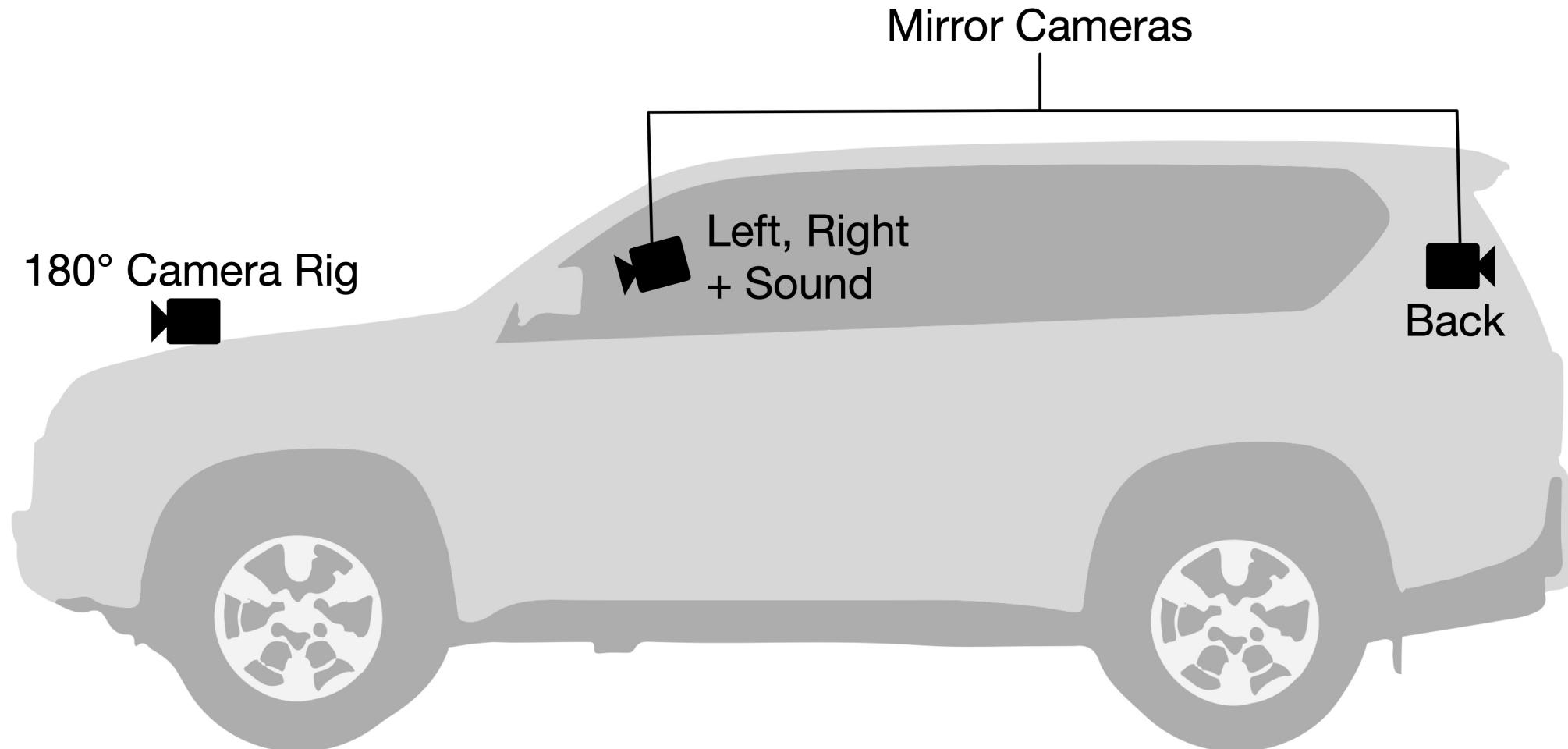
Content Development



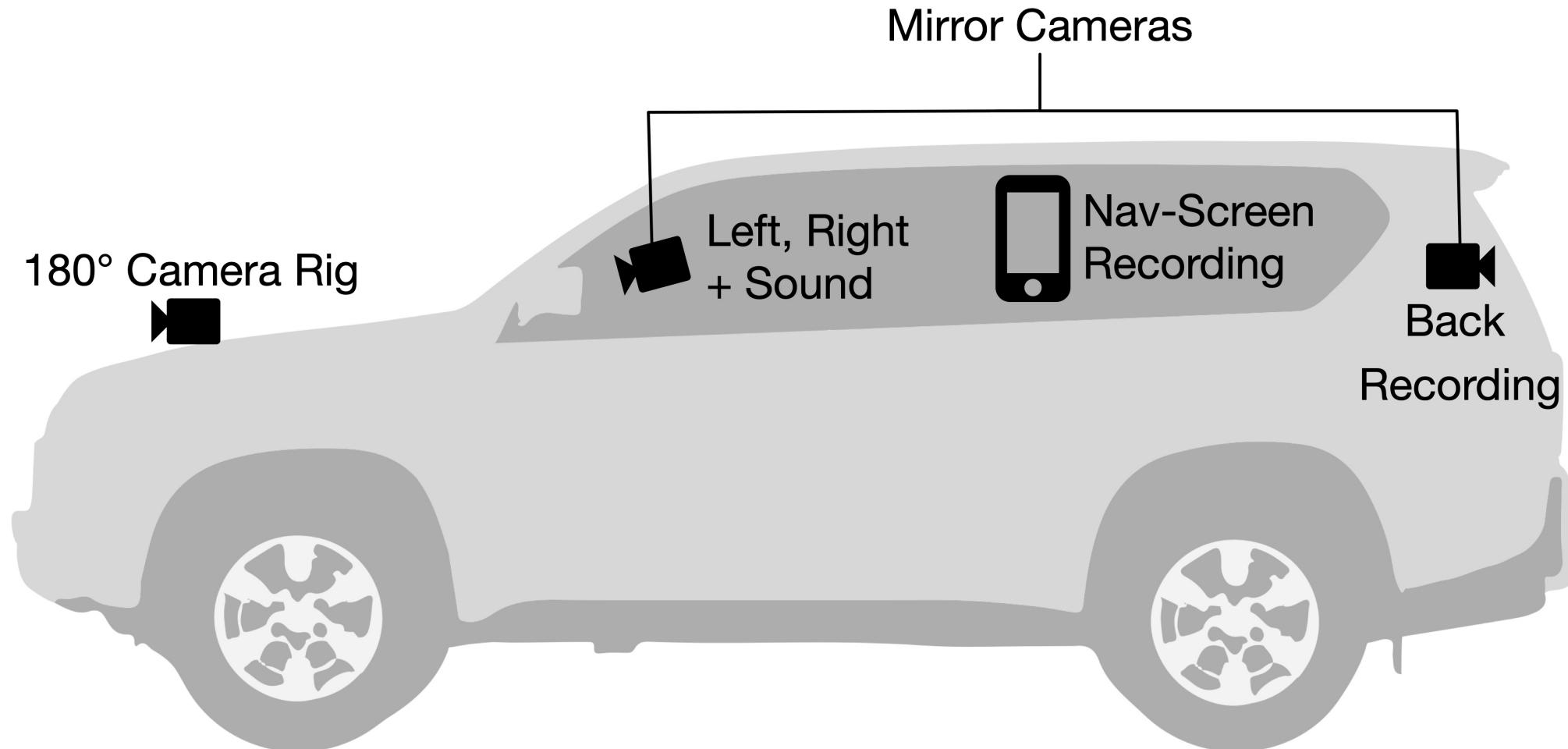
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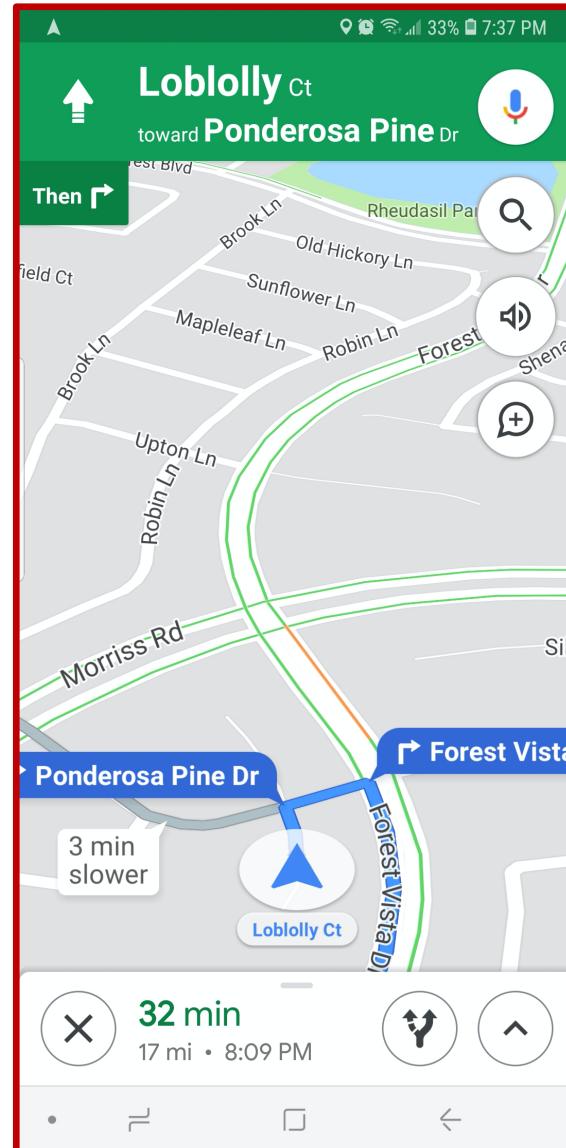
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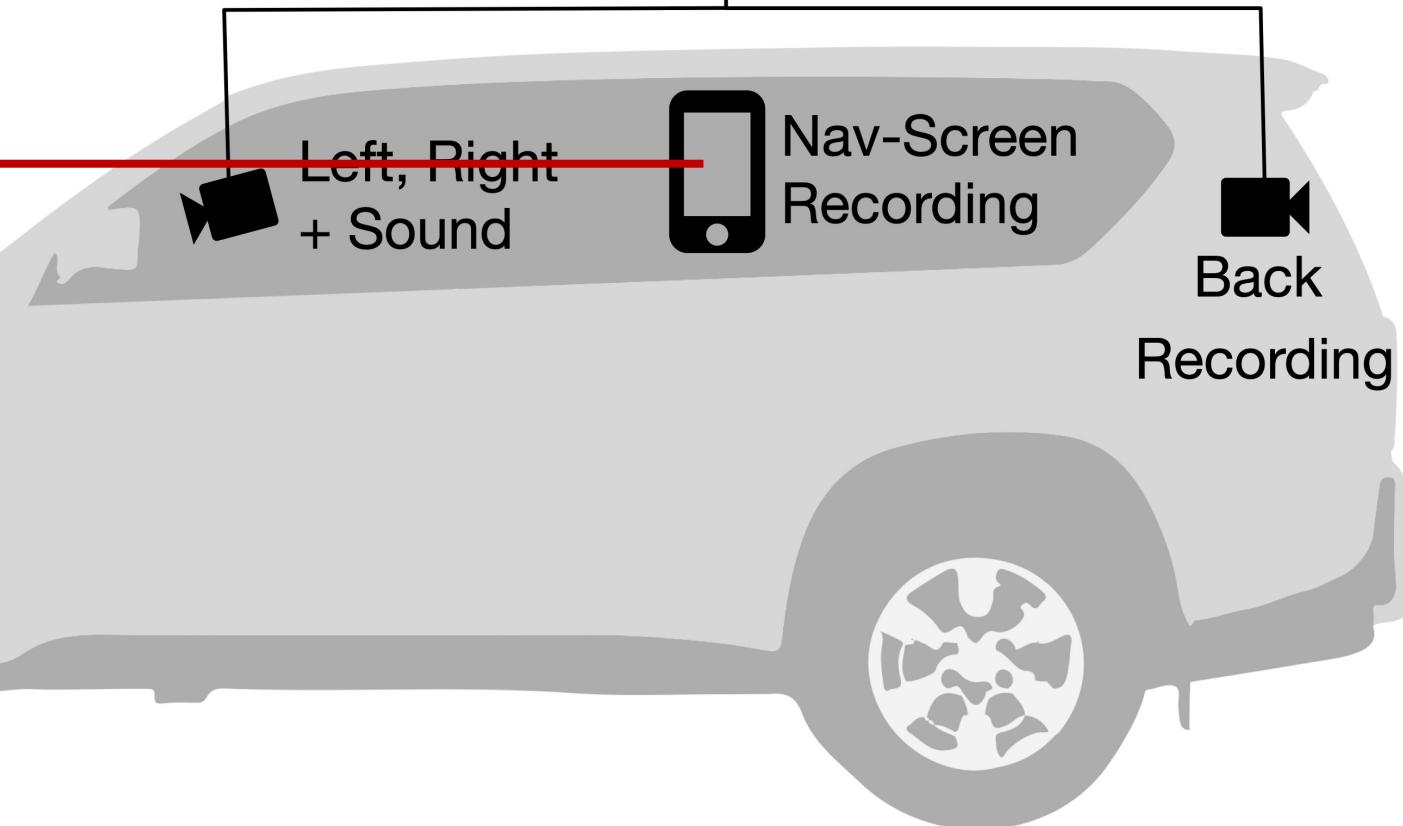
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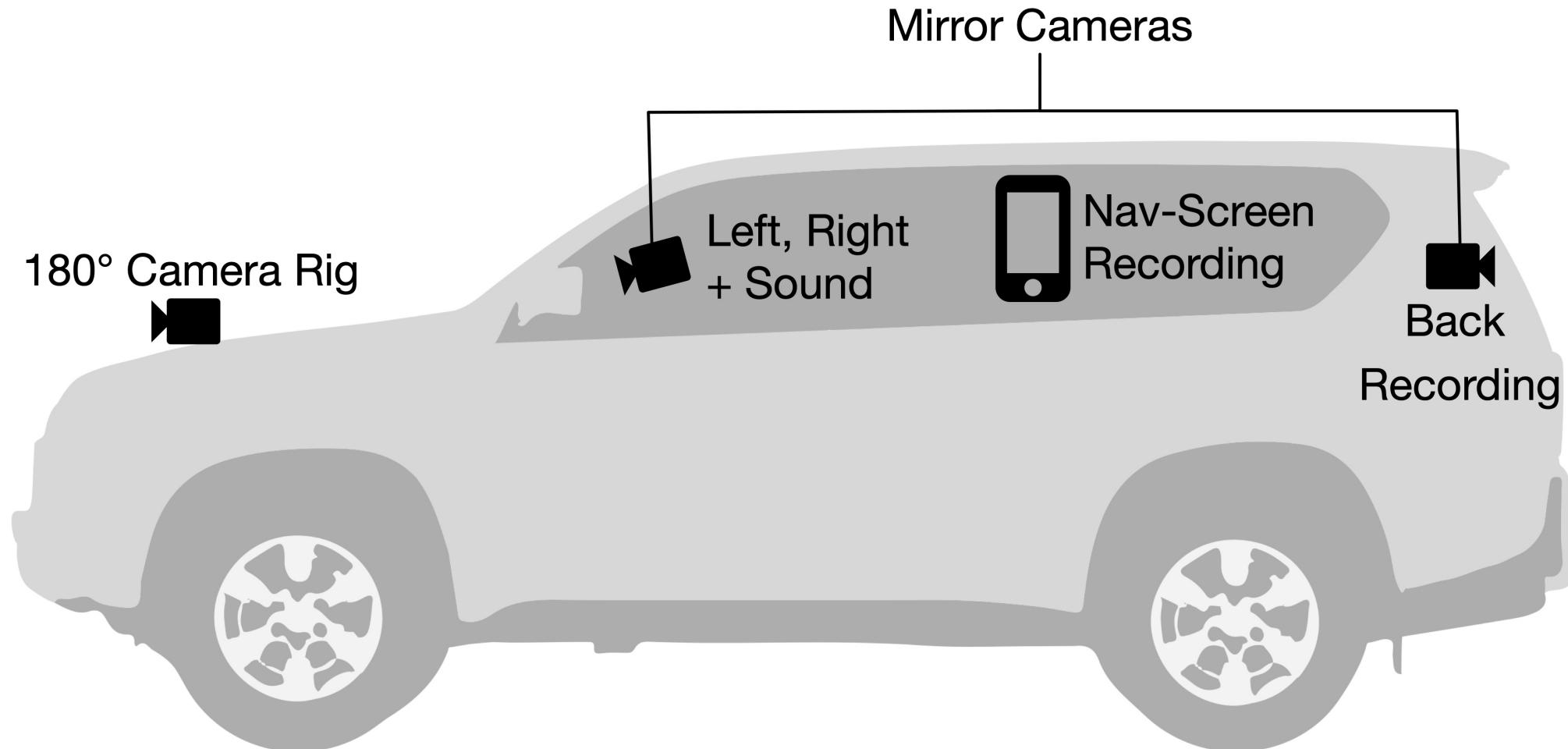
Content Development



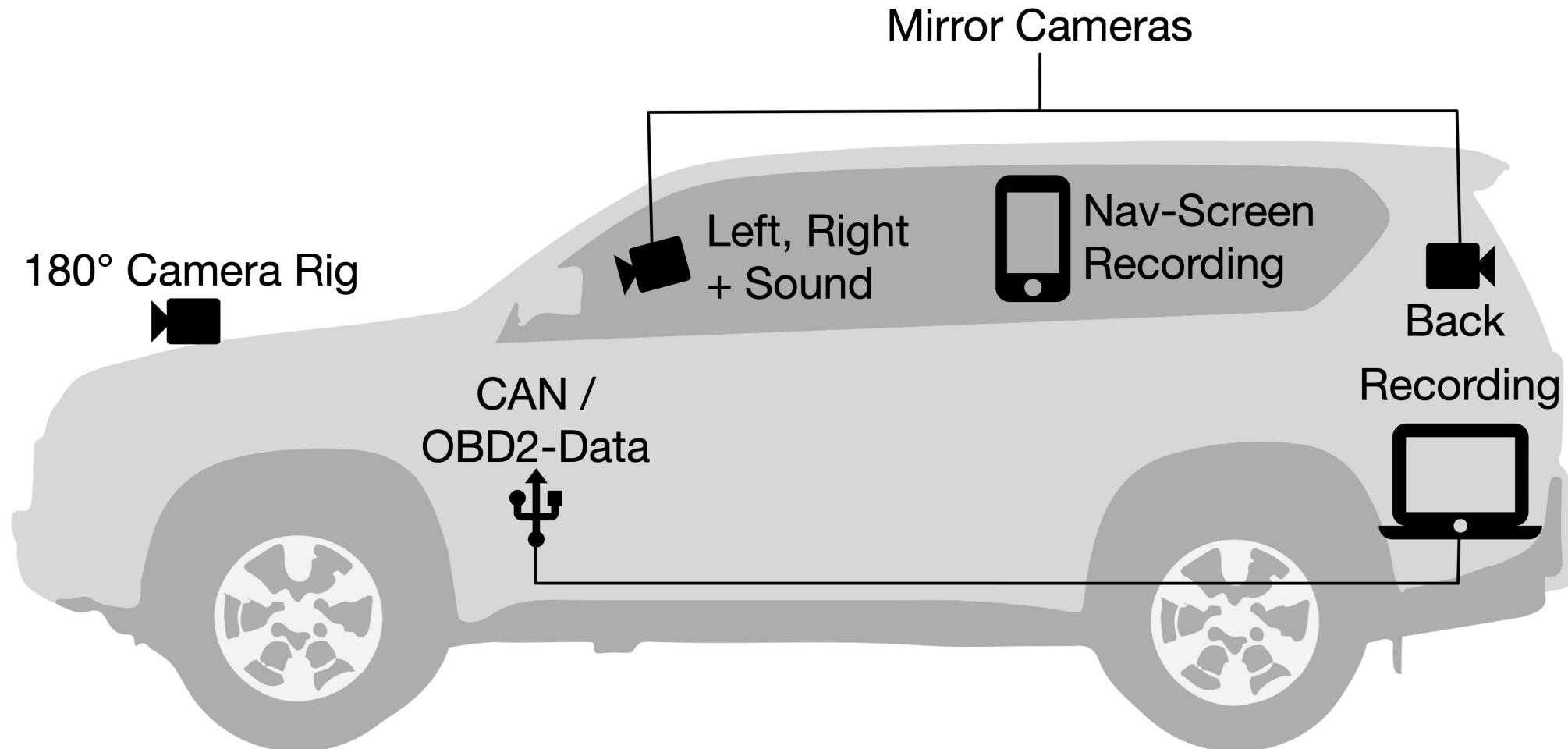
Mirror Cameras



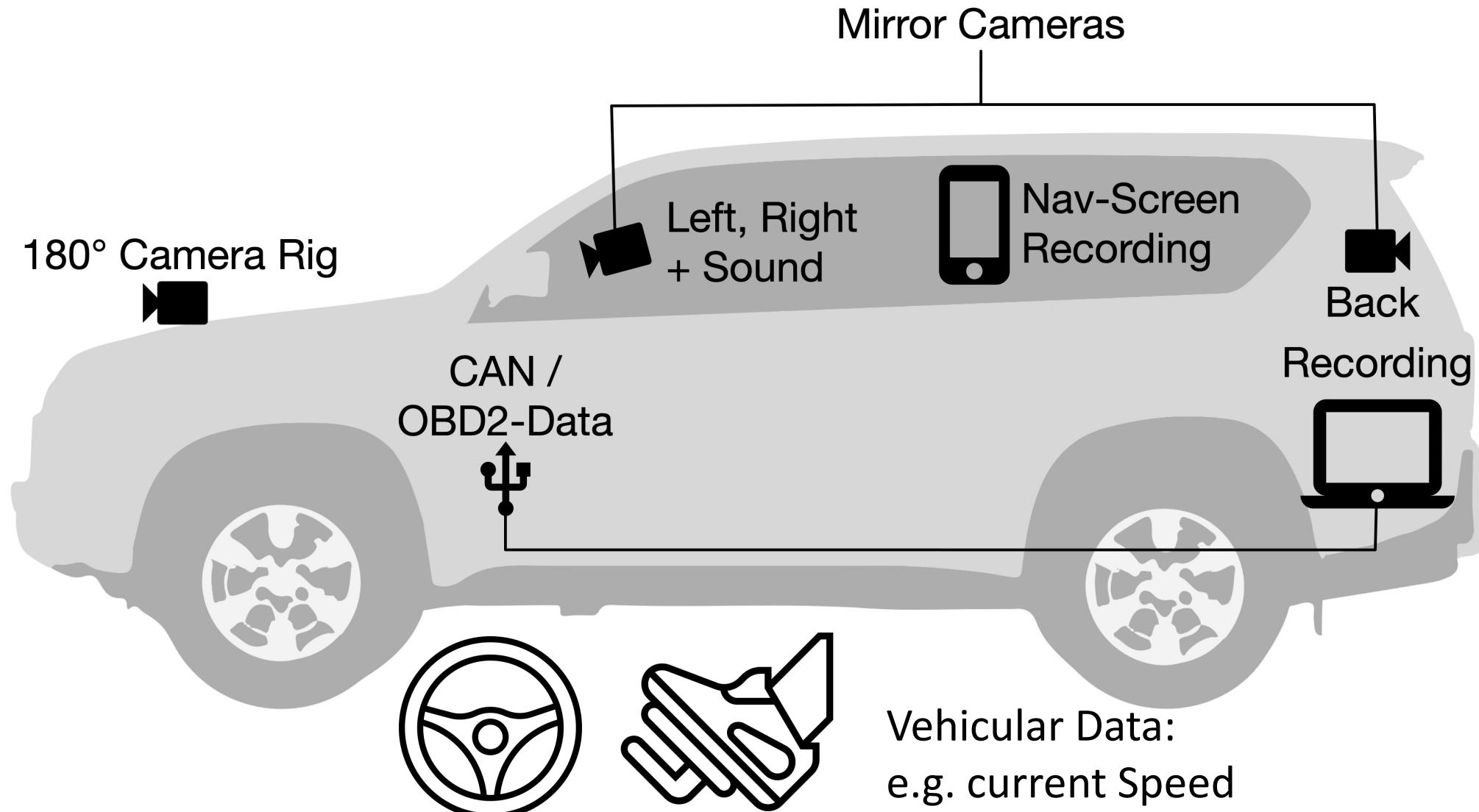
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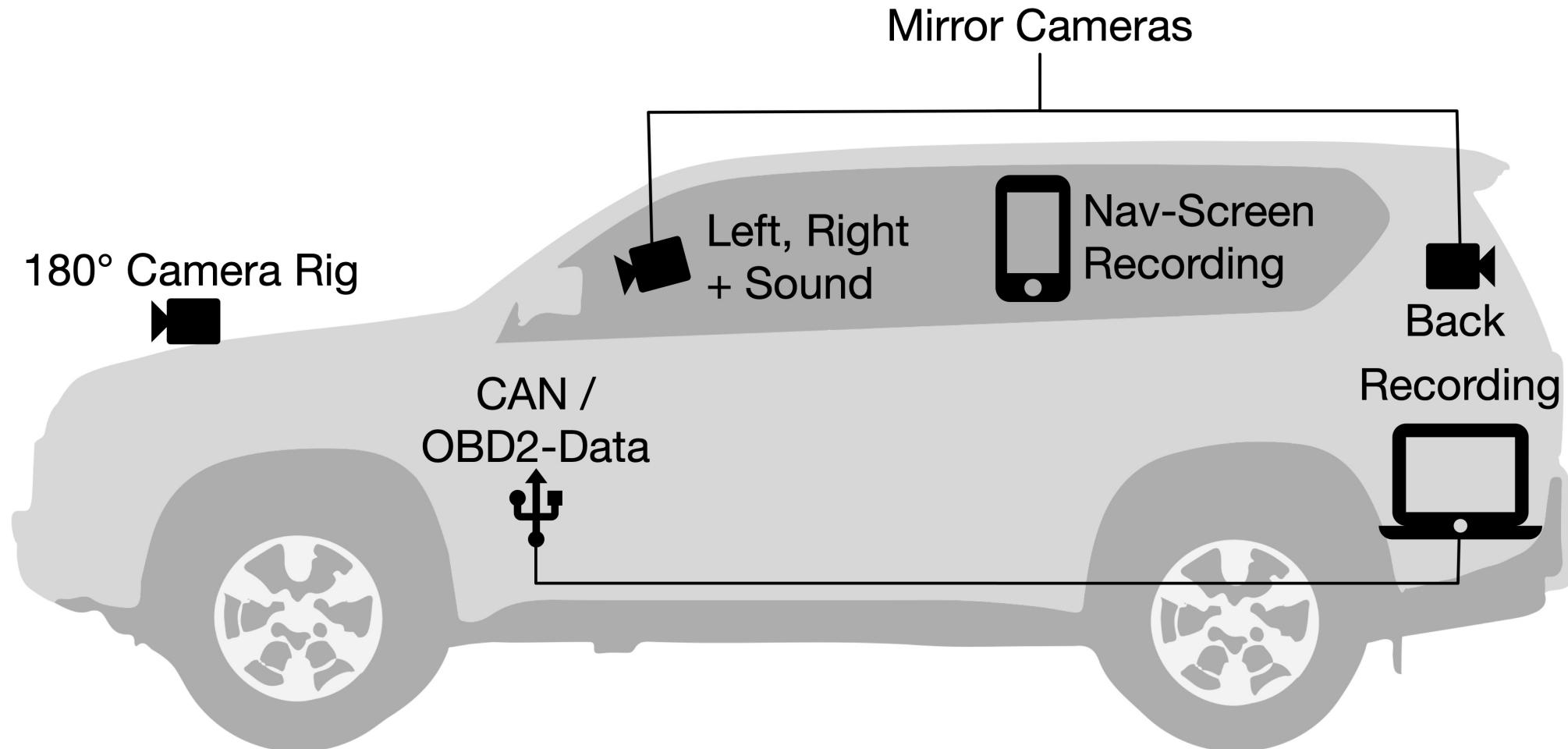
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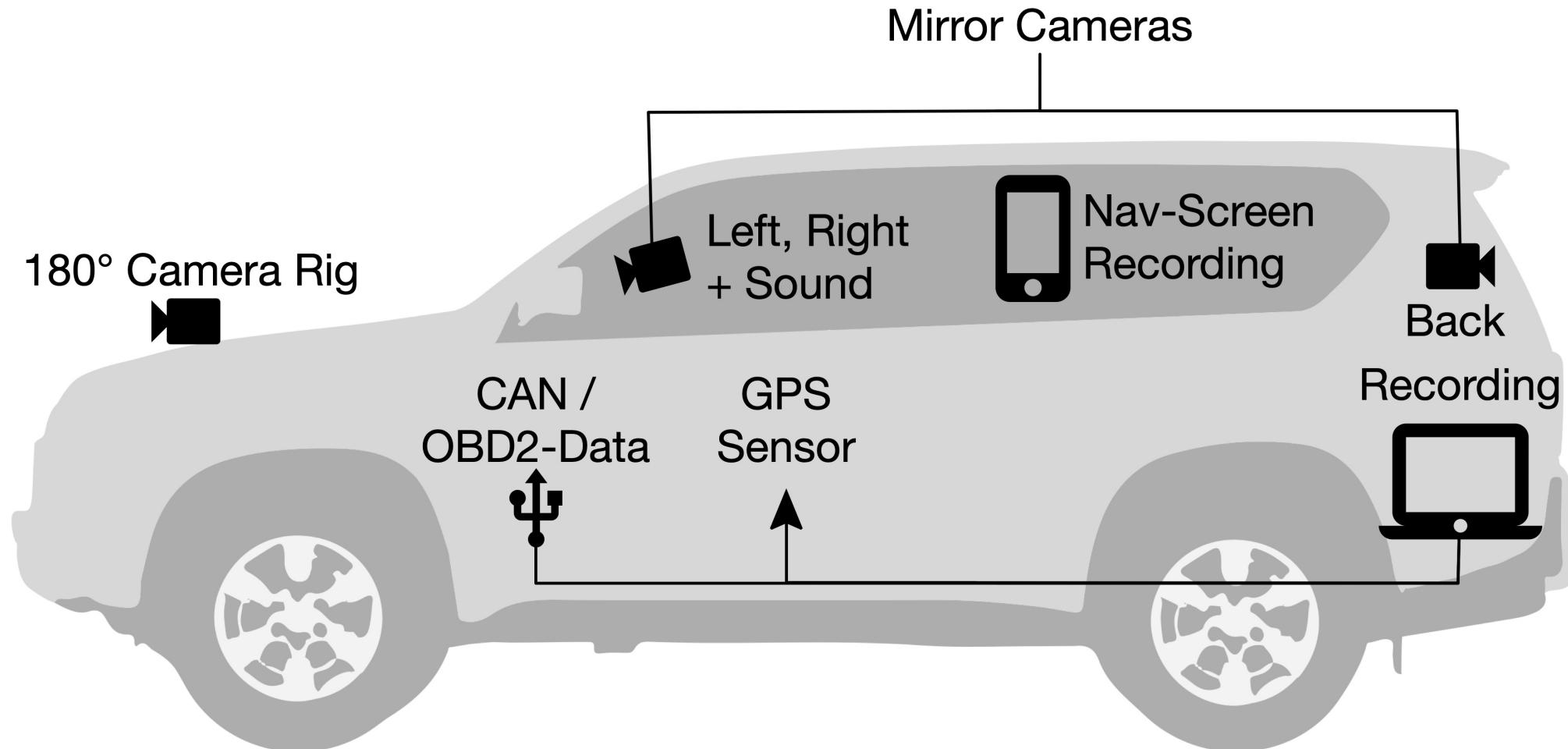
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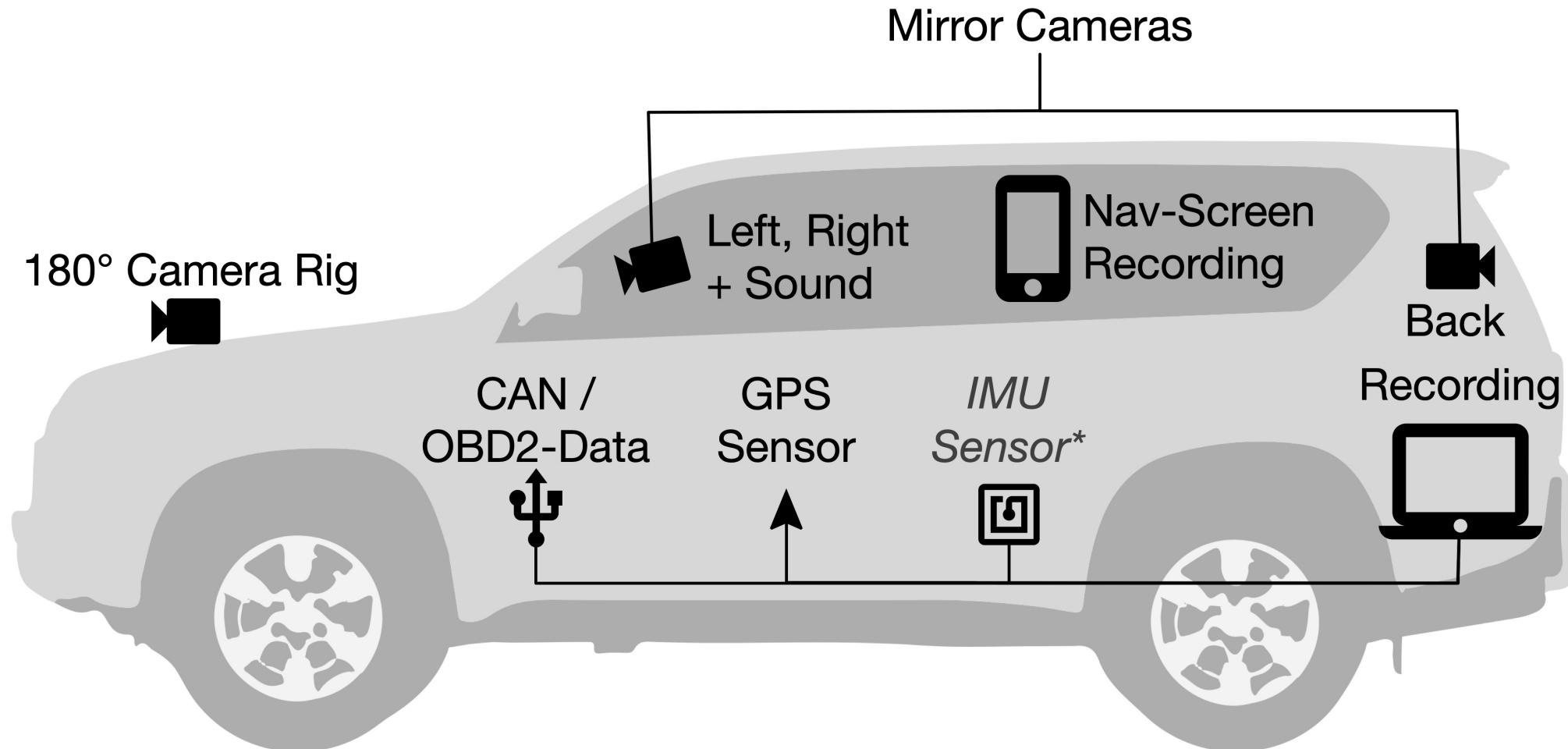
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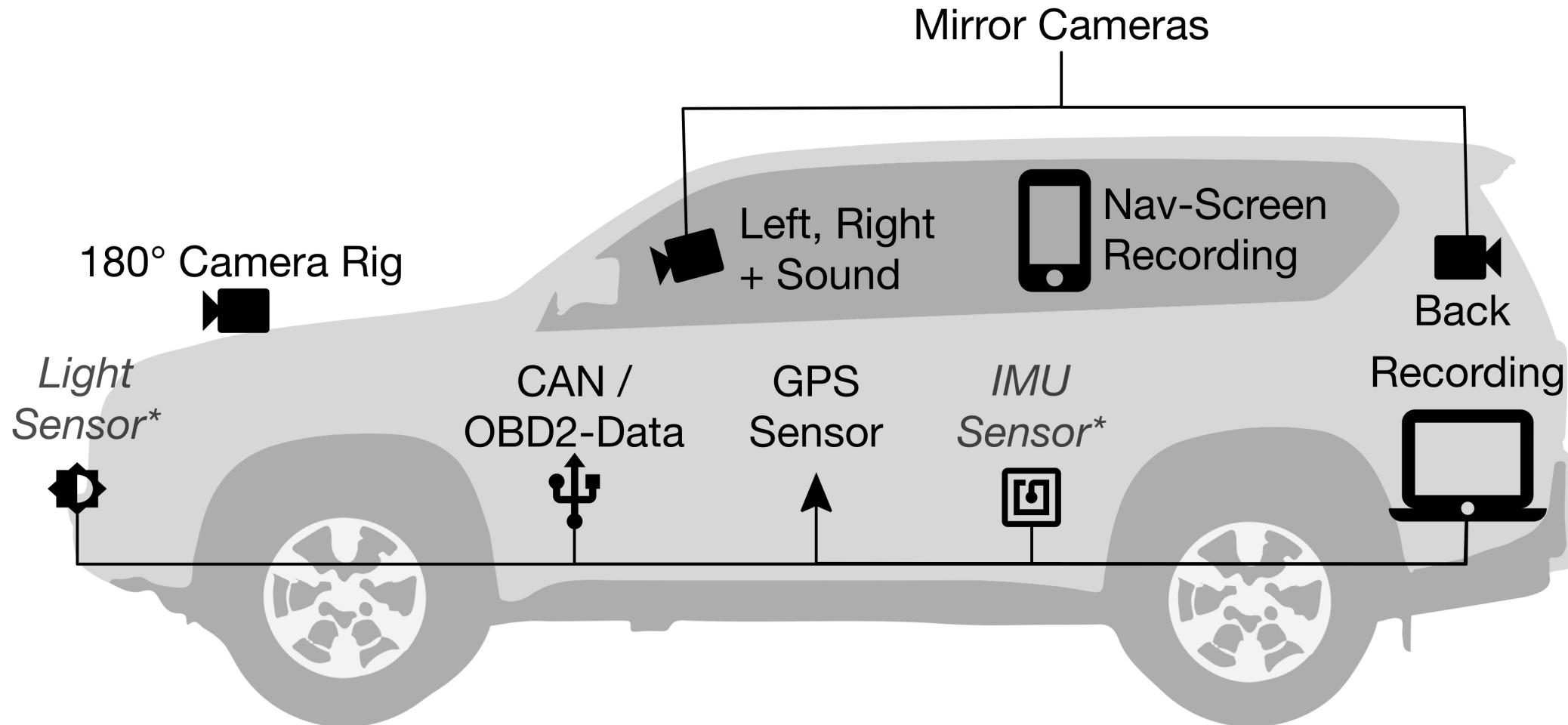
Content Development



Content Development – Future Work



Content Development – Future Work



Study 1



Study 1



Study 1



Study 2



Study 2

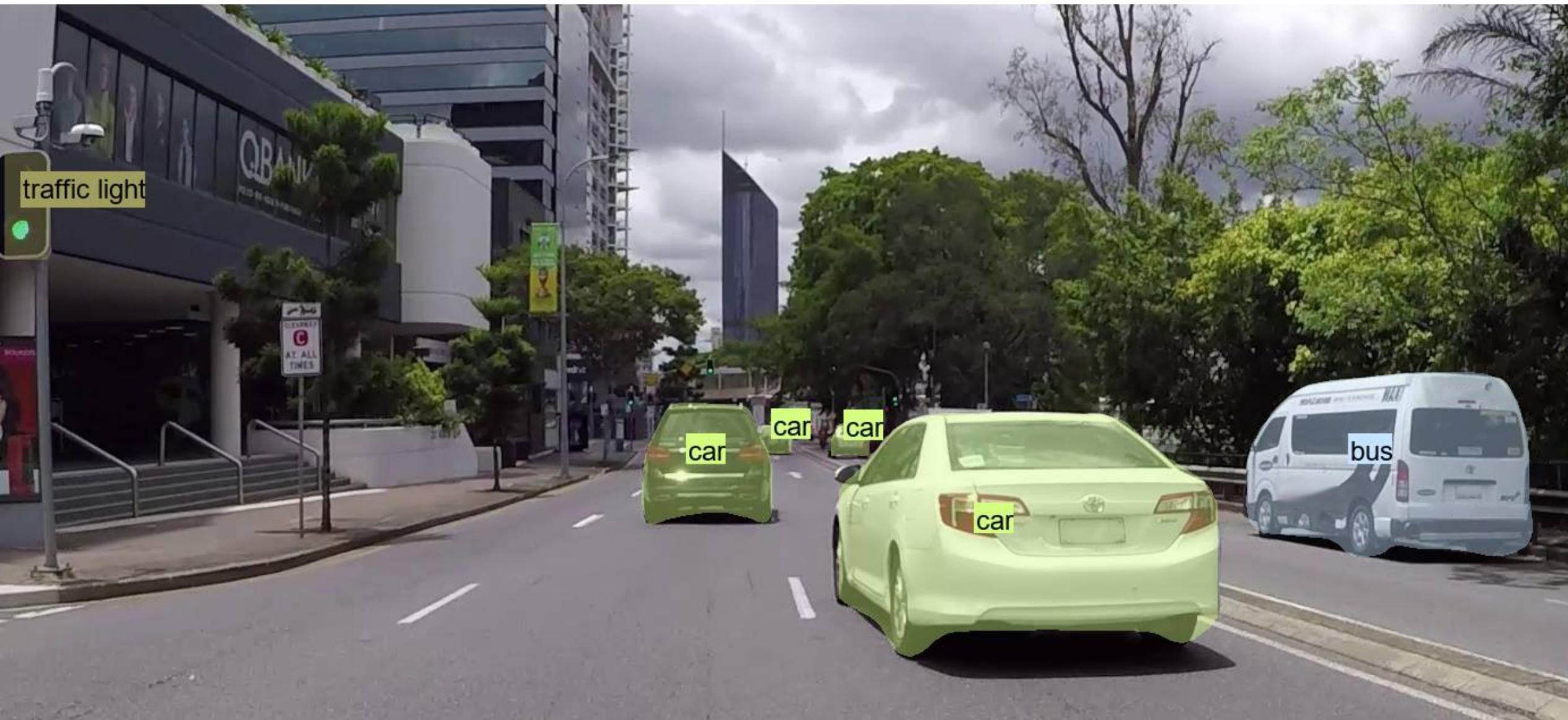


Future Work

Future Work



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Find additional Documentation and Source:
github.com/CARRS-Q/IVAD-Simulator
available from 06. October