ARTIFACT-BASED COMPUTING & USER RESEARCH

TU WIEN Informatics

THE ETERNITY BIKE

A vision for self-driving bicycles with diverse applications, including safety, accessibility, and rider comfort.

MOTIVATION

- **Reach out to new users** and encourage people to ride a bike
- **Explore novel** and innovative **infrastructure concepts**
- Empower people to discuss **alternative solutions**, e.g., safety innovations

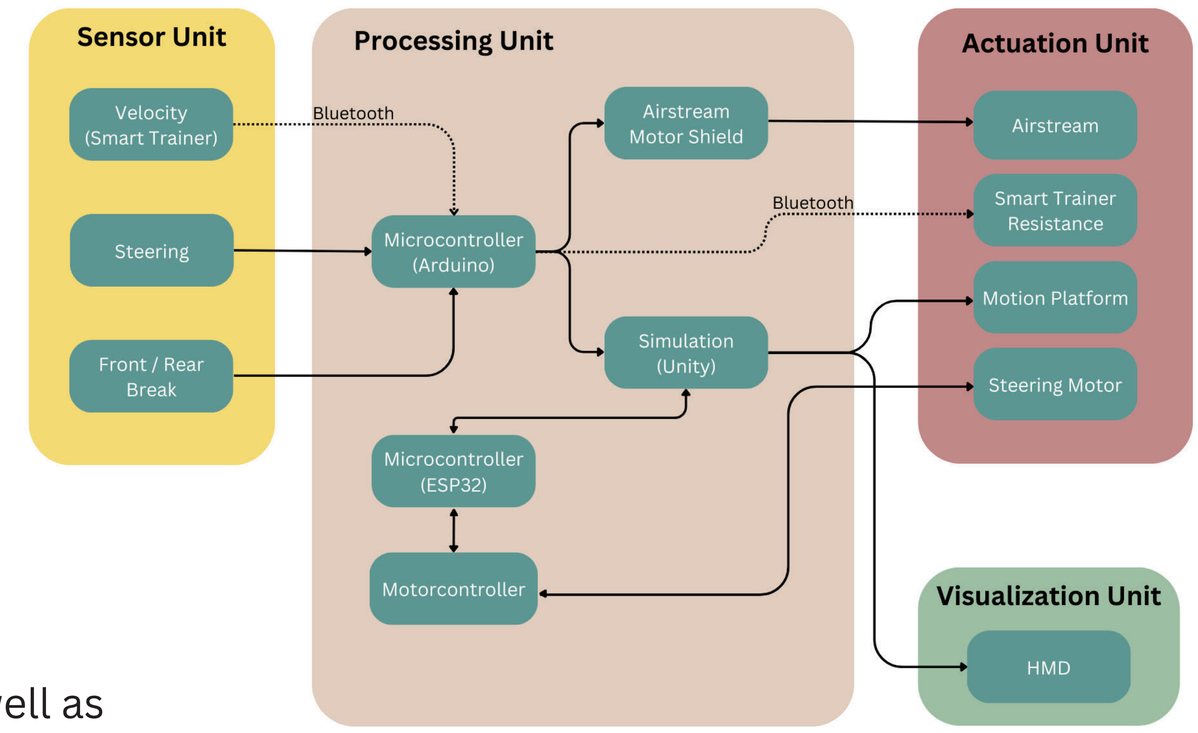
PROBLEM STATEMENT

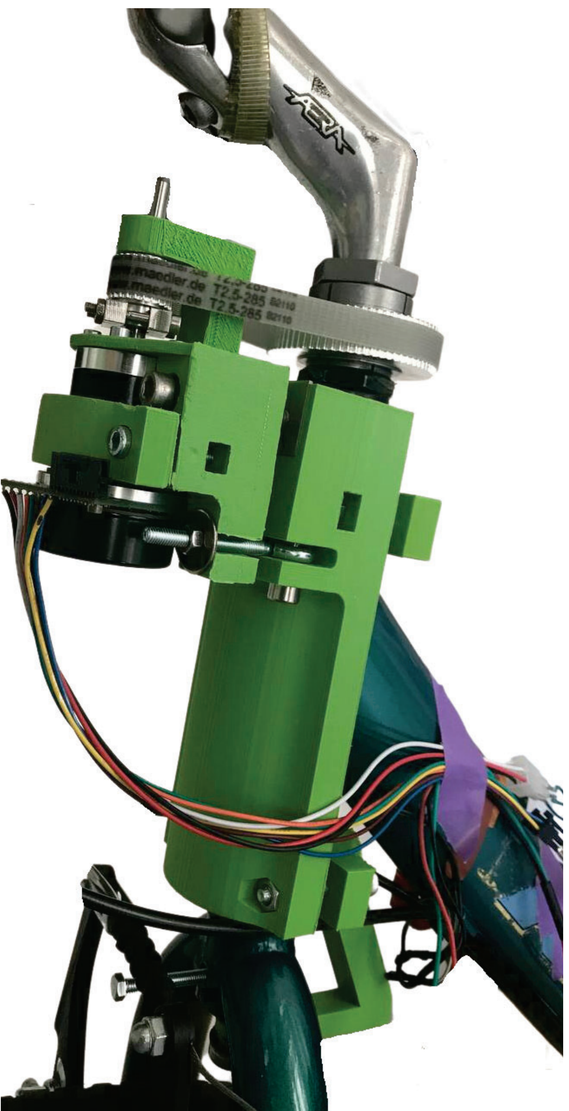
- Today, **traffic planning is** limited to experts and **not accessible**.
- Bike simulators can provide **immersive experiences**
- Simulations allow to develop **realistic alternatives**.
- Experience novel concepts, e.g. **self-balancing bicycle**,.

APPROACH

SIMULATOR - OVERVIEW

- **Sensors** measure the *steering angle, brakes*, and *velocity*
- **Actuators** like the *motion platform* for tilting movement are used to enhance realism and enable new innovations, such as adding force with the *steering motor*
- **Processing** the data and running the simulation are achieved with *Unity and Microcontrollers*
- **Visualization** is achieved with an *HMD* to immerse the participant in the scenario





SIMULATION

- Unity 3D development
- Using a **Vienna city model** as well as conceptual world environments
- **Different bike models**, e.g., city bikes, cargo bikes
- Target objects for **lane deviation measurements**
- To enhance realism, **steering torque is applied to the handlebar** with a motor to replace the missing dynamic effect
- The motor is mounted on the handlebar with a **custom-made** design and **3D-printed attachment**