



HOCHSCHULE RUHR WEST
UNIVERSITY OF APPLIED SCIENCES

INSTITUT MESS- UND SENSORTECHNIK

Self-driving E-Bikes

w/o complex balancing or gyroscopic systems

Institute of Measurement Engineering and Sensor Technology
Institute of Mechanical Engineering
University of Applied Sciences Ruhr West

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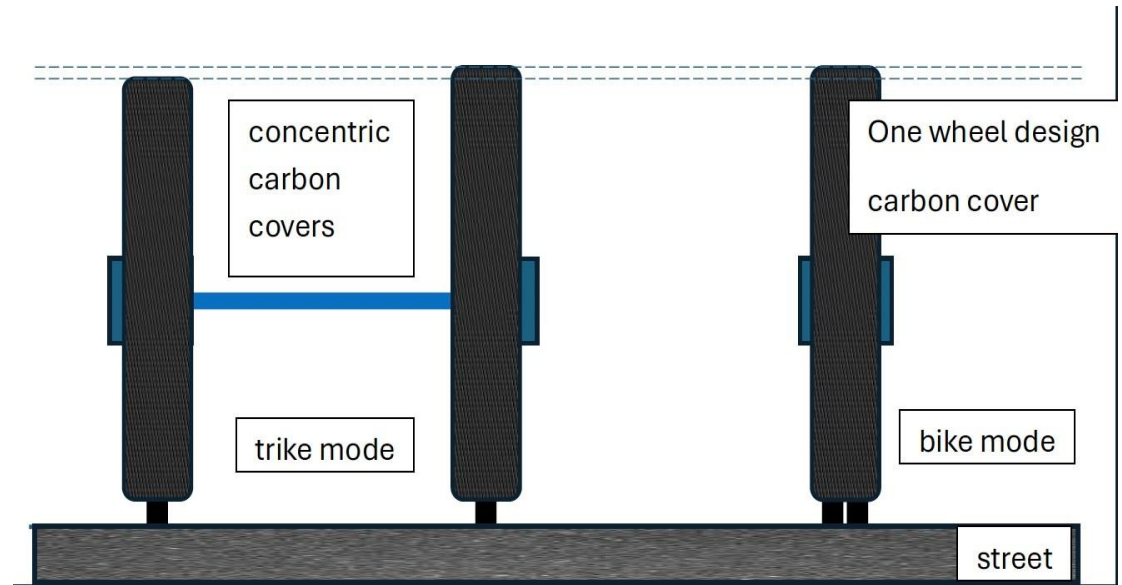
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Introduction

- **Look and experience like a usual e-bike.**
- **As a stable tricycle for goods delivery:**
 - Impact on the business model of shops and supermarkets.
- **Cost-effective and energy-saving taxi.**
- **Faster than the almost omnipresent e-scooters.**
- **Alternative for stationary and dockless bike-sharing.**
- **Impacts:**
 - CO₂ reduction due to elimination of truck-based collection trips.
 - Be ordered any time and place, complement the public transport.
 - More safety on ice/snow days than normal bicycle.
 - Sharing of people with disabilities in bike use.
 - Expand the public transport by offering door-to-door services.

Approaches

- Mechanical construction**



- AI-based surrounding detection as well as bicycle traffic sign detection and recognition**

- Much more difficult than recognizing standard road signs and traffic lights



smaller size



closer to pedestrian



more likely occlusion



more likely pollution



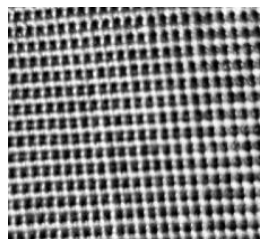
lower illumination

Tasks

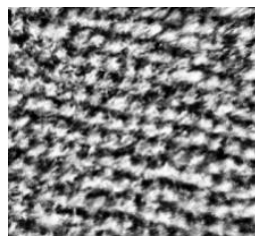
- **Mechanical design and construction,**
- **Steering and drivetrain,**
- **Emergency braking system,**
- **Bicycle traffic sign detection and recognition**
- **Route planning and navigation,**
- **Road inclination measurement,**
- **Recuperation (energy recovery) and charging.**

Seeking partners

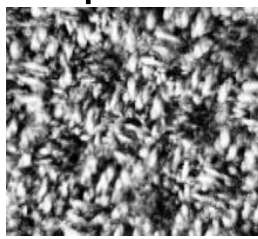
- Producers of bicycles.
- Producers of bicycle parts.
- BTW, we are also working on
 - non-destructive textile composition detection, e.g. cotton proportion



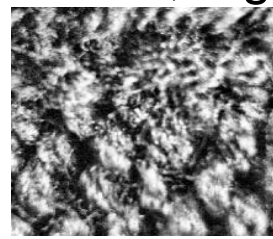
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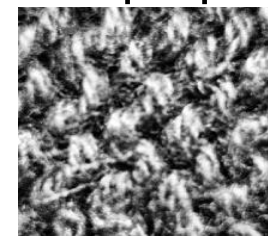
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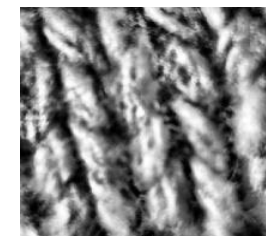
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- Smart integration of net zero technologies into energy intensive industries

