A Novel Machine Vision Roadside Unit for Improved Intersection Safety

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Why Focus on Intersection Safety?

- **20 % of all fatal traffic accidents take place in intersections in the US and EU**
- **Urban intersections are especially dangerous due to limited visibility**

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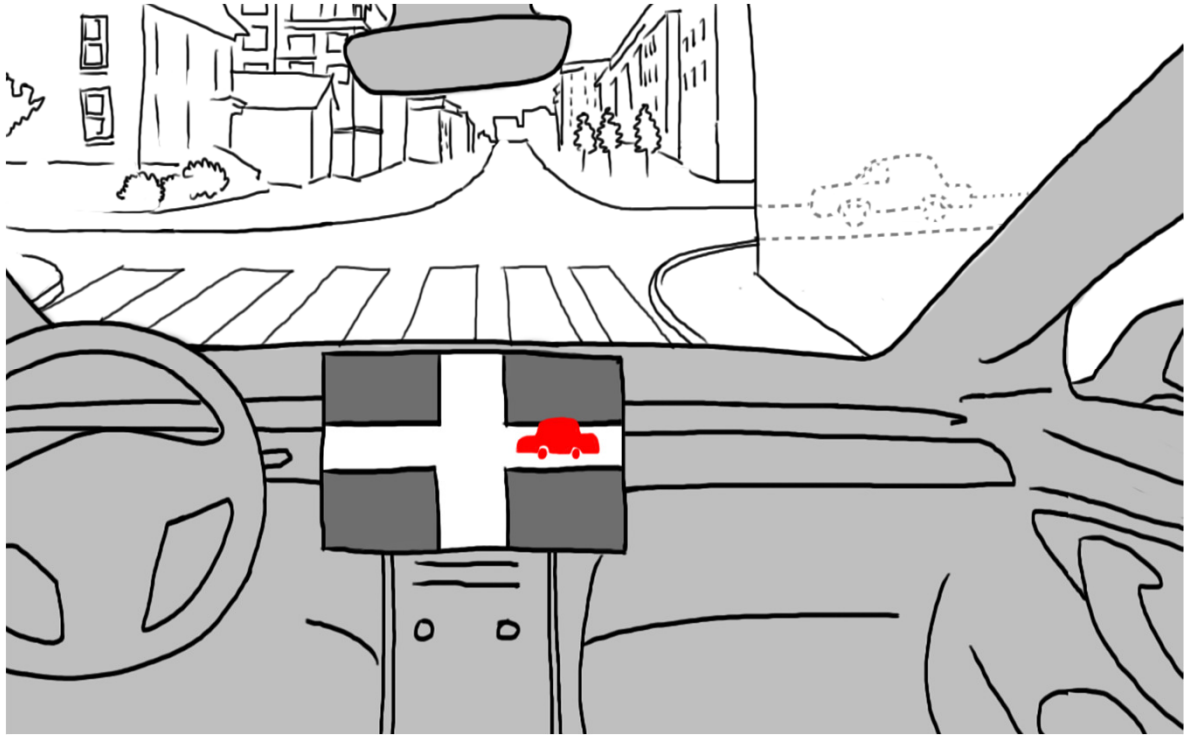
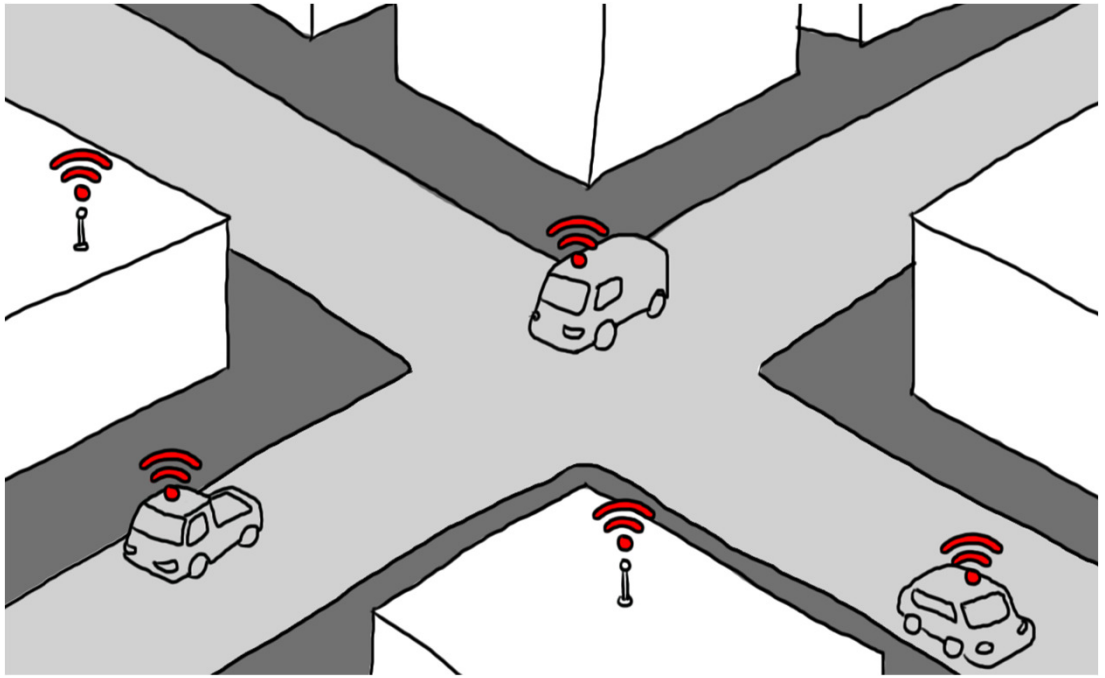


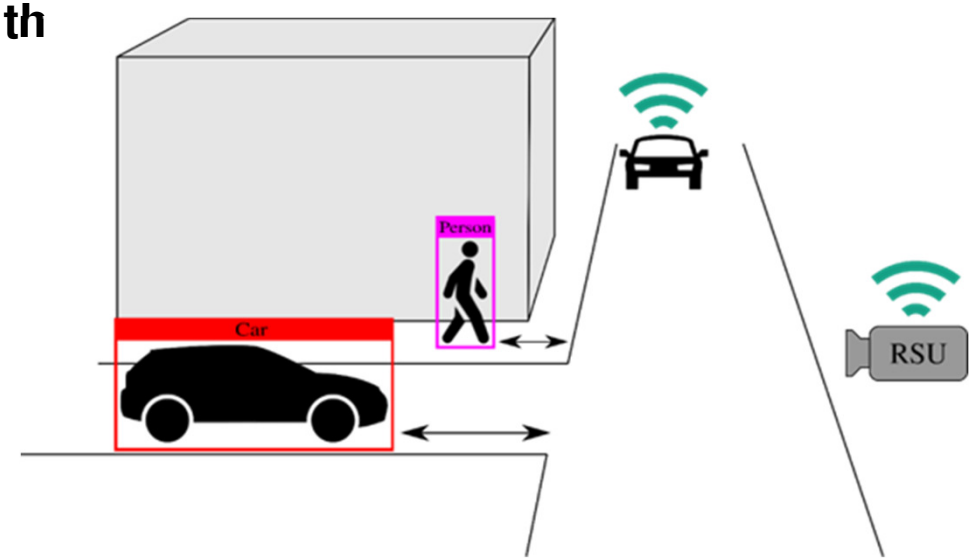
Vehicle-to-Infrastructure (V2I) Technologies for Safety

- Vehicle-mounted safety systems suffer from limited visibility in intersections
- Infrastructure-based technologies have the advantage of a different viewpoint



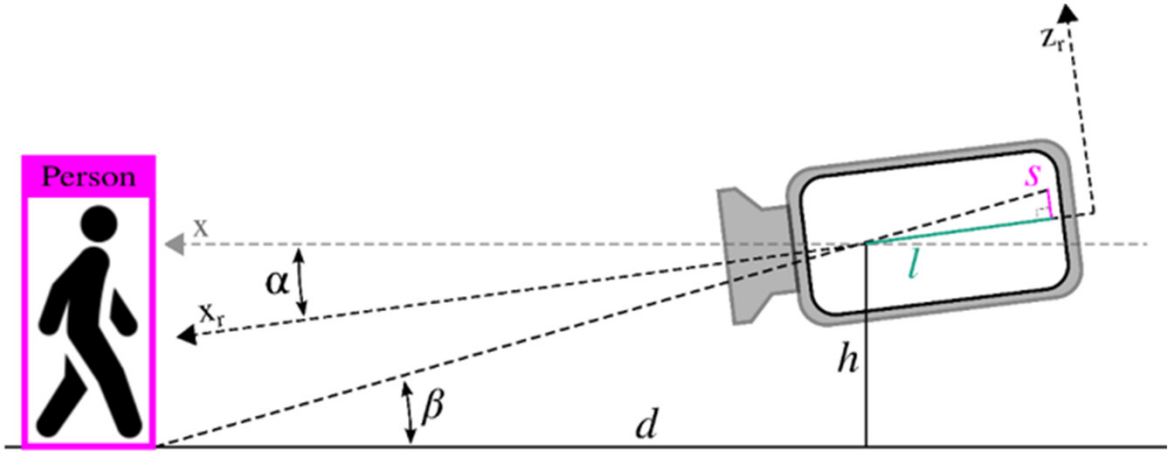
Concept of Machine Vision Roadside Unit (RSU)

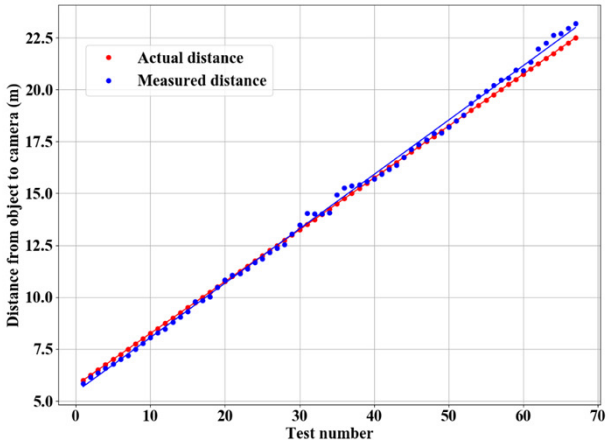
- All types of road users detected with state-of-the-art machine vision, convolutional neural networks
- Localisation with a monovision algorithm
- Information of out-of-sight road users delivered to connected vehicles



Monovision Localisation for Efficiency and Scalability

- Calibrated monovision cameras produce accurate location estimations in traffic scenarios
- Existing traffic cameras can be utilised





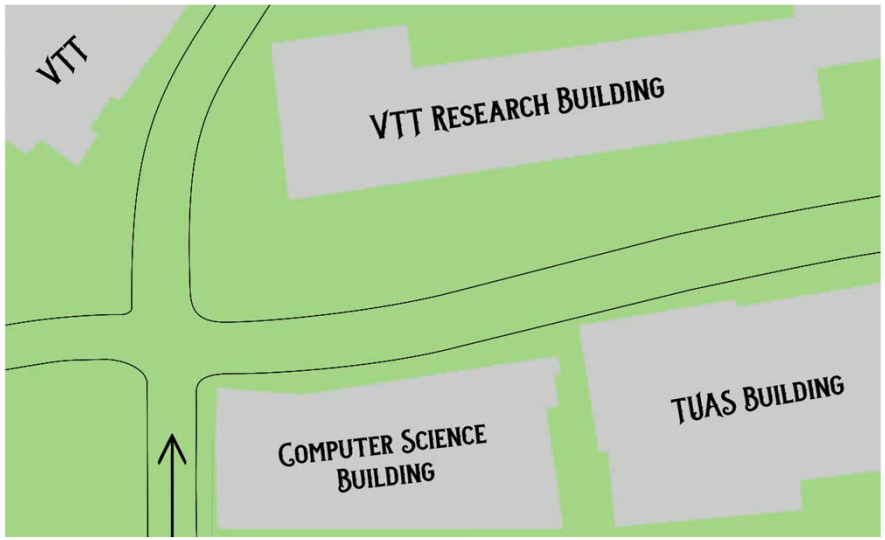
Testsite at Aalto University Campus

Images: Google Maps

Development Environment

- **Camera installation with 4G/5G connections to a research vehicle**

Operation Tests



Ongoing/Future Research Activities

- New motion detection based machine vision algorithms for road user detection

- Computationally light tracking algorithms with convolutional neural networks

- Filtering and path prediction algorithms with Bayesian methods

Thank you!

Questions?

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