

Tim J. Schoonbeek

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<https://timschoonbeek.github.io>



Seeking to participate in the MaVi Summer of Research 2024

As a PhD student in computer vision for egocentric procedural activity recognition, I am excited at the opportunity to participate in the MaVi Summer of Research 2024. Specifically, with professor Dima Damen, a leading expert on video understanding. Her impressive track record, publications by students under her supervision, as well as the inspiring keynote at WACV this year, motivate me to apply for a research visit to her group.

My PhD research focuses on recognizing procedure actions from egocentric video, and providing a measure of completion as well as correctness for these actions. I find this research meaningful and highly interesting, since I strive to use computer vision to enable people, rather than replace or frustrate them. To this end, the work of professor Damen is highly relevant for my project. In particular, I find the recent works *generating actions and state transformations from instructional videos* and *action recognition generalisation over scenarios and locations* very relevant for my project. Expanding on such work, perhaps by recognizing the completion and correctness of actions or applying it to industrial-like settings, appears valuable and captivating to me.

Seizing the opportunity for a research internship with professor Damen at UoB would significantly contribute to my academic and personal growth. Simultaneously, I can bring enthusiasm, motivation, and an open mindset to the group.

RESEARCH INTERESTS

- Egocentric video understanding
- Scalability through synthetic/generated data
- Recognition of procedure steps
- Domain adaptation and generalization

RESEARCH EXPERIENCE

- **PhD: Advanced Augmented Reality Solutions for AI-based Servitization** (09/2021-10/2025)
This PhD project aims at automatically extracting relevant and meaningful information from (egocentric) procedural actions within an industrial setting. These industrial settings contain a wide variety of procedural actions and a significant cost associated with mistakes. A solution requires scalable and robust algorithms, which we intend to deploy on augmented reality devices to provide advanced support.
- **Learning to Predict Collision Risk from Simulated Optical Flow** (2020-2021)
Master thesis on domain generalization by design, rather than explicit training techniques.
- **Interaction-Aware Trajectory Prediction using Graph Neural Networks** (2020)
A 5 month research internship at Honda Research Institute Europe GmbH in Germany.

EDUCATION

- **MSc Mechanical Engineering (Automotive - Mobile Perception Systems)** (2019-2021)
Eindhoven University of Technology.
- **BSc Electrical Engineering (Track: Automotive Technology)** (2015-2019)
Eindhoven University of Technology.

REFERENCES TO SUPERVISORS

- **dr.ir. Fons van der Sommen**, associate professor at TU/e fvdsoimmen@tue.nl
- **dr. Hans Onvlee**, senior researcher at ASML hans.onvlee@asml.com

FIRST AUTHOR PUBLICATIONS

- **IndustReal: A Dataset for Procedure Step Recognition Handling Execution Errors in Egocentric Videos in an Industrial-Like Setting.** WACV 2024
- **Beyond Action Recognition: Extracting Meaningful Information from Procedure Recordings.** IEEE VR-W 2023 (short paper)
- **Augmented Reality for Automatically Generating Robust Manufacturing and Maintenance Logs.** IS&T London Imaging Meeting 2022 (oral)
- **Learning to Predict Collision Risk from Simulated Video Data.** IEEE IV 2022 (oral)