

Maxim Vochten

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Experience

KU Leuven

Oct 2018 – Present

Postdoctoral Researcher in Robotics

Leuven, Belgium

- Worked on the European project ROBOTGENSKILL (2018 – 2024) on generalizing human-demonstrated robot skills, which was proposed based on the results of my doctoral research.
- Contributed to a novel framework for programming contact tasks on robots based on human demonstrations. Implemented receding-window optimization methods to enable online trajectory analysis, task recognition and robot trajectory generation from invariant task models. This research resulted in three articles in top robotics journals.
- Developed software toolboxes implementing our learning framework to further disseminate our research results.
- Lead the regular project meetings with the whole team, and created and maintained the project website.
- Co-promotor of two PhD researchers and supervisor of 10+ master thesis students at KU Leuven.
- Coordinated the team of KU Leuven within the Flanders Make ICON project PROROB on programming robot tasks in virtual reality from 2021 to 2022, resulting in a publication at an international conference in automation science.
- Responsible for the allocation of didactical tasks among teaching assistants within the Automation Division of the Mechanical Engineering department (2019-2023).

KU Leuven

Aug 2013 – Sep 2018

Doctoral Researcher in Robotics

Leuven, Belgium

- Researched novel trajectory representations to enable data-efficient learning from demonstration for motion recognition and robot programming, resulting in three publications at the top two conferences in robotics.
- During the summer of 2014, I did a side project on time-optimal motion planning of a fruit picking robot with the Flanders' Mechatronics Technology Centre (FMTC, now part of Flanders Make).
- Teaching assistant for the Applied Mechanics 3 course and the Mechanisms and Vibration course in the Bachelor of Mechanical Engineering programme at KU Leuven. I also supervised three master thesis students.

Agis Consulting

2010, 2012

Software Developer – Student Job

Antwerp, Belgium

- Developed a website featuring different leadership and management tests for assessing candidates, supporting the company's recruitment services.
- Developed a software application to automatically process and report on the results of leadership and management tests, supporting the company's recruitment services.

Education

KU Leuven

2013 – 2018

Doctor of Engineering Science (PhD) in Mechanical Engineering

Leuven, Belgium

- **PhD thesis:** Invariant representations of rigid-body motion trajectories with application to motion recognition and robot learning by demonstration
- **Elective courses:** Uncertainty in Artificial Intelligence (2013), Winter School on Numerical Optimal Control at the University of Freiburg in Germany (2016)

KU Leuven

2011 – 2013

Master of Science in Mechanical Engineering – specialization in Mechatronics and Robotics

Leuven, Belgium

- **Master's thesis:** Computer vision-based navigation of a quadrotor using constraint-based control
- **Courses:** Advanced Robot Control Systems, Pattern Recognition & Image Analysis, Optimization of Mechatronic Systems, Systems and Control Theory, Numerical Modeling in Mechanical Engineering

KU Leuven

2008 – 2011

Bachelor of Science in Mechanical Engineering – with a minor in Computer Science

Leuven, Belgium

Volunteering

Sumo Robot Competition

Sep 2014 – Aug 2017

IEEE Student Branch Leuven

Leuven, Belgium

- Organized and presented hands-on workshops for building and programming an autonomous mobile robot from scratch, intended for motivated engineering students as an extracurricular activity during the academic year.
- Organized and presented the yearly Sumo Robot Competition in Leuven in which around 10 teams of students participated each year for a wide public.

Awards

Best paper award 14th International Workshop on Human-Friendly Robotics

Oct 2021

- First author of the winning paper which was on implementing human-robot object handovers using constraint-based programming. The experimental results originated from a master thesis that I supervised.

Finalist KUKA Innovation Award

Apr 2016

- Participated in an international competition on innovative robotic applications for flexible manufacturing.
- As part of the KU Leuven team, I co-developed an automated kitting system for the automotive industry. A robot was programmed to locate, pick up, and insert work pieces in a tray, while adapting to changes during execution.
- I was mainly responsible for the 3D vision system, which detected and estimated the position of objects on the table and identified human presence. Additionally, I presented and demonstrated the application to the general public and jury throughout the 5-day Hannover Messe event in April 2016.

Skills

Concepts: Numerical Optimization, Optimal Control, State Estimation, Robot Control, 3D Kinematics, Differential Geometry, Machine Learning, Statistics, Trajectory Analysis, Trajectory Generation, Motion and Path Planning

Software: Python, Matlab, C++, Linux, Git, ROS, OROCOS, eTaSL, CasADi

Hardware: Robots (KUKA LWR, ABB Yumi, Franka Emika Panda, Universal Robot UR10, KUKA iiwa),
Sensors (Krypton K600, Microsoft Kinect, HTC Vive, force/torque sensing, laser distance sensing)

Languages: Dutch (Native), English (Fluent)