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Professional Experience

Research Fellow in Robotics and Computer Vision, University of Birmingham, UK 2020 – present

- Member of the Intelligent Robotics Lab with Mohan Sridharan and Aleš Leonardis
- Work on EU CHIST-ERA project BURG: Benchmarking and Understanding Robotic Grasping
- Data-driven robotic grasping with two-finger grippers based on single-view point clouds

Graduate Research and Teaching Assistant, Technical University Berlin, Germany 2014 – 2019

- Member of Industrial Automation Technology group with Jörg Krüger
- Image processing and pattern recognition (particularly object detection and 6d pose estimation), service-based architectures in manufacturing industries and innovative strategies for industrial robot control and programming
- Teaching courses on image processing, machine learning, robotics and automation technology as well as supervising students during their Bachelor and Master theses

Freelance Lecturer, Technical University Berlin, Germany 2016 – 2019

- Engagement in a seminar which introduces didactic concepts to graduate teaching assistants and provides guidance for the design and implementation of university courses (one day twice a year)

Freelance Lecturer, Turkish German University Istanbul, Turkey 2015 – 2019

- Teaching courses for micro-controller programming, image processing, and automation technology for undergraduates as part of the Flying Faculty (4–5 times two days each year)

Student Assistant, Berner & Mattner Systemtechnik GmbH (expleo), Berlin, Germany 2013 – 2014

- Design and implementation of methods for smartphone-based traffic sign recognition (80h/month)

Student Assistant, Technical University Berlin, Germany 2010 – 2013

- Work at Machine Tools and Production Technology group of TU Berlin (40h/month)
- Conception and implementation of a controlling tool based on a PostgreSQL data base server with Excel/VBA clients, to support the administration of the group (ca. 40 researchers plus 60 students)
- Development of a LabVIEW-based force controller for a piezo-actuated tribometer

Education

PhD in Computational Engineering Science, Technical University Berlin, Germany 2015 – 2020

- Thesis titled "Towards Robust Object Detection and Pose Estimation as a Service for Manufacturing Industries" (DOI: 10.14279/depositonce-11302), summa cum laude

Diploma in Computational Engineering Science, Technical University Berlin, Germany 2007 – 2014

- Corresponds to M.Sc., grade 1.1
- Thesis: "Design and Implementation of a Classification Algorithm for Speed Limit Traffic Sign Recognition"

Highlighted Works & Publications

End-to-End Learning to Grasp from Object Point Clouds 2022

- Considering the problem of grasping objects with a two-finger gripper based on a partial point cloud from a single-view depth image, we propose a learning-based approach which combines contact point sampling, grasp regression, and grasp evaluation
- A. Alliegro, M. Rudorfer, F. Frattin, A. Leonardis and T. Tommasi, 'End-to-end learning to grasp from object point clouds,' under review for IEEE RA-L/IROS, 2022. [Online]. Available: https://arxiv.org/abs/2203.05585

Robots Assembling Machines: Learning from the World Robot Summit 2018 Assembly Challenge 2019

- After participating in the Assembly Challenge, we conducted a survey among all teams and analysed their competition performances to categorise different approaches and to investigate associated benefits, drawbacks and identify potential future research directions
- F. Von Drigalski, C. Schlette, M. Rudorfer, N. Correll, J. C. Triyonoputro, W. Wan, T. Tsuji and T. Watanabe, 'Robots assembling machines: Learning from the world robot summit 2018 assembly challenge,' *Advanced Robotics*, vol. 34, no. 7-8, pp. 408–421, 2020

Holo Pick'n'Place 2018

- We created an intuitive, drag-and-drop-like programming approach for pick-and-place tasks with industrial robots, enabled by object detection and augmented reality using a Microsoft HoloLens
- M. Rudorfer, J. Guhl, P. Hoffmann and J. Krüger, 'Holo pick'n'place,' in *2018 IEEE 23rd International Conference on Emerging Technologies and Factory Automation (ETFA)*, IEEE, vol. 1, 2018, pp. 1219–1222

Other Publications

International Journals and Conferences

- A. Vick, M. Rudorfer and V. Vonasek, 'Benchmark concept for industrial pick&place applications,' *IOP Conference Series: Materials Science and Engineering*, vol. 1140, no. 1, 2021
- M. Ziegler, M. Rudorfer, X. Kroischke, S. Krone and J. Krüger, 'Point pair feature matching: Evaluating methods to detect simple shapes,' in *International Conference on Computer Vision Systems*, Springer, 2019, pp. 445–456
- M. Rudorfer, L. Neumann and J. Krüger, 'Towards learning 3d object detection and 6d pose estimation from synthetic data,' in *2019 24th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA)*, IEEE, 2019, pp. 1540–1543
- M. Rudorfer, T. J. Pannen and J. Krüger, 'A case study on granularity of industrial vision services,' in *Proceedings of the 2nd International Symposium on Computer Science and Intelligent Control*, Best Student Paper Award, 2018, pp. 1–6
- M. Rudorfer and J. Krüger, 'Industrial image processing applications as orchestration of web services,' *Procedia CIRP*, vol. 76, pp. 144–148, 2018
- A. Vick, C. Horn, M. Rudorfer and J. Krüger, 'Control of robots and machine tools with an extended factory cloud,' in *2015 IEEE World Conference on Factory Communication Systems (WFCS)*, IEEE, 2015, pp. 1–4

National Journals and Conferences

- O. Kröger, J. Guhl, O. Heimann, M. Katanacho, C. Niebuhr, M. Rudorfer, T. Özkaya, J. Wassermann, J. Hügle, T. Pannen and J. Krüger, 'A service-oriented robotic manufacturing system: Lessons learned from participating in the world robot challenge 2018,' in *Tagungsband des 4. Kongresses Montage Handhabung Industrieroboter*, Springer, 2019, pp. 44–53
- M. Rudorfer, C. Krause, A. Vick and J. Krüger, 'Dienstebasierte Architekturen für Robotersysteme [service-based architectures for robot systems],' *Fortschritt-Berichte Fertigungstechnik: Produktion 2030 - Wandel in der Automatisierungstechnik*, 2019
- M. Rudorfer and M. Chemnitz, 'Dienstebasierte Integration objekt-spezifischer Lageerkennungsalgorithmen am Beispiel eines roboterbasierten Greifszenarios [service-based integration of object-specific pose detection methods for a robotic grasping scenario],' *Fortschritt-Berichte Fertigungstechnik: Industrie 4.0 - Wertschöpfungspotenziale in der dienstebasierten Produktion*, 2018
- M. Rudorfer and X. Kroischke, 'Evaluation of point pair feature matching for object recognition and pose determination in 3d scenes,' in *19. Anwendungsbezogener Workshop zur Erfassung, Modellierung, Verarbeitung und Auswertung von 3D-Daten*, GFaI Gesellschaft zur Förderung angewandter Informatik e.V., 2016, pp. 27–36

Research Experiences and Community Engagement

Participation in the World Robot Competition, Tokyo 2018

- Lead of team "BerlinAUTs" with members from TU Berlin, Fraunhofer IPK Berlin and TGU Istanbul
- Securing of 10k€ travel fund for participation in the assembly challenge, achieving rank 10/16

Research Visit at Czech Technical University, Prague 2017

- Collaboration with the Multi-Robot Systems group of Martin Saska
- Work on cloud-based, multi-robot bin picking during a one-month research stay

Community Engagement

- Reviewer of RA-L, IROS, ICRA, ICVS, ETFA, Procedia CIRP, and others
- Program Committee Member and Session Chair at ICVS 2021
- Co-organisation of a robotics seminar series at University of Birmingham, publication on YouTube
- Member of steering committee for postdoctoral and early researcher career development and training at University of Birmingham

Teaching

Modules and Courses 2014 – 2019

- As teaching assistant at TU Berlin
  - Industrial Image Processing
  - Computer Vision and Machine Learning
  - Industrial Automation Group Project
  - Industrial Robotics
- As Flying Faculty lecturer at TGU Istanbul
  - Micro-Controller Programming
  - Computer Vision and Machine Learning
  - Industrial Automation Technology

Supervision and Examination of Final Projects 2015 – present

- Supervisor and Examiner for 20 Master's and 6 Bachelor's theses at TU Berlin, Germany
- Examiner of two Bachelor's theses at Czech Technical University, Prague
- Co-Supervisor for a Master's thesis at Politecnico di Tornio, Italy

Certification 2018

- Completion of the "Continuing Education Programme for Promotion of Quality in Teaching" at TU Berlin, which is accredited following the procedure of the European Association for Quality Assurance in Higher Education (ENQA)