Aran Mohammad

Robotics and Machine-Learning Engineer

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Experience

Research Associate, Institute of Mechatronic Systems, Hanover — Mar 2021 – Present

- Developed interaction-control and machine-learning methods in MATLAB and Python
- Authored 5 publications incl. best paper; presented at major conferences (ICRA, IROS)
- Co-secured project (€400k) on sensor fusion, time series modeling and control
- Taught course (150 students) on robotics, vision-based control and machine learning
- Supervised 23 theses and guided 17 students in research and lecture projects

Research Intern and Master Student, IAV GmbH, Gifhorn — Mar 2020 – Nov 2020

- Developed emission models via physics-based ML; published in journal and conference

DAAD-Funded Research Intern, UNESP, Bauru, Brazil — Oct 2019 – Dec 2019

- Analyzed CFRP structures in frequency-domain using MATLAB

Tutor in Control and Modeling, Leibniz University Hanover — Nov 2014 – Jan 2018

- Co-supervised courses with 50 students on control, kinematics and dynamics

Projects

Implemented Robot-Agnostic Communication System — aranmoha/testbench

- Designed communication using EtherCAT and Simulink for modeling and logic design
- Implemented code base that deployed in 7 cross-industry testbeds
- Integrated camera, force sensors and IMUs via Python, C++ and ROS

Developed Contact-Detection and Reaction Framework for Safe Robots — aranmoha/safepr

- Implemented real-time algorithms combining detection, classification and reaction
- Validated control in software-in-the-loop and real-world tests
- Combined physical modeling with machine learning in Python for online prediction in MATLAB
- Extended with domain randomization and domain-adversarial training for sim-to-real transfer

Co-Designed Teaching Courses for Undergraduate and Graduate Students

- Implemented inverted-classroom teaching and interactive workshops in 150-student course on robotics and ML
- Co-guided a 6-student team in lecture projects, including technical supervision and task tracking

Skills

Software: MATLAB/Simulink, Python, C++, ROS, Autodesk Inventor, MS Office, Git, DaVinci Resolve
Libraries: scikit-learn, PyTorch, Tensorflow, MuJoCo, OpenCV, SciPy
Languages: German, Kurdish, English

Education

Dr.-Ing. in Robotics and ML, Leibniz University Hanover — Mar 2021 – Present
M.Sc. in Mechanical Engineering (grade: 1.0, distinction), LUH — Oct 2017 – Dec 2020
B.Sc. in Mechanical Engineering (grade: 2.2), LUH — Apr 2014 – Sept 2017
Engineering and Business Administration, LUH — Oct 2012 – Mar 2014

Achievements

Best-paper award at robotics workshop, M.Sc. with distinction (grade: 1.0), Dean's List honoree

Selected Publications (Google Scholar)

[1] A. Mohammad, M. Schappler, T. -L. Habich and T. Ortmaier, "Safe Collision and Clamping Reaction for Parallel Robots During Human-Robot Collaboration", 2023 IEEE/RSJ IROS, DOI

[2] A. Mohammad, M. Schappler and T. Ortmaier, "Towards human-robot collaboration with parallel robots by kinetostatic analysis, impedance control and contact detection", 2023 IEEE ICRA, DOI

[3] A. Mohammad, H. Muscheid, M. Schappler and T. Seel, "Quantifying Uncertainties of Contact Classifications in a Human-Robot Collaboration with Parallel Robots", 2023 Human-Friendly Robotics, Springer Proceedings in Advanced Robotics, DOI