AKHIL SATHULURI

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akhilsathuluri.github.io

EDUCATION

Technical University of Munich, Munich, Germany
Research Associate, PhD Student *Feb 2021 - Present*
Robot Systems Group, Laboratory for Product Development and Lightweight Design (LPL)

Indian Institute of Technology Madras, Chennai, India – CGPA: 9.15/10
M.Tech. Automotive Engineering *Jun 2014 - May 2019*
B.Tech. (with Honours) Engineering Design
Minor: Systems Engineering
Summer Research Scholar: Mechatronics Department, University of Duisburg-Essen, Germany
Awards: DAAD Scholarship (2017), Srikanth Sundararajan Award for the highest GPA (2016)

RESEARCH

Artificial and Mechanical Intelligence Research Line, IIT, Genova *September 2023 – Present*
Research Exchange, Advisor: Dr. Silvio Traversaro

· Co-design of a humanoid via joint optimisation of a locomotion controller and joint actuation design

Robot Systems Group *Feb 2021 – Present*
Research Associate, Advisor: Prof. Markus Zimmermann

· Development of methods for conventional and solution space optimisation based co-design of robots
· Development of low-cost, lightweight robots on demand with collaborators from TUM funded by StMWi
· Conceptualisation of robot like tool development for construction and manufacturing funded by KME

IIT Madras Manipulators Lab *June 2018 – July 2019*
M.Tech. Project, Advisor: Prof. Sandipan Bandyopadhyay

· Developed a reduced order mapping for accurate realtime simulation of constrained multi-body systems
· Designed and implemented realtime MPC, computed-torque and optimal controllers (`Mathematica`)
· Compared and implemented methods for root-tracking of a system of non-linear equations (`C++`, Eigen)

PROFESSIONAL EXPERIENCE

Bajaj Auto Ltd., Pune, India *July 2019 – October 2020*
Electrical Engineer, Robotics and Automation Team

· Deployed low cost vision solutions for model and defect classification (OpenCV, Qt, Flask, Pytorch)
· Developed an end-to-end edge computing based IIoT platform for realtime process control (Python)

Siemens Corporate Technology, Bangalore, India *December 2017 - June 2018*
Robotics Research Intern

· Developed a simulation and control pipeline for parallel training of industrial robots (Gazebo, PyBullet)
· Developed hierarchical controller to transfer RL based policies onto an industrial robot (KUKA KR6)

TEACHING

Course instructor: Numerical Optimisation for Robot Design and Control *Ongoing*

· Created the course, including the curriculum, teaching material and the examinations in MATLAB
· Conducted hands-on course covering both theoretical and practical aspects in co-operation with Altair

Teaching Assistant: Serial and Parallel Manipulators *July 2018 - June 2019*

· Conducted sessions on mathematical modelling and simulation of parallel robots in Mathematica
· Organised 20 students and supported the class with sample codes, study material and assignments

PUBLICATIONS

Akhil Sathuluri, Anand Vazhapilli Sureshbabu, Jintin Frank, Maximilian Amm, and Markus Zimmermann. Computational systems design of low-cost lightweight robots. *Robotics*, 12(4), 2023a. ISSN 2218-6581. doi: 10.3390/robotics12040091. URL `https://www.mdpi.com/2218-6581/12/4/91`

Akhil Sathuluri, Anand Vazhapilli Sureshbabu, and Markus Zimmermann. Robust co-design of robots via cascaded optimisation. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 11280–11286, 2023b. doi: 10.1109/ICRA48891.2023.10161134

Matteo Pantano, Vladislav Klass, Qiaoyue Yang, **Akhil Sathuluri**, Max Schnaubelt, Daniele De Gregorio, Fabian Schuetze, Daniel Regulin, Markus Zimmermann, Michael Suppa, and Dongheui Lee. Simplifying robot grasping in manufacturing with a teaching approach based on a novel user grasp metric. In *5th International Conference on Industry 4.0 and Smart Manufacturing - ISM 2023*, pages –. ISM, Accepted, 2023

Akhil Sathuluri, Lukas Krischer, Anand Vazhapilli Sureshbabu, and Markus Zimmermann. A Multidisciplinary Optimization Approach for Resolving the Vicious Cycle of Morphology and Control of Robots. In *16th World Congress on Structural and Multidisciplinary Optimization*, pages –, Accepted, 2023

Manan Tomar, **Akhil Sathuluri**, and Balaraman Ravindran. MaMiC: Macro and Micro Curriculum for Robotic Reinforcement Learning. In *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems*, AAMAS '19, pages 2226–2228, Richland, SC, 2019. ISBN 978-1-4503-6309-9. URL `http://dl.acm.org/citation.cfm?id=3306127.3332066`

Karthik Chandrasekaran, **Akhil Sathuluri**, and Asokan Thondiyath. MagNex — Expendable Robotic Surgical Tooltip. In *2017 IEEE International Conference on Robotics and Automation (ICRA)*, pages 4221–4226, May 2017. doi: 10.1109/ICRA.2017.7989486

PREPRINTS

Akhil Sathuluri, Anand Vazhapilli Sureshbabu, and Markus Zimmermann. A systems design approach for the co-design of a humanoid robot arm. In *2022 IEEE-RAS International Conference on Humanoid Robots (Humanoids 2022)*. IEEE, Presented at the workshop on Development and Design Pipelines - From first ideas to well-functioning robots, 2022. URL `https://arxiv.org/abs/2212.14256`

Akhil Sathuluri and Sandipan Bandyopadhyay. Extended-configuration-space modelling: mapping to reduced order models and real-time simulation of Lagrangian dynamics and control of parallel manipulators, [preprint]. a. URL `https://akhilsathuluri.github.io/research/pdf/DDP_report.pdf`

Akhil Sathuluri and Sandipan Bandyopadhyay. Root-tracking methods and their applications in simulations, [preprint]. b. URL `https://akhilsathuluri.github.io/research/pdf/DDP_report.pdf`

PATENTS

Karthik Chandrasekaran, **Akhil Sathuluri**, and Asokan Thondiyath. A Magnetically Coupled Disposable Compliant Tool Tip For Robotic Surgery, 201741001039, 2017, Indian Institute of Technology Madras (IIT Madras)