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Summary

I am a roboticist who uses applied mathematics and machine learning to develop efficient algorithms for robot control and motion planning.

Education

June 2019 – Now
Doctor of Philosophy.
École Polytechnique Fédérale de Lausanne
Advisor: Dr. Sylvain Calinon
Thesis: Low-rank Approximation Techniques in Robot Learning

June 2014– June 2016
Master of Engineering.
Indian Institute of Science, Bangalore, India
Advisor: Dr. Ashitava Ghosal
Thesis: Trajectory Tracking and Control of Car-like Robots

Work Experience

June 2019 – Now
Idiap Research Institute, *Martigny*, Switzerland.
Research Assistant at Robot Learning and Interaction Group
I am developing algorithms for robot exploration as used in the project CoLLaboratE for industrial assembly tasks, reinforcement learning and fast optimization algorithms as used in projects Learn-Real and MEMMO for robot control and motion planning. In particular, using tensor methods I exploit the low-rank structure existing in these problems to develop fast and memory efficient algorithms that were previously considered to be intractable.

Oct 2018 – April 2019
Robert Bosch Center for Cyber-Physical Systems, *Bangalore*, India.
Research Associate
Applied reinforcement learning to generate walking gaits for an in-house manufactured quadruped robot called Stoch.

July 2016 – Mar 2018
The MathWorks Inc., *Bangalore*, India.
Engineering Development Group
Developed MATLAB and Simulink based models for demonstrating the applicability of MATLAB products such as Control System Toolbox, Robotics System Toolbox and Automated Driving System Toolbox in robotics applications.

Publications

2022
S Shetty, T Lemobono, T Loew, and S Calinon, "Tensor Train for Global Optimization Problems in Robotics", arXiv preprint (under review).

2021 **S Shetty**, J Silverio, and S Calinon, "Ergodic Exploration Using Tensor Train: Applications in Insertion Tasks", in *IEEE Transactions on Robotics*.
[Awarded Idiap's Paper of the year 2021 by Idiap Research Institute, Switzerland]

2021 L Brudermüller, T Lembono, **S Shetty**, S Calinon, "Trajectory Prediction with Compressed 3D Environment Representation using Tensor Train Decomposition", in *Proc. IEEE Intl Conf. on Advanced Robotics (ICAR)*.

2019 S Kolathaya, A Joglekar, **S Shetty**, D Dholakiya, A Sagi, S Bhattacharya, A Singla, S Bhatnagar, A Ghosal, B Amrutur, "Trajectory based deep policy search for quadrupedal walking", in *28th IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*.

2019 **S Shetty,** A Ghosal, "Trajectory Tracking and Control of Car-Like Robots", in *Machines, Mechanism and Robotics, Lecture Notes in Mechanical Engineering. Springer, Singapore*.

Miscellaneous

- Ranked in top 100 among 200k candidates in the Graduate Aptitude Test in Engineering (Mechanical Engineering Division) in the year 2014. This is a highly competitive national level mathematics and technical aptitude test held by India's top tier universities for graduate studies.

- Ranked 12th in the Engineering Sciences in the National Eligibility Test for Junior Research Fellow in the year 2013. The test is held by the Council of Scientific and Industrial Research, India for research scholarship.

Soft Skills

- Programming Languages: Python, MATLAB, C++
- Technical Softwares: Pytorch, Tensorflow, JAX, Mujoco, Pybullet, Gazebo, ROS
- Spoken Languages: English, Kannada, Hindi, French (A2)