



Master Thesis

Superhuman-Speed Imitation Learning *for* Robotic Manipulation

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*We are inviting applications for the **Master Thesis Topic** in the **Physical AI Lab** at the Chair of Imaging and Computer Vision, Faculty of Electrical Engineering and Information Technology, RWTH Aachen University. Our group develops generalist robots that autonomously solve real-world long-horizon tasks.*

Introduction of the Topic

Robot policies can increasingly do the task. Often they cannot do it fast enough to matter, which is much of what separates a convincing demo from a deployable system. Vision-Language-Action (VLA) models such as $\pi 0.5$ learn from teleoperation data, and behavior cloning tends to inherit the demonstrator's pace. But a demonstration is not uniformly informative: free-space motion appears to carry far less about manipulation than contact-rich motion, so it may be compressible while grasps and releases stay untouched. How far this holds beyond simple pick-and-place, and what sets the optimal compression factor, is largely unexplored (cf. [1]). You will collect teleoperation data, fine-tune a VLA policy, implement contact-aware time warping and inference-time chunk skipping, and run the real-robot ablations needed to find out.

[1] <https://www.argonrobotics.ai/research/scaling-and-speeding-up-robots-in-the-real-world>

Your Profile

- Experience of at least one of the following areas, and ideally several: machine learning, computer vision, language models, robotics, diffusion models, reinforcement learning, or related fields
- Strong programming skills, with the ability to rapidly prototype, implement, and evaluate research ideas
- High motivation, scientific curiosity, and the ability to work both independently and collaboratively
- Willing to spend much of the thesis on real hardware rather than only in simulation

What We Offer

- An open research question rather than a reimplementation task
- Close supervision and scientific mentoring; strong support for publications
- Dedicated access to robot cells with teleoperation setup
- Access to extensive on-premises computing infrastructure, including around 120 GPUs and additional high-end GPU clusters available on demand

Application

Duration of the master thesis is 6 months. Please send your application to the following email address yuli.wu@lfh.rwth-aachen.de using the subject "**FastPolicy_{Name}**" and include your CV and academic transcripts.