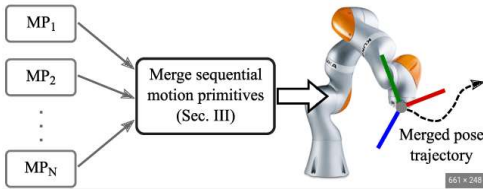
Optimization to Blend Several Robot Skills

Focus: Learning from Demonstration (LfD) via optimization

Learning from Demonstration (e.g. Dynamic Movement Primitives (DMP)) has been getting attention in the robotics field to reproduce human skills and transfer them into a robot. However, it is not easy to improve or generalize the learned behaviours unless we demonstrate human skills again. Therefore, this challenge can be resolved by reusing and blending previous data[4][5] to create new behaviours.

The project will cover the following topics:

- Choose and implement suitable LfD methods to a task (possibly two).
- Implementation optimization methods to blend the skills. (e.g. Quadratic Programming)
- Evaluating the learned paths from each method.



[4] N. Jaquier, Y. Zhou, J. Starke, *et al.*, "Learning to sequence and blend robot skills via differentiable optimization," *IEEE Robotics and Automation Letters*, vol. 7, no. 3, pp. 8431–8438, 2022.

[5] M. Saveriano, F. Franzel, and D. Lee, "Merging position and orientation motion primitives," in *2019 International Conference on Robotics and Automation (ICRA)*, 2019, pp. 7041–7047.