Problem description:
Research at the intersection of machine learning and control made impressive advances over the past years. Data-driven identification using Gaussian processes have been successfully employed in various control tasks [2]. However, the performance is highly sensitive to the available data, which leads to the question how high quality dataset are obtained.

In this thesis, we aim to design a control approach to efficiently explore the state space of an unknown dynamical system. While many of the existing approaches simply explore the points with the highest uncertainty [1], we want to achieve an efficient covering and a time efficient collection of valuable training points.

The goal is to design an efficient approach for the exploration of the state space, based on a Gaussian process model. It must consider the dynamics of the system, which should be learned, in the planning of the trajectory [3]. Starting with a literature review on related work, an optimal exploration strategy should be formulated. A theoretic analysis and an evaluation in simulation should be a performed.

Tasks:
- Literature research on covering and the traveling salesman problem
- Design of an exploration strategy with optimality guarantees
- Implementation and evaluation of the proposed concept.

Bibliography:
