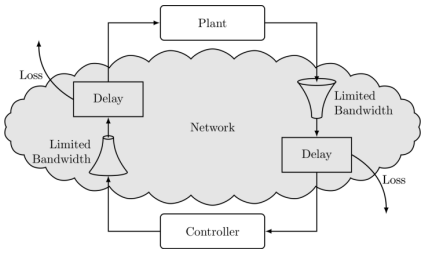
Universität Stuttgart
Institut für Systemtheorie und Regelungstechnik
Prof. Dr.–Ing. Frank Allgöwer

Open Thesis (MA)

Safe reinforcement learning for periodic event-triggered control

Description:



Networked control systems (NCS) are control systems in which some or all links in the feedback loop are closed over a shared communication network. A major challenge in the field of NCS is to find sampling and control strategies that require only a small amount of communication while still guaranteeing stability and a certain degree of performance for the control system. An approach to reduce the required amount of communication is event-triggered control (ETC). However, most existing ETC approaches with guarantees for stability, especially for nonlinear systems, do not take into account the trade-off between communication savings and performance. Promising results to optimize simultaneously both the amount of communication and the system performance based on reinforcement learning come in turn without any guarantees. The goal of this thesis is to combine an ETC approach with stability guarantees with reinforcement learning techniques in order to optimize both communication savings and the system performance whilst preserving stability guarantees. This project will be carried out in cooperation with the Max Planck Institute for Intelligent Systems (ics.is.mpg.de).

Prerequisites:

- Lecture *Nonlinear control*
- Interest in machine learning, (ideally prior knowledge, especially in supervised and reinforcement learning)

Supervisor:

Michael Hertneck, Dominik Baumann
Room 3.240/ MPI

Area:

Networked Control Systems
Reinforcement learning

Properties:

Type: MA

Beginning:

Please approach me via email or at my office in case of interest in the topic to discuss further details.

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

Aushang vom 13. November 2019