



Bachelor or Master Thesis:

Performance Analysis of Universal Robot Control System Using Networked Predictive Control



Networked control systems (NCSs) are feedback control systems with system components distributed at different locations connected through a communication network. Since the communication network is carried out through the internet and there are bandwidth and packet size limitations, network constraints appear. Some of these constraints are time delay and packet loss. These network limitations can degrade the performance and even destabilize the system. To overcome the adverse effect of these communication constraints, various approaches have been developed, among which a representative one is networked predictive control. Networked predictive control systems (NPCSs) are NCSs that use predictive controllers as an active compensation method for network communication constraints. The basic idea in this algorithm is to use a model of the process or system (to be controlled) in order to predict and optimize future process behavior. This approach proposes a controller, which compensates for the network time delay and packet loss actively.

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Tasks:

- Performance analysis of the designed NPCS with real-time data
- Show the stability of the system despite a high delay and a considerable packet loss
- Suggest the improvements to previous networked predictive control systems
- Investigate the effects of different system and environment parameters

Requirements:

- Programming experience in C++ or Python
- Basic knowledge in control theory (Preferred: Model Predictive Control)
- Knowledge in communication network
- Considerable motivation and ambitiousness

If you are interested, please contact:

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