

Thesis or Project on Encrypted Control

- Looking for an opportunity to work at the cutting edge of encrypted control research? -

Job description

Modern control systems tend to be more networked and distributed. Prominent examples come along with the internet of things, industry 4.0, intelligent transportation and logistic systems, smart grids, building automation, or robot swarms. While these systems offer exciting new possibilities, they also involve privacy and security concerns due to their vulnerability to cyberattacks. In order to secure the process and controller information, we combine state-of-the-art control algorithms with novel cryptographic techniques, which allow *computations on encrypted data*, in our research (see Figure 1).

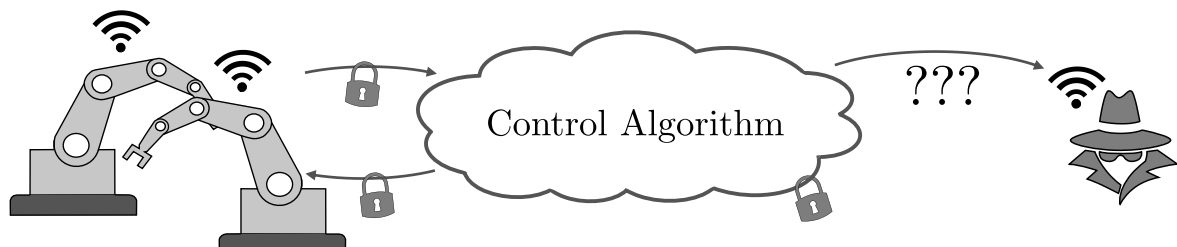


Figure 1: Industry 4.0 system with secure cloud-based control under attack.

During your work, *possible* tasks are the

- design of control algorithms for encrypted evaluation
- implementation and benchmarking of encrypted controllers
- development of tools for public usage
- investigation of novel cryptographic schemes
- extension of existing solutions
- development and realization your own ideas

Your profile

You are ambitious and like to learn new things about control theory and cryptography? Perfect! Ideally (not necessary), your expertise encompasses some of these fields

- control theory (state space representation, stability analysis, linear algebra, ...)
- coding (C++, Python, or Matlab)
- optimization (quadratic programming, nonlinear programming, ...)
- cryptography (homomorphic encryption, secret sharing, ...)

Of course, we provide support whenever you need help. Your work can be done in English or German.

Interested?

Do not hesitate to contact us via nils.schlueter@tu.dortmund.de with *relevant information*.