Design, Integration, and Evaluation of a Cyber-Physical System

SEDDIT Fall 2025 Project

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LINKÖPING UNIVERSITY

SEDDIT
Sensor Informatics and Decision-making for the Digital Transformation

UPPSALA UNIVERSITET

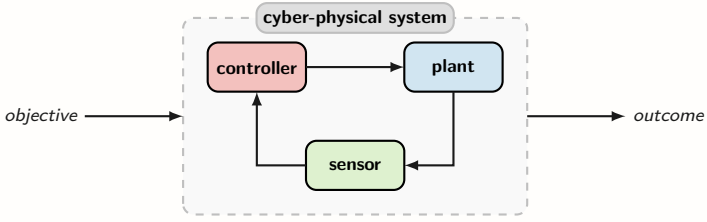
Course Introduction

First time the project course is given (incl. the previous LINK-SIC era)

Course was designed with the following in mind:

- relevance to core competence of SEDDIT—control/planning, optimization, fault diagnostics, and sensor informatics
- relevance to the system-building industry—focus on system integration which is complex, time consuming, and costly
- training of theoretical/analytical ability of the PhD students

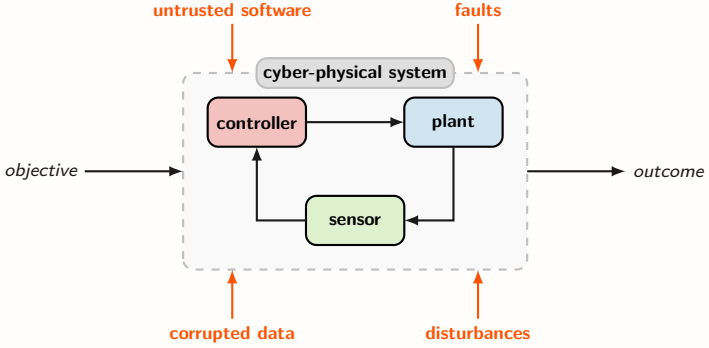
Project Overview



The problem is to design, integrate, and evaluate a *cyber-physical system* (CPS), which includes:

- a *plant* that represents the physical system to be controlled;
- a *controller* that computes control inputs based on the current state of the system and the desired behavior; and
- a *sensor* that measures the state of the system.

Project Tasks



The following **tasks** are considered:

- **System modeling:** Modeling of the system of interest and its subsystems
- **Subproblem 1:** Run-time assurance
- **Subproblem 2:** Fault diagnostics
- **Subproblem 3:** False data detection
- **System integration:** Integration of the developed subsystems