

IFAC Safeprocess 2024 Competition

LiU-ICE Industrial Fault Diagnosis Benchmark

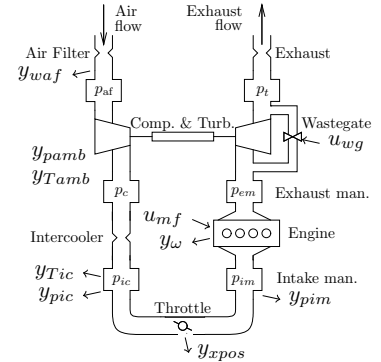
- Anomaly Detection and Fault Isolation with Incomplete Data



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Benchmark Theme

A common challenge of designing diagnosis systems in industrial applications, is limited data availability from relevant fault scenarios and a lack of knowledge of model uncertainty. Development of fault diagnosis design techniques in this situation is the theme of the competition.

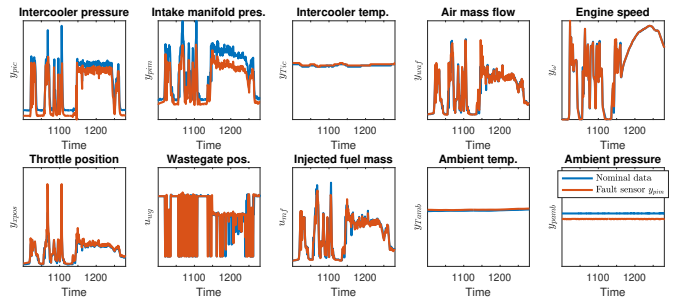
The case study is the air-flow of an internal combustion engine. The complexity of modeling the engine combined with noisy measurements makes it a challenging system to diagnose because of its non-linear dynamic behavior and wide operating range.

Competition Objectives

- Design a diagnosis system that can detect faults and identify the cause of the abnormal behavior.
- Handle that availability of representative data from all fault scenarios and fault sizes is limited.
- The solution should handle unknown faults.

Given

- Data is collected from both nominal and faulty behavior during transient operation of the process. The set of available actuator and sensor signals corresponds to the standard signals that are available in a commercial vehicle.



- Considered faults include leakage and sensor faults. Each dataset in training data represents one fault scenario with almost 30 minutes of operational data sampled in 20Hz.
- A system description in the form of a state-of-the-art analytical model where model parameters are unknown.

Evaluation Criteria

- False alarm rate/Missed detection rate
- Time from fault occurrence until detection
- Fault isolation accuracy
- Computation time

How to participate

Information for competition participants is found on the benchmark homepage: https://vehsys.gitlab-pages.liu.se/diagnostic_competition/

Submission deadline: April 21, 2024