

Sensor Failure Detection

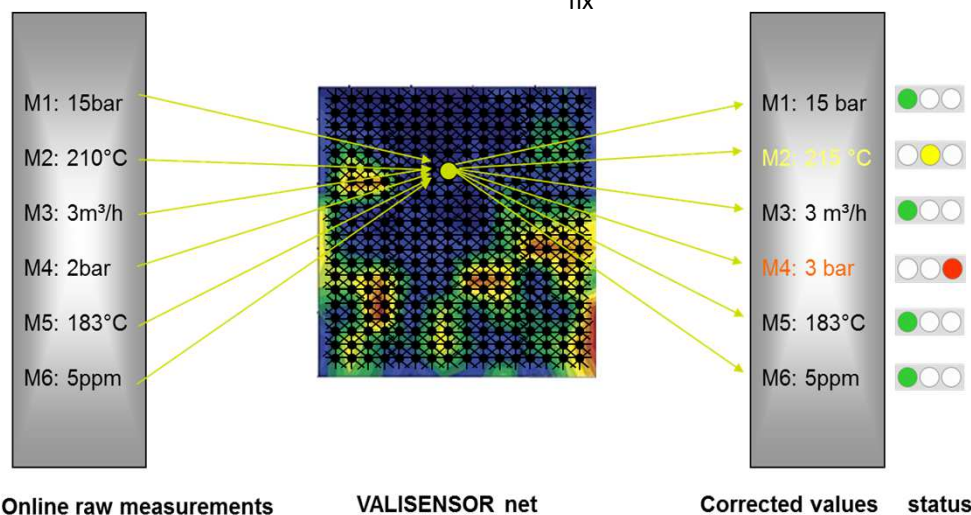
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Problem / Objective

- For each control approach, modelling and APC accurate sensor values are important
- Sensor failures and inaccuracies are prevalent
- The effort to secure measurements is very high
- The cost of redundancies are very often too high

Goal:

Develop a system, which detects failures in sensor data, identifies the respective sensor and delivers reliable calculated data as a substitute for the wrong measurement.



General Solution

- A system learns the multi-dimensional relationships between all measured variables of a process from sample data for a longer period
- The system should work like an adaptive pattern recognition based on an extended SOM Concepts (Self Organizing Maps) with statistics
- The system can recognize faulty sensors, calculate their error and make substitutional values for individual failed sensors available online
- The system thus increases availability of processes and APC
- It should allow plant operators to find bugs faster and to fix

First Results

- The algorithm works proper, runs stable and shows good results in practice!
 - Up to 50% of the measurements can be substituted, in case of sensor fault!
 - Practical Test in Hydrogenium Plant (Air Liquide) successful
- Finding of the best configuration parameters is not easy and (up to now) only for specialists
 - Many experiments will find the best solution / autoconfiguration
- The calculation time is increased now by parallelization (from 20h to 3-4h)
 - Massive parallelization works proper (Multi processors / Graphic Card implementation)
- The problem of coding the problem is not easy (grouping of measurements)
 - Standards will be developed and defined - ongoing

Market opportunity

- Market readiness is expected to be achieved in 2-5 years
- We are very certain of the success, i. e. >75% chance of a positive market response within this time frame.
- We expect good exploit opportunities in the fields of power industry, chemical industry, petrochemical industry and related trades

References and Acknowledgements



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