Master's thesis (30 ECTS)

Working title: Mining Gas Sensor Data (in Julia)

In cooperation with: Materials Center Leoben Forschung GmbH

Materials Center Leoben Forschung GmbH (MCL) is an internationally active research institution specializing in materials research along the whole product value chain starting from the materials synthesis, proceeding with the processing of products and concluding with their in-service behavior until the end of the product life time. MCL is carrying out long-term research and development projects in cooperation with a total of some 150 industrial and scientific partners as well as laboratory, computational and advisory services.

MOS gas sensor technology is a hot research topic pursued at MCL, including in-house fabrication of nano materials and their CMOS-process integration. Julia is a new programming language aiming at scalable technical computing. Potentially, the same code might be deployed on clusters, desktop computers and embedded devices.

Tasks:

- Learning about latest MOS gas sensor technology
- Understanding measurement setup and existing data sets
- Collecting existing data sets in a single SQL database
- Automating data segmentation
- Apply standard data mining algorithms to existing data sets
- [Optional: Evaluating data throughput on Hex cluster]
- Design dashboard for automatic reporting
- Investigate and report performance of different algorithms
- Rank algorithms by sensor selectivity and noise robustness

Requirements:

- Education: TU Technical Physics, Technical Chemistry, Telematics
- Expert knowledge: Lecture and documented interest in data mining Prior experience with Weka, Orange or similar proven programming skills in Python or similar
- Nice-to-have: Interest in SQL, Linux, Hex cluster, Julia

Additional information:

- Supervisor TU Graz: Prof. Alexander Bergmann; Supervisors MCL: Dr. Anton Köck, Dr. Manfred Mücke
- Expense allowance: € 3.000,00 netto for 6 months
- Period: 6 months
- Start of work: as soon as possible
- Graz & Leoben
- Employment

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