

Masterverteidigung von Hannes Hornig am 29.5.2018 um 16:15 Uhr in Raum WE5/05.132

Titel : "Ontology based Anomaly Detection in Fine-Dust Sensory Networks".

Abstract:

In this presentation, an ontology based anomaly detection approach, in the use case of particulate matter sensors (PM-sensor) is described and a reference implementation shown.

Furthermore, the transition from anomaly detection, to data quality metric (DQM) calculation, is made in concept. Function approximation and function extrapolation is employed to gain the necessary ground truth for calculating an accuracy metric. The environment-out-of-Range error was chosen, as anomaly type. In addition to this, an experiment was undertaken to gather data from an indoor particulate-matter sensor and compare it, against data from outdoor sensors and the nearest weather station. As data basis, we used the PM-sensor network provided by Luftdaten.info and the sensor network of the German Weather Service. We could show, that the majority of the PM-sensor are in a radius of 30KM from the nearest weather station and that there is a weak correlation of PM values and humidity. For every PM-sensor, a corresponding weather station could be found and the anomaly detection rule be applied. This, together with evidence of beneficial runtime properties of our application and evidence, that the DQM adheres to the underlying statistical properties of our data, shows the feasibility of our approach.

Future research, need to address the more thoroughly use of ontologies, to generate and deploy anomaly detection rules and more sophisticated function approximation and extrapolation methods for DQM-calculation.