



Master Thesis Work

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Evaluierung von Algorithmen zur Detektion von Anomalien in den Telemetriedaten des Flying Laptop Satelliten

Evaluation of anomaly detection algorithms in the telemetry data of the satellite Flying Laptop

Motivation:

Within the field of spacecraft operations, anomalies have to be currently identified manually by the spacecraft operator. This can often be a time consuming and tedious process, especially when trying to identify contextual and collective anomalies. Point anomalies, however, can be easily identified using the out-of-limit method. Hence, an artificial intelligence which can detect all mentioned categories of anomalies in multi-variate time series data should be developed within this thesis.

In this thesis, the telemetry data of the Flying Laptop, a small satellite developed and operated by the Institute of Space Systems, is used. This data has to be analysed and preprocessed for training of the anomaly detection algorithms. In order to identify the most promising algorithm, a suitable performance evaluation metric has to be researched. Afterwards, multiple suitable anomaly detection algorithms shall be identified, implemented and evaluated regarding their performance.

Task description of the Master thesis work:

- Familiarization with Flying Laptop's telemetry data
- Research on preprocessing and anomaly detection (AD) algorithms for multi-variate time series data
- Research on performance evaluation metrics for unlabelled anomalies
- Preprocessing and selection of the telemetry data
- Implementation and performance evaluation of different AD algorithms
- Documentation

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Starting date: Click for date

Submission until: Click for date

Acknowledgement of receipt:

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Prof. Dr.-Ing. Sabine Klinkner
(Responsible Professor)

Date

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