Data Science – Industrial Machine Learning – IoT – Microsoft Azure

MOL – ELTE Tudáskezelő rendszerek Labor

Témajavaslatok önálló laborra

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Federated learning for IoT via MS Azure services

Collecting, managing and analyzing edge-device data is a more and more important field in data science due to the increasing number applications. However in certain cases - due to the sensitivity of the data – it is not allowed to share the data between different locations, while it would be useful to develop machine learning models on all available data. Federated learning solutions can be used to train machine learning models on smaller subsets of data, then – without sharing the data itself – aggregate these models into one model, which can be used distributed to all end-points.

The aim of the project is to develop a federated learning solution with Microsoft Azure services and prove its added value.

Signal processing and data storage for the development of machine learning algorithms – Industrial digitalization and machine learning

The shifts that arise during processing different spectral data, managing other signals, and integrating them into a model are serious challenges during industrial digitalization. Therefore, it is of utmost importance that the various signals are stored in a typical data lake and processed, even for constructing machine learning algorithms. The topic is to process the different signals and build them into different machine learning algorithms, including as much input data as possible, to develop more robust models and to make their operation as efficient as possible. In addition to processing different signals, handling the sensitivity of different variables is an additional challenge.

The main goal of the project is to develop a solution which is capable to handle spectral data from different sources, signals and other related information in the machine learning model development process.

Development of machine learning algorithms and creation of sandboxing environments

Build, develop and optimize machine learning algorithms by nesting different models. Test the impact of feature selection on model performance. Achieve the best predictive performance by optimising the number and type of combinable models. Adjust the hyperparameters of ML models to affect training time, performance, and accuracy (hyperparameter optimization). Create a sandboxing environment that helps end users use machine learning algorithms on daily base.