Time Series

Course code: MLC_TISE

This course is focused on time series prediction problems. We will begin with examples of classical methods for modeling and prediction of time series and continue to more advanced methods based on machine learning. We will finish with a complex example of a training time series model on historical data using neural network and evaluate its performance in predicting the future.

Required skills

- basic knowledge of programing in Python
- high school level of mathematics
- Basics of machine learning on the level of our course Introduction to machine Learning

Course outline

- Introduction to the theory of time series modeling
- Classical methods for time series prediction (space &frequency domain, spectral analysis, autocorrelation, ARIMA models etc.)
- Hands-on example (pandas, basic characteristics, simple prediction)
- Machine learning for time series prediction (state-space methods, Hidden Markov Chain, Kalman filter, classical neural networks, recurrent networks, LSTM)
- Hands-on examples of machine learning methods (training set preparation for specific task and model, training process &evaluation)
- Complex example of time series prediction using recurrent neural network (temperature prediction from high-dimensional input data: training data set preparation, training process &validation, prediction with trained neural network)

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