8. November

OPENCAMPUS.sh

Time Series Prediction

WEEK 3

COVERING SEASONALITY: ARMA + ARIMA + SARIMA MODELS

ATTENDANCE REGISTRATION

Online:

- **Use your full names in the zoom meetings!**
- **Only counts as attended with camera on.**

- **Organizational Matters:**
  - **Projects**

- **Session 2:**
  - **ARMA**
  - **ARIMA**
  - **SARIMA**

PROJECTS:

HTTPS://OPENCAMPUS.GITBOOK.IO/OPENCAMPUS-MACHINE-LEARNING-PROGRAM/PROJECTS/REQUIREMENTS

HTTPS://GITHUB.COM/OPENCAMPUS-SH/ML-PROJECT-TEMPLATE/TREE/MAIN

SESSION 2:

THE ARMA MODEL:

KEY TAKEAWAYS:

- The ARMA model is the combination of the autoregressive model and the Moving Average model.
- The hyperparameters of ARMA are p and q: p for the autoregressive order and q for the moving average order.
- A grid search is a common tool for optimizing the choice of hyperparameters. It can be combined with cross-validation to yield more reliable error estimates.
- You can use the distribution of residuals to evaluate the fit of a model. If the residuals do not follow a normal distribution, there is generally something wrong with the model specification.
- You can use the model summary to look at detailed indicators of model fit. You can also find the estimates of model coefficients and a hypothesis test that tests the model coefficients against zero.

THE ARIMA MODEL:

KEY TAKEAWAYS:

- The ARIMA model combines three effects:
  - The AR process, based on autocorrelations between past and present values
  - The MA process, based on correlations between past errors and present values
  - Automatic integration of a time series if it is not stationary
- The ARIMA(p,I,q) model has three hyperparameters:
  - The order of the AR process denoted by p
  - The order of the MA process denoted by q
  - The order of integration denoted by I (or d in some notations)

THE SARIMA-MODEL:

KEY TAKEAWAYS:

- The SARIMA model adds a seasonal effect to the ARIMA model.
- The SARIMA model is the completest version of univariate time series models.
- There are four more hyperparameters in the SARIMA model:
  - Seasonal AR order
  - Seasonal MA order
  - Seasonal integration order
  - Periodicity (based on the number of periods that a seasonality would logically return)

TASKS UNTIL NEXT WEEK

- **Completion of the learning material of week 3: watch the third YouTube-playlist ;-)**

- **Complete/prepare the IPython-Notebooks:**
- **i.e. SARIMAX: Environment**
- **i.e. VAR: Finance-1**
- **i.e. VARMAX: Finance2 (maybe SVAR or BVAR ….)**

- Chapter 8/9/10
- https://github.com/Apress/advanced-forecasting-python

- **Bring questions!**