DIPLOMA IN ARTIFICIAL INTELLIGENCE

APRO Aalto University Professional Development

**AI Programming
21.4.-22.4.2021**

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AI PROGRAMMING

The two-day training is divided into thematic sessions, where problems are presented to the students and when students create the solutions to the problems during the session.

Each student should have a computer and preparedness to run Python programs in Jupyter notebooks.

Each session contains a brief introductory lecture to the topic, and description of the programming exercise. Then, student proceed by programming, either alone or in pairs. Towards the end of the session, solutions will be reviewed.

SESSION 5: CLUSTERING AND PREDICTION

- This session will be covered on the second day during 9.00-10.30.

- The learning objective is get familiar with with clustering and prediction tasks on a more practical level

LECTURE CONTENTS

- Clustering model
- Prediction model
- Description of the exercises

CLUSTERING MODEL

- Clustering refers to the formation of groups in your data, when the group membership is not known beforehand
- The grouping is emergent, that is the solution of of the problem
- Clusters are represented as prototypical "data cases", or with models

- Models/algorithms: K-means, hierarchical clustering, finite mixture models, DBSCAN, others

Python solution:

- See clustering models: https://scikit-learn.org/stable/modules/clustering.html

PREDICTION MODEL

- Prediction refers to estimating unknown quantities of interest
- In time series context, future is always unknown. Time is not necessarily needed in prediction.
- In industrial context, prediction of quantities needing for instance laboratory measurements. Compute these quantities with the prediction model

Python solution:

- Regression, supervised learning: https://scikit-learn.org/stable/supervised_learning.html

EXERCISES

- The exercises are listed in the Jupyter notebooks: Session-5-clustering.ipynb and Session-5-prediction.ipynb and Session-5-non-linear-regression.ipynb

- Work one exercise at the time

- Not all exercises need to be completed

REVIEW OF THE SOLUTIONS

- How do the solutions look like?