Course contents

The following assignments will be covered:

- A1: "Linear Regression"
- A2: "Logistic Regression"
- A3: "Multi-class Classification and Neural Networks"
- A4: "Neural Network Learning"
- A5: "Regularized Linear Regression and Bias/Variance"
- A6: "Support Vector Machines"
- A7: "K-Means Clustering and PCA"
- A8: "Anomaly Detection and Recommender Systems"

First part of the workshop

Session 1:

Activity	Time	Remark
Introduction	42m	Self-study
Linear Regression with One Variable	1h10m	Self-study
Linear Algebra Review	1h	Self-study
Linear Regression with Multiple Variables	1h4m	Self-study
Octave/Matlab Tutorial	1h19m	
Work on assignment "Linear Regression"	Rest	

Session 2:

Activity	Time
Presentation of solution to assignment A1	20m
Logistic Regression	1h11m
Regularization	39m
Work on assignment A2	Rest

Session 3:

Activity	Time	Remark
Presentation of solution to assignment A2	30m	
Neural Networks: Representation	1h2m	Self-study
Neural Networks: Learning	1h17m	Self-study
Work on assignments A3 and A4	Rest	

Session 4:

Activity	Time	Remark
Presentation of solution to assignment A3 and A4	60m	
Advice for Applying Machine Learning	1h3m	Self-study
Machine Learning System Design	59m	Self-study
Work on assignment A5	Rest	

Session 5:

Activity	Time	Remark
Presentation of solution to assignment A5	30m	
Support Vector Machines	1h37m	Self-study
Unsupervised Learning	39m	Self-study
Dimensionality Reduction	1h7m	Self-study
Work on assignments A6 and A7	Rest	

Session 6:

Activity	Time	Remark

Presentation of solutions to assignments A6 and A7	60m	
Anormaly Detection	1h30m	Self-study
Recommender Systems	58m	Self-study
Work on assignment A8	Rest	

Session7:

Activity	Time	Remark
Presentation of solution to assignment A8	30m	
Large Scale Machine Learning	1h3m	Self-study
Application Example: Photo OCR	56m	Self-study
Outstanding issues	Rest	

Guest talk by Simon Lauritsen from Enversion

On **May 17 at 13:00** Simon Lauritsen will give a guest talk about how they apply machine learning technologies at Enversion.

Room: 5125 (Edison) - 408E.

Second part of the workshop

Activity	Time	Remark
Presentation and discussion of machine learning papers	4h	Prepare presentation of selected paper(s).

List of papers:

Electricity Consumption w.r.t. various measurements:

- Forecasting uncertainty of Thailand's electricity consumption compare with using artificial neural network and multiple linear regression methods, IEEE Conference on Industrial Electronics and Applications, 2017
- Forecasting household electricity consumption in the province of Aceh using combination time series model, International Conference on Electrical Engineering and Informatics, 2017
- A hybrid method for short-term electricity consumption prediction, IEEE Conference of the Industrial Electronics Society, 2017
- Prediction of electricity consumption based on DT and RF: An application on USA country power consumption, IEEE International Conference on Electrical, Instrumentation and Communication Engineering, 2017
- Short-term electricity consumption forecast with artificial neural networks — A case study of office buildings, IEEE Manchester PowerTech, 2017
- Support Vector Regression for Electricity Consumption Prediction in a Building in Japan, IEEE International Conference on Computational Science and Engineering, 2017
- Estimation of the electricity consumption of Turkey trough artificial neural networks, IEEE International Symposium on Computational Intelligence and Informatics, 2016
- A hybrid forecasting method of electricity consumption based on trend extrapolation theory and LSSVM, IEEE PES Asia-Pacific Power and Energy Engineering Conference, 2016
- Multivariate electricity consumption prediction with Extreme Learning Machine, International Joint Conference on Neural Networks, 2016

Classification of (malware) software:

- Malware Visualization for Fine-Grained Classification, IEEE Access, 2018
- Malware classification with LSTM and GRU language models and a character-level CNN, IEEE International Conference on Acoustics, Speech and Signal Processing, 2017
- Malware classification using static analysis based features, IEEE Symposium Series on Computational Intelligence, 2017
- Classification of Malware programs using autoencoders based deep learning architecture and its application to the microsoft malware Classification challenge (BIG 2015) dataset, IEEE National Aerospace and Electronics Conference, 2017
- NLP-based approaches for malware classification from API sequences, Asia Pacific Symposium on Intelligent and Evolutionary Systems, 2017
- Deep android malware detection and classification, International Conference on Advances in Computing, Communications and Informatics, 2017
- Evolving Deep Neural Networks architectures for Android malware classification, IEEE Congress on Evolutionary Computation, 2017
- Empowering convolutional networks for malware classification and analysis, International Joint Conference on Neural Networks, 2017
- On the effectiveness of application characteristics in the automatic classification of malware on smartphones, International Conference on Malicious and Unwanted Software, 2016