



# MACHINE LEARNING, ML

## **PROF. CARL GUSTAF JANSSON**

School of Electrical Engineering and Computer Science  
KTH, The Royal Institute Of Technology

**PRE-REQUISITES** : Relevant applied math and statistics, core computer science

**INTENDED AUDIENCE** : Interested students

**INDUSTRIES APPLICABLE TO** : Broad industrial interest at present, i.e. for autonomous vehicles, robots, intelligent assistants and general datamining

## **COURSE OUTLINE :**

The scientific discipline of Machine Learning focuses on developing algorithms to find patterns or make predictions from empirical data. It is a classical sub-discipline within Artificial Intelligence (AI). The discipline is increasingly used by many professions and industries to optimize processes and implement adaptive systems. The course places machine learning in its context within AI and gives an introduction to the most important core techniques such as decision tree based inductive learning, inductive logic programming, reinforcement learning and deep learning through decision trees.

## **ABOUT INSTRUCTOR :**

Prof. Carl Gustaf Jansson is tenured Professor in Artificial Intelligence at the School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology, Stockholm, Sweden. His research contributions are mostly in artificial intelligence, in particular Knowledge Representation and Machine Learning. Particular research interests are intelligent interfaces and ubiquitous computing. Henrik Boström is tenured professor in computer science and data science at the School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology, Stockholm. His research focuses on machine learning algorithms and applications, in particular ensemble learning and interpretable models, including decision trees and rules, and conformal predictio. He is also a senior researcher at the Swedish institute RISE SICS. Fredrik Kilander is Associate Professor in Computer Science at the School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology, Stockholm. His PhD was in Machine Learning in particular Conceptual Clustering. A particular research interest is ubiquitous computing. Dr Kilander has a broad experience from teaching in Computer Science in particular Programming Methodology.

## **COURSE PLAN :**

**Week 1:** Introduction to the Machine Learning course

**Week 2:** Characterization of Learning Problems

**Week 3:** Forms of Representation

**Week 4:** Inductive Learning based on Symbolic Representations and Weak Theories

**Week 5:** Learning enabled by Prior Theories

**Week 6:** Machine Learning based Artificial Neural Networks

**Week 7:** Tools and Resources + Cognitive Science influences

**Week 8:** Examples, demos and exam preparations