

FDD3601 Deep Generative Models and Synthesis 7.5 credits

Djupa generativa modeller och syntes

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Intended learning outcomes

After passing the course, the students should be able to:

characterise synthesis problems, deep generative methods, and their applications distinguish different objectives, performance measures, and common problems with generative modelling

describe the relation between deep generative models and regression-based methods train and tune deep generative models on different datasets

evaluate generative models objectively and subjectively

discuss ethical aspects of particular relevance to generative AI

in order to

be able to judiciously use deep generative modelling to solve problems in industry and/or academia.

Course contents

Relevant concepts from probability theory and estimation Introduction to synthesis problems and generative models

Principles of synthesis versus classification

Regression versus probabilistic modelling

Modelling goals and evaluation

Mixture density networks (MDNs)

Autoregression and large language models (LLMs)

Normalising flows

Variational autoencoders (VAEs)

Diffusion models and flow matching

Generative adversarial networks (GANs)

Subjective evaluation

Hybrid approaches

Recent developments

Ethical aspects of generative AI

Examination

• LAB1 - Laboratory work, 7.5 credits, grading scale: P, F

Other requirements for final grade

The final grade is determined by accumulating the grades in individual exercises.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.