

Machine Learning and Data Mining

Intro and Course overview

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Sept 11, 2020

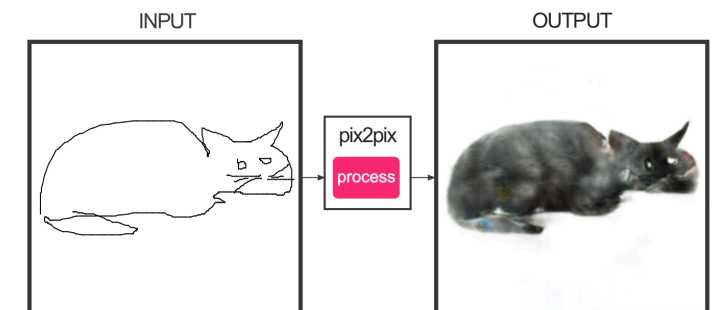
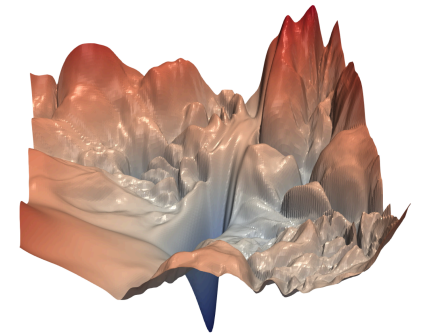
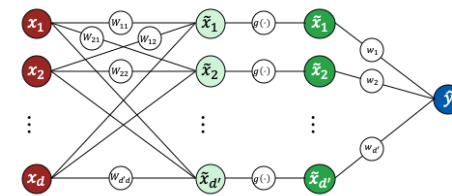
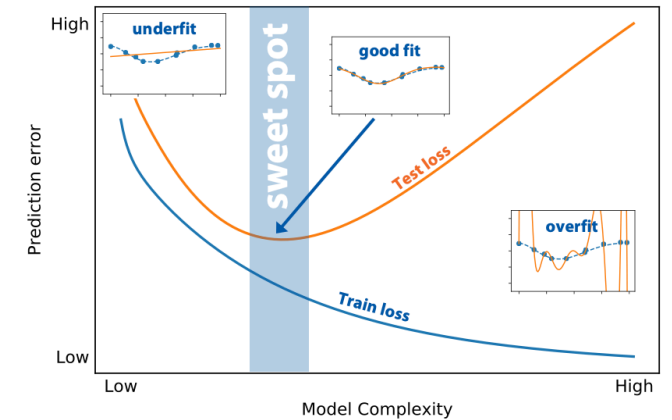
Overview

Machine Learning and Data Mining (MLDM)

- ▶ Compulsory course for ISSA spec. year 2
- ▶ Elective for other specializations, year 1
 - The two groups are merged
- ▶ Duration: 1st half of the academic year (modules 1 and 2)
- ▶ Assessment elements:
 - Homework assignments, Exam
- ▶ Format:
 - 1st lecture & seminar: offline
 - Then: **online**

Course content

- ▶ Introduction to classical machine learning
 - Basic algorithms and their application (metric methods, linear algorithms, SVM and kernel trick)
 - Bias-variance error decomposition, regularization techniques
 - Ensembling, bagging, boosting
- ▶ Introduction to deep learning
 - MLP, backpropagation, optimization techniques
 - Regularization layers, CNNs
- ▶ Advanced techniques
 - Deep generative models, notable architectures
 - Bayesian optimization, bayessian NNs, ELBO
 - Misc. topics (imbalanced datasets, importance sampling, etc.)



Repository with course material

github.com/HSE-LAMBDA/MLDM-2020

Please also join the Telegram group
(see the link in the repository starting page)

The formula

- ▶ Final grade = $0.5 \cdot \text{Homework score} + 0.5 \cdot \text{Exam score}$
 - $0 \leq \text{Homework score} \leq 10$
 - $0 \leq \text{Exam score} \leq 10$
 - Rounding up

Homework

- ▶ Small set of tasks each week
- ▶ Solve tasks to earn points
- ▶ Deadline: 2 weeks per task
- ▶ Homework grade = $10 \cdot \min\left(1, \frac{\sum \text{points}}{\frac{2}{3} \text{ total}}\right)$

Exam

- ▶ Exam in the form of project defence
- ▶ Project is either:
 - Participation in a machine learning competition (on www.kaggle.com or similar)
 - Teams of up to 3 people are OK (roles of all members of a team should be clear and significant)
- ▶ Or:
 - Implementation of some technique or study from an advanced machine learning paper
 - I'll provide some suggestions later,
 - or you can find something that interests you by yourself
- ▶ **Please discuss your choice with me**

Deep learning course

- ▶ There's an elective course just on the deep learning:
 - <https://www.hse.ru/en/edu/courses/396736640>
 - Highly recommended!
 - Homework scores for overlapping topics can be transferred to our course

Thank you!



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