Organizational notes

Monday, January 20, 2020

Foundations of Deep Learning, Winter Term 2019/20

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Where are we in the lecture?

- We're almost done with the lecture material
  - Last set of videos & assignment coming out this week:
    Variational Auto-Encoders / Generative Adversarial Networks
- After this: final last 3 weeks of the course for the final project
- Poster presentation / oral exam: March 9th (7 weeks from today)

Exam on March 9th, 2020

- It's an oral exam
- You have the opportunity to first talk about your project
  - This generally helps to get less nervous
- We also ask questions about the course material
  - Perfect preparation for this part
    + Understanding the material in the lecture
    + Reading the parts of the book and other material we recommend
    + Doing and understanding all assignments

Default Project: 2 Tasks with Learning Curve Data

- Default: tackle both tasks
- Also possible: tackle one task really in-depth
- We'll have a leaderboard for these tasks
  - This is just for gamification; please focus on learning something interesting rather than tweaking your score

Some Other Possible Projects (1)

- Learning to select activation functions
  - If interested, please email my PhD student Jörg Franke:
    frankej@cs.uni-freiburg.de
- For each neuron, instead of using one activation function, use k
  copies of the neuron with a different activation function each & let
  the network decide which ones are best
  - Inspired by a question that was asked in class
  - Does this improve performance over using the single best activation
    function?
  - Do you need some special normalization (e.g., normalize all outputs of
    the same act. fun.)?
  - Are different activation functions selected, or always the same?

Some Other Possible Projects (2)

- Deep Learning for Small Tabular Data
  - If interested, please email my PhD student Raghu Rajan: rajan@cs.uni-freiburg.de
- Systematically test different regularization techniques we learned about in class
  - Implement and compare different methods for handling uncertainty
  - Experiments on many small tabular data sets from OpenML.org
  - Code base to start from: Auto-Pytorch (https://github.com/automl/Auto-PyTorch)

Some Other Possible Projects (3)

- Re-implement tricks for very fast training of neural networks
  - If interested, please email my research engineer Lucas Zimmer: zimmerl@cs.uni-freiburg.de
- See the following blog post: https://myrtle.ai/how-to-train-your-resnet-8-bag-of-tricks/
- Carefully evaluate how useful each of the tricks is, also for different data sets and architectures

- Improving exercises based on student feedback
- Improving lectures based on student feedback
  - Please provide anonymous feedback on `https://cryptpad.fr/pad/#/2/pad/edit/1H8s2geK3YbPTEzRQXRc3ALN/`
- Help with making lectures publicly available
  - Mostly: make sure we have the rights to distribute all the images, etc
- Needed skills: very good understanding of the course; LaTeX skills

Teaching evaluations

- This is important, both for getting credit for trying something new and for improving the course
- We are aware that the lectures weren't always available on time; we are sorry for that!
- Please let us know what else you liked / disliked