Introduction to Machine Learning

Image recognition in Python and Tensorflow

Esten H. Leonardsen and Martin Hovin 19.01.23



Esten H. Leonardsen (UiO and Biometrical AS) Interests:

- Talking about esoteric theory
- Making deep learning tutorials



Martin Hovin (Biometrical AS) Interests:

- Installing tensorflow
- Debugging Estens code

Theory session:

- What is a statistical learning model?
- · What is a loss function?
- How do we train a statistical learning model?
- · How does a (deep) neural network work?
- · What operations does a convolutional neural network use?
- · What is transfer learning?
- · What is overfitting?
- · How do we combat it?

Practical session:

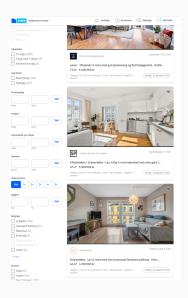
- 1. Set up a Python-environment containing Tensorflow
- 2. Use a pretrained convolutional neural network to predict
- 3. Fit a flower classifier using transfer learning
- 4. Improve the flower classifier

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Models



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Summary

- What is a statistical learning model?
 A formula representing the relationship between inputs and outputs
- What is a loss function?
 A function quantifying how good a model is
- How do we train a statistical learning model?
 Gradual updates of parameters using gradient descent
- How does a (deep) neural network work?
 Sequentially applying (non-linear) artificial neurons to inputs
- What operations does a convolutional neural network use?
 Alternating convolutions and pooling
- What is transfer learning?
 Retraining an already trained model for a new problem
- What is overfitting?
 When a model learns patterns in the training data that does not hold generally
- How do we combat it?
 Rigorous testing, regularization and data augmentation