Practice session 7. Image classification using Keras
“The more languages frameworks you know the easier it is to learn new ones”*

What is important when selecting the framework:

- Purpose of project (industry vs research, deployment to mobile device?)
- Experience (some frameworks more intuitive for python programmers)
- Community (it is important to know where to look for help)
- Model availability (OpenAI’s GPT-3 has over 175 billion parameters, and GPT-4 will have over 100 trillion parameters)

* All arguments in the presentation are subjective opinion and can be criticized
Research trends


Imperative Programming vs Symbolic Programming

Dynamic Computation Graph vs Static Computation Graph
Papers with code

https://paperswithcode.com/task/image-classification
Why do we still need Tensorflow?

- Model deployment
- Serialization
- Device management
- Visualizer
- Open-source
- Documentation (actually both are good)

Pytorch is better for rapid prototyping in Research. Good start for small-scale projects. Better utilization and optimization for use of GPUs.

Tensorflow is better for large-scale deployments. Good for cross-platform and embedded deployment. Bigger community base and many users.
Google AI: primary publish research with TensorFlow

DeepMind: standardized the use of TensorFlow in 2016, although in 2020 announced use JAX to accelerate their research

OpenAI: standardized the use of PyTorch in 2020, however, older baselines in TensorFlow. Baselines provides high-quality implementation of Reinforcement Learning algorithms, so TensorFlow may be the best choice for Reinforcement Learning practitioners.
JAX: another library developed by DeepMind. With its updated version of Autograd, JAX can automatically differentiate native Python and NumPy code. JAX is able to differentiate through all sorts of python and NumPy functions, including loops, branches, recursions, and more. This is incredibly useful for Deep Learning apps as we can run backpropagation pretty much effortlessly.
Course focus:
Training industry-ready deep learning engineers

Course focus:
Deep Learning theory; Research preparation

Ideally: both!

*https://www.assemblyai.com/blog/pytorch-vs-tensorflow-in-2022/
Example

Pytorch:
https://colab.research.google.com/drive/1KBTKiz1bDLavswWsv71gKBoHC8KEI04X?usp=sharing

Tensorflow:
https://colab.research.google.com/drive/1Rt6ROvjLC2Ash7Nusrwsc5eFmYzMn45C?usp=sharing