



# Workshop 5

COMP90051 Statistical Machine Learning  
Semester 1, 2023

# Learning Outcomes

At the end of this workshop you should be able to:

1. Learn the basic ops of **PyTorch**
2. be familiar with **autograd**
3. Be familiar with multiclass classification, implement **multiclass logistic regression** with automatic differentiation

# Popular frameworks for neural nets

- Dominant frameworks are **TensorFlow** (Google) and **PyTorch** (Facebook AI Research)
- Both are written in C++/CUDA and provide Python APIs
- With the release of TensorFlow 2.0, both frameworks support an **imperative** programming style—i.e. they work like NumPy

 PyTorch

  
TensorFlow

# PyTorch

- In workshops we'll mainly use the PyTorch
- PyTorch library built on top of C++ backend of computational library torch
- Designed for efficient tensor operations on CPU/GPU
- We will use PyTorch to implement logistic regression today, the NN model will come in the future.

## Install PyTorch

1. Start -> Anaconda3(64-bit) -> Anaconda Prompt
2. Enter the following at the prompt:

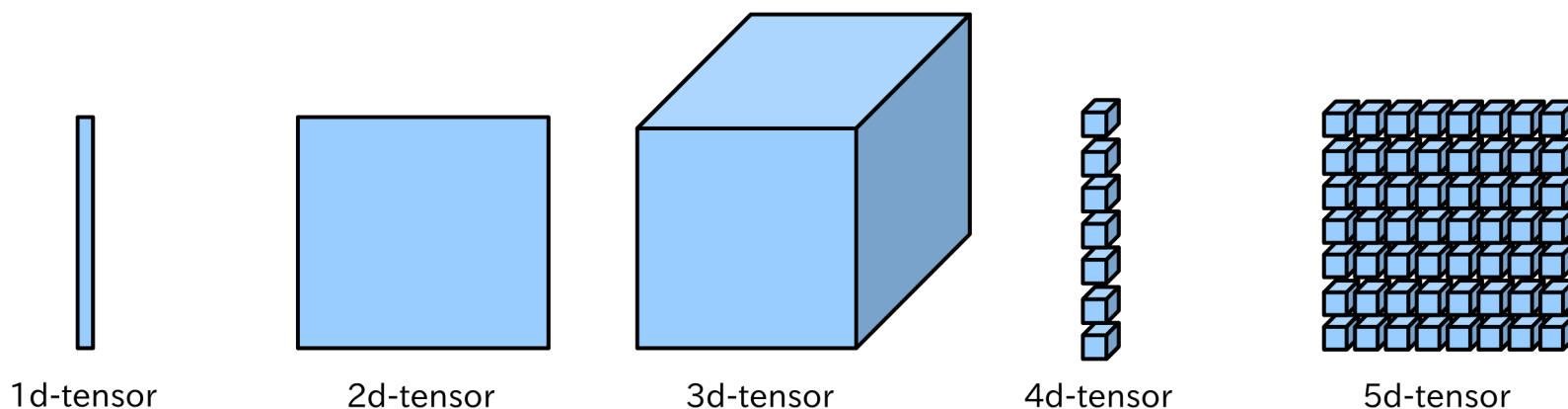
```
conda install pytorch torchvision cpuonly -c pytorch
```

3. Launch jupyter

```
jupyter notebook
```

# Tensor

- **Tensors** are basic object of **PyTorch**
- A **tensor** is a multi-dimensional array of values, similar to a matrix but with an arbitrary number of dimensions.
- E.g. an **image** can be represented as a **3d-tensor**: 2 dimensions for horizontal/vertical pixels + 1 dimension for the RGB channels



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