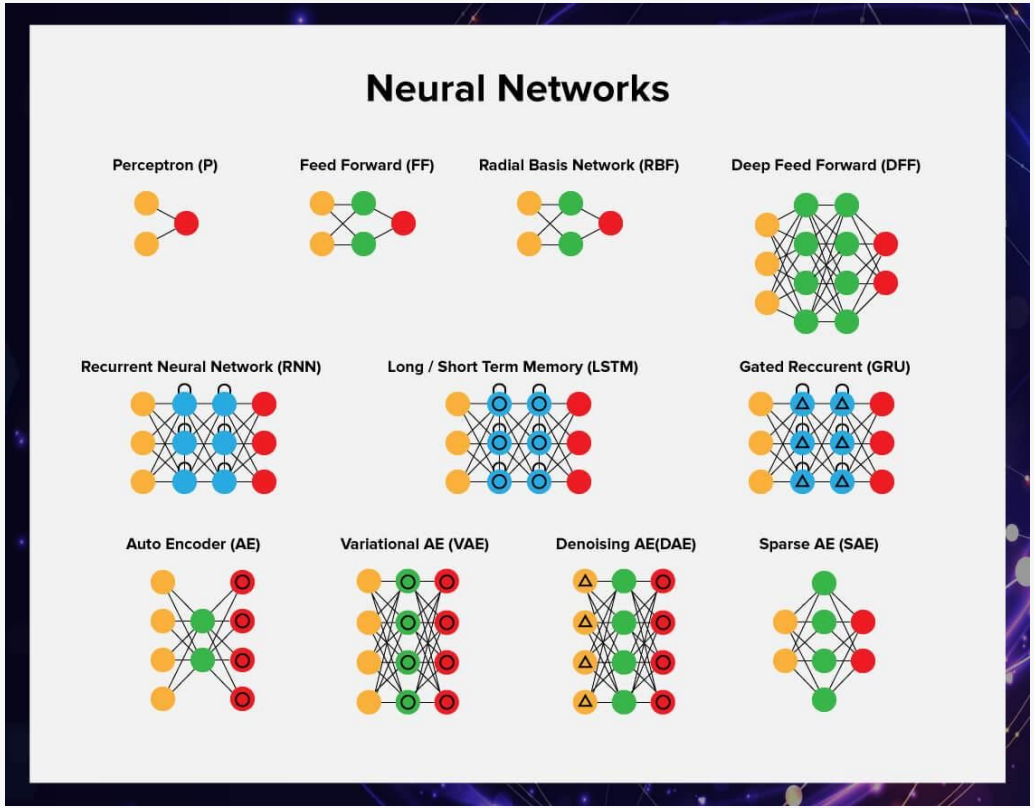
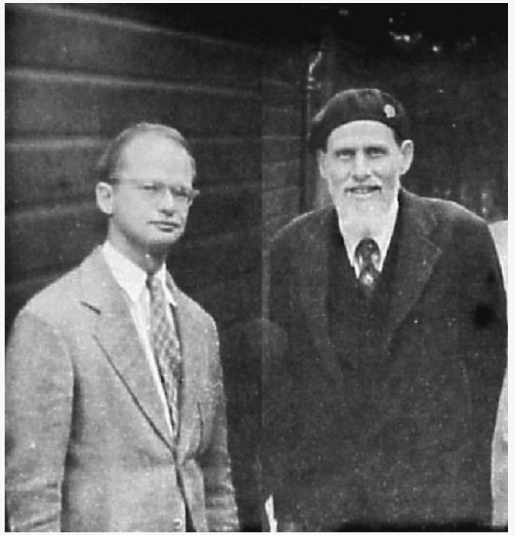
Module 3

Introduction to Neural Networks

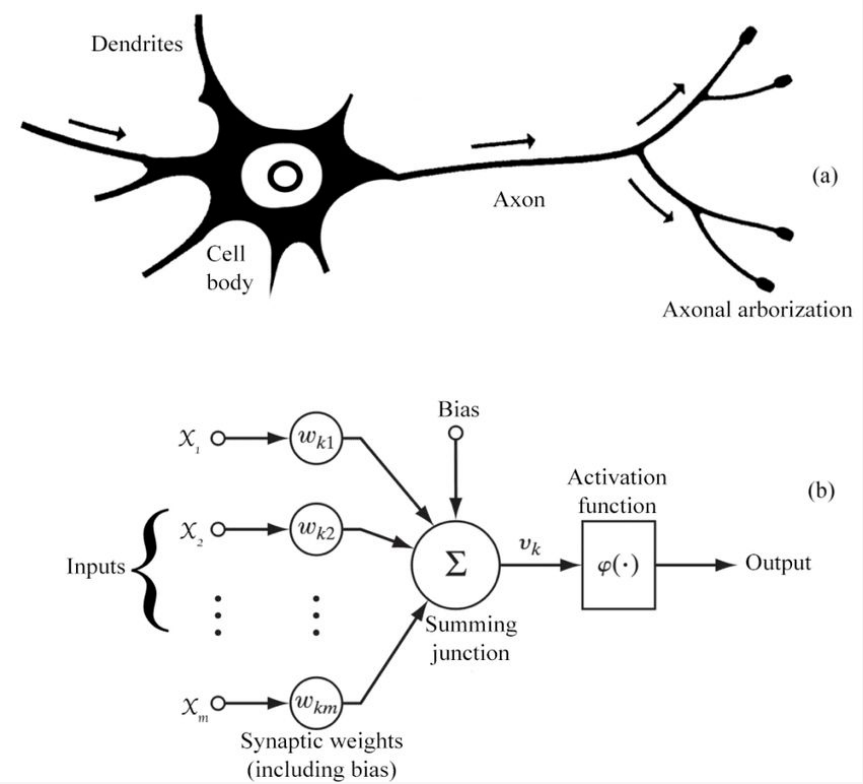




Pitts and McCulloch

Source: Serokell blog post

McCulloch Pitts model

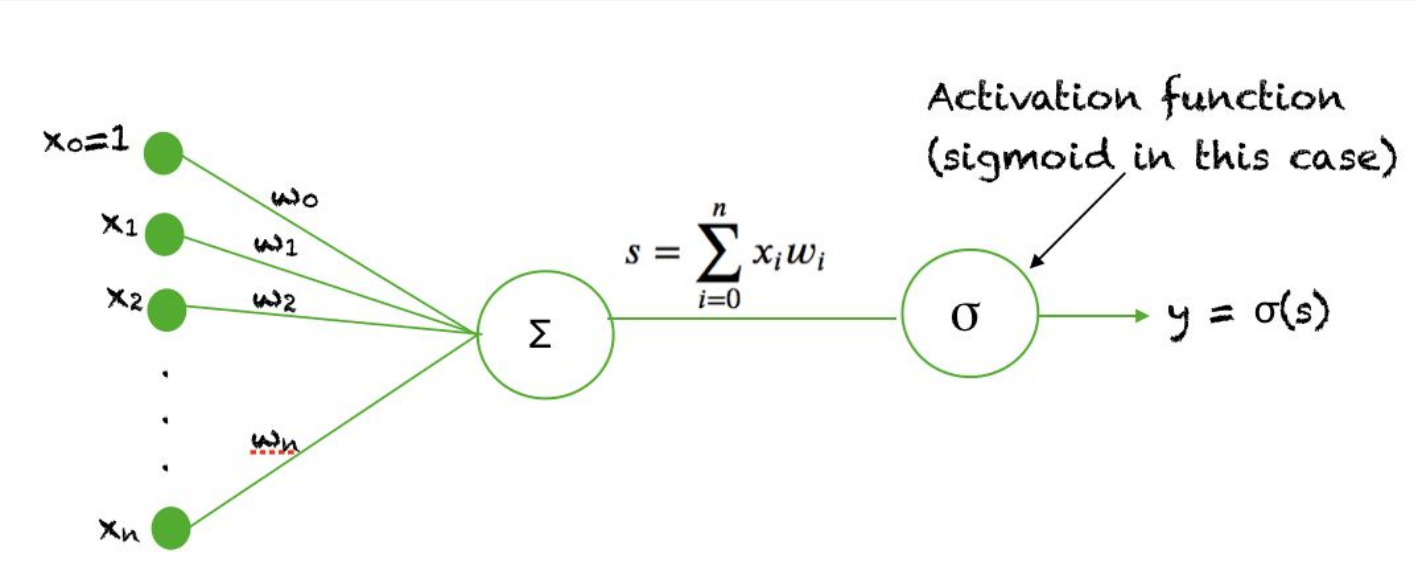


We have seen this exact idea before, haven't we ...?

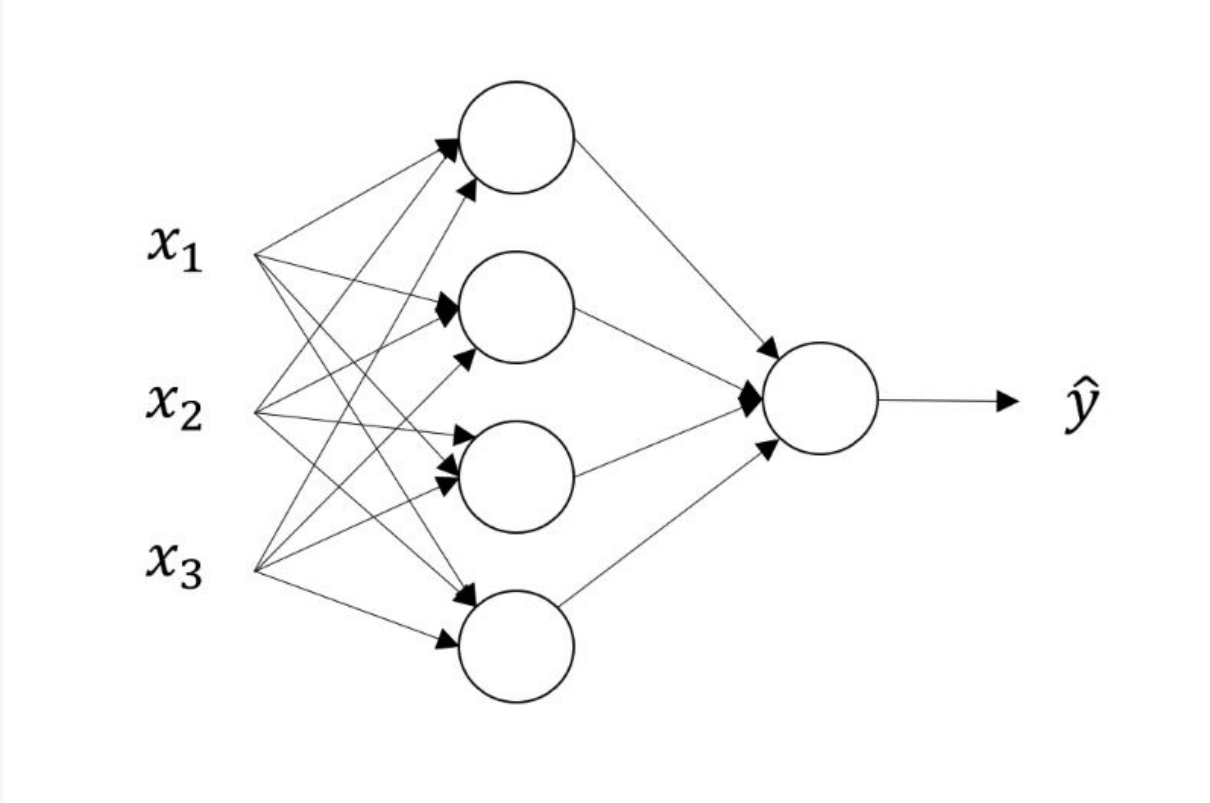
Minsky and the Perceptron

Frank Rosenblatt's Perceptron - 1957
The Minsky paper and the misunderstanding that led to the AI winter - 1969
Multilayer perceptron and the backprop paper - Rumelhart et al - 1980s
Solving the XOR problem

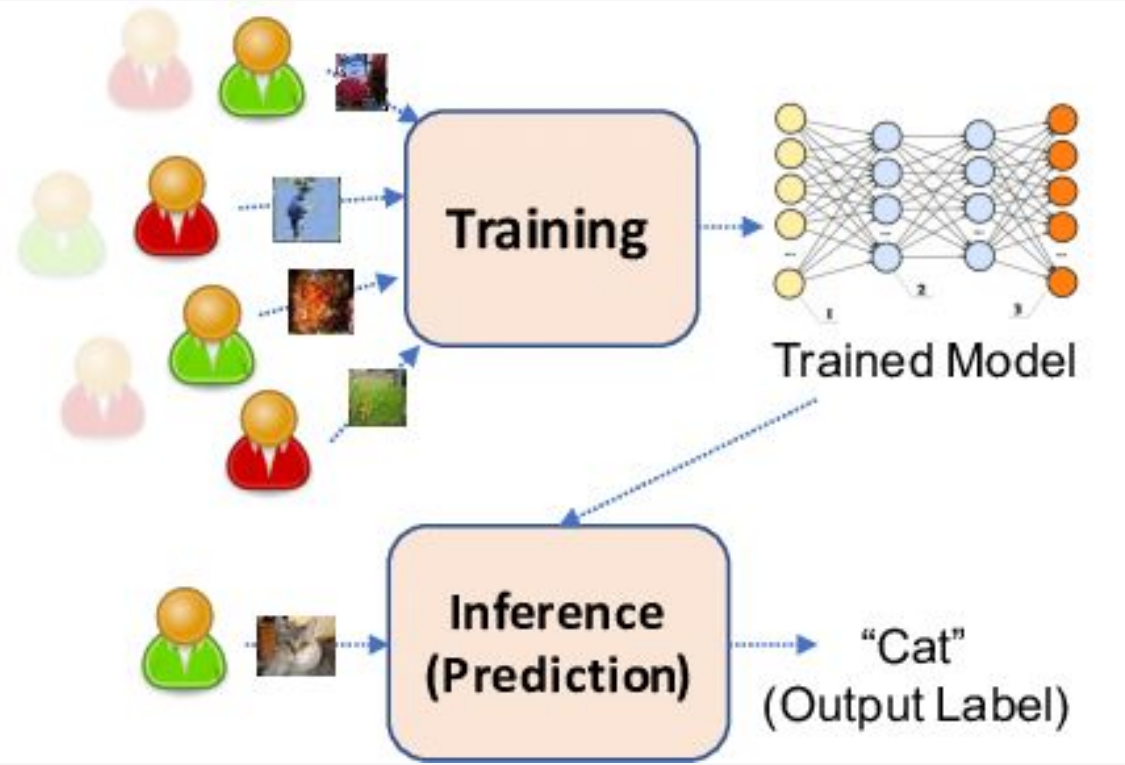
From Logistic regression to Neural Nets



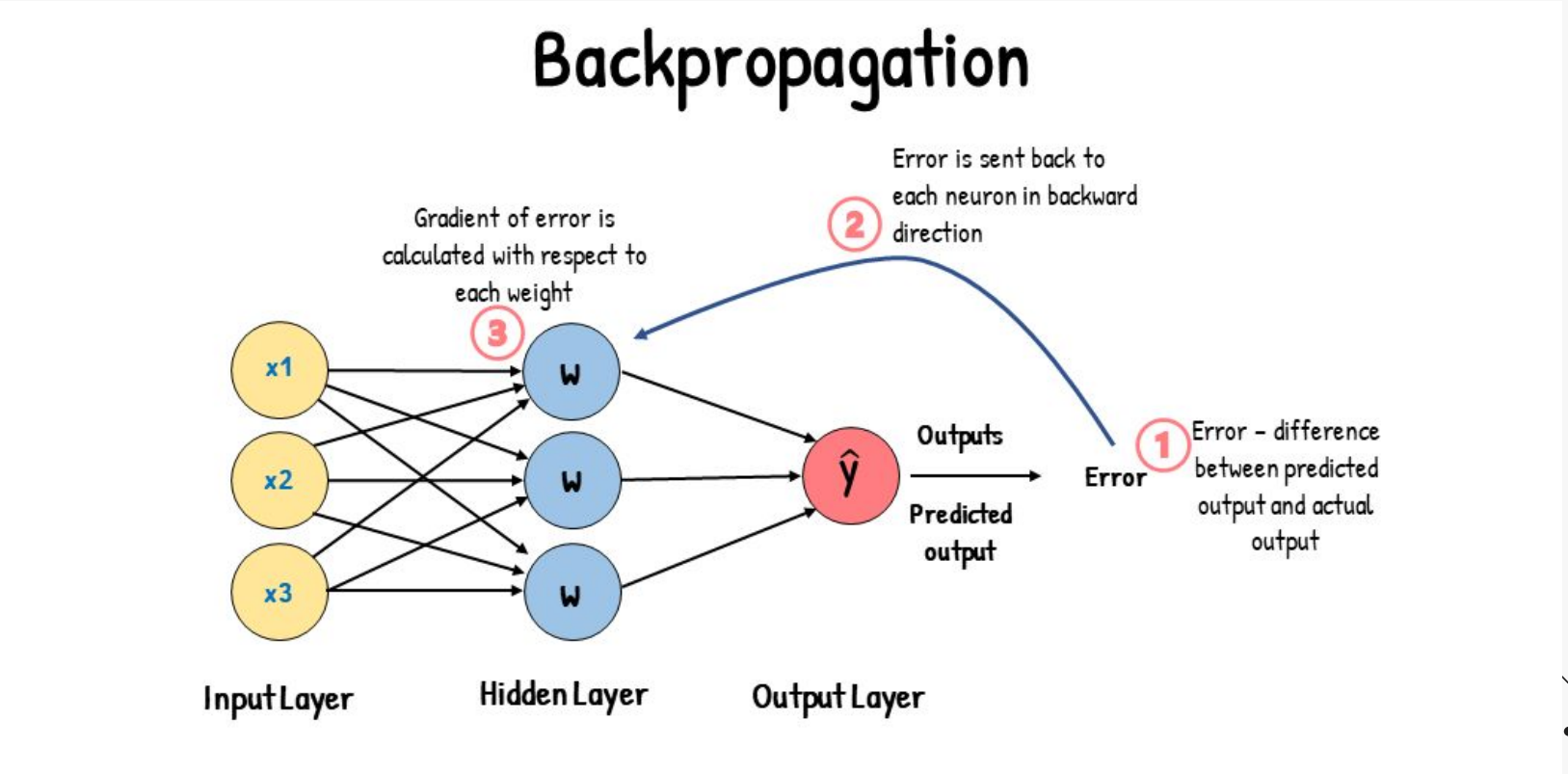
NN Representation



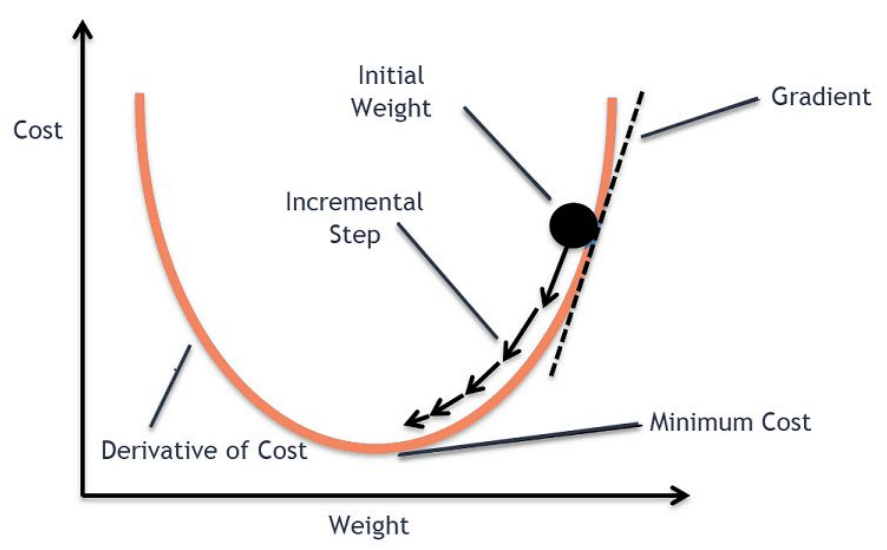
NNs - Key ideas

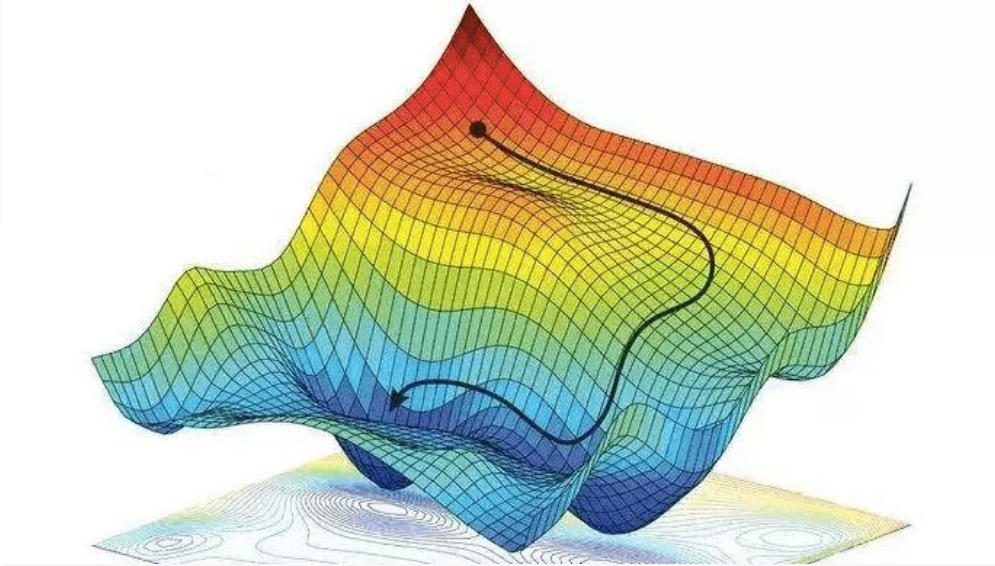


NNs - Key ideas contd...



NNs - Key ideas contd...





MNIST dataset

SciKit Learn ⇒ Keras and Tensorflow

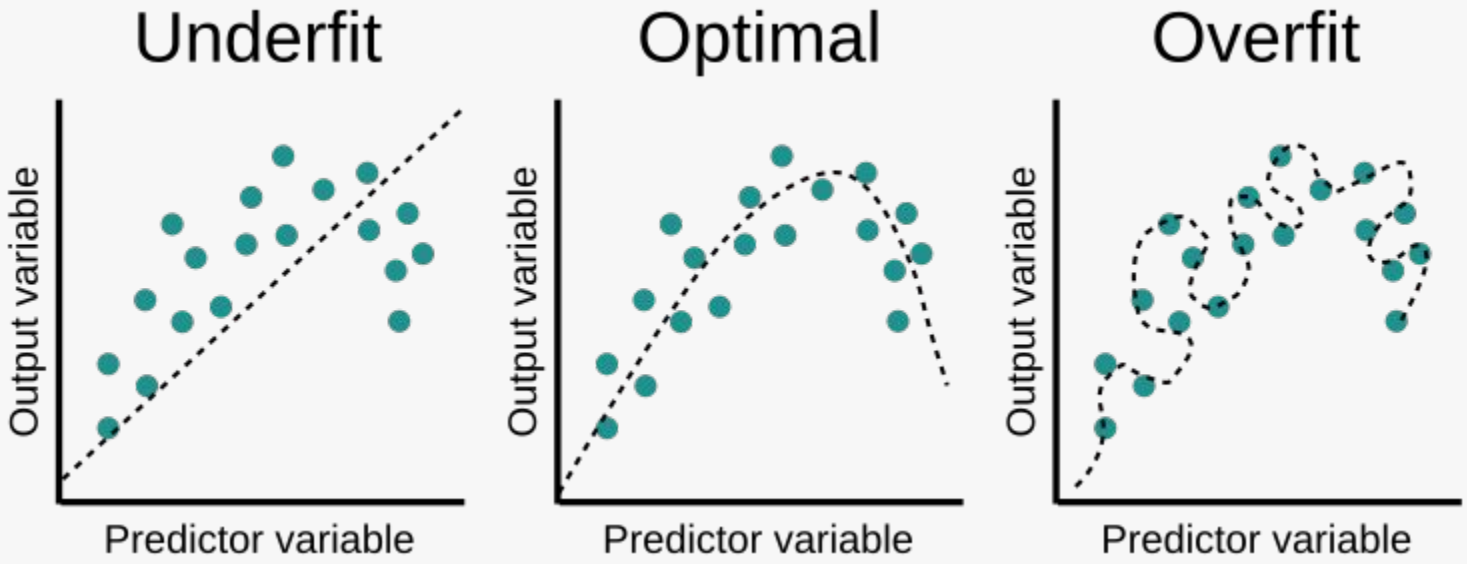
Rajat Monga

Francois Chollet

MNIST Digits Classification - code walkthrough


Me
Deep learning
Simple problem

How is the fit?



Understanding the bias-variance tradeoff

NNs - Key ideas - recap

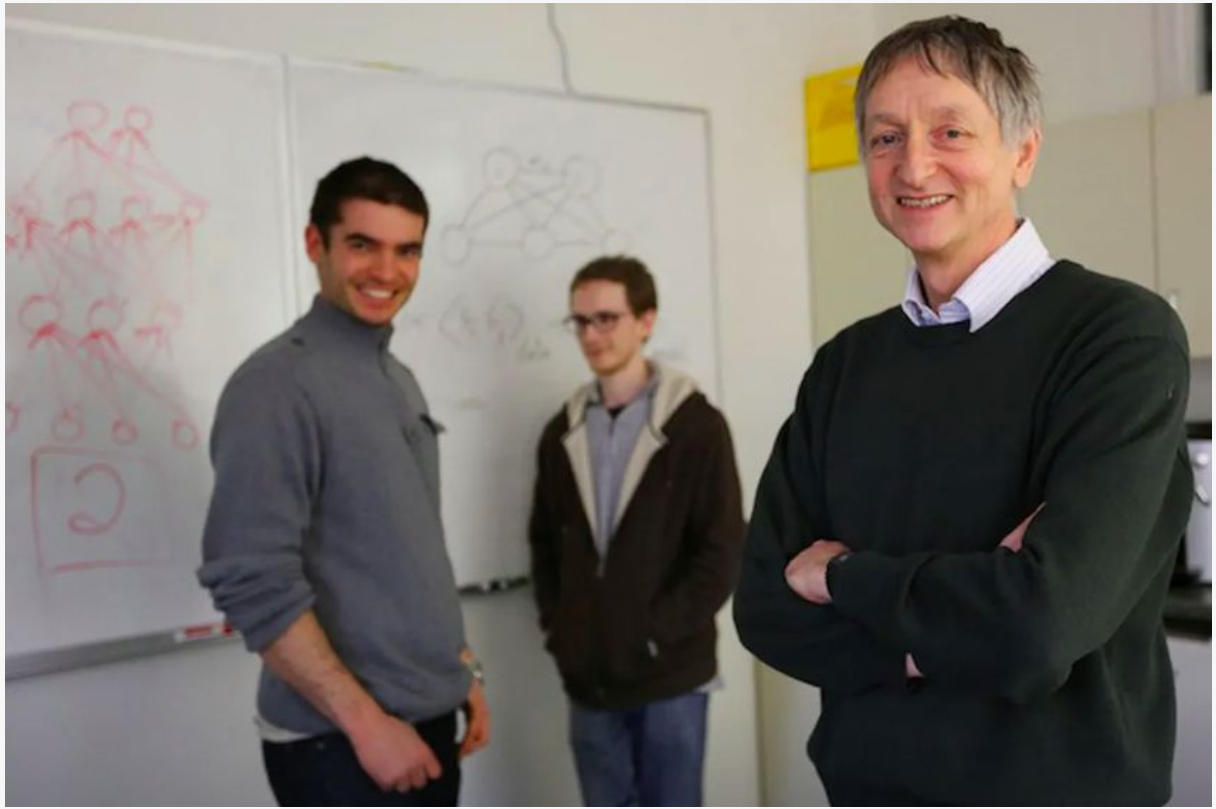
- Feature Representation as Vectors
- Training mode vs Inference mode
- Cost Function
- BackPropagation
- Gradient Descent

Hyperparameter tuning

Things you can tweak:

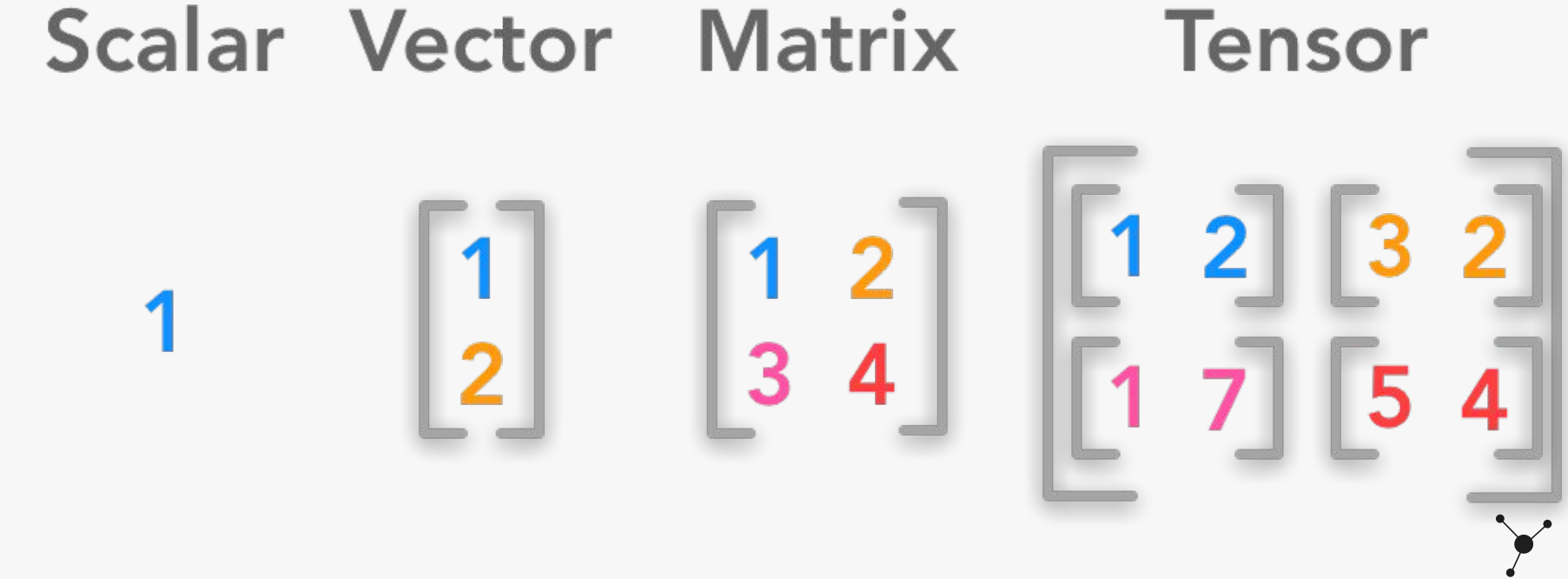
- Batch size
- Epochs
- Learning Rate (α) 1e-3 = 0.001
- Momentum (Optimizer)
- Loss Functions?
- Regularization parameters

Deep Learning founders - tribute



Geoff Hinton
Ilya Sutskever
Alex Krizhevsky

Vectors and Tensors!



Source: Hadrien Jean's blog post

Understanding Tensor Ops - PyTorch

Vectors

Tensors

Matrices

Matrix multiplication

Soumith Chintala

Yann LeCun