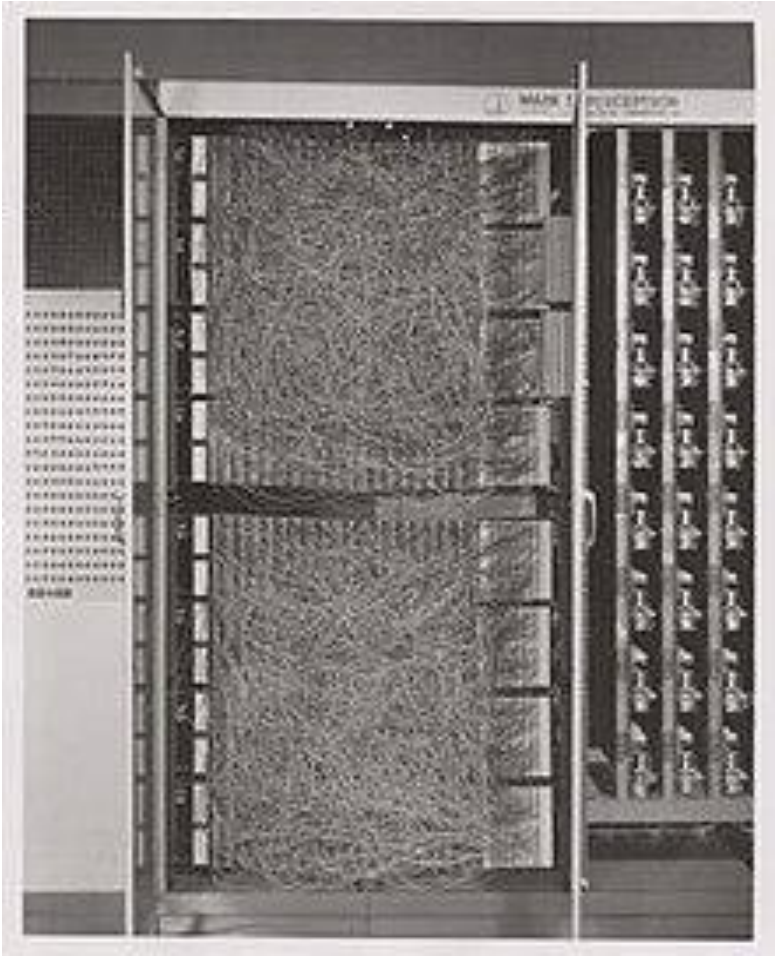
Deep Learning através das abstrações

O Perceptron
e o MLP

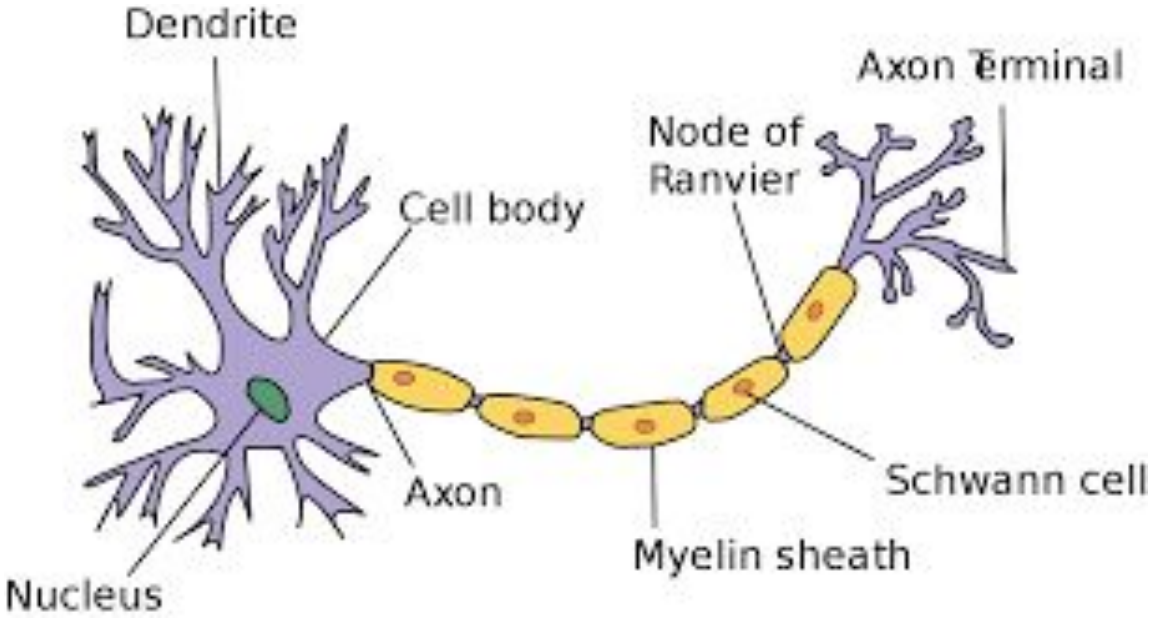
Surgimento

- Frank Rosenblatt 1957
- Mark I
- Inspiração biológica
- Aplicação biologica
- Embrião das redes neurais
- Mais simples, garantias teóricas

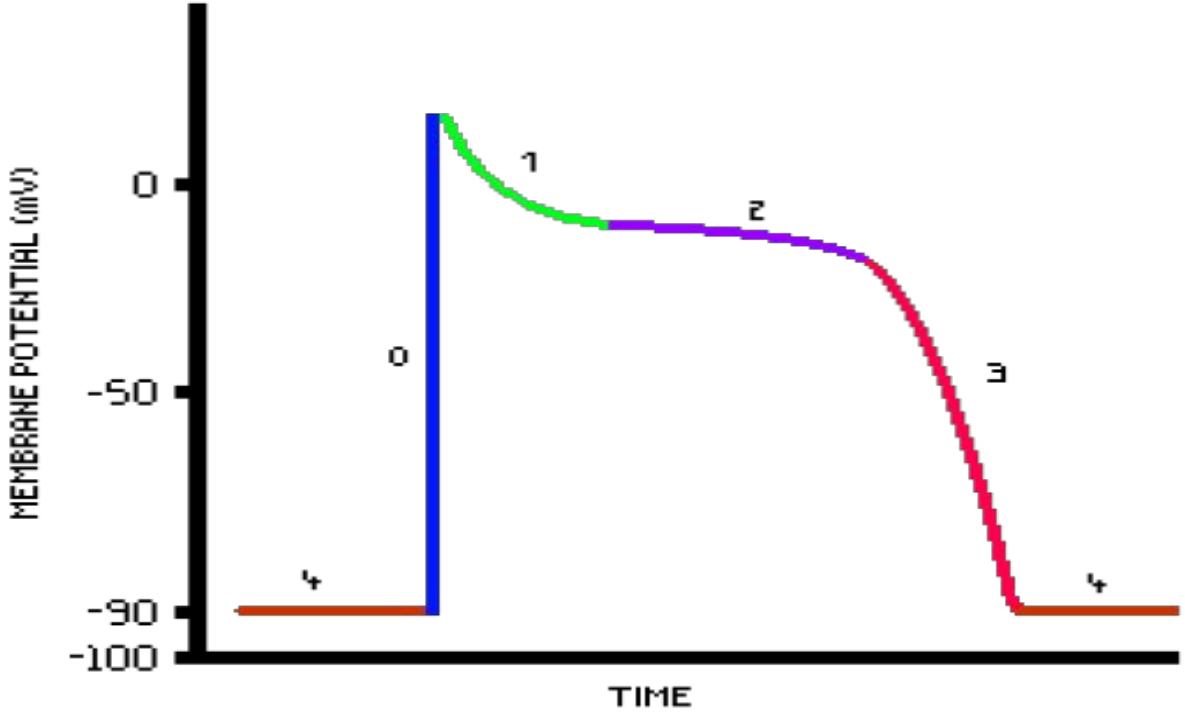
Mark I



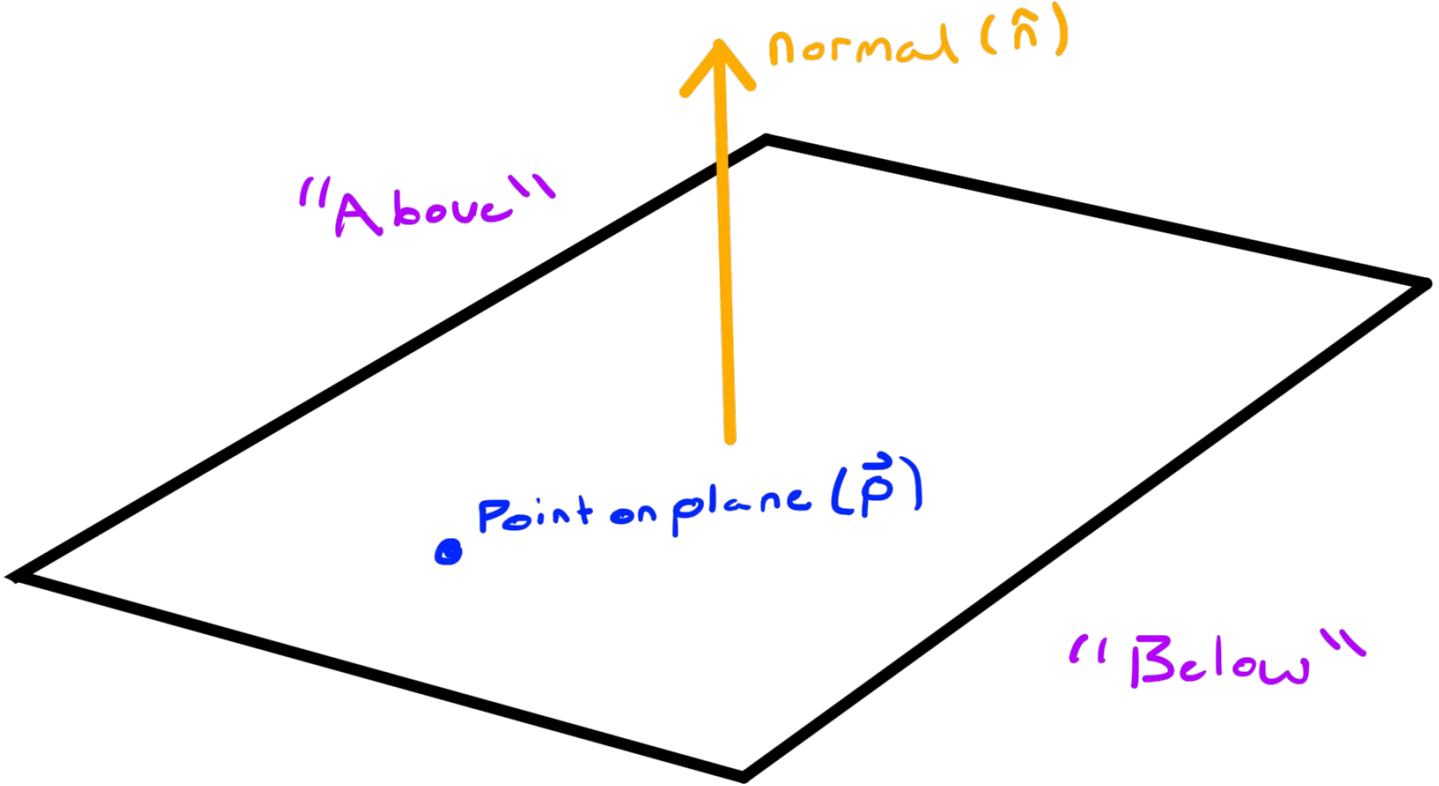
Inspiração Biológica



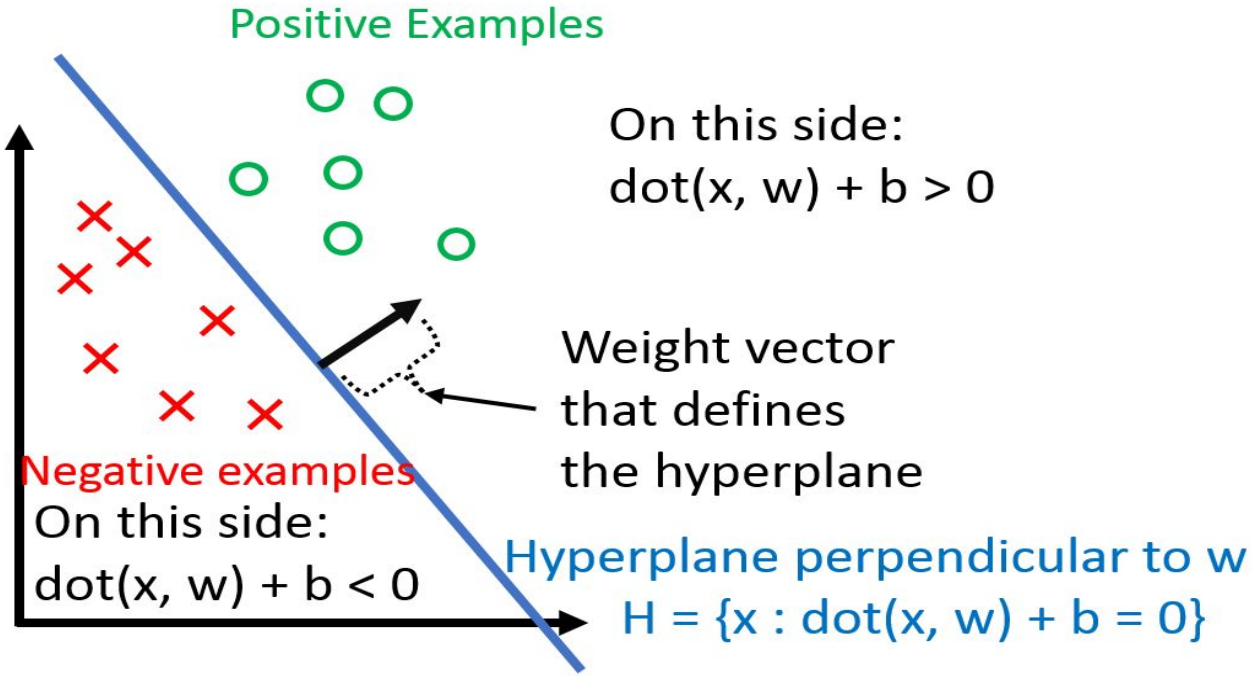
Inspiração biológica



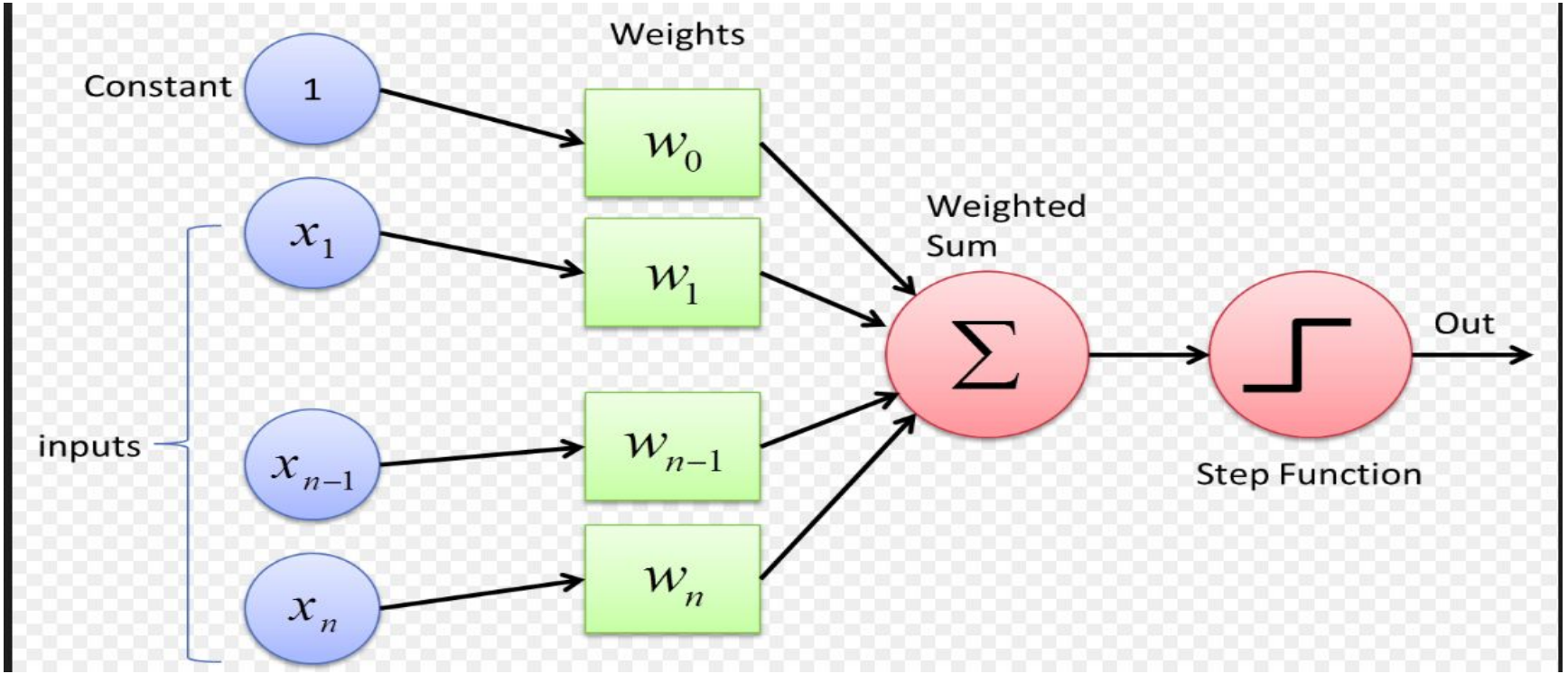
Modelo Matemático



Separador Linear



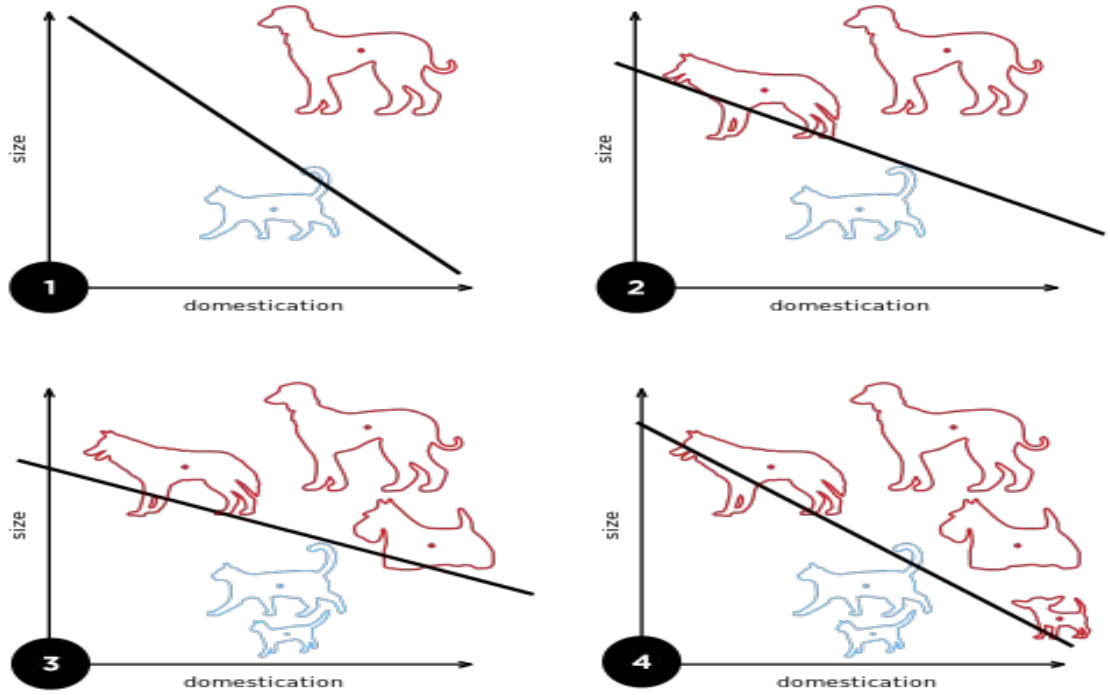
Modelo Matemático



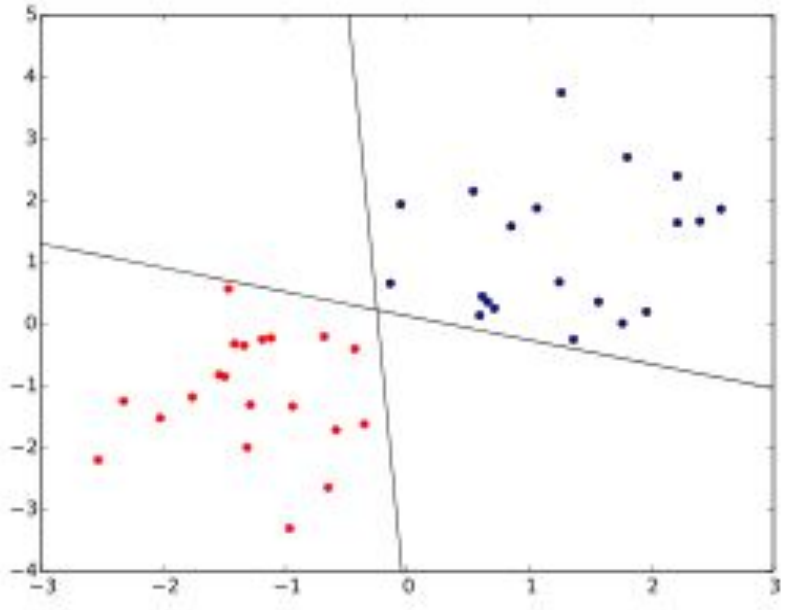
Treinamento

- Para cada entrada calcula a saída do perceptron
- Atualiza os pesos dele com
  - W += (t - y)*X
- Repete até convergir

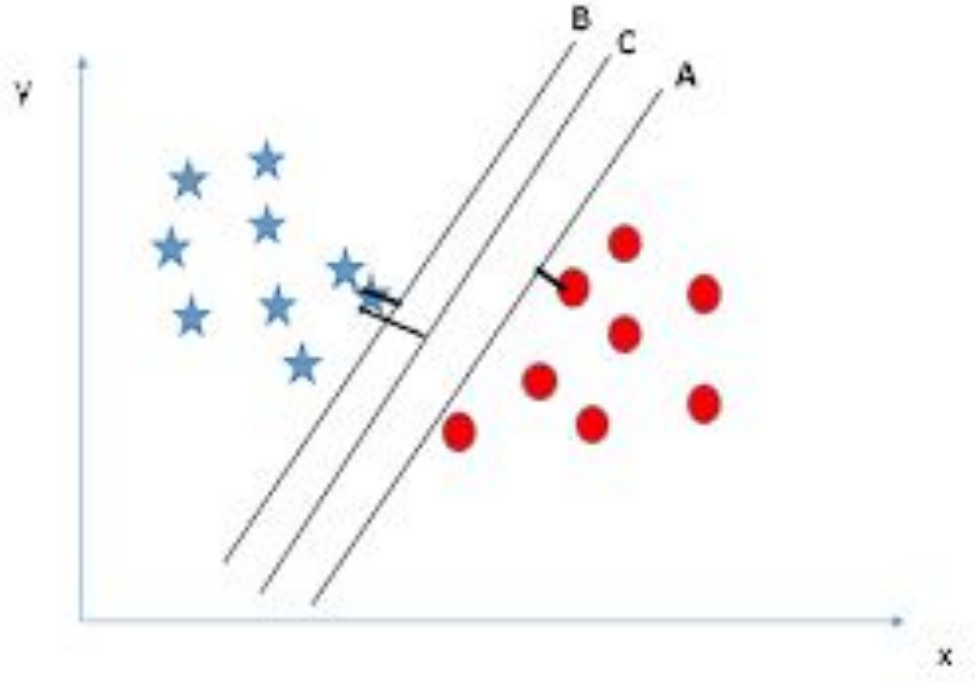
Treinamento



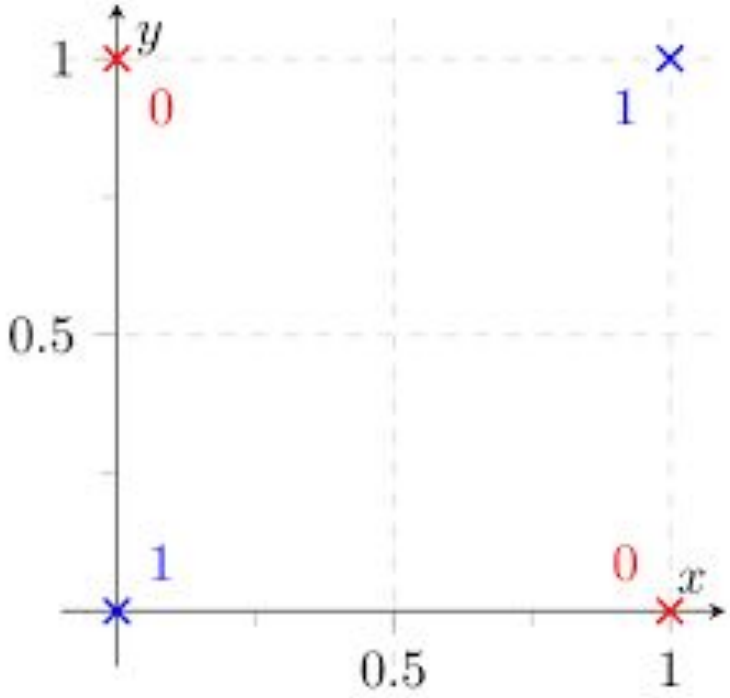
Convergência



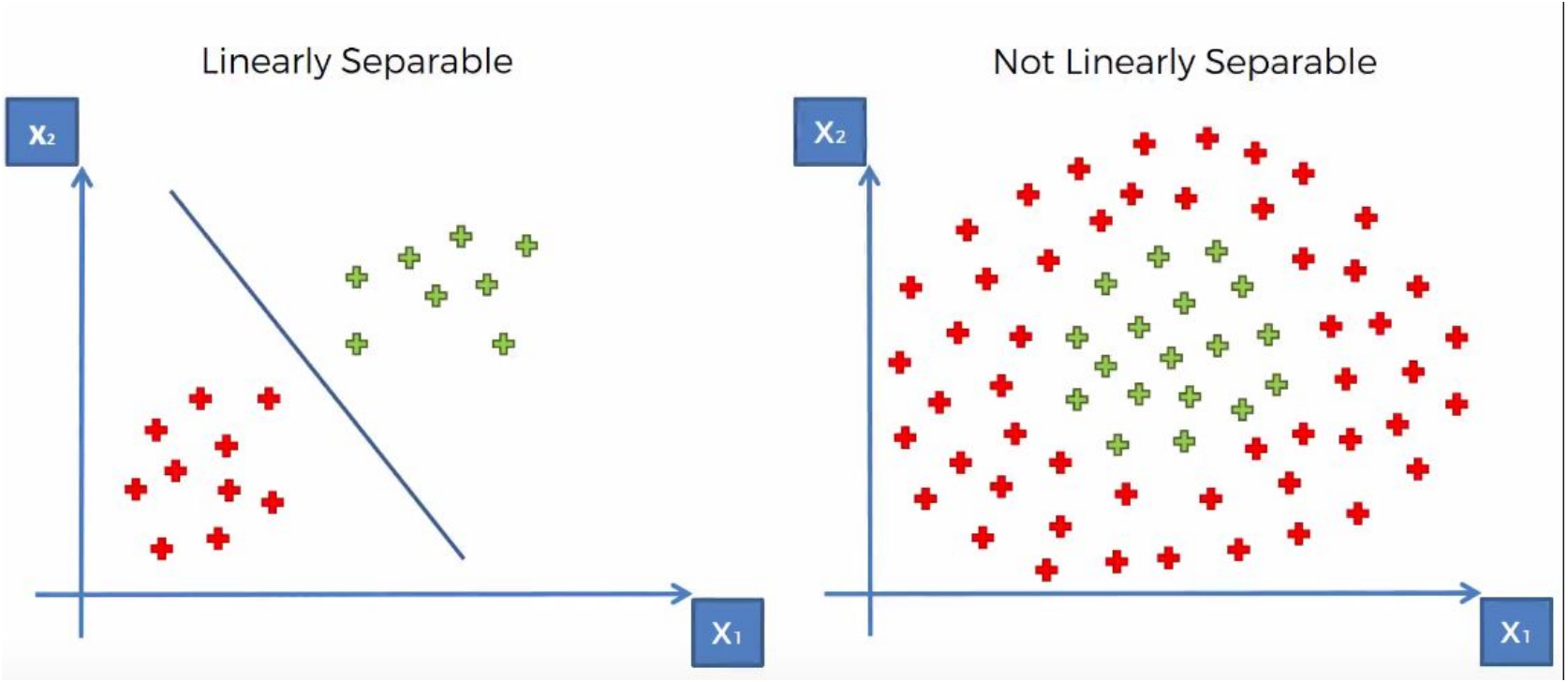
Convergência



Xor e problemas não lineares



Xor e problemas não lineares



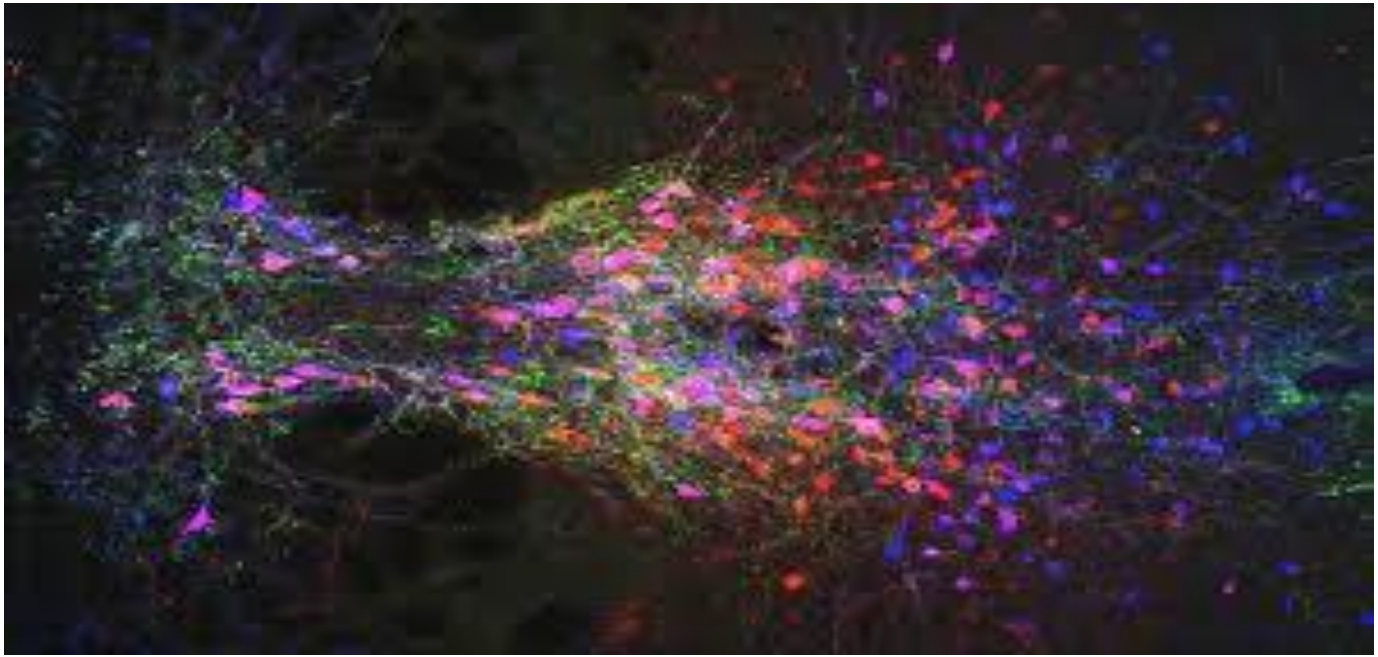
Solução

- Introduzir não-linearidade no modelo
  - Kernel methods: transformação do espaço
  - MLP: Multilayer perceptron
  - No fundo, são a mesma coisa

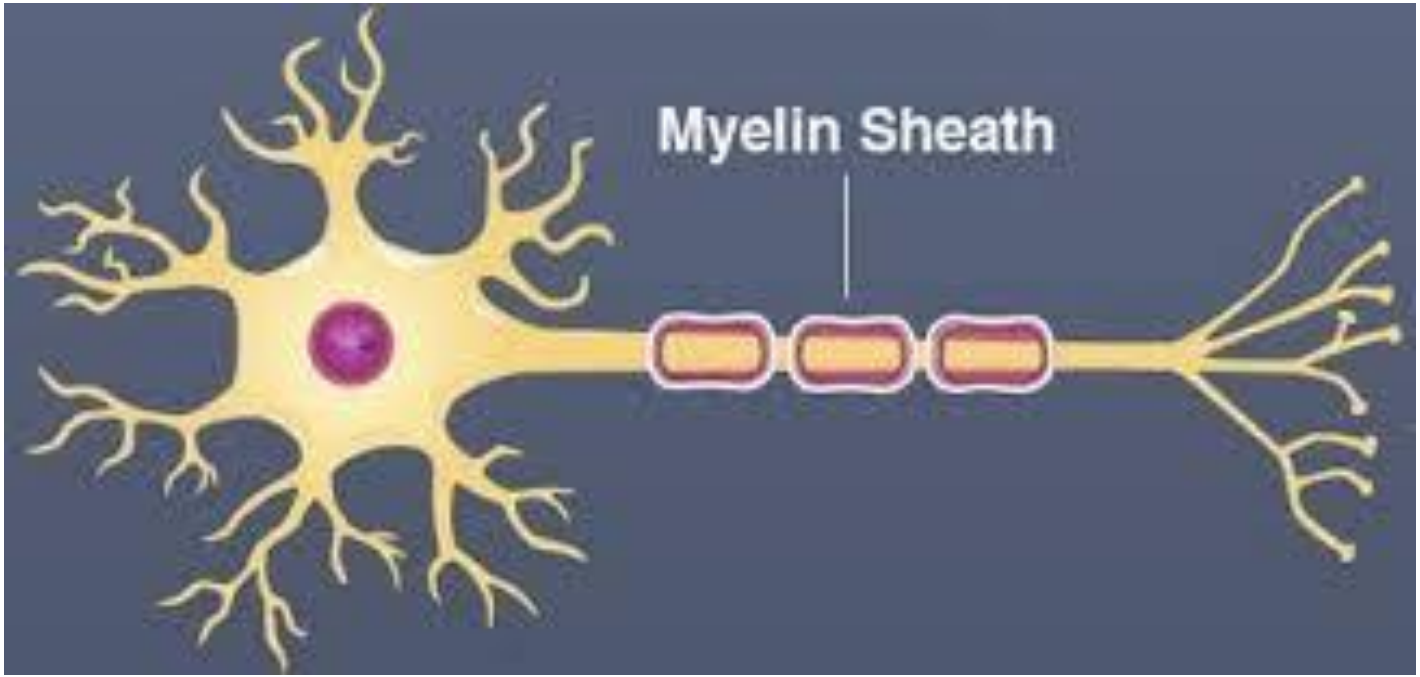
Multilayer Perceptron

- Combinação de vários perceptrons formam uma camada
- Várias camadas formam um MLP
- A famosa rede neural
- Resolve muitos dos nossos problemas, introduz novos
- Muito complexas, menos garantias teóricas
- Teorema da aproximação universal

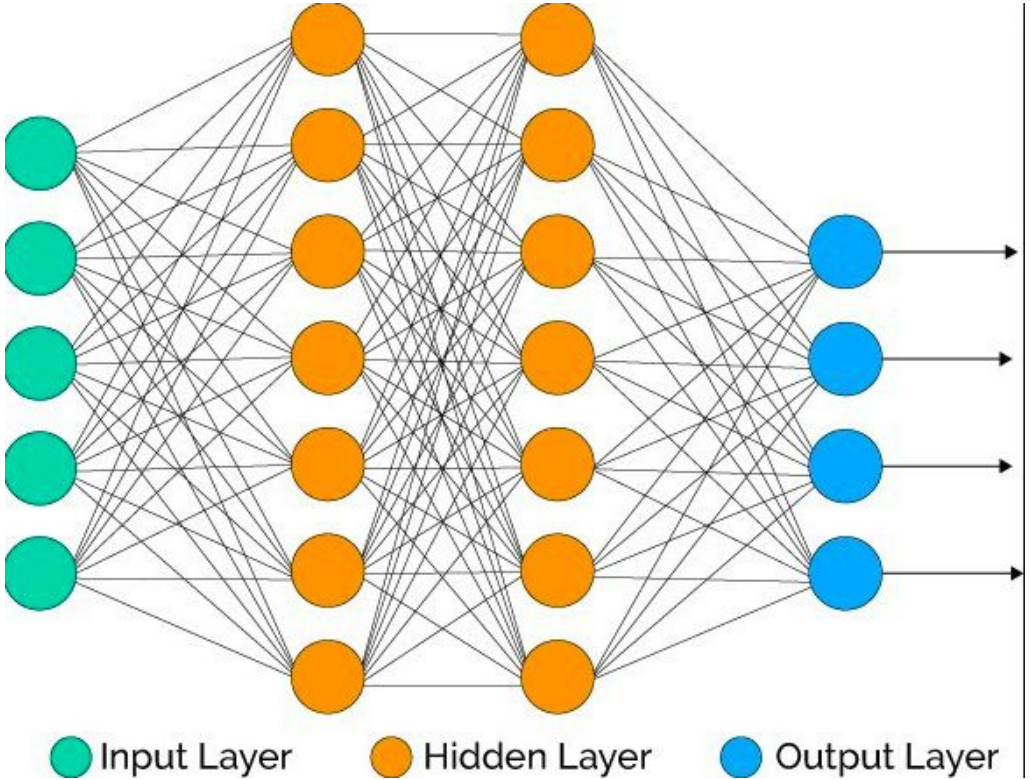
Inspiração biológica - arquitetura



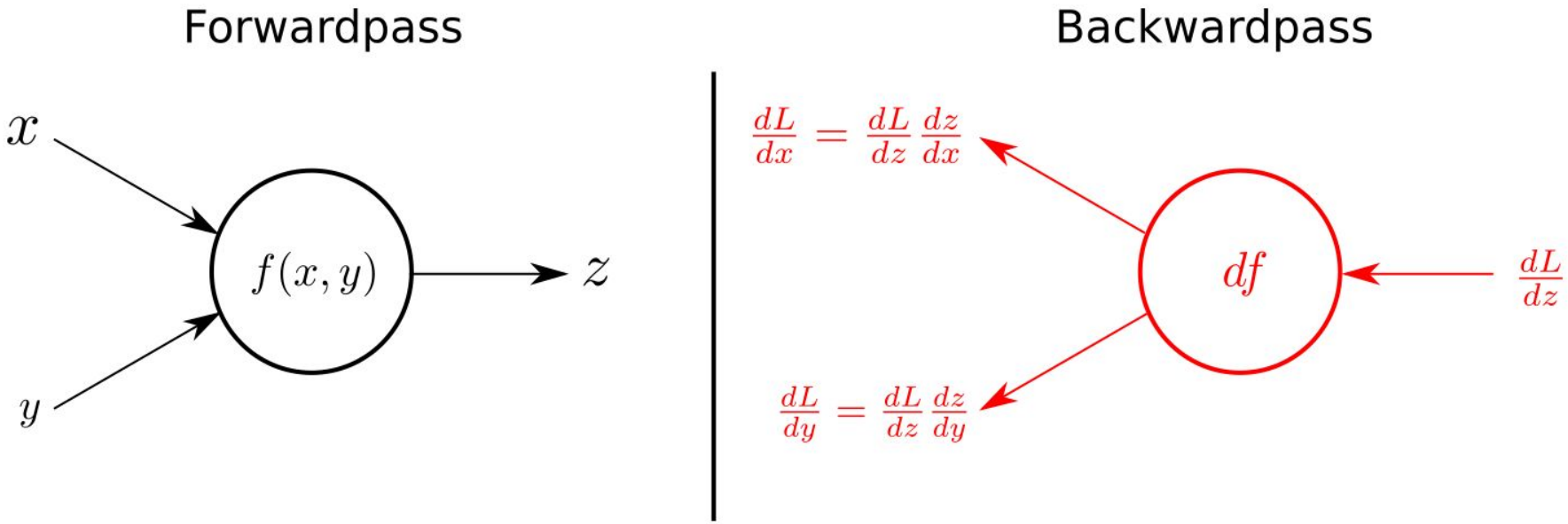
Inspiração biológica - treinamento



Modelo Matemático



Treinamento - Backpropagation



Resources - Cursos

- Tensorflow 2.0 Udacity
- Tensorflow 2.0 Coursera
- Machine Learning Andrew Ng
- Cornell CS 478
- Stanford CS 231n

Resources - Livros

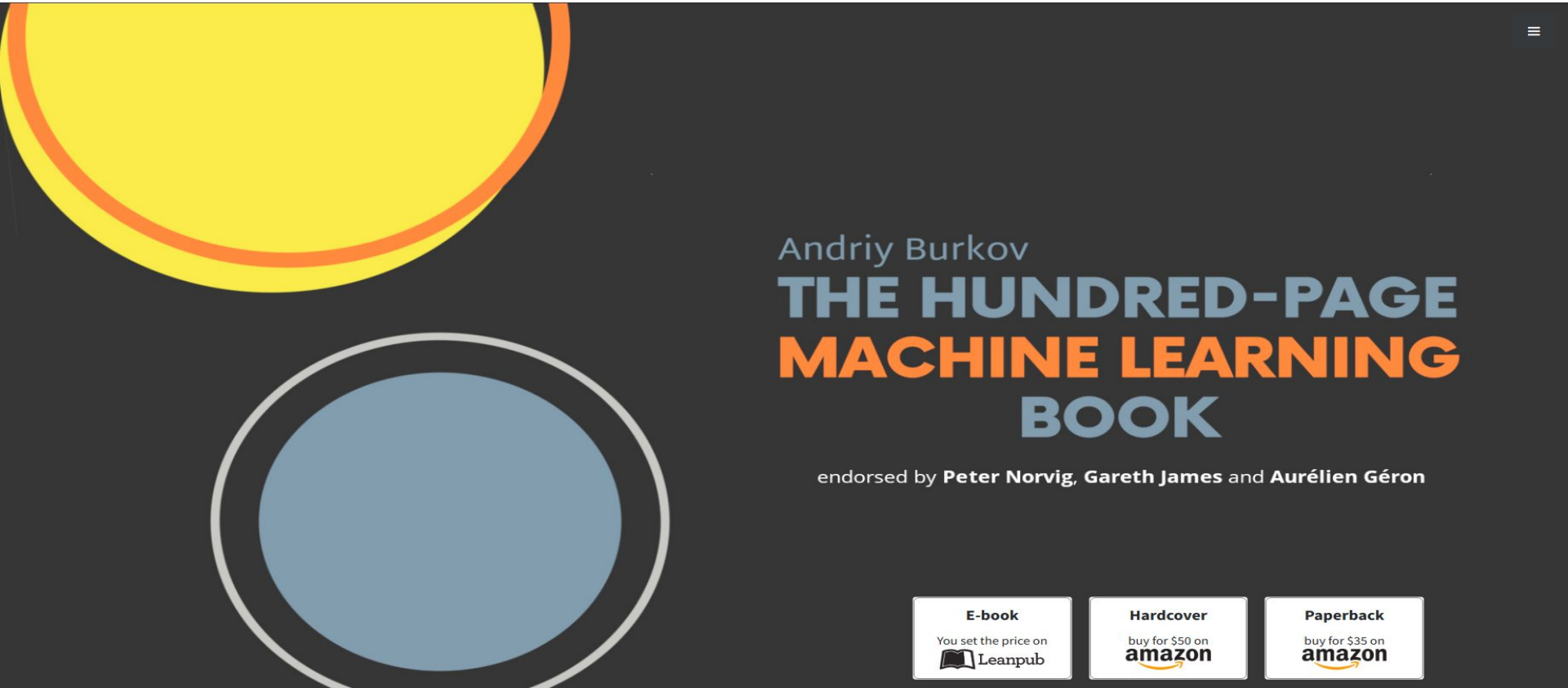
Neural Networks and Deep Learning

Neural Networks and Deep Learning is a free online book. The book will teach you about:

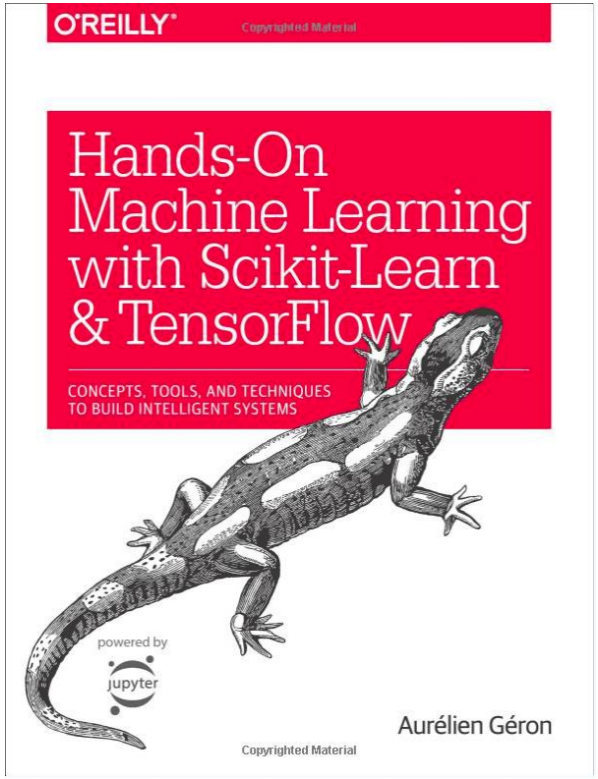
- Neural networks, a beautiful biologically-inspired programming paradigm which enables a computer to learn from observational data
- Deep learning, a powerful set of techniques for learning in neural networks

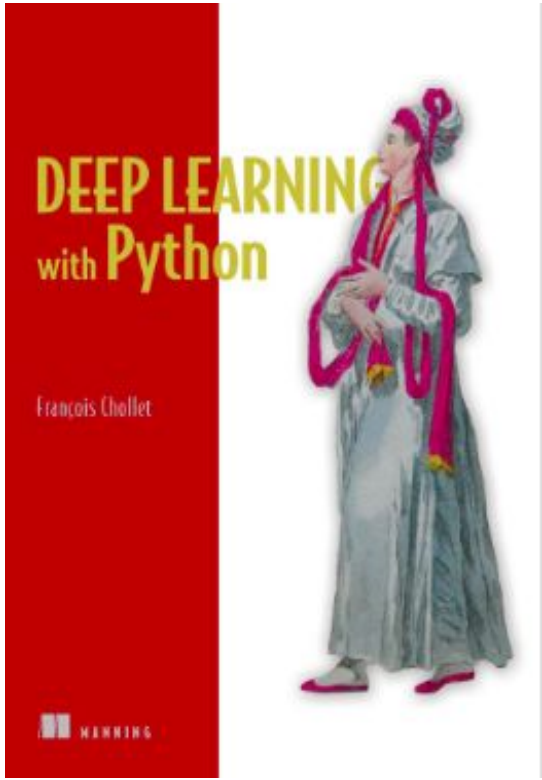
Neural networks and deep learning currently provide the best solutions to many problems in image recognition, speech recognition, and natural language processing. This book will teach you many of the core concepts behind neural networks and deep learning.

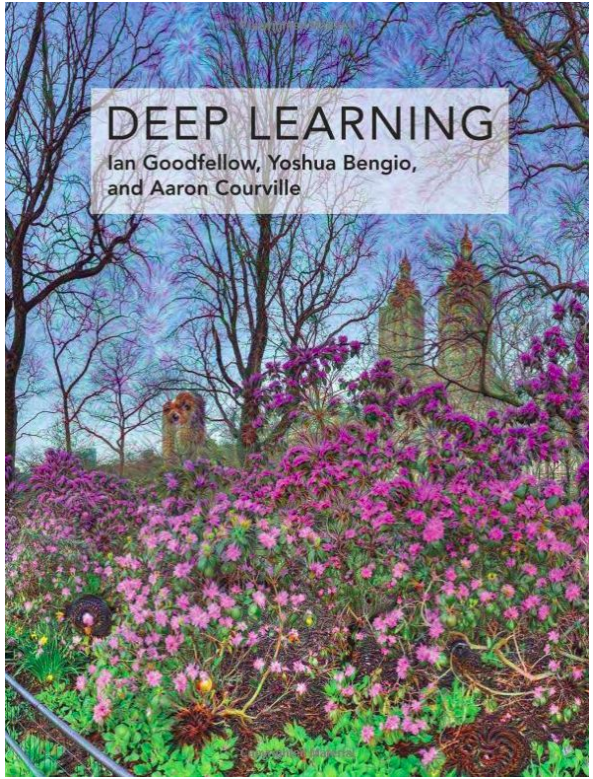
Resources - Livros



Resources - Livros







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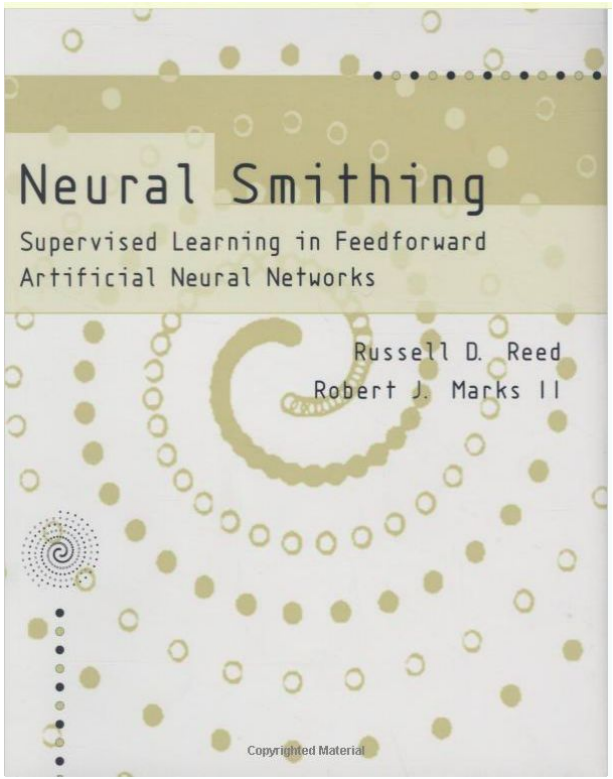

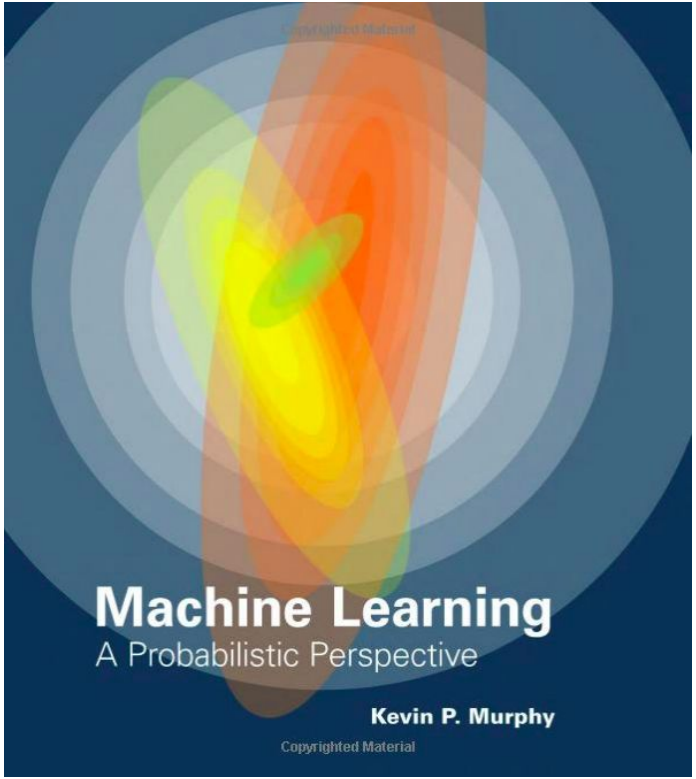

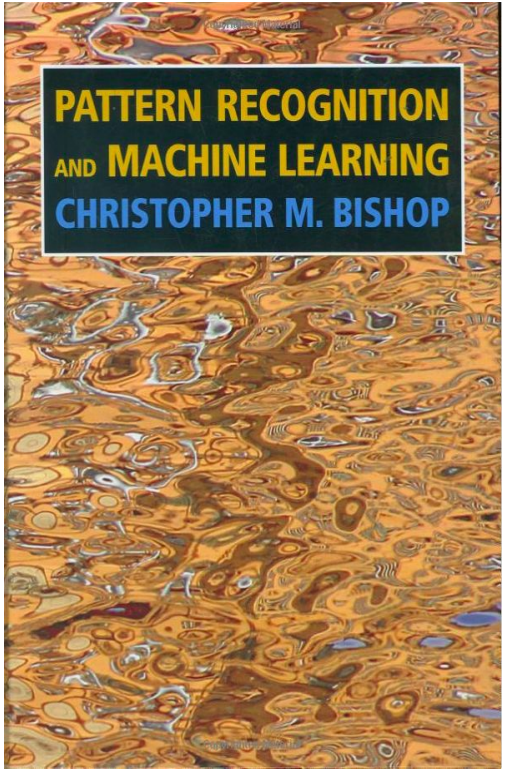

Mexer e pegar intuição

- Tensorflow playground
- Aifiddle

Despedida

- Deem uma olhada em algum dos resources
- Respondam o forms
- Queria que o número de slides fosse divisível por 3