Neural Networks: From Perceptron to Practice

Complete Course Summary

MODULE 1

The Perceptron

- Biological inspiration
- Single layer classifier
- Linear decision boundaries
- Convergence theorem
- XOR problem limitation

MODULE 2

Multi-Layer Perceptrons

- Hidden layers
- Activation functions
- Universal approximation
- Forward propagation
- Loss functions

MODULE 3

Training NNs

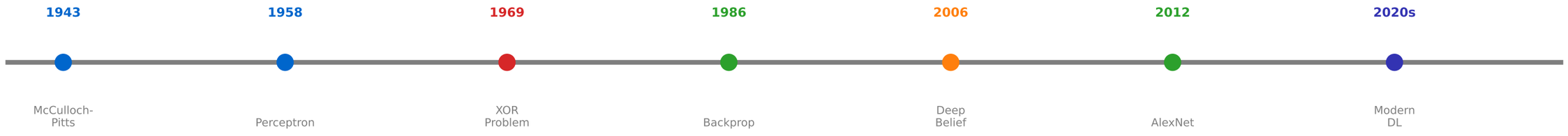
- Backpropagation
- Gradient descent
- Regularization
- Overfitting
- Hyperparameters

MODULE 4

Applications

- Finance applications
- Model selection
- Limitations
- Best practices
- Future directions

Historical Journey: 1943 - Present



Key Equations: $y = \sigma(Wx + b)$ | $L = -\sum y \log(\hat{y})$ | $w \leftarrow w - \eta \nabla L$