Introduction

Resana Machine Learning Workshop

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Motivation

Machine learning and deep learning has taken over most AI tasks:

- Computer Vision: Object Recognition, Face Analysis, …
- Signal Processing: Data Compression, Denoising, …
- Control: Games, Robotics
- Audio and Speech Recognition
- Natural Language Processing
- Automation of Smart Devices

Motivation

Machine learning and deep learning has taken over most AI tasks:

- Computational Social Science
- Computational Biology and Bioinformatics
- Computational Neuroscience
- Brain-Computer Interface
- Medicine, Diagnosis and Health Care
- Financial Forecasting
- Recommender Systems

Main Objectives

- Concepts:
  - Familiarity with some of the terminology and main concepts of machine learning
  - Understanding the main steps of building an AI agent
  - Understanding basic concepts about learning and optimization
  - Understanding neural networks (design and training)
- Practical:
  - Become familiar with practical implementation of learning algorithms and neural networks through hands-on practice in python

Main Objectives

- Topics:
  - Introduction to Machine Learning
  - Supervised Learning and Unsupervised Learning
  - Generalization
  - Artificial Neural Networks
  - Multilayer Perceptron
  - Optimization
  - Loss Functions and Regularization
  - Error Backpropagation
  - Convolutional Neural Networks
  - Recurrent Neural Networks
  - Advanced Topics: Reinforcement Learning or Generative Models