Data Driven Engineering 1
Machine Learning for Dynamical Systems

Basics

1. Basics I: Introduction to DDE
   1.1. Foundations of Intelligence
   1.2. Introduction of AI: Historical Context
   1.3. Data-Driven Dynamical Systems
   1.4. Contemporary Examples
   1.5. The Flow of the Lecture

2. Basics II: An Ode to Learning
   2.1. Problem Solving and Reasoning
   2.2. Planning
   2.3. Theory of Learning and Learning Types
   2.4. Decision Theory
   2.5. Machine Learning: Overview, Means and Goals

Fundamentals

3. Analysis of Static Datasets I: Classification and Regression
   3.1. Supervised ML Landscape
   3.2. Classification
       3.2.1. Logistic Regression
       3.2.2. Gradient Decent
       3.2.3. Random Forests
       3.2.4. Boosting
   3.3. Regression
       3.3.1. Lasso
       3.3.2. Elastic Net
       3.3.3. SVM
       3.3.4. Bayesian Ridge Regression
4. Analysis of Static Datasets II: Clustering and Dimensionality Reduction
   4.1. Unsupervised ML
   4.2. Clustering
       4.2.1. K-Means

ML for Dynamical Systems