

Introduction in Machine Learning

The aim of this presentation is to introduce you in the fascinating world of algorithms that learn and predict from the data. In the first part we will provide a brief overview of the fundamentals of machine learning (ML) and in the last part we will shortly present some machine learning techniques and applications. For the beginning we will consider machine learning like a black box without being interested in the inside of a specific machine learning techniques in order to better understand the mechanism of inductive learning and the general steps to be followed for solving a problem using whatever machine learning technique. Scikit-learn, the Python library for machine learning, is used to exemplify the implementation of these steps. As examples we consider different problems successfully tackled using machine learning (face detection, text feature extraction, classification). A presentation of few representative ML techniques (decision trees, neural networks, support vector machines, Bayesian methods) will pave the way for a further exploration of the ML field. As application is presented a tool designed for automate identification of watermarks in noisy images using neural networks.

Machine Learning, Nature Inspired Algorithms and Applications

Many insects (e.g ants, wasps) or animals (e.g fishes) have a collective intelligence. Nature inspired algorithms simulates this kind of collective intelligence being very useful in agents based applications. The aim of this talk is to present the characteristics of ants and wasps algorithms and some practical applications. A multi-agent 3D ant colony simulator illustrates the ant behaviour exploited by the ant behaviour based algorithms. Other application is a simulator for an intelligent vehicle control system based on reinforcement learning combined with a wasp behaviour type algorithm.