All About AI

Python Edition

Starts 23 September 2018

Plan

- Course Objective
- Prerequisites
- Components
- Course Length
- Tools Used
- Week 1: Python
- Week 2: Data Manipulation
- Week 3: Supervised Learning
- Week 4: Ensemble Learning
- Week 5: Unsupervised learning
- Week 6: Recommender Systems
- Week 7: Artificial Neural Networks
- Week 8: Reinforcement Learning

Plan (Suite)

- Week 9: Convolutional and Recurrent Neural Networks
- Week 10: Logic Programming
- Week 11: Search
- Week 12: Planning
- Week 13: Genetic Algorithms
- Week 14: Knowledge Representation
- Final Project
- References

Course Objective

- The course “All About AI” aims to introduce the students to the different branches of AI from a programming angle.
- They will learn the different programming techniques related to the AI field in a particular programming language.
- In this edition, the learning will be in Python

Prerequisites

- Be familiar with the concept of a programming language

Components

- Educational presentations
- Quizzes
- Reading Assignments
- Coding Assignment
- Students Feedback
- Final Project

school of ai

Course Length

- 14 weeks
- 7-8 hours of dedicated study per week
- Starts September 23 at 8 AM GMT+1

Tools Used

- Google Colab
- Python’s libraries
- Eliademy learning platform

Week 1: Python

Topic Covered:

- Introduction to AI, Python and Colab
- Basics (in Python)
- Data structures and control flow
- Regular Expression
- System programming
- Object Oriented Programming

Week 2: Data Manipulation

Topic Covered:

- NumPy & pandas
- Data loading, Storage, and File formats
- Data cleaning and preparation
- Data Wrangling: Join, Combine, and Reshape
- Plotting & Visualization
- Data aggregation and group operations
- Time Series

Week 3: Supervised Learning

Topic Covered:

- Supervised learning, classification and Regression
- Linear and polynomial regression
- Linear regression for single and multi-variable data
- Logistic regression classifier
- Naive Bayes classifier
- Support Vector Machine classifier and regressor

Week 4: Ensemble Learning

Topic Covered:

- Decision Trees
- Bagging & Pasting
- Random Forest
- Logistic regression classifier
- Adaptive Boosting (AdaBoost)
- Gradient Boosting

Week 5: Unsupervised Learning

Topic Covered:

- Unsupervised learning and k-mean clustering
- Mean shift algorithm
- Silouette Scores
- Hierarchical clustering (ward clustering)
- Gaussian Mixture Models
- Affinity Propagation Model

Week 6: Recommender Systems

Topic Covered:

- Extracting the nearest neighbors
- Building a K-Nearest Neighbors classifier
- Computing similarity scores
- User Based Collaborative Filtering
- Item Based Collaborative Filtering
- Building a Recommendation System

Week 7: Artificial Neural Networks

Topic Covered:

- Introduction to ANN
- Perceptron
- Single layer neural network
- Multi layer neural networ
- Tensorflow & Keras
- Training MLP with Tensorflow

Week 8: Reinforcement Learning

Topic Covered:

- Introduction to reinforcement learning and Policies
- OpenAI Gym
- Credit Assignment Problem
- Policy Gradients
- Markov Decision Processes
- Temporal Difference Learning and Q-leqrning

Week 9: Convolutional & Recurrent Neural Networks

Topic Covered:

- CNN architectures
- CNN layers: convolutional & pooling layer
- LeNet-5, AlexNet, GoogLeNet, ResNet
- Introduction to RNN and recurrent neurones
- Basics RNN in tensorflow
- Training RNNs

Week 10: Logic Programming

Topic Covered:

- Logic Programming
- Application: matching mathematical expressions A
- Application: validation primes
- Application: parsing a family tree
- Application: analyzing geography
- Application: building a puzzle zolver

Week 11: Search

Topic Covered:

- Uninformed search strategies
- Heuristic search strategies
- Local search Techniques
- Simulated Annealing
- Constraint Satisfaction Problem
- Application: Building a maze solver

Week 12: Planning

Topic Covered:

- Classical Planning
- Planning as State Space search
- Planning Graphs
- Hierarchical Planning
- Planning and Acting in non deterministic domains
- Implementation for some planning algorithms

Week 12: Genetic Algorithms

Topic Covered:

- Genetic algorithms concepts
- Binary and continuous genetic algorithms
- Application: Genetic Search Algorithm
- Application: One max problem
- Application: One max problem variant (generating bit pattern)
- Application: Building an intelligent Robot Controller

Week 12: Knowledge Representation

Topic Covered:

- Ontological Engineering
- Categories and Objects
- Events
- Mental Events and Mental Objects
- Reasoning Systems for Categories
- Reasoning with Default Information

Final Project

Topic Covered:

- Creating a git repository
- List of problems
- Apply on of the AI methods to solve one of the given problems

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Thank you!

FOR ALL YOUR TIME