Introduction to Python and Machine Learning

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https://goo.gl/WC8Wgi

Outline

- Introduction to Python
- What is Anaconda?
- What is PIP?
- Jupyter Notebook
- Basics
- Operators and Expressions
- Control Flow
- Functions
- Modules
- Object Oriented Programming
- Introduction to Machine Learning
- Loading the Dataset
- Summarizing the Dataset
- Visualizing the Dataset
- Prediction using Machine Learning
- Evaluating the results

Introduction to Python

- Free and Open-Source
- Readable, very clear syntax
- On average, 3.5 times smaller code than Java/C++
- No declarations of arguments or variables
- Dynamic declaration and use of variables
- Python is interpreted (not compiled)
  - Compiler: a lot of time for processing the code, faster execution
  - Interpreter: almost no processing of the code, slower execution

What is Anaconda?

- Free and Open-Source
- Package Manager and Distribution of Python
- Optimized for Data Science and Machine Learning
  - conda –V
  - conda create -n NAME python=3.6
  - conda env list
  - conda activate NAME (or activate NAME)
  - python --version

What is PIP?

- It is a package manager for python
- PIP stands for PIP Installs Python
- A package is all the files you need for a module
- A module is code libraries you can include in your project
- Anaconda automatically installs pip for you
  - pip install jupyter
  - pip install pandas
  - pip install sklearn
  - pip install -r requirements.txt

Jupyter Notebook

- cd WORKSHOP_DIR
- jupyter notebook

The basics of python

- jupyter notebook
- If you don’t have jupyter notebook installed:
  - https://github.com/nimamahmoudi/python-ml-workshop-2019/blob/master/introduction_to_python.ipynb

Useful Links

- https://github.com/nimamahmoudi/python-ml-workshop-2019
- https://www.anaconda.com
- https://www.python.org
- https://www.jetbrains.com/pycharm/
- https://jupyter.org/
- https://pypi.org
- https://pypi.org/project/pip/
- https://python.swaroopch.com/
- https://www.slideshare.net/saketkc/python-workshop-11152935

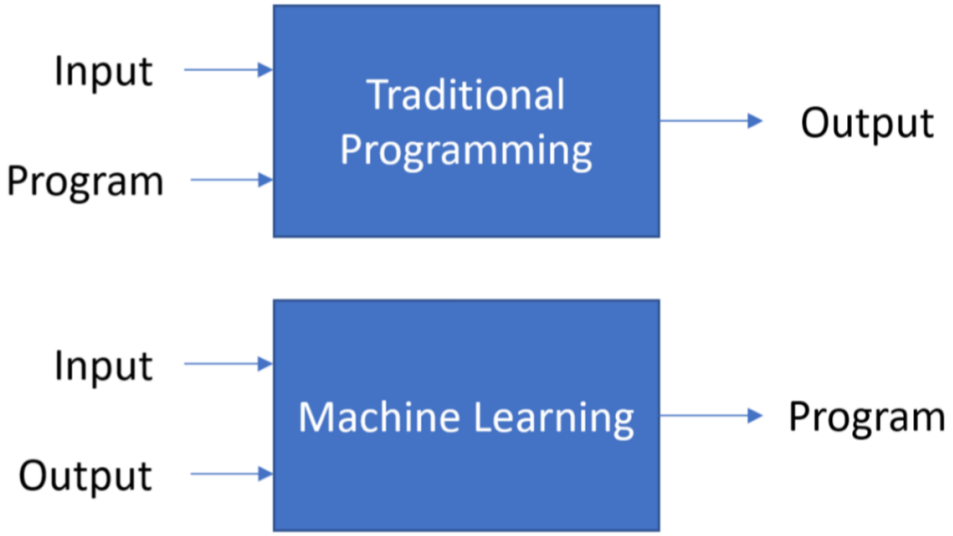
Introduction to Machine Learning with Python

Introduction to Machine Learning

- Machine learning is a field of artificial intelligence that uses statistical techniques to give computer systems the ability to ”learn” (e.g., progressively improve performance on a specific task) from data, without being explicitly programmed.
  - Arthur Samuel, 1959
- A computer is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at task T, as measured by P, improves with experience E.
  - Tom Mitchel, 1959

Simple Definition

- We have a set of examples from which we want to extract regularities (patterns).



Method Classification

- Supervised
  - The training data you feed to the algorithm includes the desired output.
  - E.g. Face recognition
- Unsupervised
  - The training data is unlabeled. Thus, the system tries to learn without a teacher.
  - E.g. Classify users into 10 groups
- Semi-Supervised
  - We have a lot of unlabeled data and a little bit of labeled data.
  - E.g. Google Photos

Problem Types

- Classification
  - In classification, the aim is to assign each input vector to one of finite number of discrete categories.
    - E.g. Email spam filtering (Spam or Ham)
- Regression
  - If the desired output consists of one or more continues variables, the task is called Regression.
    - E.g. Predict the price of a house

Introduction to Machine Learning using Python

- jupyter notebook
- If you don’t have jupyter notebook installed:
  - https://github.com/nimamahmoudi/python-ml-workshop-2019/blob/master/introduction_to_ml.ipynb

Useful Links

- https://github.com/nimamahmoudi/python-ml-workshop-2019
- https://en.wikipedia.org/wiki/Iris_flower_data_set
- https://machinelearningmastery.com/machine-learning-in-python-step-by-step/
- https://scikit-learn.org
- https://pandas.pydata.org
- https://matplotlib.org
- http://www.numpy.org

What’s next?

- Check out the links
  - Look through each library
  - Try simple projects
- Take an online course!
- Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems
  - By Aurélien Géron
  - Great book, especially for beginners.