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SCIKIT-LEARN

A Python Package for Machine Learning

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Agenda

1. What is Scikit-Learn?
2. Data Modelling
3. Machine Learning
4. Installation
5. Hands-on Implementation

What is Scikit-Learn?

What is Scikit-Learn?

- Scikit-Learn (Sklearn) is a powerful and robust open-source machine learning library for Python.
- Sklearn provides tools for efficient implement of classification, regression, clustering and dimensionality reduction techniques.
- Sklearn has a clean and uniform API as well as complete online documentation.
- Basic knowledge of NumPy, Pandas, SciPy and Matplotlib is required to successfully use Sklearn for machine learning.

What is Scikit-Learn?

- 2007: Sklearn was initially developed by David Cournapeau as a Google summer code project.
- 2010: Developers from French Institute for Research in Computer Science and Automation took sklearn to another level and made its first public release (v0.1)
- Since then there have been 12+ versions of iterations and improvements. The latest version is 0.21.0.

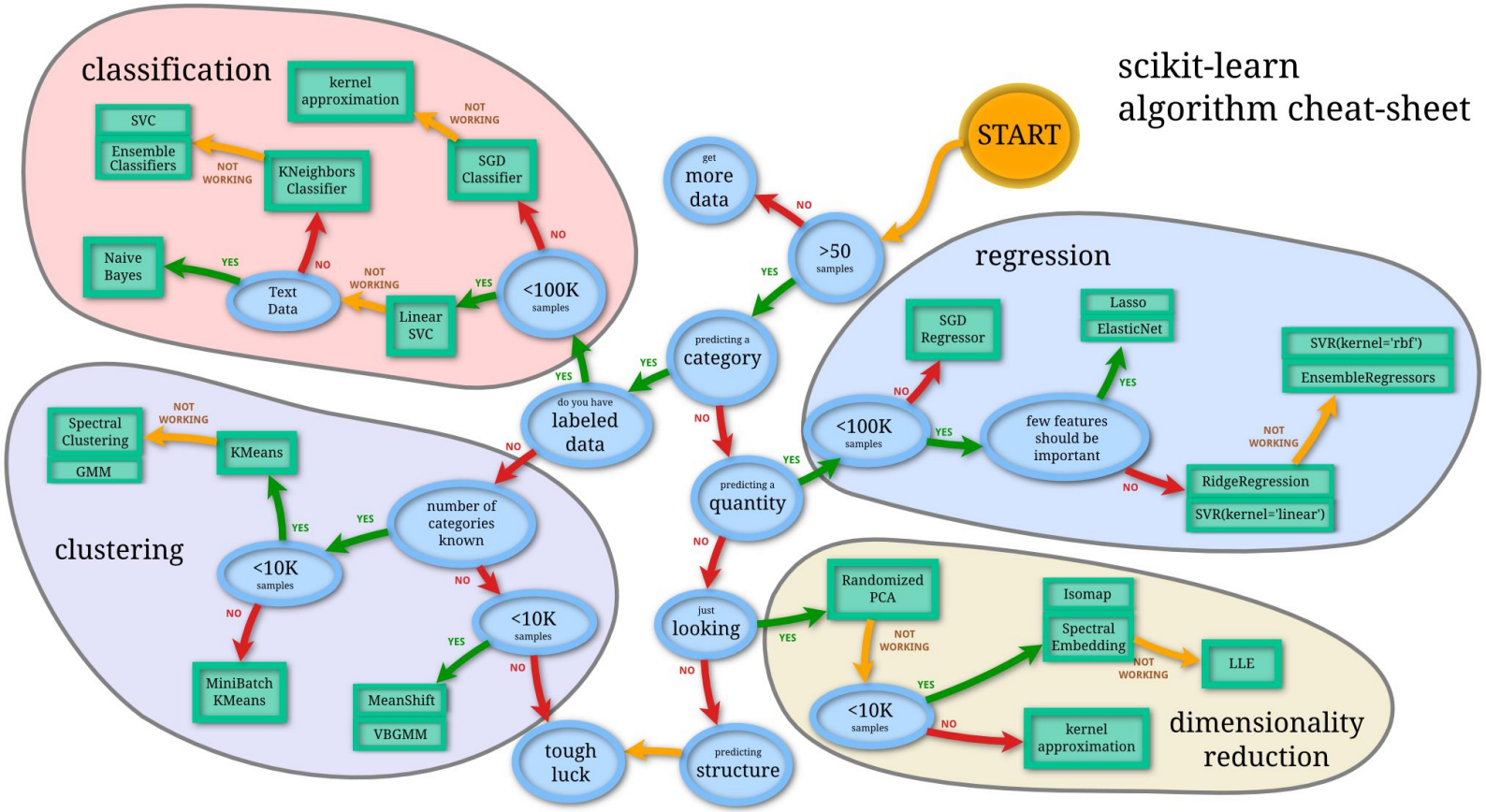
What is Scikit-Learn?

- Sklearn is an community project and anyone can contribute to it.
- Currently, there are more than 2058 contributors on its github repository.
- Various organizations including booking.com, JP Morgan, Evernote, Spotify use Sklearn.

Data Modelling

Data Modelling

- **Sklearn is focused on modelling the data rather that reading or writing data.**



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Data Modelling

- **Sklearn offers numerous tools for**
  - **efficient data modelling**
  - **preprocessing support such as data encoding**
  - **feature selection / extraction**
  - **hyper-parameter search tools**
  - **end to end data modelling pipeline**

Machine Learning

Machine Learning

- **Machine Learning (ML) is a study of algorithms that can learn to solve a specified task using data.**
- **ML models are trained using a sample of historical data called the training data and the model itself is evaluated based on its performance on an unseen data called the test data.**
- **ML has wide variety of application from research to health to finance to speech recognition and language translation.**

Machine Learning

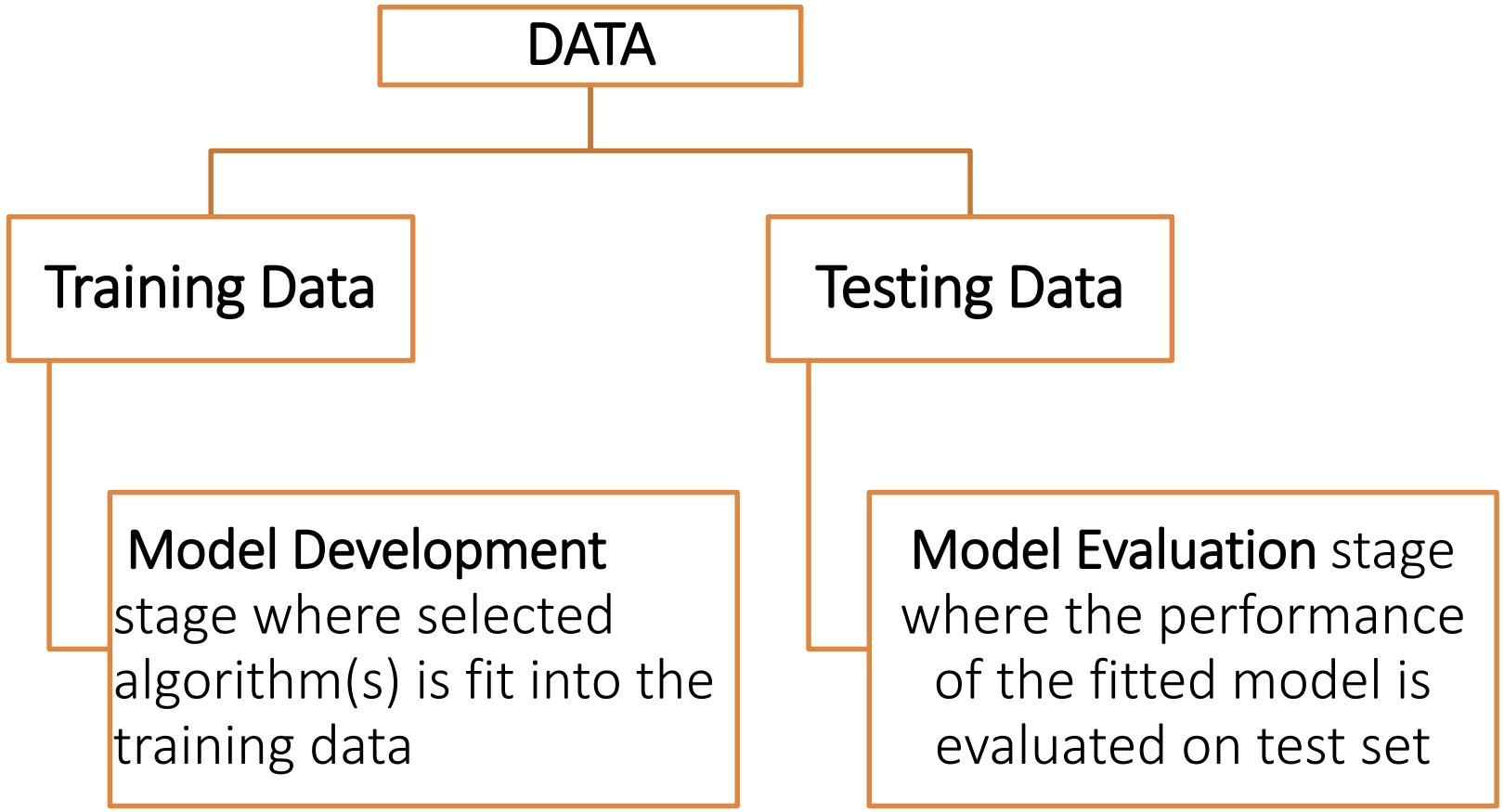
- **Machine Learning (ML) is a study of algorithms that can learn to solve a specified task using data.**

- **There are two main types of ML models:**

1. **Supervised:**
   - **Model learns to identify pattern in data using inputs and desired outputs called labels.**
   - **Each training example has an array of properties, known as feature vector or input vector and a label, known as output.**
   - **Examples: Linear Regression, Logistic Regression, Random Forest Classifier, Decision Trees**

2. **Unsupervised**
   - **Model learns to identify pattern and structure in the data without any labels**
   - **Examples: K-means Clustering, Principal Component Analysis, etc.**

Machine Learning



- Both model development and model evaluation stage comprises additional steps. For example:
  - Crossvalidation
  - Hyperparameter search
- All these steps can be neatly packed into a pipeline object.

Installation

Installation

To install sklearn:

```
conda install -c anaconda scikit-learn
```

Type and enter on your Anaconda prompt application

Prerequisite packages will also be installed

Installation

To check sklearn version installed:

```
conda list scikit-learn
```

Type and enter on your Anaconda prompt application

Or to a see list of installed packages:

```
conda list
```

Hands-on Implementation

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- Go to [link]
- To open on google drive
  - Click on introtosklearn.ipynb to
  - Download data file and upload on google drive
  - Mount your google drive to the folder where the data is uploaded
- To open on your local jupyter notebook
  - Download introtosklearn.ipynb file
  - Download data file
  - Save both file in one folder
  - Open jupyter notebook

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- **Tutorials:**
  - **Quick Start Tutorial http://scikit-learn.org/stable/tutorial/basic/tutorial.html**
  - **User Guide http://scikit-learn.org/stable/user_guide.html**
  - **API Reference http://scikit-learn.org/stable/modules/classes.html**
  - **Example Gallery http://scikit-learn.org/stable/auto_examples/index.html**
  - **PyCon 2014 Scikit-learn Tutorial by Jake VanderPlas**
  - **Parallel Machine Learning with scikit-learn and IPython by Olivier Grisel (also offered at Strata 2014)**

- **Books:**
  - **Learning scikit-learn: Machine Learning in Python (2013)**
  - **Building Machine Learning Systems with Python (2013)**
  - **Statistics, Data Mining, and Machine Learning in Astronomy: A Practical Python Guide for the Analysis of Survey Data (2014).**

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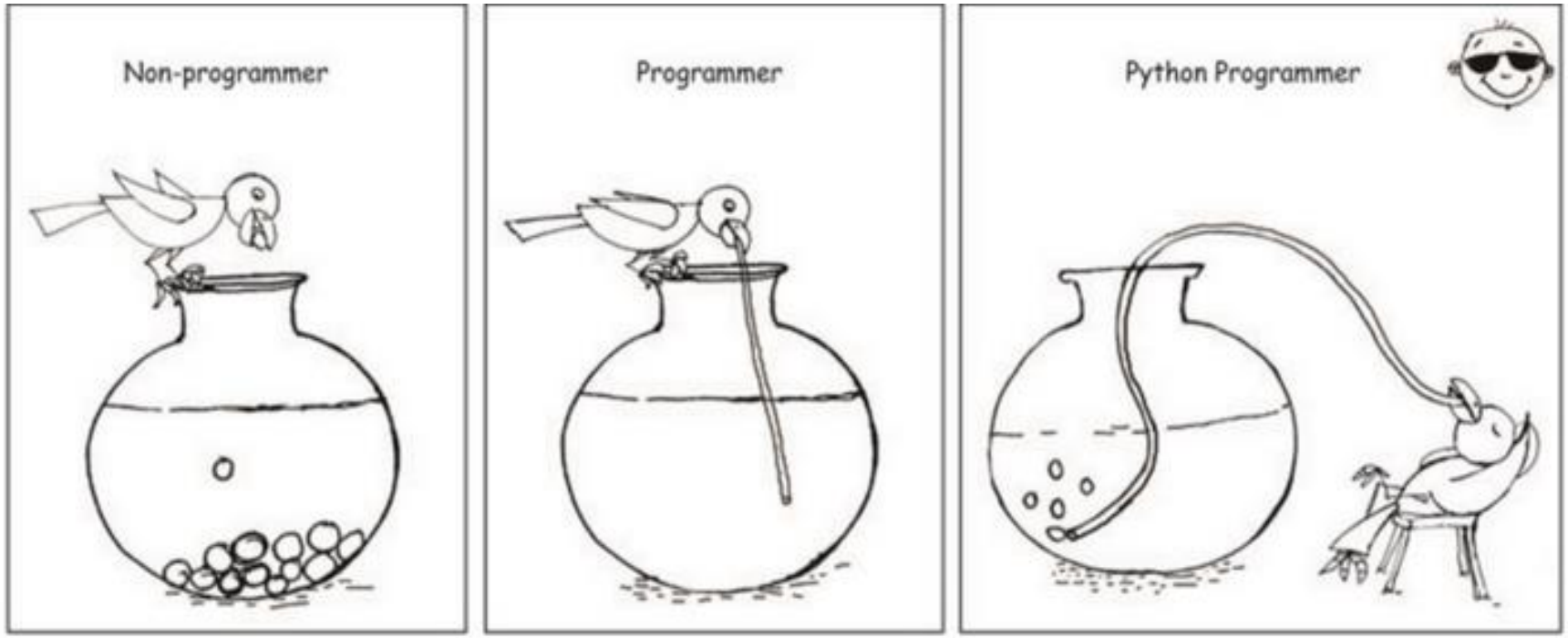

Who wants to become a Python Programmer?

Questions?

Thank you