# Information Analysis and Modeling

## **Tutorial 01: Classification**

Lecturer: Marco Brambilla
Teaching Assistant: Elena Di Lascio

Lugano, March 08, 2018

# Elena Di Lascio

- PhD student (September 2016-now)
  - Università della Svizzera Italiana (USI), Faculty of Informatics
  - Current research: Mobile Health, Affective Computing
- MSc Telecommunication Engineering (2016)
  - «Università degli studi Roma Tre»
  - Thesis: «A battery-free indoor localization system»
  - Six months internship at «Uppsala University», Sweden
- BSc Electronic Engineering (2013)
  - «Università degli studi Roma Tre»
  - Thesis: “Use of Nanoparticles in Environmental and Medical applications”
- Born and grew up in Rome, Italy

# Groups

- Who does not have a group-mate?

- Send me an email (elena.di.lascio@usi.ch) with the groups' info:
  - Name
  - Surname

# What are we going to talk about today?

- Python for Machine Learning
- Classification pipeline

# What we need

- Python (3.3 or greater, or 2.7)
- Jupyter Notebook


# Python for Machine Learning

# Python https://www.python.org/

- General-purpose language
- Great for backend web development, **data analysis**, **artificial intelligence**, and scientific computing
- Easy to read syntax
- Install Anaconda:
  - https://www.anaconda.com/download/

```
1  #!/usr/bin/python
2
3  print "Hello, World!";
4
```

"Hello, World!" program in Python

```
1  #include <stdio.h>
2
3  int main()
4  {
5     printf("Hello, World! \n");
6     return 0;
7  }
8
```

"Hello, World!" program in C

# Python-Basics

- **INDENTATION**
- Python does not use curly braces but instead requires **indentation for nesting**:

```
for i in range(10):
    print("Hello")
```

- **VARIABLES**
- Not assign types to variables, as types are inferred, and can be changed

```
name = "Bob"
age = 15
```

# Python-Basics

- **COMMENTS**
- Denoted by the hash #

- **LISTS**
- Collections of data of any type, denoted by [ ]

```
numbers = [1, 2, 3]
```

- **ITERATION**
- Make an iterable object using the **range** function

```
for i in range(3):
    print(i)
```

# Python-Basics

- **LENGTH**
- Use the function **len** to get the length of a string or a list

- **IF STATEMENT**

```
name = "Joe"

if len(name) > 3:
    print("Nice name,")
    print(name)
else:
    print("That's a short name,")
    print(name)
```

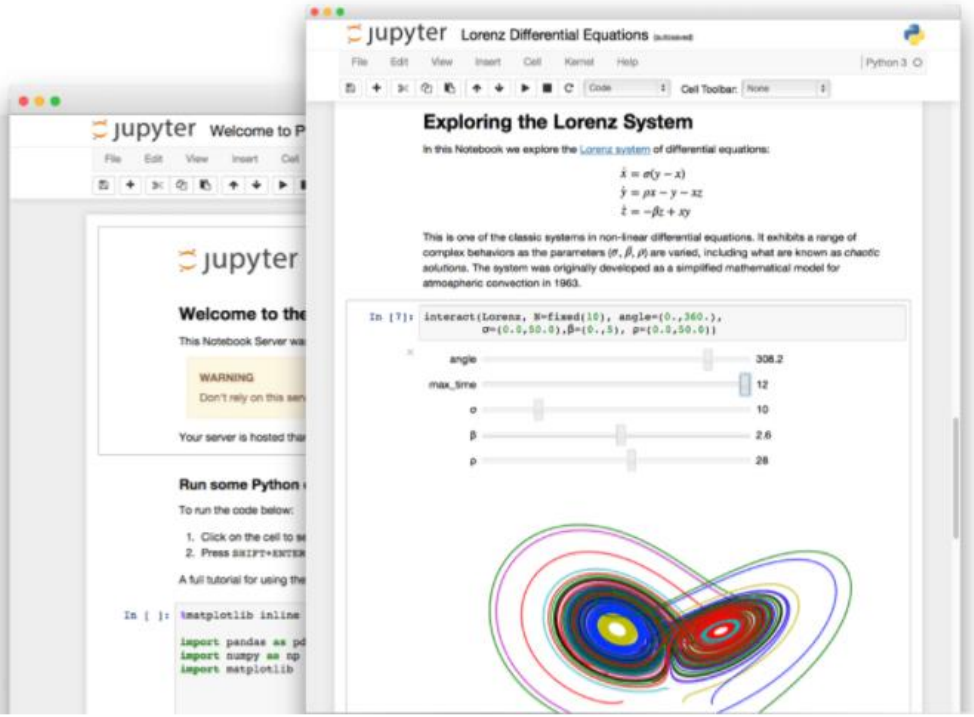
# Jupyter Notebook

- *"Open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text"*

- **Ju**lia + **Pyt**hon + **R**

- Alternative to Anaconda
  - pip3 install jupyter

- Run the notebook:
  - jupyter notebook

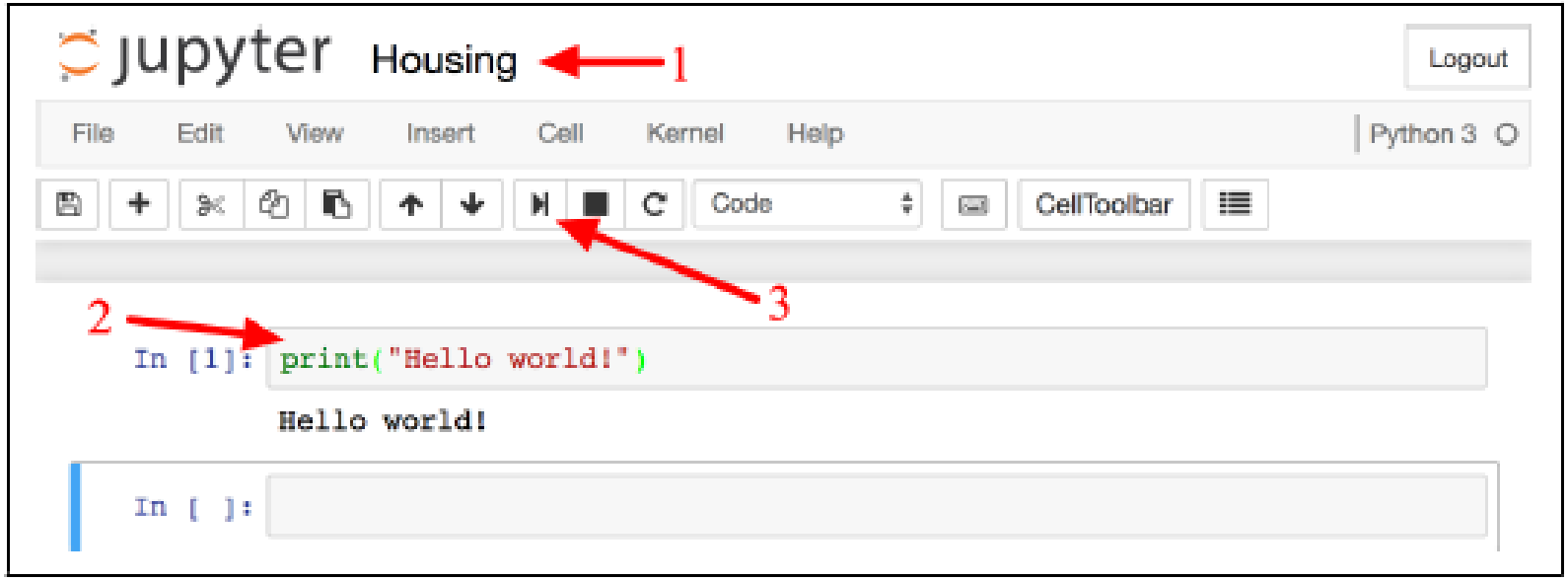


# Python for Machine Learning

- Scikit-learn
  - main library for ML, widely used in industry and academia
- NumPy
  - multidimensional arrays, high level mathematical functions
- Scipy
  - functions for scientific computing (signal processing, statistics)
- Pandas
  - data wrangling and analysis (based on DataFrame)
- Matplotlib and/or Seaborn (**pip install seaborn**)
  - visualization
- pip3 install --upgrade jupyter matplotlib numpy pandas scipy scikit-learn

# Tutorial 01


jupyter
Logout
Files
Running
Clusters
1
Select items to perform actions on them.
Upload
New
Text File
Folder
env


jupyter
Housing
1
Logout
File
Edit
View
Insert
Cell
Kernel
Help
Python 3
Code
CellToolbar
2
3
In [1]: print("Hello world!")
Hello world!
In [ ]: