

CI Course - EX1.1

General Introduction

What is **Computational Intelligence (CI)** ?

Computational Intelligence is a subfield of Artificial Intelligence (AI) that focuses on developing algorithms and computational models to solve complex problems that are difficult to solve using traditional mathematical or rule-based methods. It encompasses a wide range of techniques, including neural networks, fuzzy logic, evolutionary algorithms, and swarm intelligence.

Course content

You can find the full course syllabus on the course Moodle.

The course is mainly an introduction to the following subjects:

- Genetic Algorithms (Ex 2-3)
 - Fuzzy Logic (Ex 4-5)
 - Machine Learning & Neural Networks (Ex 6-12)
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Pre-requisites

- Python knowledge
 - Linear algebra and Statistics&Probability understanding
 - Control theory basics
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Requisites during the course

- Completion of 4 HW assignments
 - Self learning and exercising! Without learning by yourself and make some trials and errors you won't complete the course successfully. Use any source that helps you make a progress - google, youtube, github, chatgpt...
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Grade components

HW=40% + Exam=60%

Staff

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Coding Environment

In this course we recommend on using Anaconda as the python development environment.

What is **Anaconda** ?

Anaconda is a distribution of the Python programming language that comes with pre-installed data science and scientific computing packages. Its advantages include easy installation, pre-installed packages for data science and scientific computing, and its own package and environment management system. Anaconda simplifies the process of setting up and managing a Python environment for data science, making it an efficient choice for data scientists and researchers.

We will cover here how to Install Anaconda and the dependencies packages.

Installation - Anaconda

If you already have Anaconda installed on your computer - skip to the next section.

Anaconda download link at the official web

Then the installing process will be very intuitive

Note: you have an hebrew guide for download Anaconda+pycharm, but it is not include explanations on how to configure the packages. Therefore, I recommend to read the Anaconda installation from the hebrew guide, and then skip to the next parts of this guide.

Installation - course python environment

As mentioned above, environment is all the python packages (/libraries) which your projects depend on. It means that for running the course exercises and

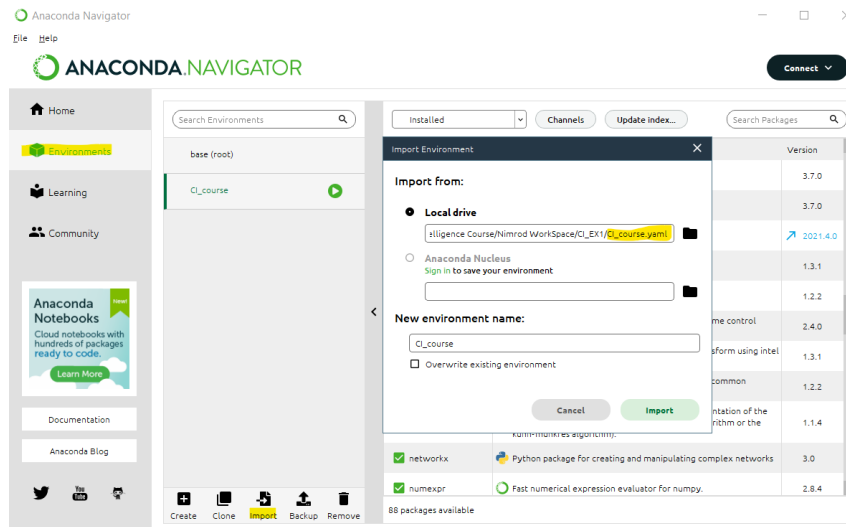
assignments we will need our specific environment.

Methods for Install course env:

There are a lot of ways to configure your environment. If you already know what works best for you - feel free to add the required packages with your method.

We will cover 2 ways of configuring the course env:

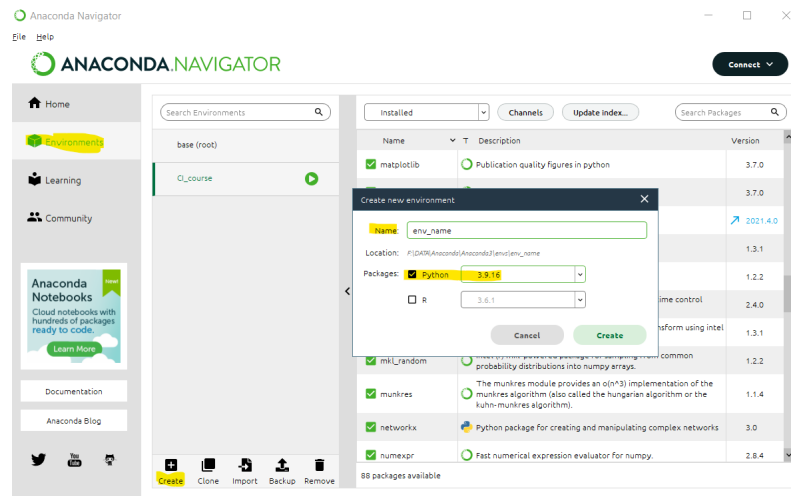
1. Full env in one-shot:
 - (a) Download `CI_course.yaml` from the moodle.
 - (b) Enter "Environment" option in the Anaconda Navigator
 - (c) Choose "import" option and pick the `CI_course.yaml` file in the browser.



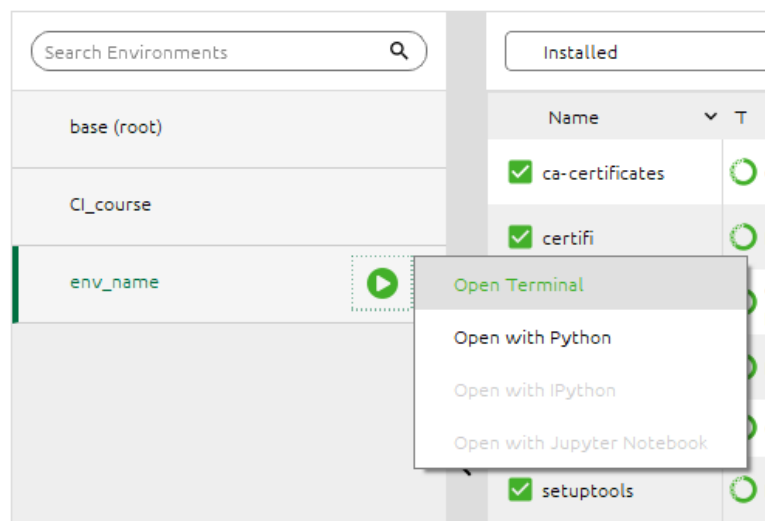
If the method above didn't work for you - move next to the second method.

2. Install every package separately using `conda/pip` command:

- (a) Enter "Environment" option in the Anaconda Navigator
- (b) Choose "create" option and insert env name and python version (we use 3.9)



- (c) Press on the 'play' button right to your new env you have just created, and then choose "open termina" option.



- (d) Install the requierd package by typing the command as follow:

`conda/pip install <package_name>`

Install the packages below:

- numpy
- matplotlib
- scikit-learn
- scikit-fuzzy (using pip only)
- torch (=pytorch)

NOTE: for pytorch, if you use Windows - type the command below: `conda install pytorch torchvision torchaudio cpuonly -c pytorch`

for example:

```
C:\WINDOWS\system32\cmd.exe

(CI_course) C:\>conda install numpy
```

Installation - python IDE + open new project with course env

We recommend using **PyCharm** or **VSCode** as the IDE (Integrated development environment) for the course python assignments.

If you already have an IDE that works for you - feel free to skip to the next section.

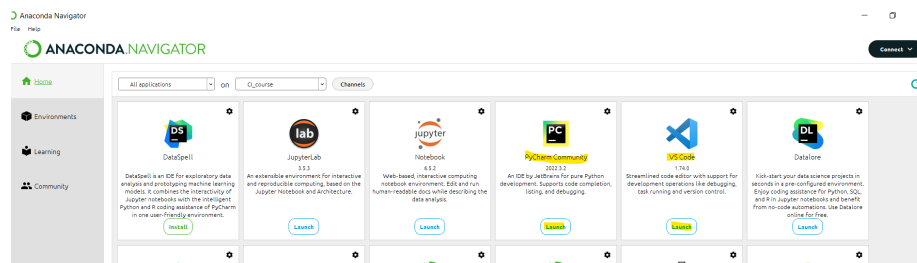
We will cover here **Pycharm** installation and how to open new project which based on the course env.

install PyCharm:

You can install **Pycharm Community** (free edition) from the official web

Then the installation process will be intuitive.

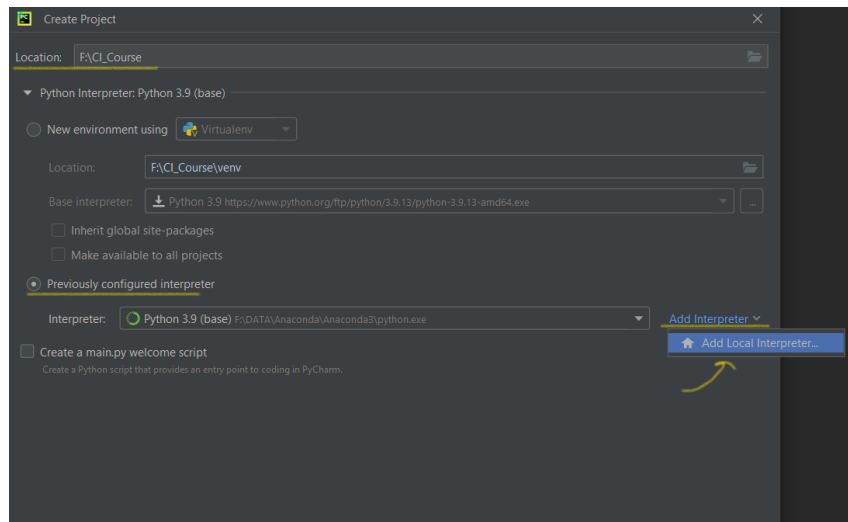
After the installation, in addition to the shortcut of launching pycharm from the desktop you could launch it from the Anaconda Navigator.



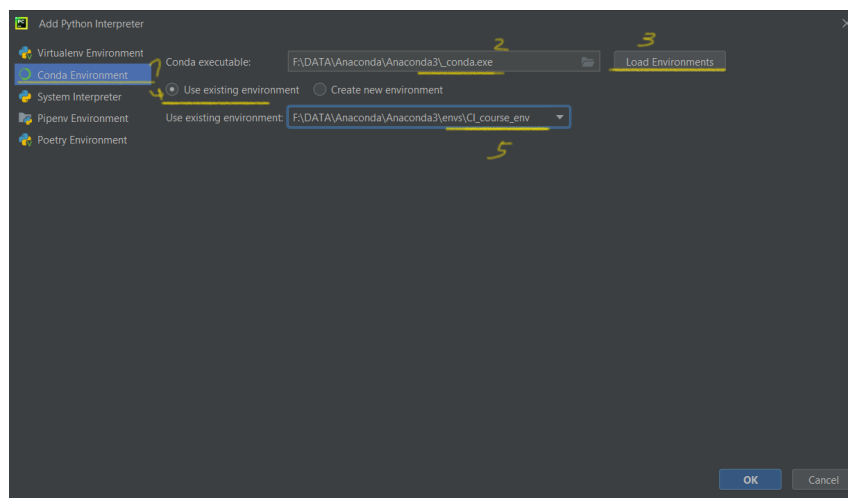
Open new project

1. Launch pycharm

2. Select "open new project"
3. Set the location of your course folder (there you put all your scripts and assignments), then pick the "Previously configured interpreter" and press "Add interpreter".



4. Select on the left -> Conda Environment and find the `_conda.exe` file located inside your Anaconda folder option. Then press "load environments" and after pick "using existing environment" checkbox and select the new environment we created earlier. `<your Anaconda folder name>/envs/<Course environment name>`



5. Finally press "create".

Test everything

Now we can test that everything was set properly and we are ready to go!

Download from course moodle the `test_env.py` file and run it on your IDE which pre-configured with the course env interpreter.

```
## test_env.py

try:
    import numpy
    import sklearn
    import skfuzzy
    import scipy
    import matplotlib
    import torch

    print("Env is ready!")

except ModuleNotFoundError as e:
    print(e)

Env is ready!
```