Install Python

Install Python using the installer *Windows x86-64 executable installer* found at the link:

https://www.python.org/downloads/release/python-365/

This is Python version 3.6.5, and it's been tested with the robot car. Other newer versions were not tested.

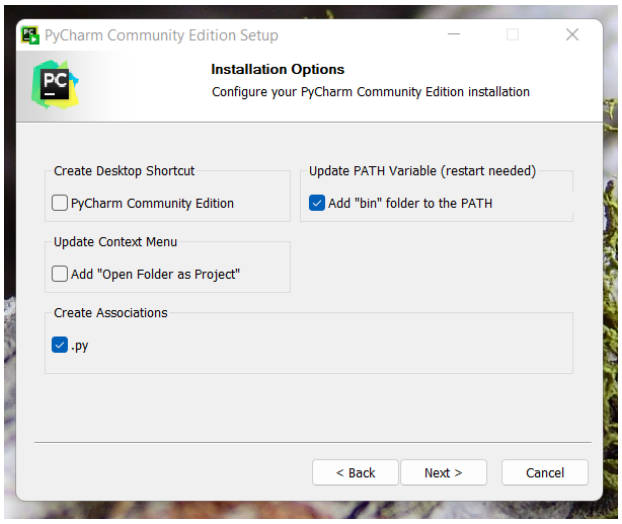
If asked, during the installation, select the *add Python to PATH* option.

Install PyCharm

PyCharm is an Integrated Development Environment (IDE) for the Python programming language. A free version, called *Community Edition* is available at the following link:

https://www.jetbrains.com/pycharm/download/#section=windows

Python scripts (.py file extension) can be associated to PyCharm during the installation procedure.



Creation and configuration of a new project

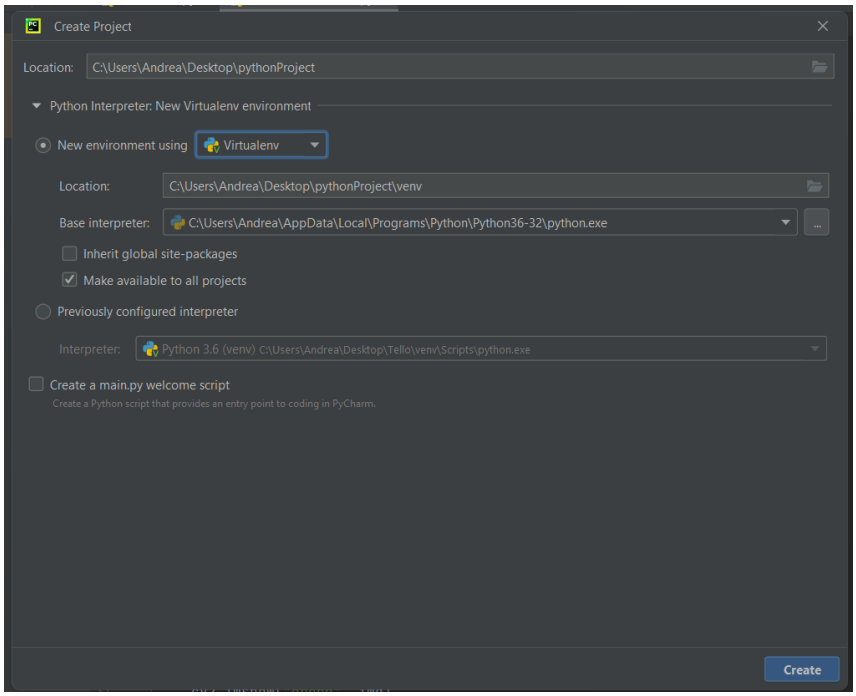
Once PyCharm has been installed, it is possible to create a new project.

It is necessary to specify in which folder the project should be placed, as well as the *virtual environment* path. The *virtual environment* is an independent space into which the libraries and the chosen Python version for the project can be stored without conflicting with other project having different Python version or library requirements. The *virtual environment* can be placed inside the project folder, or in a more generic path so it can be used by other projects as well.

The Python interpreter is selected in the same window. More Python versions can be installed on the PC, and for each *virtual environment*, the desired version can be selected.

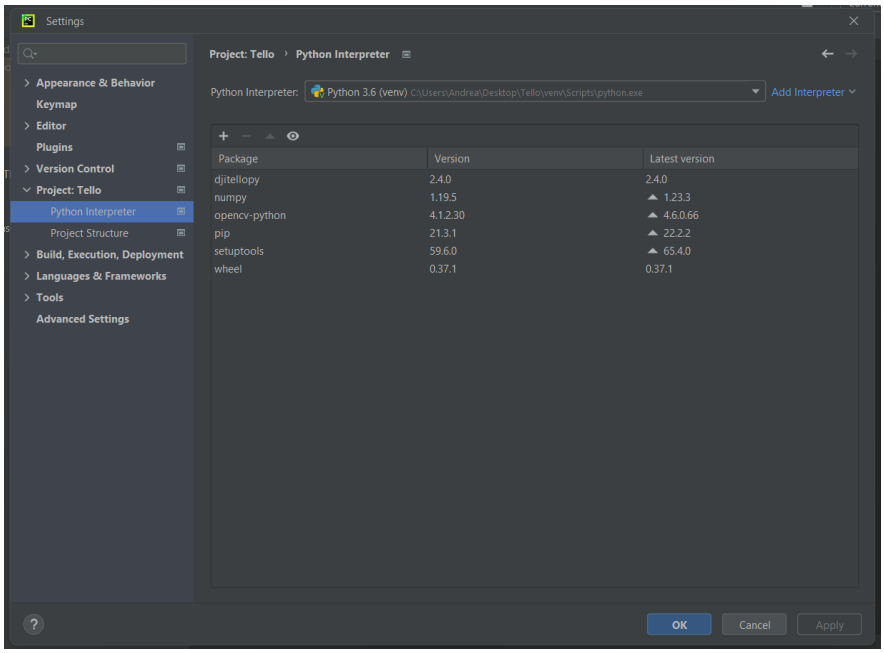
Do not tick the *Inherit global site-packages*, especially if Python is already installed on the PC.

Press *Create*, at the bottom right, to end the configuration.



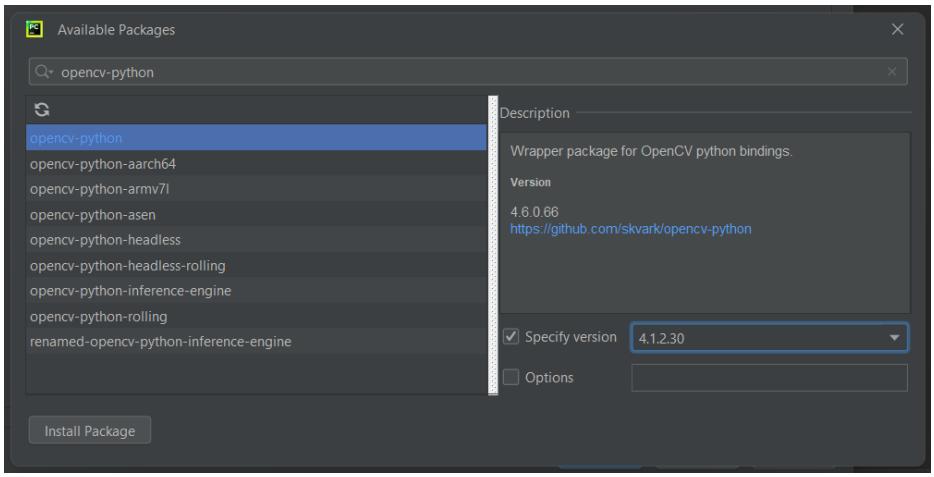
Once the project and the *virtual environment* have been created, the required libraries can be installed.

Go to *File > Settings* and, under the *Project* settings, by pressing the + icon, the user can look for new packages.



Search for *opencv-python* and, before proceeding with the installation, **specify the version 4.1.2.30. This passage is fundamental to guarantee the correct behaviour of the system.**

OpenCV is a multiplatform opensource library dedicated to computer vision. This library is required to work on the images, as well as to visualize the video stream from the camera.

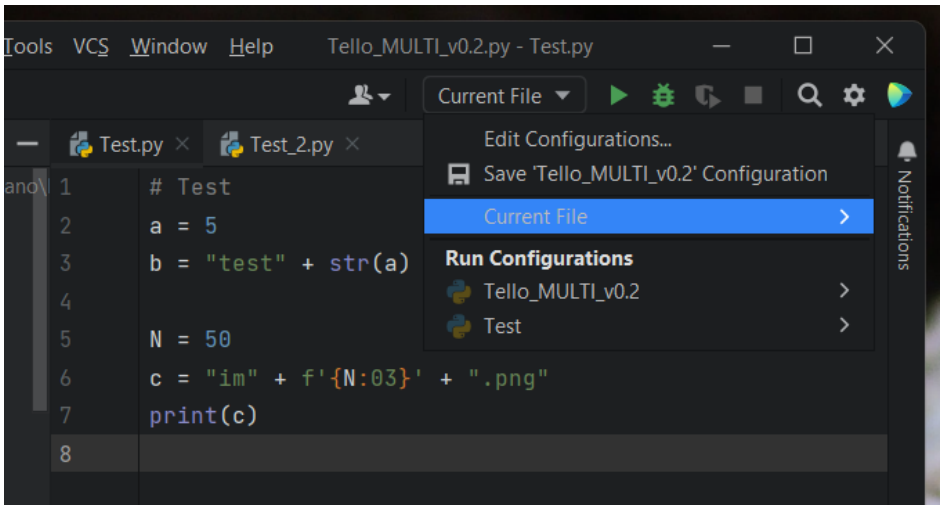


Then, install also the *numpy* library, if it is not already installed on your PC, which contains all basic commands to operate with arrays, matrices and so on,. Other maybe useful libraries are *scipy (data processing, for example FFT), matplotlib* (for data visualization) and *pandas* (for handling files).

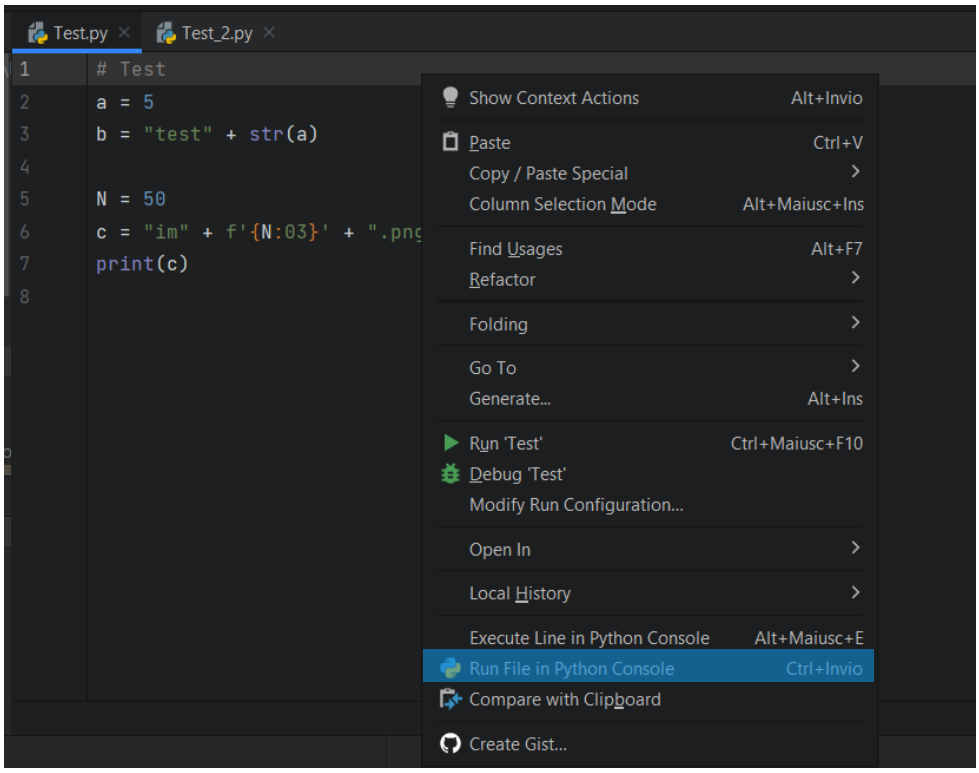
Useful tips in PyCharm

The files inside a project folder can be run by pressing the green triangle at the top right of the screen. Be sure to select the correct file.

In the image, as an example, the *Test.py* code can be run by selecting the tab of the con that needs to be run, then select *current file* in the drop down window. Now, each time the green triangle is pressed, the currently selected file is run.



In order to look at the values stored in the variables, right click on the code and press *Run File in Python Console*. A rectangle appears at the bottom right of the screen, containing the variables names and values. Otherwise, the *debug* mode can be used.


Test.py
Test_2.py
# Test
a = 5
b = "test" + str(a)
N = 50
c = "im" + f'{N:03}' + ".png
print(c)
Show Context Actions Alt+Invio
Paste Ctrl+V
Copy / Paste Special
Column Selection Mode Alt+Maiusc+Ins
Find Usages Alt+F7
Refactor
Folding
Go To
Generate... Alt+Ins
Run 'Test' Ctrl+Maiusc+F10
Debug 'Test'
Modify Run Configuration...
Open In
Local History
Execute Line in Python Console Alt+Maiusc+E
Run File in Python Console Ctrl+Invio
Compare with Clipboard
Create Gist...