COMP 7308: Introduction to unmanned systems Fall 2023
Assignment 0 - Prerequisites
:

1 Installation

Our assignments requires Python $\geq$ 3.7. We strongly recommend you to use Anaconda to manage your python environments. You will need to install the simulator library, `Intelligent-Robot-Simulator`, along with others dependent libraries like `numpy`, `matplotlib`. Below are the installation instructions:

1. (**ONLY** applicable when you want create a new environment using Anaconda.) You can change the name from "3356" to others or choose another version of Python: conda create -n 3356 python=3.8, and then activate it: conda activate 3356

```
[ ~  conda create -n 3356 python=3.8                                          ✓ | base Py
Collecting package metadata (current_repodata.json): done
Solving environment: done
[ ~  conda activate 3356                                                ✓ | 19s | base Py
```

2. Install `ir_sim` by pip: pip install ir_sim==1.1.5, which will automatically install dependent packages:

```
[ ~  pip install ir_sim==1.1.5                                                 ✓ | 3356 Py
Collecting ir_sim==1.1.5
```

3. After the installation, you can run some examples at our project `./usage` to check whether you set up your environment successfully.

```
~  cd assignment0/usage                                                        ✓ | 3356 Py
~/assignment0/usage  python 02robot_world/robot_world.py                       ✓ | 3356 Py
Figure will be closed within 3 seconds.
Simulated Environment End
```

2 Resources

Some resources are listed which may assist in your understanding.

2.1 Programming

There are a brunch of NumPy tutorial videos online. If you are not very familiar with NumPy, you can check some of them below:

1. Python for Data Analysis - Numpy Arrays: `https://www.youtube.com/watch?v=KJlHh8mBQyY`

2. CS 285: Lecture 3, Part 2.
YouTube: `https://www.youtube.com/watch?v=kPa6hU9prg4`
Bilibili: `https://www.bilibili.com/video/BV1fT4y1o7TS/?p=12`

2.2   Courses

In the future, if you are having trouble understanding algorithms, you can refer to these two courses.

1. Introduction to Mobile Robotics, by Wolfram Burgard.
Course Webpage: `http://ais.informatik.uni-freiburg.de/teaching/ss20/robotics/`
Bilibili: `https://www.bilibili.com/video/BV1ma4y1L7SH/`

2. **SLAM course** by Cyrill Stachniss: `http://ais.informatik.uni-freiburg.de/teaching/ws13/mapping/`
Youtube: `https://www.youtube.com/playlist?list=PLgnQpQtFTOGQrZ4O5QzbIHgl3b1JHimN_`
Bilibili: `https://bilibili.com/video/BV1Kt411V76G` and `https://bilibili.com/video/BV1jz4y1D7oP`

2.3   Further improvements

1. Deep Reinforcement Learning CS285 by Sergey Levine at UC Berkeley.
Course Webpage: `http://rail.eecs.berkeley.edu/deeprlcourse/`
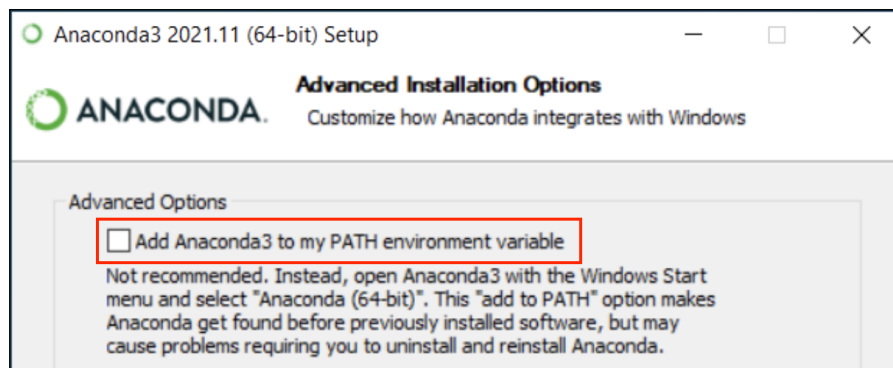Youtube: `https://www.youtube.com/playlist?list=PL_iWQOsE6TfXxKgI1GgyV1B_Xa0DxE5eH`
Bilibili: `https://www.bilibili.com/video/BV1fT4y1o7TS`

3   Q/A

3.1   Anaconda

To install Anaconda, just follow the instructions on Anaconda official website. One thing you should be aware of is **whether to add Anaconda to the Windows PATH or not**.

Here is an answer from the official website: `https://docs.anaconda.com/anaconda/user-guide/faq/`

- Should I add Anaconda to the Windows PATH?

When installing Anaconda, Anaconda recommends that you do not add Anaconda to the Windows PATH because this can interfere with other software. Instead, open Anaconda with the Start Menu and select

Anaconda Prompt, or use Anaconda Navigator (Start Menu - Anaconda Navigator).

Note. If you do not add Anaconda to the Windows PATH, you cannot use Anaconda in the cmd or other softwares like PyCharm terminal. You may try to find other ways like googling "Get the Anaconda prompt running in the PyCharm terminal", which is complicated.

- Should I add Anaconda to the macOS or Linux PATH?

Anaconda recommends against adding Anaconda to the PATH manually. During installation, you will be asked "Do you wish the installer to initialize Anaconda3 by running conda init?" Anaconda recommends **entering yes** to allow the installer to initialize Anaconda3. If you enter no, then conda will not modify your shell scripts at all. In order to initialize after the installation process is done, first run `source <path to conda>/bin/activate` and then run `conda init`. Replace `<path-to-anaconda>` with the actual path of your installed Anaconda file.

- What is the default path for installing Anaconda?

If you accept the default option to install Anaconda on the "default path" Anaconda is installed in your user home directory:
1. Windows 10: `C:\Users\<your-username>\Anaconda3\`

2. macOS: `/Users/<your-username>/anaconda3` for the shell install, `/opt` for the graphical install. See installing on macOS.
3. Linux: `/home/<your-username>/anaconda3`

3.2 Editor

We recommend VSCode or PyCharm.

3.3 Others

1. TabError: inconsistent use of tabs and spaces in indentation.

Set tab width to be 4 spaces in your editor.

2. No outputs show up when I use Python without Anaconda on Windows.

Sometimes it happens for unknown reasons. Installing Anaconda for new environment will solving this problem.

3. No figures show up on MacOS.

It could be the reason of the backend. Check link: "Can't use Matplotlib with Python installed by Conda on Mac"