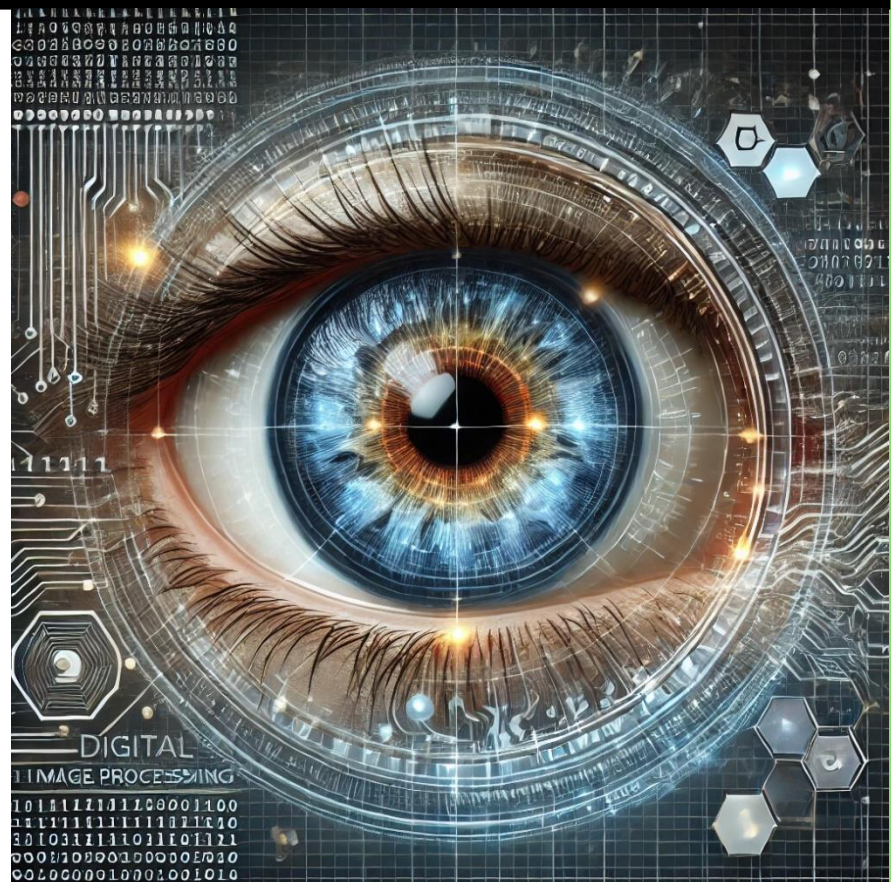


LAB 1 : DIGITAL IMAGE PROCESSING



Maryam Arshad

PAF-IAST (B22F0031AI085)

Lab Report 1:

Digital Image Processing

Lab Overview:

This lab provided a practical introduction to managing software environments and dependencies using Conda. These skills are foundational for effectively implementing Digital Image Processing (DIP) projects, where managing multiple libraries and dependencies is crucial for smooth execution of algorithms. The lab covered three main objectives:

- ✓ Mastering basic Conda commands.
- ✓ Managing virtual environments using the Conda CLI.
- ✓ Creating and managing environments through the Anaconda Navigator GUI.

Tasks and Outputs

Task 1:

Mastering Basic Conda Commands

Objective:

Gain hands-on experience with fundamental Conda commands for managing packages in digital image processing projects. These skills ensure that necessary libraries, like OpenCV or scikit-image, can be installed and updated efficiently.

List Installed Packages:

 **Command:** *conda list*

- 🚦 **Purpose:** Display all currently installed packages in the active environment. This is particularly useful in DIP to verify if image processing libraries like OpenCV or Matplotlib are installed.

```
C:\Windows\System32\cmd.exe - conda install ipykernel - conda deactivate
Microsoft Windows [Version 10.0.19045.5247]
(c) Microsoft Corporation. All rights reserved.

(base) C:\Users\Think pad>conda list
# packages in environment at D:\anaconda:
#
# Name                    Version            Build    Channel
#-----
anaconda_depends          2024.10            py312_mkl_0
aiobotocore               2.12.3             py312h827c3e9_0
aiohappyeyeballs          2.4.0              py312h827c3e9_0
aiohttp                   3.10.5             py312h827c3e9_0
aiotertools               0.7.1              pyhd3eb1b0_0
aiosignal                 1.2.0              pyhd3eb1b0_0
alabaster                 0.7.16             py312h827c3e9_0
altair                    5.0.1              py312h827c3e9_0
anaconda-anon-usage       0.4.4              py312h827c3e9_0
anaconda-catalogs         0.2.0              py312h827c3e9_0
anaconda-client           1.12.3             py312h827c3e9_0
anaconda-cloud-auth       0.5.1              py312h827c3e9_0
anaconda-navigator        2.6.3              py312h827c3e9_0
anaconda-project          0.11.1             py312h827c3e9_0
anaconda_powershell_prompt 1.1.0              haa95532_0
anaconda_prompt           1.1.0              haa95532_0
annotated-types            0.6.0              py312h827c3e9_0
anyio                     4.2.0              py312h827c3e9_0
aom                       3.6.0              hd77b12b_0
appdirs                   1.4.4              pyhd3eb1b0_0
archspec                  0.2.3              pyhd3eb1b0_0
argon2-cffi               21.3.0             pyhd3eb1b0_0
argon2-cffi-bindings      21.2.0             py312h827c3e9_0
arrow                     1.2.3              py312h827c3e9_0
```

🚦 Install Flask Package:

- 🚦 **Command:** `conda install flask`
- 🚦 **Purpose:** Practice installing packages. Flask, while a web framework, was used to demonstrate how external dependencies can be added seamlessly, a skill transferable to installing DIP-specific libraries.

```

C:\Windows\System32\cmd.exe - conda install ipykernel - conda deactivate
zeromq      4.3.5      hd77b12b_0
zfp         1.0.0      hd77b12b_0
zict        3.0.0      py312haa95532_0
zipp        3.17.0     py312haa95532_0
zlib        1.2.13     h8cc25b3_1
zlib-ng     2.0.7      h2bbff1b_0
zope        1.0        py312haa95532_1
zope.interface 5.4.0     py312h2bbff1b_0
zstandard   0.23.0     py312h4fc1ca9_0
zstd        1.5.6      h8880b57_0


(base) C:\Users\Think pad>conda list flask
# packages in environment at D:\anaconda:
#
# Name          Version          Build          Channel
flask           3.0.3            py312haa95532_0


(base) C:\Users\Think pad>conda install flask
Channels:
 - defaults
Platform: win-64
Collecting package metadata (repodata.json): done
Solving environment: done

# All requested packages already installed.

```

Update a Package:

 **Command:** `conda update <package-name>`

 **Purpose:** Ensure packages stay updated. For DIP, updated libraries often include improved algorithms or compatibility fixes.

```


(base) C:\Users\Think pad>conda update numpy
Channels:
 - defaults
Platform: win-64
Collecting package metadata (repodata.json): done
Solving environment: done

# All requested packages already installed.

```

Remove a Package:

 **Command:** `conda remove flask`

 **Purpose:** Practice package removal. This helps maintain a clean environment by removing unnecessary or conflicting libraries.

```
(base) C:\Users\Think pad>conda remove flask
Channels:
  - defaults
Platform: win-64
Collecting package metadata (repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: D:\anaconda

  removed specs:
  - flask

The following packages will be REMOVED:

  _anaconda_depends-2024.10-py312_mkl_0
  aiobotocore-2.12.3-py312haa95532_0
  aioitertools-0.7.1-pyhd3eb1b0_0
  alabaster-0.7.16-py312haa95532_0
  altair-5.0.1-py312haa95532_0
  anyio-4.2.0-py312haa95532_0
  aom-3.6.0-hd77b12b_0
  appdirs-1.4.4-pyhd3eb1b0_0
  argon2-cffi-21.3.0-pyhd3eb1b0_0
```


Task 2:

Managing Virtual Environments Using Conda

Objective:

Learn to create and manage isolated environments, a critical practice in DIP where projects often require different library versions.

Environment Creation:

 **Command:** `conda create --name Maryam_B22F0031AI085
python=3.8`

🚀 **Purpose:** Create a virtual environment with Python 3.8, ensuring

```
(base) C:\Users\Hp>conda create --name maryam_B22F0031AI085 python=3.8
Collecting package metadata (current_repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 23.7.4
  latest version: 24.11.3

Please update conda by running

  $ conda update -n base -c defaults conda

Or to minimize the number of packages updated during conda update use

  conda install conda=24.11.3

Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
```

compatibility with DIP libraries like TensorFlow or PyTorch.

🚀 **Activating the Environment:**


🚀 **Command:** *conda activate Maryam_B22F0031AI085*

🚀 **Purpose:** Switch to the created environment to work on specific DIP tasks.

```
Anaconda Prompt - conda install flask - conda create --name maryam_B22F0031AI085
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>
(base) C:\Users\Hp>conda activate maryam_B22F0031AI085
```

Listing All Environments:


 **Command:** *conda env list*

 **Purpose:** View all available environments, making it easy to manage multiple DIP projects.

```
(maryam_B22F0031AI085) C:\Users\Hp>conda env list
# conda environments:
#
base                    C:\Users\Hp\Desktop\Langchain-chatbot\venv1
base                    C:\Users\Hp\anaconda3
maryam_B22F0031AI085  * C:\Users\Hp\anaconda3\ana
E:\anaconda
```

Installing Jupyter:

 **Command:** *conda install jupyter*

 **Purpose:** Add Jupyter Notebook, a popular tool for testing DIP algorithms interactively.

Anaconda Prompt - conda install flask - conda create --name maryam_B22F0031AI085 python-3.8 - conda install jupyter

```
C:\Users\Hp\Desktop\Langchain-chatbot\venv1
C:\Users\Hp\anaconda3
base
C:\Users\Hp\anaconda3\ana
maryam_B22F0031AI085 * C:\Users\Hp\anaconda3\ana\envs\maryam_B22F0031AI085
E:\anaconda
```

```
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>conda install jupyter
Collecting package metadata (current_repodata.json): done
Solving environment: done
```

```
==> WARNING: A newer version of conda exists. <==
  current version: 23.7.4
  latest version: 24.11.3
```

Please update conda by running

```
$ conda update -n base -c defaults conda
```

Or to minimize the number of packages updated during conda update use

```
conda install conda=24.11.3
```

Package Plan

environment location: C:\Users\Hp\anaconda3\ana\envs\maryam_B22F0031AI085

added / updated specs:
- jupyter

The following packages will be downloaded:

package	build	
anyio-4.2.0	py38haa95532_0	186 KB
argon2-cffi-bindings-21.2.0	py38h2bbff1b_0	36 KB
async-lru-2.0.4	py38haa95532_0	18 KB
attrs-23.1.0	py38haa95532_0	143 KB
babel-2.11.0	py38haa95532_0	6.8 MB


Proceed ([y]/n)?


```
Downloading and Extracting Packages
libclang13-14.0.6 | 22.6 MB | #####1 | 69%
beautifulsoup4-4.12. | 214 KB | #####100%
ipython-8.12.2 | 1.1 MB | #####100%
exceptiongroup-1.2.0 | 30 KB | #####100%
pygments-2.15.1 | 1.7 MB | #####100%
httpx-0.27.0 | 194 KB | #####100%
typing_extensions-4. | 61 KB | #####100%
pywin32-305 | 10.7 MB | #####100%
async-lru-2.0.4 | 18 KB | #####100%

Preparing transaction: done
Verifying transaction: done
Executing transaction: |
Warning: using menuinst v1 shortcuts
Please update menuinst in the base environment and reinstall notebook.

done
```


Adding to Jupyter Kernel:


 **Command:** `python -m ipykernel install --user --name=Maryam_B22F0031AI085`

 **Purpose:** Integrate the environment into Jupyter, simplifying workflows for DIP experimentation.

```
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>python -m ipykernel install --user --name=maryam_B22F0031AI085
Installed kernelspec maryam_B22F0031AI085 in C:\Users\Hp\AppData\Roaming\jupyter\kernels\maryam_b22f0031ai085
```

Deactivating the Environment:

 **Command:** `conda deactivate`

 **Purpose:** Exit the environment, ensuring no unintentional modifications.


```
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>
(maryam_B22F0031AI085) C:\Users\Hp>python -m ipykernel install --user --name=maryam_B22F0031AI085
Installed kernelspec maryam_B22F0031AI085 in C:\Users\Hp\AppData\Roaming\jupyter\kernels\maryam_b22f0031ai085

(maryam_B22F0031AI085) C:\Users\Hp>conda deactivate

(base) C:\Users\Hp>
```

Removing the Environment:

 **Command:** `conda remove --name Maryam_B22F0031AI085 --all`

 **Purpose:** Delete the environment when it is no longer needed, freeing up system resources.

```
installed kernel: maryam_B22F0031AI085 in C:\Users\Hp\AppData\Local\Programs\Python\Python38-64\Scripts\kernel: maryam_B22F0031AI085
(maryam_B22F0031AI085) C:\Users\Hp>conda deactivate
(base) C:\Users\Hp>conda remove --name maryam_B22F0031AI085 --all
Remove all packages in environment C:\Users\Hp\anaconda3\ana\envs\maryam_B22F0031AI085:

## Package Plan ##

  environment location: C:\Users\Hp\anaconda3\ana\envs\maryam_B22F0031AI085

The following packages will be REMOVED:

anyio-4.2.0-py38haa95532_0
argon2-cffi-21.3.0-pyhd3eb1b0_0
argon2-cffi-bindings-21.2.0-py38h2bbff1b_0
asttokens-2.0.5-pyhd3eb1b0_0
async-lru-2.0.4-py38haa95532_0
attrs-23.1.0-py38haa95532_0
```


Task 3:

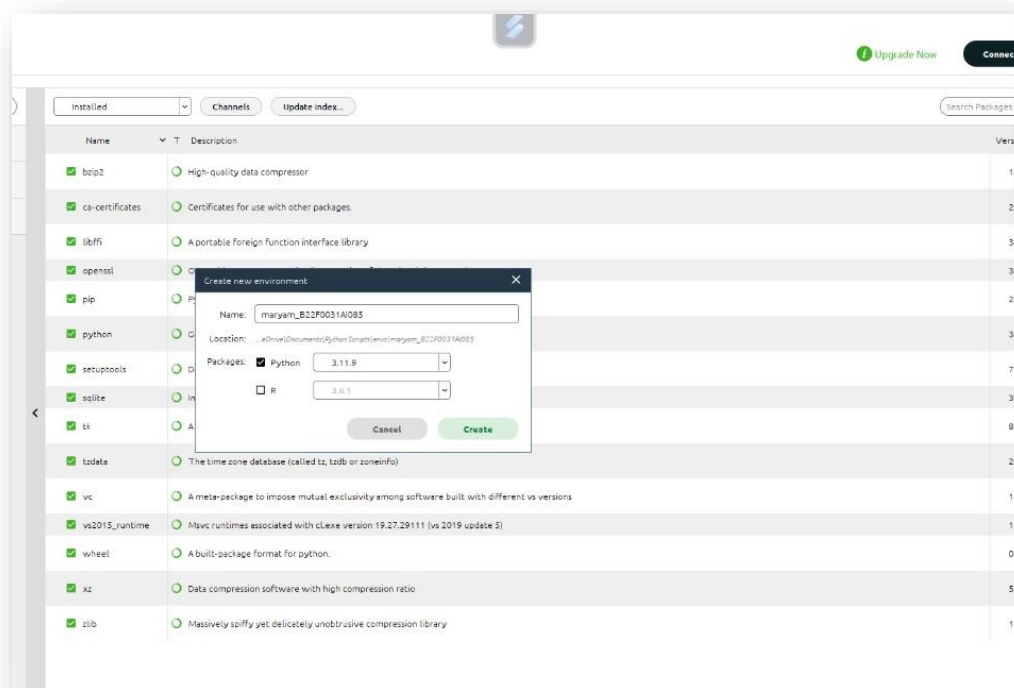
Creating Virtual Environments via Anaconda Navigator

Objective:


Explore the graphical interface for managing environments, offering a user-friendly alternative to the command line.

Opening Anaconda Navigator:


 **Purpose:** Access a visual tool for managing environments and packages.

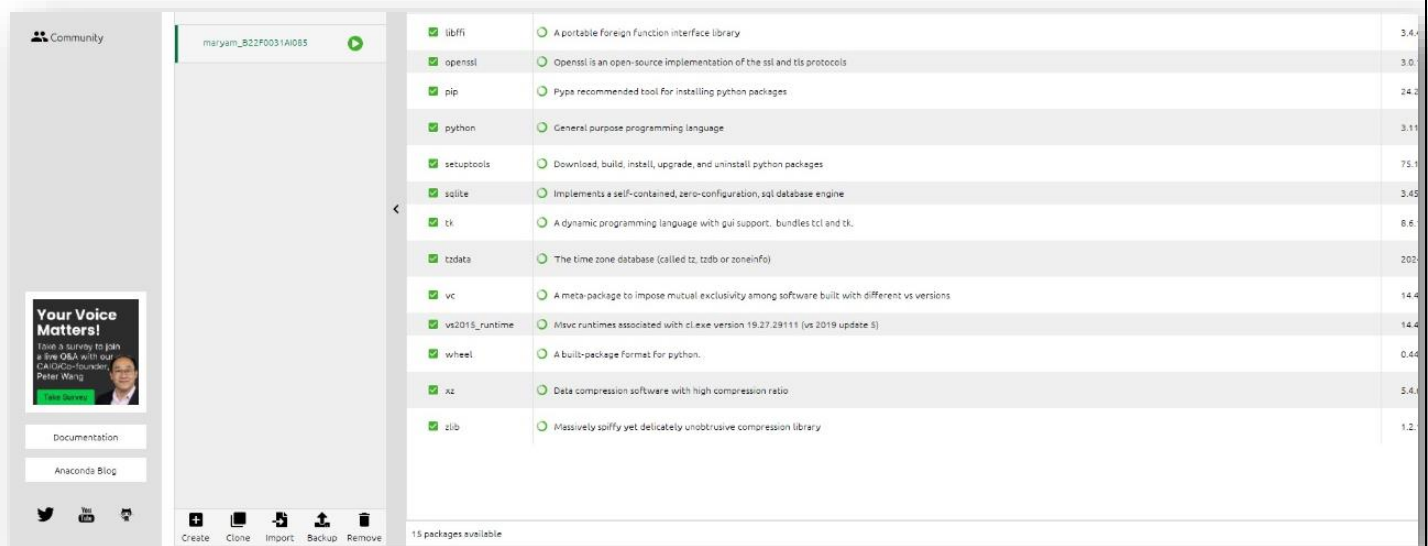


Creating a New Environment:

 **Name:** *maryam_B22F0031A085*

 **Python Version:** 3.8

 **Purpose:** Create an environment similar to Task 2 but through a GUI, demonstrating multiple approaches to managing DIP workflows.



Summary:

This lab session was an introduction to Conda's capabilities for managing packages and environments. The tasks reinforced dependency management, especially important in digital image processing projects where diverse libraries like **OpenCV**, **PIL**, and **TensorFlow** may be required.

Conclusion:

This lab emphasized the significance of tools like **Conda** and **Anaconda Navigator**, bridging the gap between theoretical knowledge and practical application.