National College of Ireland

Configuration Manual

MSc Research Project
Data Analytics

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Project Submission Sheet
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Configuration Manual

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1 Introduction

The setup guide provides an explanation of the contextual setting used for the current project. This includes information about the system setups, the programming language that was used, and the libraries and packages that were used for the research study.

2 Environment Configuration

The hardware and software system configuration utilized for the project is described in this section of the configuration documentation.

2.1 Hardware Specification

Below are the necessary for hardware specification shown in Table 1:

Hardware Component	**Specification**
Processor	Apple M1 Chip
RAM	8.0 GB
Storage	256GB SSD
Operating System	macOS Monterey
Architecture	64-bit
Processor Architecture	Apple Silicon
GPU	Apple M1 Integrated Graphics

Table 1: Hardware Specifications for Mac

2.2 Software Specification

The Table 2 lists various software and tools used for different purposes in this project.

3 Technical Specifications

3.1 Interactive Coding and Documentation

Setting up Anaconda Distribution with Python 3.9.3 and Jupyter Notebook on macOS:

Category	Software/Tool
Programming Language	Python 3.8.16
Integrated Development Environment	Jupyter Notebook
Web Browser	Safari
Productivity Software	Overleaf
Cloud Storage	iCloud Drive

Table 2: Software and Tools on macOS

1. **Install Anaconda Distribution:**
   - Download Anaconda Distribution for macOS from the official website: `https://www.anaconda.com/products/distribution`.
   - Follow the installation instructions to set up Anaconda.
2. **Create an Environment and Install Jupyter:**
   - Open a terminal and create a new Anaconda environment with Python 3.9.3: `conda create --name myenv python=3.9.3`.
   - Activate the environment: `conda activate myenv`.
   - Install Jupyter Notebook in the environment: `conda install jupyter`.
   - Launch Jupyter Notebook with the command: `jupyter notebook`.

These steps will allow you to run Python notebooks using Jupyter on your Mac with Anaconda and Python 3.9.3.

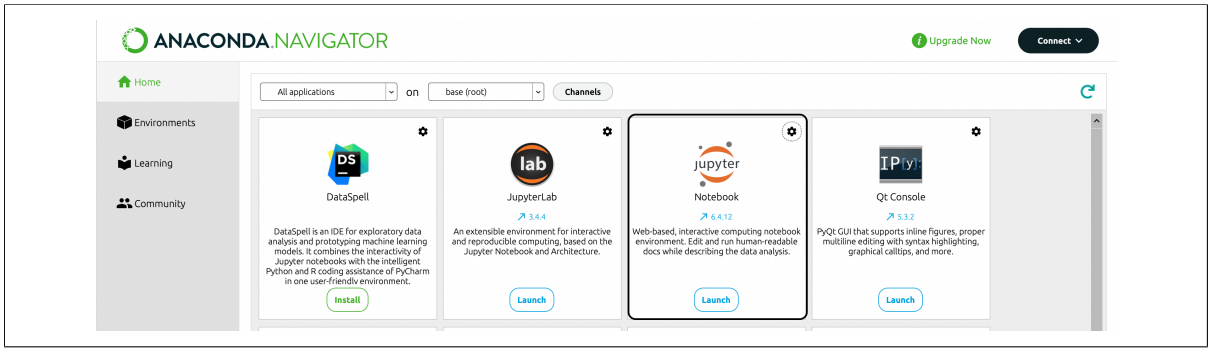

Figure 1: Anaconda Distribution

3.2 Importing Essential Python Libraries

Within the dynamic framework of a project aimed at determining the best spots for electric car charging stations in the center of Dublin, the collection of Python modules and frameworks takes center stage. Table 3 presents this tableau, which shows off a suite of crucial instruments that are typically used in the fields of data analysis and geospatial exploration. In order to strengthen the groundwork of this journey with data nuances and algorithmic discoveries, install the following essential Python friends on your code area. Allow these libraries to serve as your guide as you navigate the complex dance of data analysis and the innovative symphony of algorithms.

Library/Module	**Version**
numpy (Nelli; 2015)	1.24.3
PIL	9.2.3
Image	9.2.3
ImageDraw	9.2.3
IPython.display	7.29.0
matplotlib.pyplot	3.4.3
glob	0.7
random	3.4.0
cv2 (OpenCV)	4.5.3
warnings	0.1.1
seaborn (Waskom; 2021)	0.11.2
ultralytics	8.0.228

Table 3: Python Libraries and Modules with Versions

The figure 2 shows the imported libraries in the project.

```
In [1]: import numpy as np
        import PIL
        from PIL import Image, ImageDraw
        from IPython.display import display
        import matplotlib.pyplot as plt
        from glob import glob
        import random
        import cv2
        import warnings
        warnings.simplefilter('ignore')
```

Figure 2: Libraries Imported

4 Steps to Implement and Execute the Project.

The following are the procedural stages to execute the project:

- **Step 1:** Download the artifact.
- **Step 2:** Retrieve the dataset from kaggle [1].
- **Step 3:** Adjust the location based on the labels_train, labels_trainval, labels_val csv files location in the code. Additionally, the dataset includes an image folder, modify its placement.
- **Step 4:** Open the 'Predicting_Orientation_of_Car_in_Autonomous_Driving System.ipynb' file in jupyter notebook and click on 'Kernel' -¿ 'Restart and Run all'.

[1] https://www.kaggle.com/code/safurahajiheidari/yolov8-object-detection-on-self-driving-car-data

References

Nelli, F. (2015). The numpy library.
URL: *https://doi.org/10.1007/978-1-4842-0958-5*$_3$

Waskom, M. (2021). seaborn: statistical data visualization.
URL: *https://doi.org/10.21105/joss.03021*