

# Configuration Manual

MSc Research Project Masters in Artificial Intelligence

> Akashdip Neogi Student ID: x23218461

School of Computing National College of Ireland

Supervisor: Dr. Muslim Jameel Syed

#### National College of Ireland Project Submission Sheet School of Computing



Student Name:	Akashdip Neogi	
Student ID:	x23218461	
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## Configuration Manual

Akashdip Neogi x23218461

### 1 Introduction

This configuration manual provides detailed steps to set up and run the project titled "Critical Analysis of Machine Learning and Deep Learning Models for Mushroom Classification". The manual is designed to help users install the required dependencies, configure their system, and effectively use the models and tools that have been developed in this research.

## 2 System Requirements

#### 2.1 Hardware Requirements

- **CPU**: Minimum Intel<sup>® TM</sup> i5 or Apple<sup>®</sup> M2 processor.
- **RAM**: At least 12 GB.
- Storage: Minimum of 3 GB free disk space.

#### 2.2 Code Executing Environment Requirements

- **Operating System**: Linux, macOS, or Windows.
- Python Version: The installed python version should be 3.10.14.
- Software Required:
  - Jupyter Notebook<sup>1</sup>
  - Anaconda Navigator<sup>2</sup>
  - Github CLI<sup>3</sup>
- Libraries and Frameworks:
  - TensorFlow
  - PyTorch
  - Keras-Tuner
  - Scikit-learn
  - NumPy
  - Pandas
  - Matplotlib

<sup>&</sup>lt;sup>1</sup>https://jupyter.org/install

<sup>&</sup>lt;sup>2</sup>https://www.anaconda.com/download

<sup>&</sup>lt;sup>3</sup>https://cli.github.com/

- Seaborn
- Pillow
- Tqdm
- Torchvision
- SimpleJSON
- **Other Dependencies**: Internet connection for downloading datasets, code files and dependencies.

## 3 Installation Instructions

#### 3.1 Code File Setup

#### 1. Clone the Github Repository

git clone https://github.com/Akashdip-N/Mushroom-Classification.git cd Mushroom-Classification/

#### 2. Create a Virtual Environment (Optional but Recommended):

conda create –name myenv python=3.10.14 conda activate myenv

#### 3. Install Required Libraries

pip install -r requirements.txt

#### 4. Verify Installation:

python3 –version

#### 3.2 Dataset Folder Setup

Clone the dataset repository folder inside the same repository where the codes are present, using the following command.

git clone https://github.com/Akashdip-N/Dataset.git

## 4 Configuration Details

- 1. Environment Variables: You need to create a config folder inside the Mushroom-Classification directory.
- 2. Config File: You must create a JSON file with the name config.json. In the JSON file, you need to store the location of the dataset, train, val and test folder, in the dataset\_path, train\_path, val\_path, and test\_path variable respectively. For more help with setup refer to this readme file present in this repository, as well as the section 5.
- 3. **Dataset Structure**: Ensure the dataset folder structure is the same as the given structure below.



## 5 Steps to execute the code

- 1. After cloning the code repository as well as the dataset repository.
- 2. Open Anaconda Navigator.
- 3. In the next step click on the Jupyter Notebook as shown in, figure 1 to open the Jupyter Notebook.

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Figure 1: Anaconda Navigator Home Screen

- 4. **Jupyter Notebook** from the Anaconda Navigator home screen and open the folder that contains the code repository.
- 5. Figure 2, shows the option by clicking on the new folder option in the Jupyter Notebook to create a new folder.

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CNN_TensorFlow.ipynb	1 hour ago 97.8 KB
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vgg16-hyperparameter.ipynb	1 hour ago 97.6 KB
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requirements.txt	1 hour ago 231 B

Figure 2: Creating New Folder

Figure 3, shows the method using which the name of the folder is set to as **config**.

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CNN_TensorFlow.ipynb	1 hour ago 97.8 Ki
mobilenet_mushroom.ipynb	1 hour ago 100.9 KB
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Figure 3: Naming the New Folder

6. In the next step you have to go inside the config folder, and figure 4, shows how to create a new file.

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Figure 4: Creating New File

7. Figure 5, shows the method using which you have to name the new file as **con-fig.json** inside the directory.



Figure 5: Naming New File

8. Figure 6 shows how to edit the config file.



Figure 6: Editing the config file

9. Figure 7 shows the step with which you can insert the values in the config file.



Figure 7: Entering the configuration in the config file

10. Now go the folder in which you would see all the code files and open the files with the **.ipynb** extension, and figure 8, shows the screen that will show after you have

opened one of the code files.



Figure 8: Jupyter Notebook Code opened

11. To execute the code click on the **Run** opinion then on **Run All Cells** option as shown in figure 9.





12. After this the code will print the following display the training accuracy curve for the deep learning models, as shown in figure 10, and F1-score, precision, recall, and accuracy for all the models, as shown in figure 11 and the confusion matrix as shown in figure 12.



Figure 10: VGG16, Training Accuracy Curve

Metric	Score
Accuracy	0.5
Precision	0.625
Recall	0.5
F1 Score	0.433333

Figure 11: Random Forest Model Stats



Figure 12: VGG16, Confusion Matrix

### 6 Troubleshooting

These are some of the common issues that you might face while running the code.

- **Issue**: Missing library error.
- Solution: Run pip install -r requirements.txt again.
- Issue: Out-of-memory error during training.
- Solution: Reduce the image size from 64 to 32, or you can reduce the number of epochs from 30 to 20.

- **Issue**: Dataset not found.
- Solution: Ensure the dataset path matches the value in **config.json** file which is present in the **config** folder inside the code directory.

## 7 Related Links

- Github CLI: https://cli.github.com/
- Code Repository: https://github.com/Akashdip-N/Mushroom-Classification.git
- Dataset Repository: https://github.com/Akashdip-N/Dataset.git
- Anaconda Navigator: https://www.anaconda.com/download
- Jupyter Notebook: https://jupyter.org/install