Configuration Manual

MSc AI for Business
Practicum 2

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Project Submission Sheet
School of Computing

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Configuration Manual
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1. Introduction

This configuration manual provides the necessary steps to set up, configure, and run the Predictive Maintenance Project. The project uses machine learning techniques to predict potential failures in electric vehicles based on historical and operational data. It is designed for academic and research purposes.

2. Purpose

The purpose of this manual is to guide users through the installation of required dependencies, preparation of the environment, and execution of the provided Jupyter notebooks to reproduce the experiments.

3. System Requirements

- **Operating System:** Windows 10/11, macOS, or Linux
- **Python Version:** 3.10 or 3.11
- **RAM:** Minimum 8 GB (16 GB recommended)
- **Software:**

  GitHub (optional, for cloning the repository)
 Jupyter Notebook or JupyterLab

4. Running the model

a. Clone or Download the Repository

Option 1: Clone the project that is available in GitHub to facilitate its installation:

```
git clone https://github.com/AlexisSCC/Predictive_Maintenance_Project.git
cd Predictive_Maintenance_Project
```

Option 2: Download ZIP

Click **Code** – Download ZIP in the GitHub repository and extract the files.
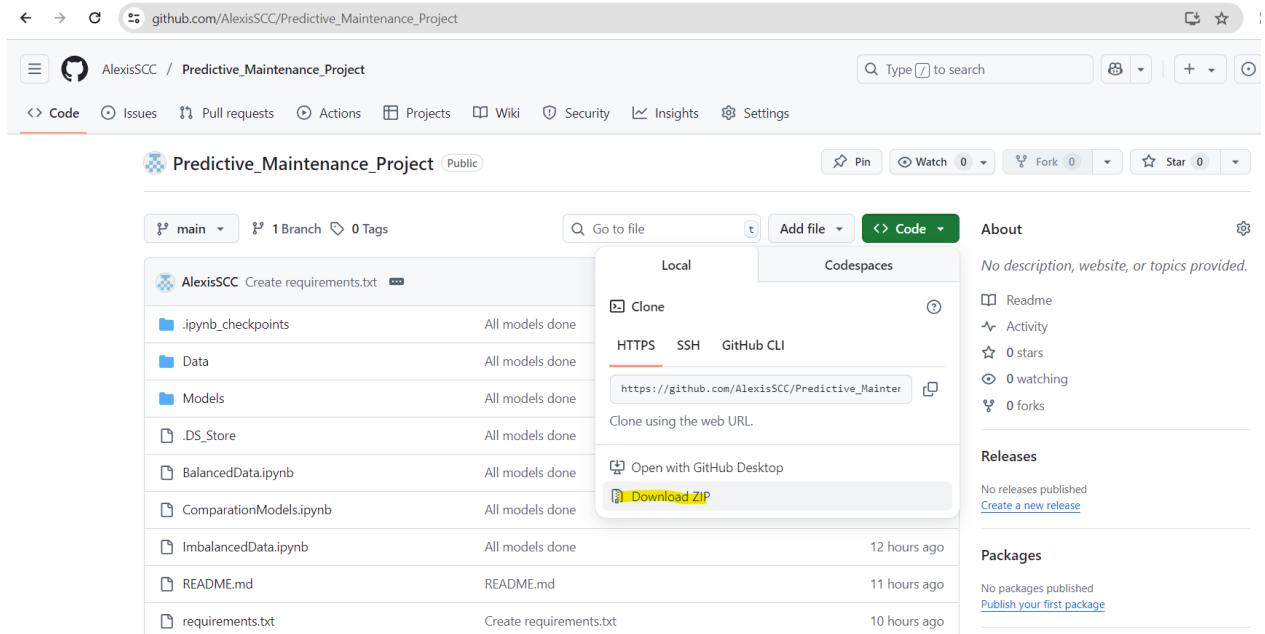
b. Install Dependencies

```
pip install -r requirements.txt
```

c. Verify Installation

```
python -c "import pandas, numpy, matplotlib, seaborn, sklearn, imblearn, xgboost, joblib;
print('All dependencies installed successfully!')"
```
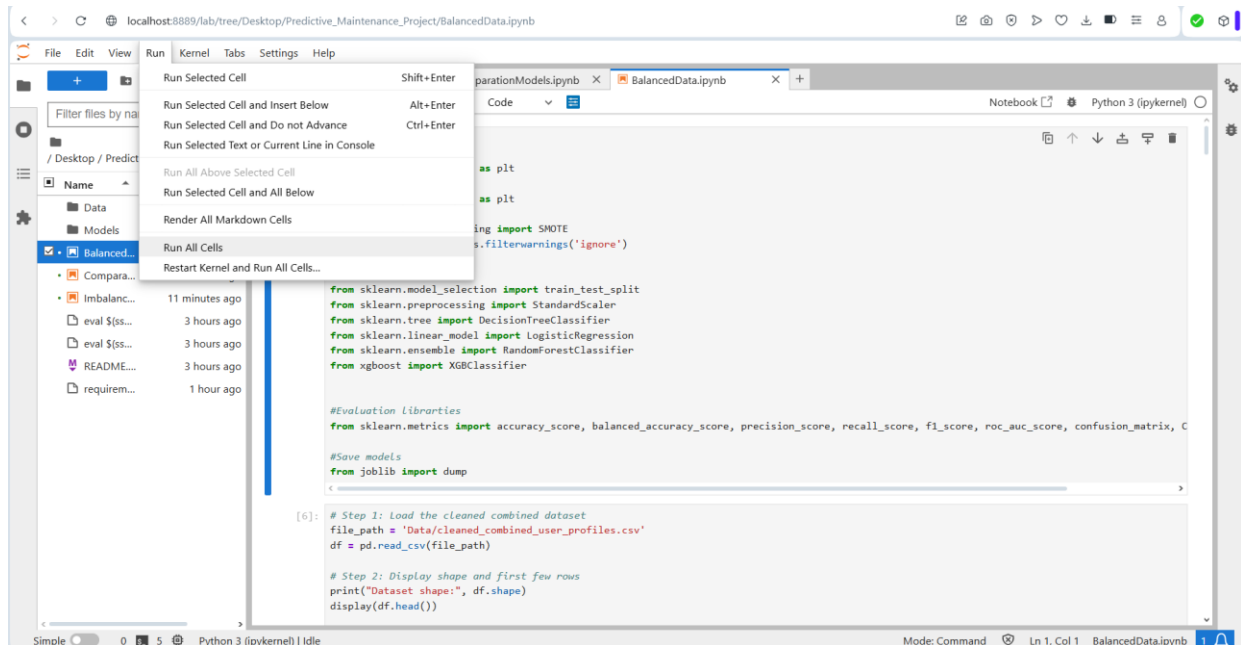
Runnning the Notebooks
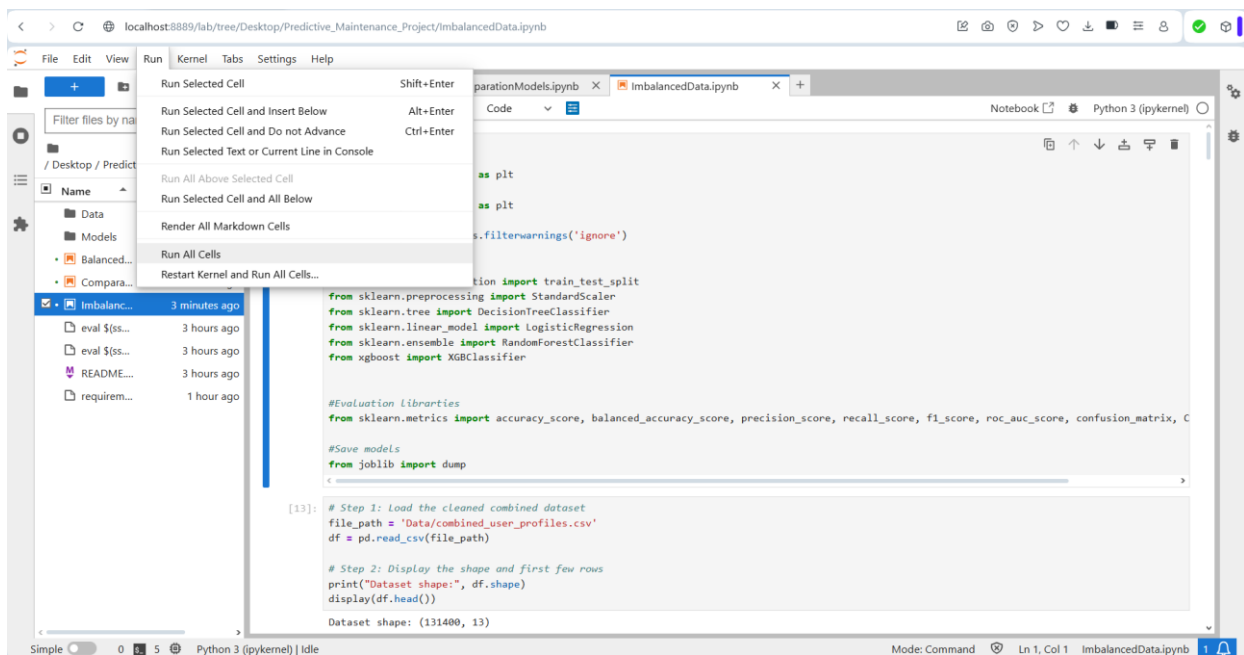
d. Open Jupyter Notebook

```
jupyter notebook
```
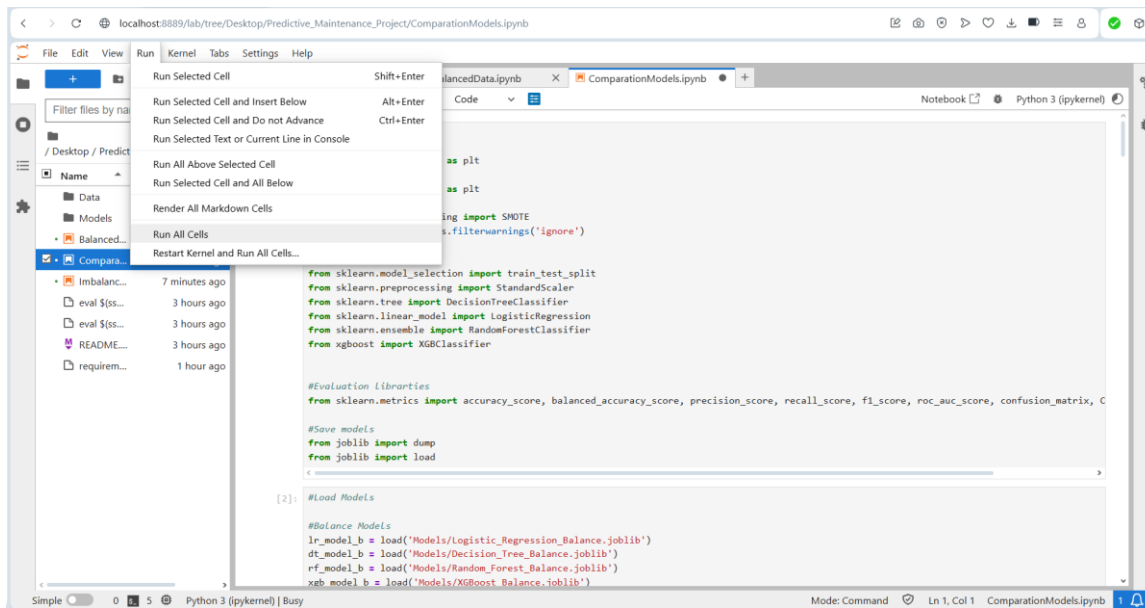
e. Open each one of the main notebooks

- **Run all BalancedData.ipynb to reproduce results**

- **Run all ImbalancedData.ipynb to reproduce results**

- **Run all ComparationModels.ipynb to reproduce results**

5. Section 3 - Organization of the Project Structure

The project is organized in a structure by steps to facilitate understanding. We followed the structure below:

```
Predictive_Maintenance_Project/
|
├── Data/
|   ├── raw/
|   |   └── # Original data before cleaning
|   └── processed/
|       └── # Cleaned data ready for modeling
|
├── Models/
|   └── # Saved trained models
|
├── BalancedData.ipynb
|   └── # Notebook for balanced dataset experiments
|
├── ImbalancedData.ipynb
|   └── # Notebook for imbalanced dataset experiments
|
├── ComparationModels.ipynb
|   └── # Model performance comparison
|
├── requirements.txt
|   └── # List of Python dependencies
|
├── README.md
|   └── # Project overview and usage instructions
|
└── Configuration_Manual
    └── # This document
```