

Introduction

This Jupyter notebook implements a logistic regression model to classify iris species based on their physical attributes. The model is trained using the Iris dataset, which includes measurements such as sepal length, sepal width, petal length, and petal width.

Libraries Required

- **NumPy**: For numerical operations on arrays.
- **Pandas**: For handling data in a tabular format.
- **Matplotlib & Seaborn**: For plotting graphs and visualizing data.
- **scikit-learn**: For machine learning tools and algorithms, including data splitting, model creation, and evaluation metrics.

Automatic Installation

To automatically install the required libraries, run the following command in your terminal or command prompt:

```
pip install numpy pandas matplotlib seaborn scikit-learn
```

How to Use

1. **Open the Notebook**: Launch Jupyter Notebook or JupyterLab and navigate to the file `Logistics Regression.ipynb`.
2. **Run the Cells**: Execute each cell sequentially to see the workflow from data loading to model evaluation.
3. **Modify Parameters**: You can change the model parameters or try different methods for preprocessing to see how they affect the results.

Code Execution

The notebook is structured into sections that include data loading, preprocessing, model training, predictions, and evaluation. Each cell is annotated with comments to guide you through the process. Ensure that you run the cells in the order they appear to maintain the flow of data processing and analysis.

- **Data Loading**: Data is loaded into a DataFrame for inspection and manipulation.
- **Preprocessing**: The dataset is split into training and test sets. Features are scaled for optimal model performance.
- **Model Training**: A logistic regression model is initialized and trained on the dataset.
- **Predictions**: The model makes predictions on the test set.
- **Evaluation**: The model's performance is assessed using a confusion matrix and classification report. Graphical visualization of the confusion matrix provides a clear view of the model's accuracy and misclassifications.

For any modifications or testing different scenarios, adjust the parameters or preprocessing steps as needed and rerun the relevant sections.