

Team 7: Analysis of Fish Length-Weight Relationships

1 Introduction

The `7.csv` **Fish Length-Weight** dataset is a synthetic dataset inspired by the research paper: *Length-weight relationships of nine fish species from the Tetulia River, southern Bangladesh*. This dataset provides key insights into the biological characteristics of different fish species, focusing on their length, weight, and weight-to-length ratio. Understanding these relationships is crucial for fisheries research, ecological studies, and species classification.

2 Dataset Description

The dataset contains the following key attributes:

- **Species** – The name of the fish species.
- **Length** – The measured length of the fish (in cm).
- **Weight** – The measured weight of the fish (in g).
- **W/L Ratio** – The weight-to-length ratio, calculated as weight divided by length.

3 Tasks and Requirements

To analyze and extract meaningful insights from the dataset, the following tasks need to be performed:

3.1 Data Exploration and Preprocessing

- Load and inspect the dataset for inconsistencies or missing values.
- Perform exploratory data analysis (EDA) to understand the distributions and relationships between length, weight, and species.
- Normalize or transform variables if necessary to improve model performance.

3.2 Data Analysis and Modeling

- Identify patterns in fish length-weight relationships across different species.
- Investigate whether weight-to-length ratios vary significantly between species.
- Develop classification models to predict fish species based on length, weight, and W/L ratio.
- Evaluate model performance using metrics such as accuracy, precision, and recall.

3.3 Visualization and Reporting

- Generate scatter plots and regression analyses to visualize length-weight relationships.
- Use histograms and boxplots to examine species-specific weight distributions.

4 Submission Requirements

- A well-structured report detailing the methodology, results, and analysis in a given report format.
- Python code is used for implementation.
- A presentation summarizing key findings and recommendations in a given presentation format.