**Project Overview: Descriptive Statistics & Machine Learning Techniques**

This project focuses on analysing a diamond dataset using Python, covering key statistical and machine learning techniques. It explores descriptive statistics, data transformations, outlier detection, and feature scaling while leveraging libraries like Pandas, NumPy, and Matplotlib for analysis and visualization.

Key aspects of the project include:

* **Data Preparation:** Splitting the dataset into numerical and categorical variables.
* **Descriptive Statistics:** Computing measures of central tendency using Pandas and statistics libraries.
* **Skewness Analysis:** Identifying skewed numeric variables and applying transformations for normalization.
* **Outlier Detection:** Implementing an IQR-based function to detect outliers.
* **Feature Engineering:** Converting categorical variables into numerical representations using Label Encoding.
* **Feature Scaling:** Applying StandardScaler and MinMaxScaler for normalization.
* **Data Visualization:** Creating histograms, KDE plots, and heatmaps for correlation analysis.
* **Gradient Descent:** Detailed explanation of the algorithm and the impact of the learning rate on convergence.

This project provides a comprehensive understanding of data preprocessing and statistical analysis, essential for data science and machine learning applications. 🚀

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