

Auto Regression Feature Selection

I need assistance in selecting the optimal feature set for my dataset. To achieve this, please apply three regression models: K-Nearest Neighbors (KNN) Regressor, Linear Support Vector Regression (Linear SVR), and Ridge Regression in an attempt to predict **MPG**. These models should be implemented on 6 distinct feature combinations extracted from the provided dataset. The results should be organized in a DataFrame, accompanied by visual representations derived from this DataFrame to facilitate comparison of the model performances. Please document your process or thoughts on how you produced each feature set. **Your models should all have the same hyper-parameters. Please do not attempt to tune the model based on hyper-parameters.**

Dataset Description:

- ID: Unique identifier of each entry
- Displacement: Engine displacement
- Cylinders: Number of engine cylinders
- Horsepower: Engine power output
- Weight: Vehicle weight
- Acceleration: Vehicle acceleration capability
- Model Year: Year of the car model
- Origin: Origin of the car manufacturer
- MPG: Miles per gallon (target variable)

Tasks:

- **Data Preprocessing:**
 - **Data Cleaning, Encoding, Normalization, etc..:** Handle missing values, outliers, and any erroneous data in the dataset.

Feature Selection:

- Create 6 distinct feature sets from the original features. You can transform, remove, or create new features as you please. **At least one of these feature sets should include new features.**
- **Model Selection and Training:**
 - Train each model on each feature set.
- **Model Evaluation:**

- Evaluate the models using appropriate metrics (e.g., Mean Squared Error, R^2 Score).
- (BONUS): Use cross-validation to assess the performance of each model-feature set combination.
- **Comparison and Analysis:**
 - Compare the performance of the different models across the feature sets.
 - Analyze which features contributed most to the model's performance.
 - Discuss the strengths and weaknesses of each model based on your observations.

Hints: Look at <https://scikit-learn.org/stable/modules/preprocessing.html> to see some of the built-in preprocessing tools available to you.