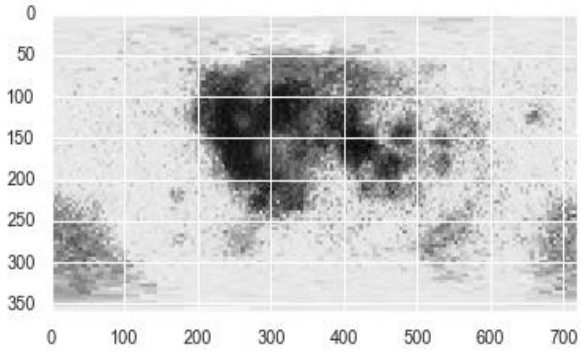
Task 1 - Predictive model for the Lunar albedo based on the chemical composition data from the Lunar Prospector.

## Results

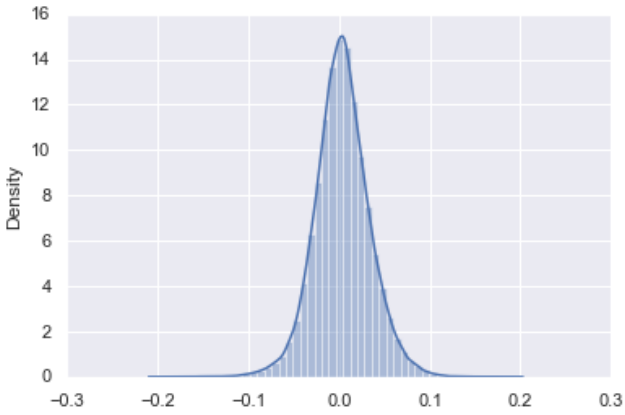
| Model | MSE (Mean Squared Error) |
|---|---|
| Linear Regression | 0.001025152221398643 |
| Support Vector Machine Regressor(tuned) | 0.0010564847231500207 |
| Random Forest (tuned) | 0.000986584356014296 |
| **XGBOOST (tuned)** | **0.0009304179266331601** |
| Neural Network (tuned) | 0.0010610954305026602 |

Best Model – XGBOOST (MSE = **0.0009304179266331601)**

## Image




## Residuals



Task 2 - Predicting Mercury's elemental composition from Albedo with MESSENGER Data

## Results

| Model | MSE (Mean Squared Error) |
|---|---|
| Linear Regression | 0.008239858222914646 |
| KNN (tuned) | 0.008517812222464106 |
| Random Forest (Tuned) | 0.007993775066409383 |
| **XGBOOST using MultiOutputRegressor** | **0.007991978600932065** |
| XGBOOST using Chained Multioutput Regression | 0.008699825503922025 |
| Neural Network using Tensorflow(Tuned) | 0.008239864792106802 |
| Neural Network using MLPRegressor | 0.008047336148208833 |

Best Model – XGBOOST (MSE = **0.007991978600932065)**

## Predictions

| | Fe | Al | Mg | S | Ca |
|---|---|---|---|---|---|
| **0** | 0.541922 | 0.786952 | 0.556812 | 0.462441 | 0.484005 |
| **1** | 0.566629 | 0.757382 | 0.526328 | 0.475923 | 0.527736 |
| **2** | 0.561151 | 0.890483 | 0.498289 | 0.452601 | 0.507011 |
| **3** | 0.566629 | 0.757382 | 0.526328 | 0.475923 | 0.527736 |
| **4** | 0.541922 | 0.786952 | 0.556812 | 0.462441 | 0.484005 |