Algonix: A Custom Machine Learning Library

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**Platform:** Python (Cross-platform)  
**Technologies:** Python, NumPy, SciPy, scikit-learn, Matplotlib  
**GitHub:** <https://github.com/bhushanzade02/ALGONIX-ML-LIBRARY>  
**PyPI:**  [**pip install algonix**](https://pypi.org/project/algonix/)<https://pypi.org/project/algonix/>

**Project Overview**

Algonix is a lightweight, modular machine learning library developed entirely from scratch using Python and NumPy. Its primary goal is to serve as an educational and experimental platform for those seeking to deeply understand the implementation of machine learning algorithms without the abstraction layers provided by popular libraries like scikit-learn. This project was developed independently as part of the M.Sc. Scientific Computing curriculum and embodies the core philosophy of transparent, explainable, and hands-on algorithm development.

**Key Features**

* **Supervised Learning Algorithms:** Simple Linear Regression, Multiple Linear Regression, Ridge & Lasso Regression, Logistic Regression, Decision Tree Regressor, K-Nearest Neighbours
* **Unsupervised Learning:** K-Means Clustering with Elbow Method
* **Ensemble Learning:** Gradient Boosting (Classification & Regression)
* **Optimization Techniques:** Batch Gradient Descent, Stochastic Gradient Descent
* **Evaluation Metrics:** MSE, MAE, RMSE, R² Score, Adjusted R² Score

**Technical Highlights**

* Developed from scratch using vectorized operations with NumPy
* Modular design to promote scalability and ease of maintenance
* Includes testing framework using PyTest for model validation
* Clean, readable code ideal for academic learning and training purposes
* PyPI deployment for easy installation: pip install algonix

**Educational Value**

Algonix provides a hands-on opportunity to understand:

* The mathematics and implementation of regression and classification models

This project exemplifies the synergy of applied mathematics, programming, and scientific computing — core to the M.Sc. Scientific Computing program.