

M3402



MyAlgo



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MyAlgo is my Machine Learning project which is focused on building Linear Regression and Artificial Neural Network from scratch without using high level machine learning libraries such as Tensorflow, PyTorch and scikit-learn.

The main goal of this project is to combining

- **python** as a user facing python API
- **C++** as a high performance computational backend (only for numerical calculations)

Implemented Algorithms

Linear Regression

Feature	Supported values
Methods	Normal Equation, GD, SGD
Regularization	Lasso, Ridge, Elastic net

Example usage:

```
model = LinearRegression(method='gd', lr=0.01, epochs=1000)
model.fit(X_train, y_train)
predictions = model.predict(X_test)
```



2. ANN

Feature	Supported values
Layers	Flatten, Dense
Activations	ReLU, sigmoid, Tanh, Softmax
Loss functions	MSE, cross-entropy

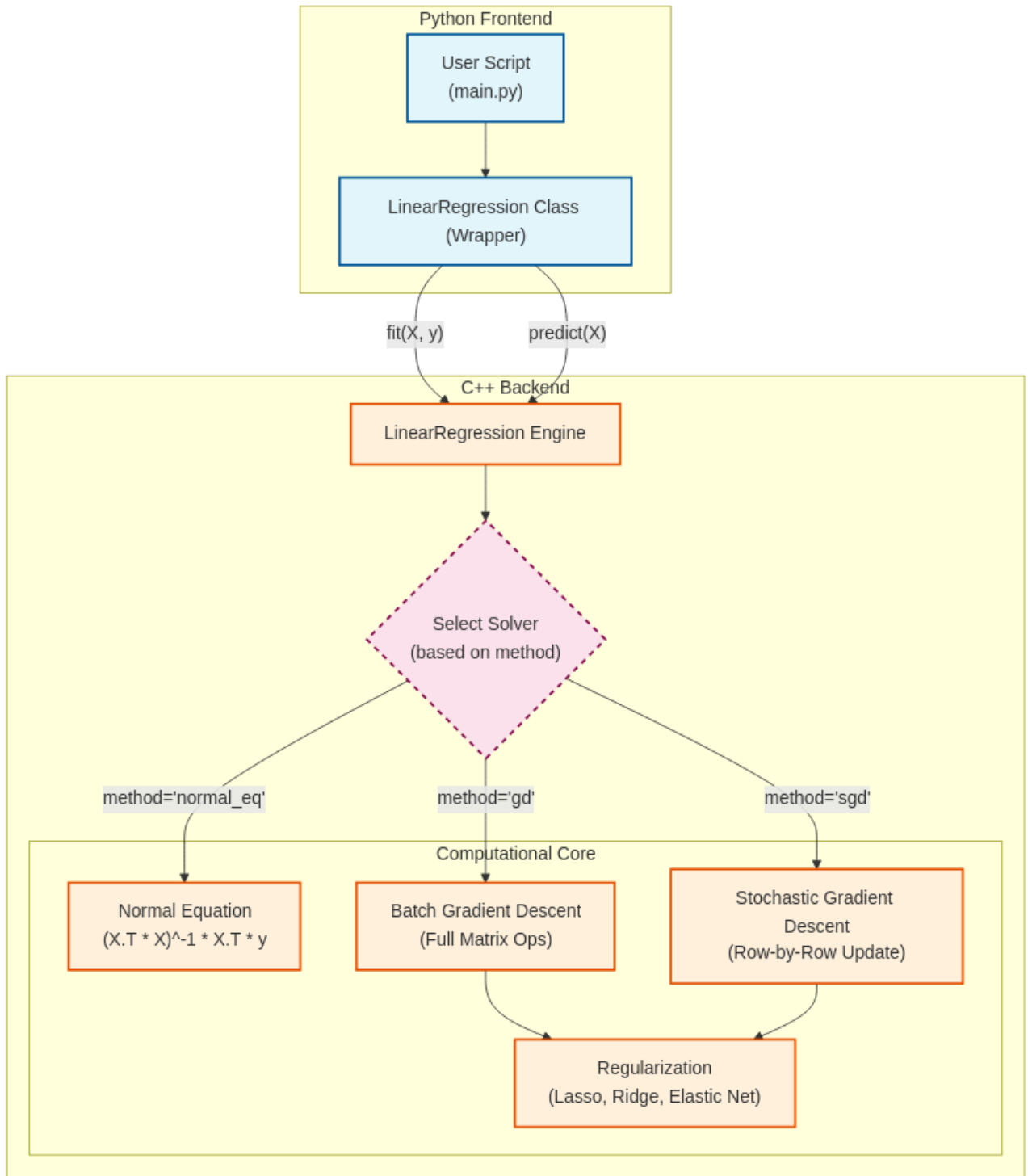
Example usage:

```
model = NeuralNetwork(
    Flatten((28,28)),
    Dense(128, activation='relu'),
    Dense(10, activation='softmax')
)
model.compile(loss='categorical_crossentropy', lr=0.01)
model.train(X_train, y_train, epochs=11, batch_size=32)
```

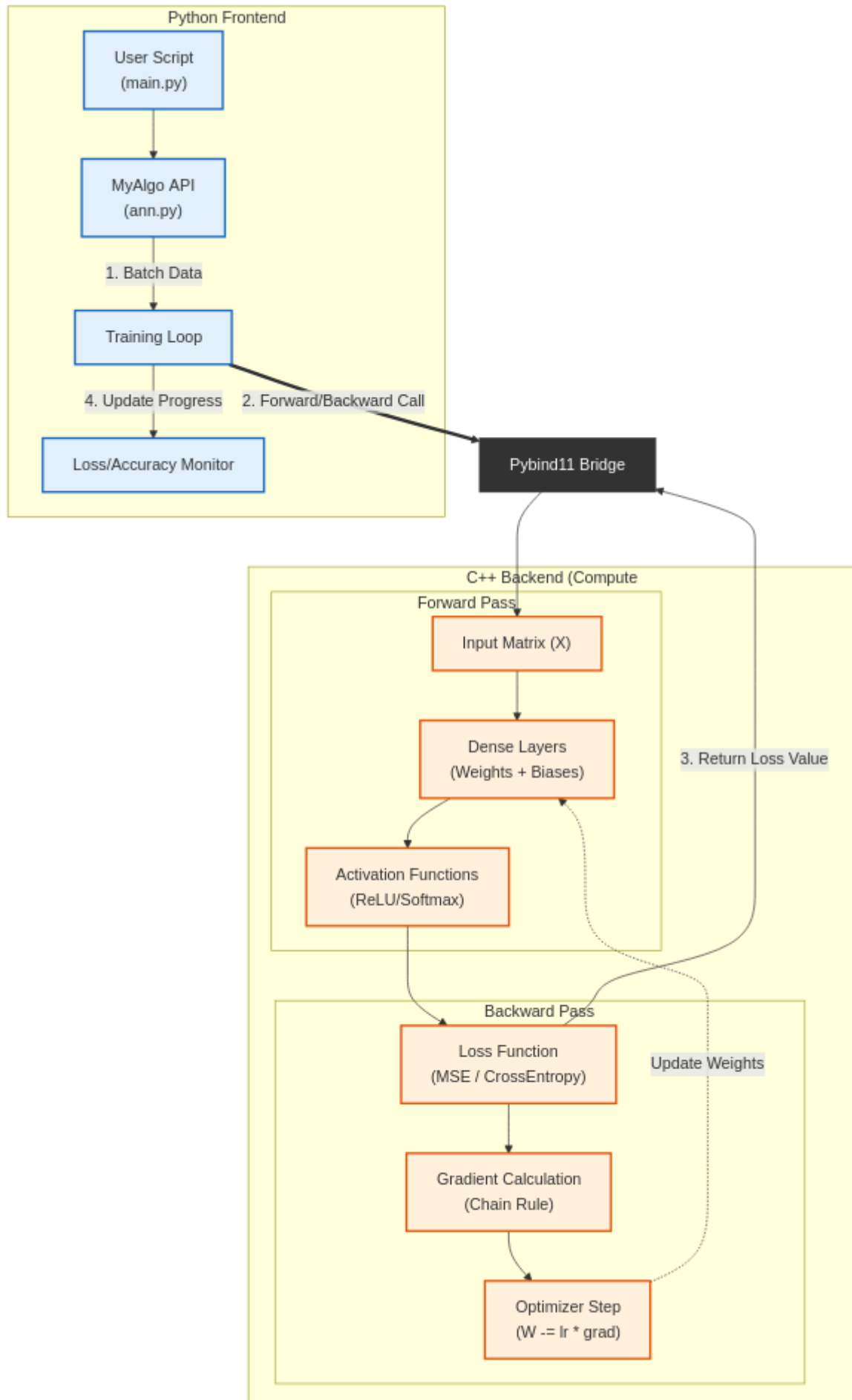


Results of MINST dataset training

Architecture of Linear Regression class, and the dataflow for training the Linear Regression model with Multiple training methods.



ANN Architecture, with a training loop handled by the python API and the C++ is used only for matrix multiplication, weight changing, activation functions, etc. mathematical operations



THANK YOU