

Testing Documentation

The testing suite comprises JUnit test classes that verify the correctness of various components within the neural network implementation. These tests cover the initialization of training data, activation functions, neurons, and layers.

1. TrainingDataTester

1.1 testTrainingDataInitialization

This test ensures the correct initialization of the `TrainingData` class.

- **Input:**
 - `inputData`: Array of input data (float).
 - `expectedOutput`: Array of expected output data (float).
- **Verification:**
 - Checks if the input data and expected output are correctly initialized in the `TrainingData` object.

2. StatUtilTest

2.1 testRandomFloat

Verifies the correctness of the `RandomFloat` method in the `StatUtil` class.

- **Input:**
 - `min`: Minimum value for the random float.
 - `max`: Maximum value for the random float.
- **Verification:**
 - Ensures that the generated random float falls within the specified range.

2.2 testSigmoid

Tests the `Sigmoid` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the sigmoid function produces the expected result for a specific input.

2.3 testLin

Tests the `Lin` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the linear function produces the expected result for a specific input.

2.4 testLinDev

Tests the `LinDev` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the linear function derivative produces the expected result for a specific input.

2.5 testSigmoidDerivative

Tests the `SigmoidDerivative` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the sigmoid derivative produces the expected result for a specific input.

2.6 testReLU

Tests the `ReLU` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the ReLU function produces the expected result for a specific input.

2.7 testReLUDerivative

Tests the `ReLUDerivative` method in the `StatUtil` class.

- **Input:**
 - `x`: Input value.
- **Verification:**
 - Checks if the ReLU derivative produces the expected result for a specific input.

2.8 testSquaredError

Tests the `squaredError` method in the `StatUtil` class.

- **Input:**
 - `output`: Output value.
 - `target`: Target value.
- **Verification:**
 - Checks if the squared error calculation produces the expected result for specific inputs.

2.9 testSumSquaredError

Tests the `sumSquaredError` method in the `StatUtil` class.

- **Input:**
 - `outputs`: Array of output values.
 - `targets`: Array of target values.
- **Verification:**
 - Checks if the sum of squared errors calculation produces the expected result for specific inputs.

3. NeuronTest

3.1 testHiddenAndOutputNeuronConstructor

Ensures the correct initialization of hidden and output neurons.

- **Verification:**
 - Checks if weights, bias, cache weights, and gradient are correctly initialized for hidden and output neurons.

3.2 testInputNeuronConstructor

Tests the initialization of input neurons.

- **Verification:**
 - Checks if values, weights, bias, cache weights, and gradient are correctly initialized for input neurons.

3.3 testUpdateWeight

Verifies the functionality of the `update_weight` method in the `Neuron` class.

- **Verification:**
 - Checks if weights are updated correctly based on cache weights.

4. LayerTest

4.1 testHiddenAndOutputLayerConstructor

Ensures the correct initialization of hidden and output layers.

- **Verification:**
 - Checks if neurons in hidden and output layers have the correct number of weights.

4.2 testInputLayerConstructor

Tests the initialization of input layers.

- **Verification:**
 - Checks if neurons in the input layer have the correct values.

Note: Additional test methods can be added to cover more functionalities and scenarios, ensuring comprehensive test coverage.

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✓ JavaProjects 49ms

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✓ LayerTest 1.0ms

✓ testHiddenAndOutputLayerConstructor() 1.0ms

✓ testInputLayerConstructor() 0.0ms

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✓ NeuronTest 2.0ms

✓ testHiddenAndOutputNeuronConstructor() 1.0ms

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✓ testUpdateWeight() 0.0ms

✓ StatUtilTest 36ms

✓ testRandomFloatInRange() 6.0ms

✓ testSigmoid() 3.0ms

✓ testSigmoidDerivative() 2.0ms

✓ testReLU() 21ms

✓ testReLUDerivative() 2.0ms

✓ testSquaredError() 2.0ms

> ✓ TrainingDataTester 4.0ms

testUpdateWeight() (Passed), in 0.0ms

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PROBLEMS

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