

CAP 4053 Artificial Intelligence for Computer Games: Neural Networks

Neural Networks for CAP 4053 Artificial Intelligence for Computer Games

Key Concepts

Neural networks are a type of artificial intelligence that are modeled after the human brain. They are composed of interconnected nodes, or neurons, which process and transmit information. Neural networks are used to solve complex problems that are too difficult for traditional algorithms. They are used in a variety of applications, including computer vision, natural language processing, robotics, and computer games.

Definitions

****Neural Network:**** A type of artificial intelligence modeled after the human brain. It is composed of interconnected nodes, or neurons, which process and transmit information.

****Node:**** A single neuron in a neural network. It is responsible for processing and transmitting information.

****Weights:**** A numerical value assigned to each connection between two nodes. Weights determine the strength of the connection between two nodes.

****Backpropagation:**** The process of adjusting the weights of a neural network based on the error of the output.

Coding Examples

Start of Code

```
// Create a neural network with 3 input nodes, 4 hidden nodes, and 1 output node
let neuralNetwork = new NeuralNetwork(3, 4, 1);

// Set the weights of the connections between the nodes
neuralNetwork.setWeights([
    [0.1, 0.2, 0.3, 0.4],
    [0.5, 0.6, 0.7, 0.8],
    [0.9, 1.0, 1.1, 1.2],
    [1.3, 1.4, 1.5, 1.6],
    [1.7, 1.8, 1.9, 2.0]
]);

// Feed the inputs into the neural network
let inputs = [1.0, 2.0, 3.0];
let output = neuralNetwork.feedForward(inputs);
```

```
// Adjust the weights using backpropagation
let desiredOutput = [4.0];
neuralNetwork.backpropagate(desiredOutput);
End of Code
```

Practice Multiple Choice Questions

Q: What is a neural network?

A: A type of artificial intelligence modeled after the human brain. It is composed of interconnected nodes, or neurons, which process and transmit information.