1. **Neural Network**: A neural network is a computer system inspired by the structure of the human brain. It consists of layers of interconnected nodes, or neurons, that process and transmit information. Neural networks are commonly used in machine learning for tasks like pattern recognition, classification, regression, and more.
2. **Forward and Backward Propagation**: In neural networks, forward propagation is the process of passing input data through the network to generate an output prediction. Backward propagation, also known as backpropagation, is the process of calculating the gradient of the loss function with respect to the weights of the network. It helps in updating the weights to minimize the error in predictions during training.
3. **Activation Functions**: Activation functions are used within neural network layers to introduce non-linearities into the model. They determine the output of a node, which is then passed as input to the next layer. Common activation functions include sigmoid, tanh, ReLU (Rectified Linear Unit), and softmax, each with its own characteristics suited for different types of problems.
4. **Classification**: Classification is a type of machine learning task where the goal is to categorize input data into predefined classes or categories. The model learns from labeled training data and then predicts the class of unseen instances.
5. **Regression**: Regression is another type of machine learning task where the goal is to predict a continuous output value based on input features. It's used to understand the relationship between input variables and the continuous target variable.
6. **Learning Rate, Batch Size, and Other Hyperparameters**: These are parameters that are set prior to training a neural network. The learning rate controls how much the model weights are updated during training. A higher learning rate can lead to faster convergence, but it can also make the training process unstable. Batch size determines the number of training examples used in each iteration of training. Other hyperparameters, such as the number of hidden layers, number of neurons per layer, regularization parameters, etc., also impact the performance and behavior of the model.