**Gradient Descent**

**Objective:** The main goal of gradient descent is to minimize the loss function of a model. The loss function measures how far the model's predictions are from the actual results.

**Gradient**: The term "gradient" refers to the derivative (or the slope) of the loss function. It indicates the direction in which the loss function is increasing most rapidly.

**Descent**: "Descent" implies moving downwards. In this context, it means adjusting the model's parameters (like weights in a neural network) in the opposite direction of the gradient to reduce the loss.

**Process**:

**Calculate the gradient:** Determine how much a small change in each parameter would change the loss.

**Update the parameters**: Adjust the parameters in the opposite direction of the gradient by a small step.

**Learning Rate:** This is a hyperparameter that determines the size of the step to take on each update. A too-large learning rate might overshoot the minimum,

Relating to Gradient Descent and Backpropagation

In the context of gradient descent and backpropagation in neural networks:

**Slope in Gradient Descent:**

* The slope here is analogous to the gradient of the loss function with respect to the model's parameters (like weights).
* A steep slope (large gradient) indicates a significant change in the loss function for a small change in the parameter.
* The goal is to adjust the parameters in the direction opposite to the gradient (downhill) to minimize the loss.

**Intercept in Neural Networks:**

* While the concept of an intercept is not directly analogous in neural networks, you can think of the intercept as part of the parameters that the model is trying to learn.
* In a simple linear regression model, the intercept is a key parameter along with the slope.
* In neural networks, biases act like intercepts. They are parameters that are adjusted along with weights during training.

A diagram of a process

Description automatically generated

A diagram of a graph

Description automatically generated