**LASSO Regression**

LASSO(Least Absolute Shrinkage and Selection Operator) is a linear regression model which uses mean squared error with the addition of L1 Regularization as the error function. LASSO is especially useful on cases which the data has few parameters.

Here is a constant which controls the amount of penalty that will affect the weight matrix.

**Ridge Regression**

Ridge Regression is a linear regression model that uses mean squared error with the addition of L2 Regularization as the error function. In the opposite of LASSO parameters which have less effect than others are not completely disabled but still might have little effect on the outcome.

Here is a constant which controls the amount of penalty that will affect the weight matrix.

**Gradient Tree Boosting Regression**

Gradient Tree Boosting is a generalized model which is classified under ensemble methods. It uses decision trees to create a predictive model which are usually called weak learners, then these predictive models are boosted with gradient descent algorithm to fit the data.

Here is the weak learner which is a decision tree of a fixed size and is the step size.

Then is given, loss function is minimized using the formula:

Gradient Boost is used to minimize this problem numerically with steepest descent.

Where step size is:

**Artificial Neural Network Regression**

Neural networks are inspired by the visual cortex system of an animal. This machine learning model isn’t a standalone algorithm but the mixture of many methods. This networks are made up by collection of nodes or so called neurons. These nodes are able to send signals to each other.

Above is the activation formula for each neuron. Here stands for weight and stands for the input. If the output of this formula satisfies the activation condition signal is sent to the adjacent neurons.

Neural networks use many different lose functions and backpropogate through its layers to optimize the weights for a specific subject. In our case lose function is L2 Distance formula: