# Predicting Survival on the Titanic Using Gradient Boosted Trees

# Overview

Understanding Gradient Boosted Trees

Use GBT to solve the Titanic problem

Understand the different parameters which can be used to control the ensemble

Find the best combination of parameters using hyper-parameter tuning

# Gradient Boosted Trees

**Models built using different**

**Training Sets**

**Each tree built from a different subset of the training set**

# Gradient Boosted Trees

## Boosting

Each tree built sequentially from a different subset of the training set

## Gradient Descent

Adjusting probability of a data point being in the next training set

# Gradient Boosted Trees

**Boosting**

**Gradient Descent**

**Each tree built sequentially from a different subset of the training set**

Adjusting probability of a data point being in the next training set

# Boosting

In Random Forests, each tree is built independently

# Boosting

With boosting, each tree is built to improve upon the previous tree

# Boosting

**Initially**

**All data points have equal probability of being chosen**

# Boosting

In each iteration

The probabilities are modified

# Boosting

**Data points which are classified correctly are down weighted**

**Data points which are classified incorrectly are up weighted**

# Boosting

In the final result, each tree's vote is given a different weight

# Boosting

**Tree weight depends on how accurate the tree was on training data**

# Gradient Boosted Trees

## Boosting

Each tree built
sequentially from
a different subset
of the training set

## Gradient Descent

Adjusting
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# Gradient Boosted Trees

## Boosting

Each tree built sequentially from a different subset of the training set

## Gradient Descent

Adjusting probability of a data point being in the next training set

# Gradient Descent

**The probabilities of choosing a training data point are updated using this technique**

# Gradient Boosted Trees

**Boosting**

Each tree built sequentially from a different subset of the training set

**Gradient Descent**

Adjusting probability of a data point being in the next training set

# Demo

Use Gradient Boosted Trees to solve the Titanic problem

# Demo

**Find the best parameters using hyper-parameter tuning**

# Summary

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