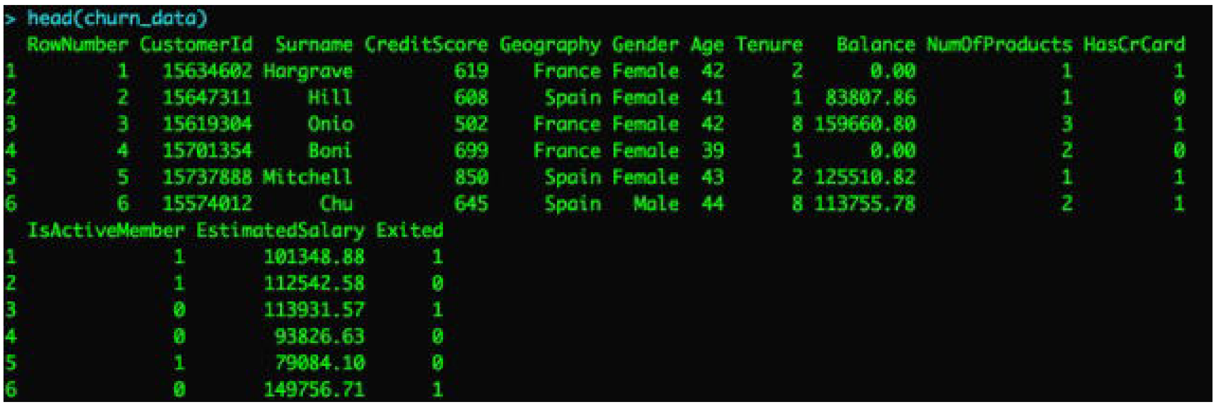
Let’s start by loading the packages we’ll need. Note that plotting XGBoost trees requires the **DiagrammeR** package to be installed, so even if you have **xgboost** installed already, you’ll need to make sure you have **DiagrammeR** also.

```
# load libraries
library(xgboost)
library(caret)
library(dplyr)
library(DiagrammeR)
```

Next, let’s read in our dataset. In this post, we’ll be using this customer churn dataset. The label we’ll be trying to predict is called “Exited” and is a binary variable with 1 meaning the customer churned (canceled account) vs. 0 meaning the customer did not churn (did not cancel account).

```
# read in dataset
churn_data <- read.csv("Churn_Modelling.csv")
```



```
> head(churn_data)
  RowNumber CustomerId  Surname CreditScore Geography Gender Age Tenure   Balance NumOfProducts HasCrCard
1         1   15634602 Hargrave         619    France Female  42      2      0.00             1         1
2         2   15647311     Hill         608     Spain Female  41      1  83807.86             1         0
3         3   15619304     Onio         502    France Female  42      8 159660.80             3         1
4         4   15701354     Boni         699    France Female  39      1      0.00             2         0
5         5   15737888 Mitchell         850     Spain Female  43      2 125510.82             1         1
6         6   15574012      Chu         645     Spain   Male  44      8 113755.78             2         1
  IsActiveMember EstimatedSalary Exited
1              1       101348.88      1
2              1       112542.58      0
3              0       113931.57      1
4              0        93826.63      0
5              1        79084.10      0
6              0       149756.71      1
```

Preparing the dataset for modeling

Now, let’s prep our dataset for modeling. First, we’ll remove a few variables we don’t need. Second, we’ll one hot encode each of the categorical variables. Then, we’ll split our dataset into train and validation.

```
# remove variables we won't be using for modeling
need_data <- churn_data %>% select(-RowNumber, -CustomerId, -Surname)

# one hot encode all categorical variables
dummy <- dummyVars(" ~ .", data = need_data)
need_data <- data.frame(predict(dummy, newdata = need_data))

y_label <- need_data$Exited
need_data <- need_data %>% select(-Exited)
need_data <- data.frame(Exited = y_label, need_data)

# convert Exited column to a factor
need_data$Exited <- as.factor(need_data$Exited)

# split data into train / validation
```

```
set.seed(0)
indexes <- sample(1:nrow(need_data), 0.7 * nrow(need_data))

train_data <- need_data[indexes,]
val_data <- need_data[-indexes,]
```

Train the XGBoost model

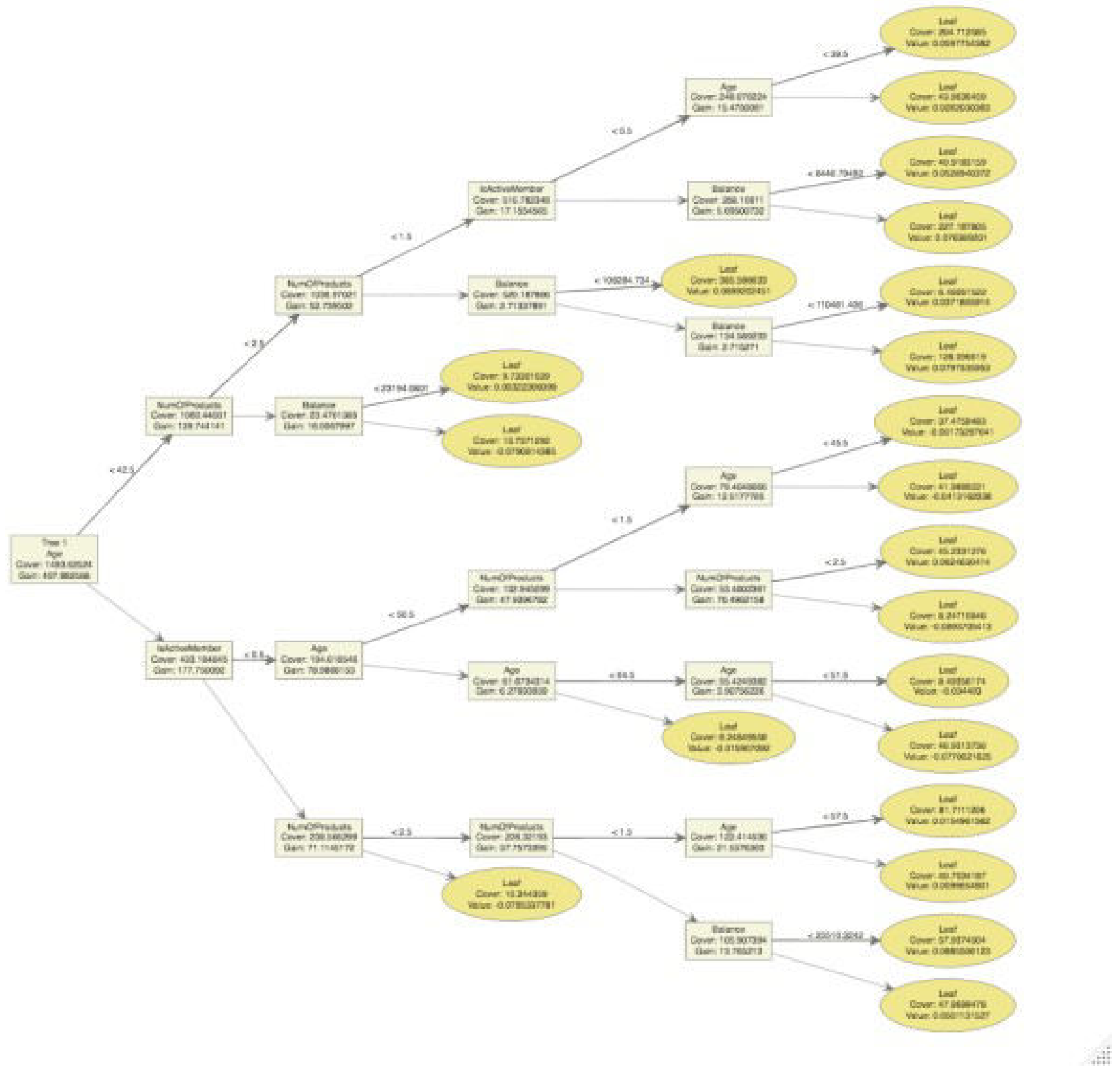
For the purpose of this article, we’ll just vary a few of the hyperparameters using a grid search.

```
# create tuning grid
grid_default <- expand.grid(nrounds = c(50, 75, 100, 150, 200, 250),
                            max_depth = c(2, 3, 4, 5),
                            eta = c(0.05, 0.1, 0.15),
                            gamma = c(0),
                            colsample_bytree = c(0.7),
                            min_child_weight = c(5),
                            subsample = c(0.6))

# set random seed
set.seed(1234)

# train XGBoost model
xgb_model <- train(formula(need_data),
                   data = need_data,
                   tuneGrid = grid_default,
                   method = "xgbTree",
                   metric = "Kappa")
```

Plotting XGBoost trees

Now, we’re ready to plot some trees from the XGBoost model. We’ll be able to do that using the *xgb.plot.tree* function. Let’s plot the first tree in the XGBoost ensemble. Note that in the code below, we specify the model object along with the index of the tree we want to plot.

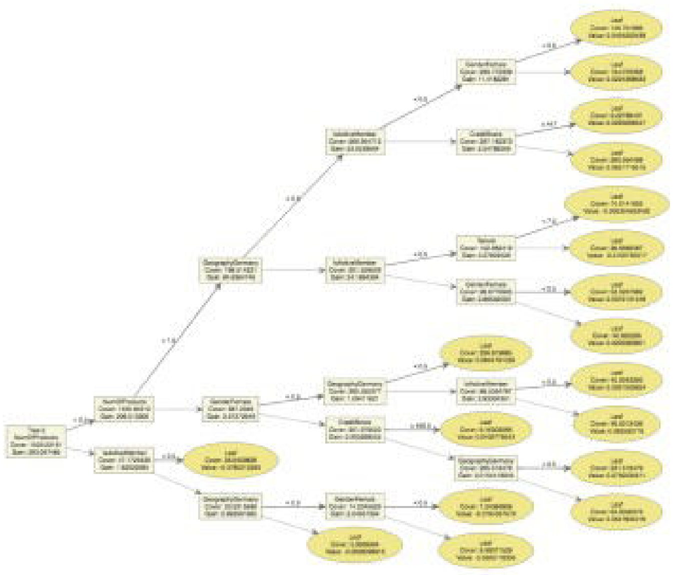
```
# plot the first tree
xgb.plot.tree(model = xgb_model$finalModel, trees = 1)
```



From the plot, we can see that Age is used to make the first split in the tree.

If we want to plot another tree, we can just change the tree index. For example, the line of code below plots the second tree in the XGBoost ensemble.

```
xgb.plot.tree(model = xgb_model$finalModel, trees = 2)
```



If you want to adjust the height and width of the plot, you can do that by changing the *plot_height* and *plot_width* parameters:

```
xgb.plot.tree(model = xgb_model$finalModel, trees = 1, plot_width = 1000,
plot_height = 1000)
```

Exporting tree plots to a file

Plots can also be exported programmatically using the *export_graph* function. Note that to do this, you'll need to set *render = FALSE* in the *xgb.plot.tree* function.

```
# create plot object of XGBoost tree
tree_plot <- xgb.plot.tree(model = xgb_model$finalModel, trees = 1,
plot_width = 1000,
                           plot_height = 1000, render = FALSE)

# export plot object to file
export_graph(tree_plot, "xgboost_tree_plot.pdf", width = 1000, height =
1000)
```

Plotting multiple trees at once

Rather than plotting a single tree, you can also plot multiple trees at once. You just need to pass a vector of which trees you'd like to plot. For example, the code below will plot the first three trees.

```
xgb.plot.tree(model = xgb_model$finalModel, trees = 1:3)
```
…