# Chi Square Test Results

c1 --> demographic\_slice

c2 --> country\_reg

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 3.2525, df = 3, p-value = 0.3543

c1 --> demographic\_slice

c2 --> ad\_exp

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 7.6743, df = 3, p-value = 0.05325

c1 --> demographic\_slice

c2 --> card\_offer

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 487.11, df = 3, p-value < 2.2e-16

c1 --> country\_reg

c2 --> demographic\_slice

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 3.2525, df = 3, p-value = 0.3543

c1 --> country\_reg

c2 --> ad\_exp

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 0.010034, df = 1, p-value = 0.9202

c1 --> country\_reg

c2 --> card\_offer

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 176.85, df = 1, p-value < 2.2e-16

c1 --> ad\_exp

c2 --> demographic\_slice

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 7.6743, df = 3, p-value = 0.05325

c1 --> ad\_exp

c2 --> country\_reg

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 0.010034, df = 1, p-value = 0.9202

c1 --> ad\_exp

c2 --> card\_offer

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 0.018046, df = 1, p-value = 0.8931

c1 --> card\_offer

c2 --> demographic\_slice

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 487.11, df = 3, p-value < 2.2e-16

c1 --> card\_offer

c2 --> country\_reg

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 176.85, df = 1, p-value < 2.2e-16

c1 --> card\_offer

c2 --> ad\_exp

Pearson's Chi-squared test

data: corr\_oth\_data[, c1] and corr\_oth\_data[, c2]

X-squared = 0.018046, df = 1, p-value = 0.8931

# Confusion Matrix Results

::::::::::::::::: RandomForest :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2100 27

Yes 17 355

Accuracy : 0.9824

95% CI : (0.9764, 0.9872)

No Information Rate : 0.8471

P-Value [Acc > NIR] : <2e-16

Kappa : 0.9313

Mcnemar's Test P-Value : 0.1748

Sensitivity : 0.9920

Specificity : 0.9293

Pos Pred Value : 0.9873

Neg Pred Value : 0.9543

Prevalence : 0.8471

Detection Rate : 0.8403

Detection Prevalence : 0.8511

Balanced Accuracy : 0.9606

'Positive' Class : No

::::::::::::::::: BAGGING :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2093 31

Yes 24 351

Accuracy : 0.978

95% CI : (0.9714, 0.9834)

No Information Rate : 0.8471

P-Value [Acc > NIR] : <2e-16

Kappa : 0.9144

Mcnemar's Test P-Value : 0.4185

Sensitivity : 0.9887

Specificity : 0.9188

Pos Pred Value : 0.9854

Neg Pred Value : 0.9360

Prevalence : 0.8471

Detection Rate : 0.8375

Detection Prevalence : 0.8499

Balanced Accuracy : 0.9538

'Positive' Class : No

::::::::::::::::: GBM :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2102 27

Yes 15 355

Accuracy : 0.9832

95% CI : (0.9773, 0.9879)

No Information Rate : 0.8471

P-Value [Acc > NIR] : < 2e-16

Kappa : 0.9343

Mcnemar's Test P-Value : 0.08963

Sensitivity : 0.9929

Specificity : 0.9293

Pos Pred Value : 0.9873

Neg Pred Value : 0.9595

Prevalence : 0.8471

Detection Rate : 0.8411

Detection Prevalence : 0.8519

Balanced Accuracy : 0.9611

'Positive' Class : No

::::::::::::::::: C50 :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2100 21

Yes 17 361

Accuracy : 0.9848

95% CI : (0.9792, 0.9892)

No Information Rate : 0.8471

P-Value [Acc > NIR] : <2e-16

Kappa : 0.941

Mcnemar's Test P-Value : 0.6265

Sensitivity : 0.9920

Specificity : 0.9450

Pos Pred Value : 0.9901

Neg Pred Value : 0.9550

Prevalence : 0.8471

Detection Rate : 0.8403

Detection Prevalence : 0.8487

Balanced Accuracy : 0.9685

'Positive' Class : No

::::::::::::::::: logisticReg :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2085 47

Yes 32 335

Accuracy : 0.9684

95% CI : (0.9608, 0.9749)

No Information Rate : 0.8471

P-Value [Acc > NIR] : <2e-16

Kappa : 0.8759

Mcnemar's Test P-Value : 0.1152

Sensitivity : 0.9849

Specificity : 0.8770

Pos Pred Value : 0.9780

Neg Pred Value : 0.9128

Prevalence : 0.8471

Detection Rate : 0.8343

Detection Prevalence : 0.8531

Balanced Accuracy : 0.9309

'Positive' Class : No

::::::::::::::::: NaiveBayes :::::::::::::::::

Confusion Matrix and Statistics

Reference

Prediction No Yes

No 2117 276

Yes 0 106

Accuracy : 0.8896

95% CI : (0.8766, 0.9016)

No Information Rate : 0.8471

P-Value [Acc > NIR] : 4.93e-10

Kappa : 0.3942

Mcnemar's Test P-Value : < 2.2e-16

Sensitivity : 1.0000

Specificity : 0.2775

Pos Pred Value : 0.8847

Neg Pred Value : 1.0000

Prevalence : 0.8471

Detection Rate : 0.8471

Detection Prevalence : 0.9576

Balanced Accuracy : 0.6387

'Positive' Class : No

# ROC – AUC Results

:::::: RandomForest ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_rf$Yes)

Data: probs\_rf$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.9978

:::::: BAGGING ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_bag$Yes)

Data: probs\_bag$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.9955

:::::: GBM ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_gbm$Yes)

Data: probs\_gbm$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.9983

:::::: C50 ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_c50$Yes)

Data: probs\_c50$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.9988

:::::: logisticReg ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_logit$Yes)

Data: probs\_logit$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.994

:::::: NaiveBayes ::::::::::

Call:

roc.default(response = te$card\_offer, predictor = probs\_bayes$Yes)

Data: probs\_bayes$Yes in 2117 controls (te$card\_offer No) < 382 cases (te$card\_offer Yes).

Area under the curve: 0.9906