BISST0663_Final_Project

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```
##This chunk is only needed when running on Jason's laptop.If it is on Jason's device change eval=TRUE
options("install.lock"=FALSE)
```

```
library(xfun)
```

```
## Warning: package 'xfun' was built under R version 4.4.2
```

```
##
## Attaching package: 'xfun'
```

```
## The following objects are masked from 'package:base':
##
##     attr, isFALSE
```

```
#This is a test2222
```

Load Datas

```
ALZH<-read.csv("https://raw.githubusercontent.com/jasonh0509/StatsLearningFinal/refs/heads/main/alzheime
```

Take a Look

```
glimpse(ALZH)
```

```
## Rows: 2,149
## Columns: 35
## $ PatientID                <int> 4751, 4752, 4753, 4754, 4755, 4756, 4757, 47~
## $ Age                      <int> 73, 89, 73, 74, 89, 86, 68, 75, 72, 87, 89, ~
## $ Gender                   <int> 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1, 1,~
## $ Ethnicity                <int> 0, 0, 3, 0, 0, 1, 3, 0, 1, 0, 3, 0, 0, 0, 0,~
## $ EducationLevel           <int> 2, 0, 1, 1, 0, 1, 2, 1, 0, 0, 1, 2, 1, 1, 2,~
## $ BMI                      <dbl> 22.92775, 26.82768, 17.79588, 33.80082, 20.7~
## $ Smoking                  <int> 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0,~
## $ AlcoholConsumption       <dbl> 13.2972177, 4.5425238, 19.5550845, 12.209265~
## $ PhysicalActivity         <dbl> 6.3271125, 7.6198845, 7.8449878, 8.4280014, ~
## $ DietQuality              <dbl> 1.34721431, 0.51876714, 1.82633466, 7.435604~
## $ SleepQuality             <dbl> 9.025679, 7.151293, 9.673574, 8.392554, 5.59~
## $ FamilyHistoryAlzheimers  <int> 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0,~
## $ CardiovascularDisease    <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1,~
## $ Diabetes                 <int> 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1,~
## $ Depression               <int> 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1,~
## $ HeadInjury               <int> 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0,~
## $ Hypertension             <int> 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0,~
## $ SystolicBP               <int> 142, 115, 99, 118, 94, 168, 143, 117, 117, 1~
## $ DiastolicBP              <int> 72, 64, 116, 115, 117, 62, 88, 63, 119, 78, ~
## $ CholesterolTotal         <dbl> 242.3668, 231.1626, 284.1819, 159.5822, 237.~
## $ CholesterolLDL           <dbl> 56.15090, 193.40800, 153.32276, 65.36664, 92~
```

```
## $ CholesterolHDL        <dbl> 33.68256, 79.02848, 69.77229, 68.45749, 56.8~
## $ CholesterolTriglycerides <dbl> 162.18914, 294.63091, 83.63832, 277.57736, 2~
## $ MMSE                   <dbl> 21.4635324, 20.6132673, 7.3562486, 13.991127~
## $ FunctionalAssessment   <dbl> 6.5188770, 7.1186955, 5.8950773, 8.9651063, ~
## $ MemoryComplaints       <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0,~
## $ BehavioralProblems     <int> 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0,~
## $ ADL                    <dbl> 1.72588346, 2.59242413, 7.11954774, 6.481225~
## $ Confusion              <int> 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 1,~
## $ Disorientation         <int> 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1,~
## $ PersonalityChanges     <int> 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1,~
## $ DifficultyCompletingTasks <int> 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0,~
## $ Forgetfulness          <int> 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0,~
## $ Diagnosis              <int> 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0,~
## $ DoctorInCharge         <chr> "XXXConfid", "XXXConfid", "XXXConfid", "XXXC~
```

```r
ALZH_noID<-ALZH[,-1]
```

```r
na_plot_ALZH<-vis_miss(ALZH_noID);na_plot_ALZH
```
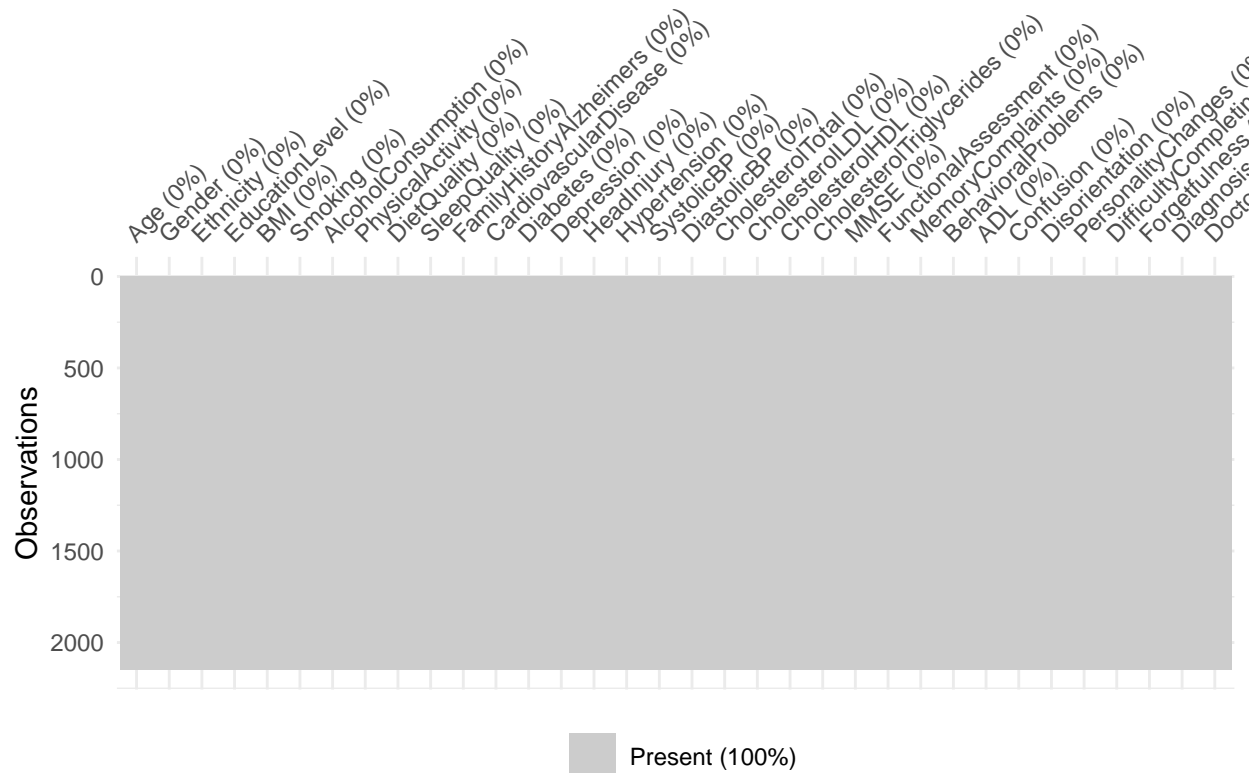


```r
colSums(is.na(ALZH_noID))
```

```
##              Age            Gender         Ethnicity
##                0                 0                 0
##      EducationLevel              BMI           Smoking
```

```
##                                0                        0                          0
##         AlcoholConsumption         PhysicalActivity              DietQuality
##                                0                        0                          0
##             SleepQuality  FamilyHistoryAlzheimers    CardiovascularDisease
##                                0                        0                          0
##                 Diabetes              Depression               HeadInjury
##                                0                        0                          0
##             Hypertension               SystolicBP              DiastolicBP
##                                0                        0                          0
##         CholesterolTotal          CholesterolLDL           CholesterolHDL
##                                0                        0                          0
## CholesterolTriglycerides                    MMSE       FunctionalAssessment
##                                0                        0                          0
##         MemoryComplaints       BehavioralProblems                      ADL
##                                0                        0                          0
##                Confusion            Disorientation        PersonalityChanges
##                                0                        0                          0
## DifficultyCompletingTasks            Forgetfulness                Diagnosis
##                                0                        0                          0
##             DoctorInCharge
##                                0
```

```r
ALZH_noID$Diagnosis<-as.factor(ALZH_noID$Diagnosis)
ALZH_noID <- ALZH_noID %>%
  mutate(across(c(Gender, Ethnicity,EducationLevel,Smoking,FamilyHistoryAlzheimers,CardiovascularDiseas
```

Set up Data Set(Keep Same Across All Stats Leraning Models)

```r
ALZH.raw <- ALZH_noID %>% select(-DoctorInCharge) %>% mutate(Diagnosis = as.numeric(as.character(Diagnos
ALZH.gbm <- ALZH.raw
##Dispite the name, this ALZH.gbm is the data set will be used for all models, the set in other models 
```

```r
ALZH_for_explore<-ALZH.gbm
```

```r
alzh_classes<-ggplot(data = ALZH_noID, mapping = aes(x=Diagnosis,fill=Diagnosis))+
  geom_bar()+
  xlab("Diagnosis Status")+
  ggtitle("Figure x.x Classes of Alzheimer's Disease")

alzh_classes
```

Figure x.x Classes of Alzheimer's Disease
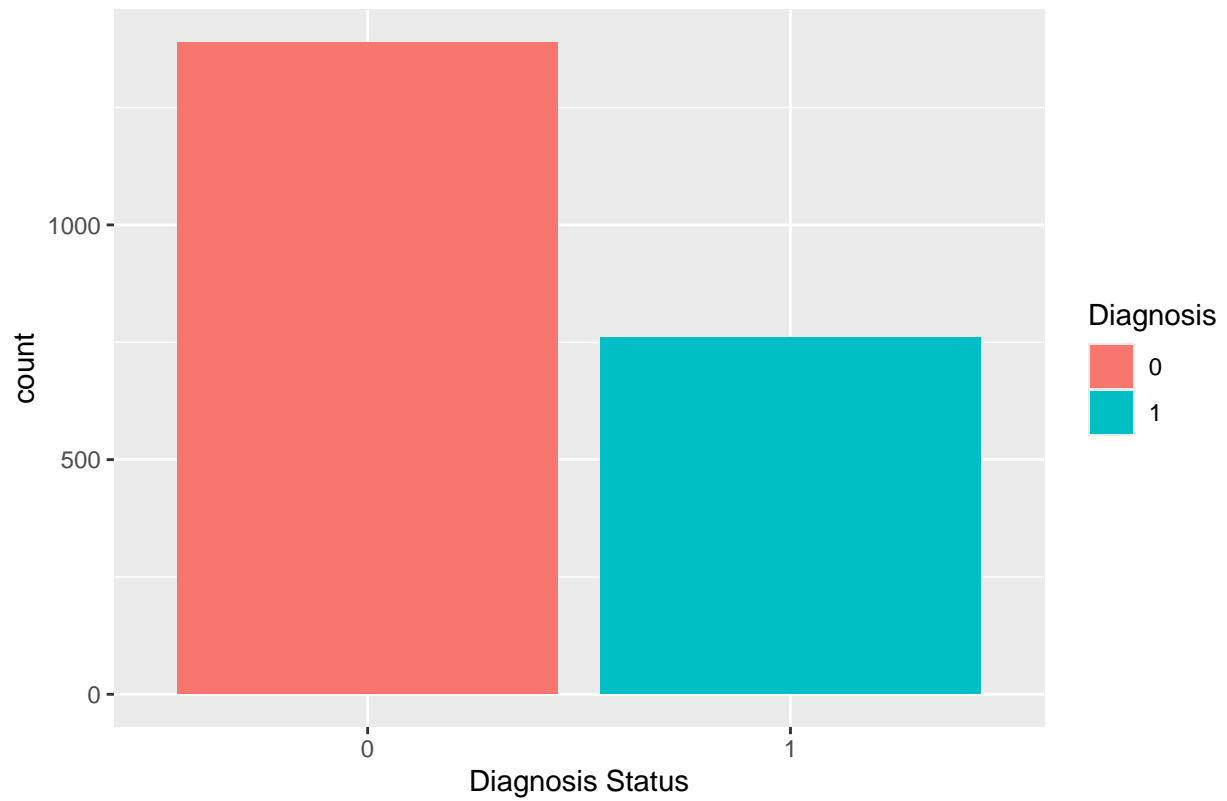
```
ggplot(data = ALZH_noID, mapping = aes(x=Diagnosis,fill=Diagnosis))+
  geom_bar()+
  xlab("Diagnosis Status")+
  ggtitle("Classes of Alzheimer's Disease After SMOTE")
```

Classes of Alzheimer's Disease After SMOTE
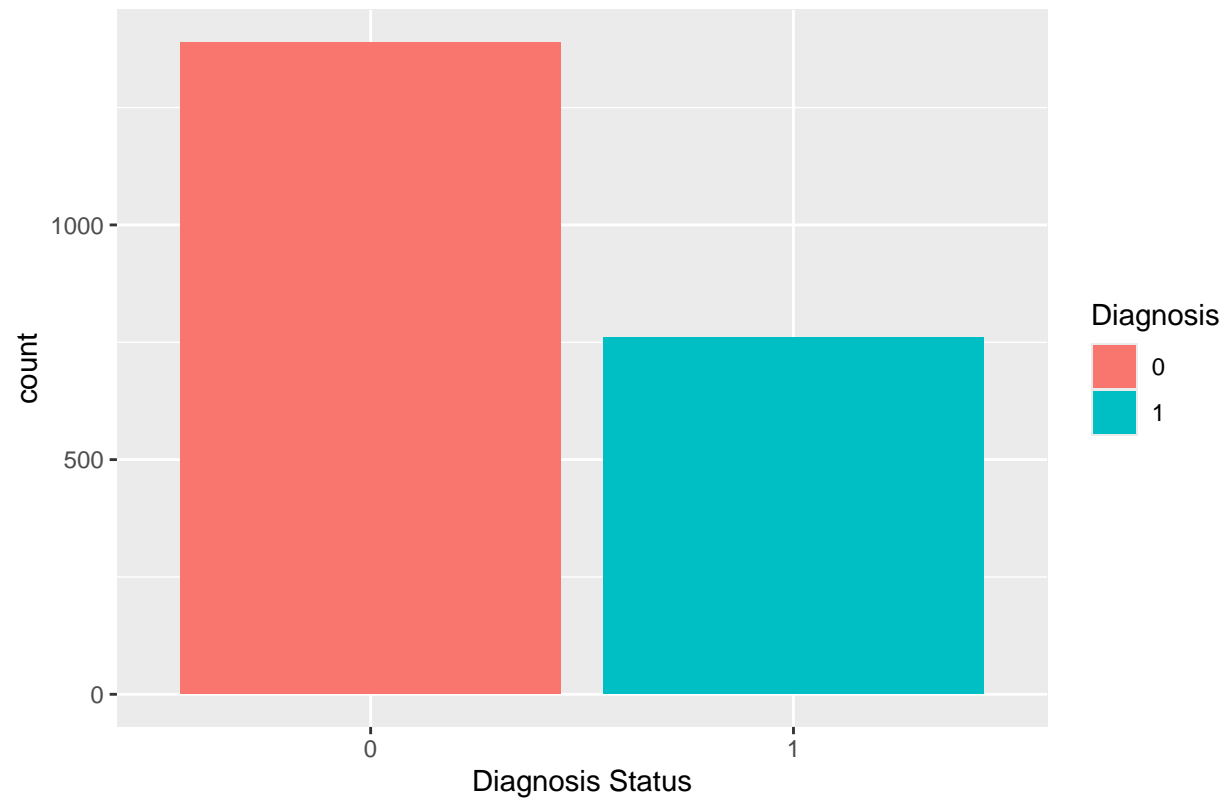
```
plot_intro(ALZH_noID)
```

Memory Usage: 411.8 Kb
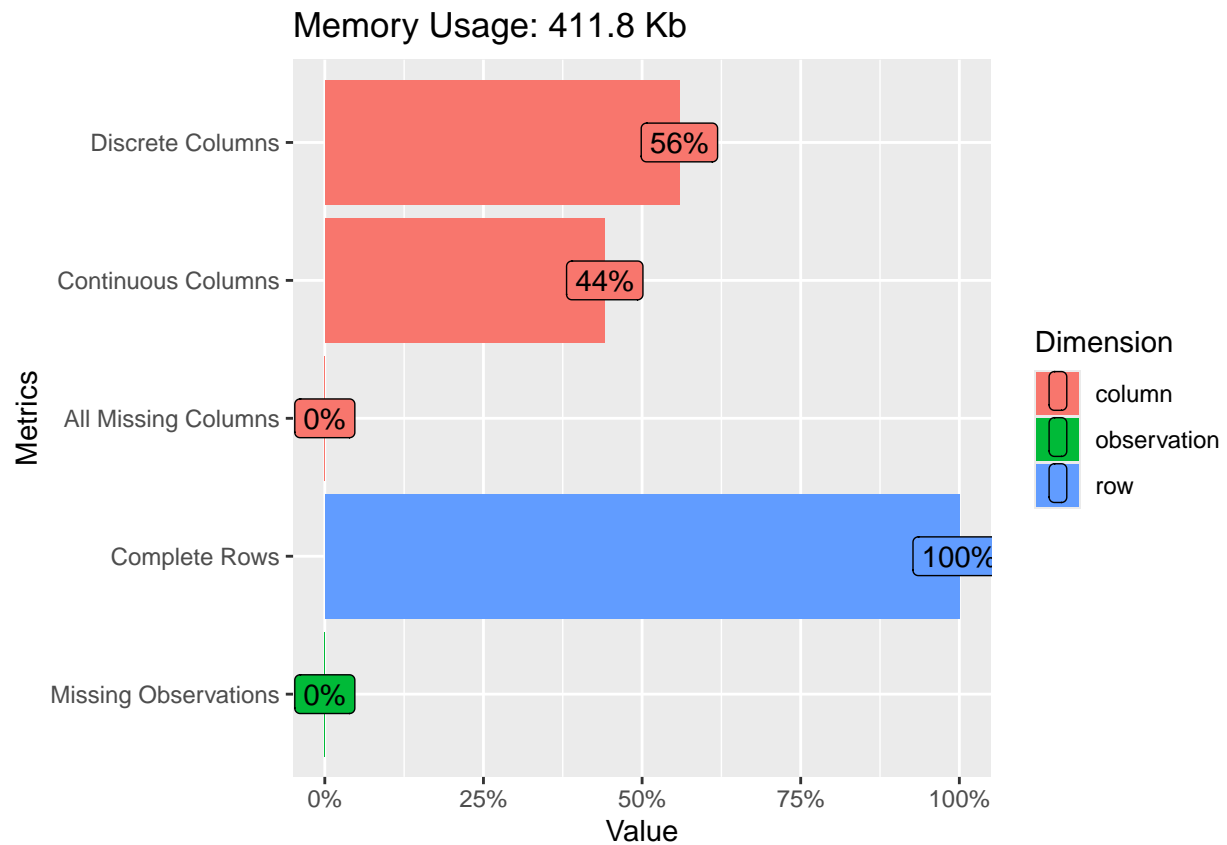
More EDA focused on positive cases

```
alzh_pos<-subset(ALZH_noID,Diagnosis==1)

alzh_gender<-alzh_pos%>%
  group_by(Gender)%>%
  summarise(n = n()) %>%
  ggplot(aes(x = Gender, y = n,fill=Gender))+
  geom_col()+
  labs(y="Count of Alzheimer's ")
alzh_gender+ggtitle("Alzheimer's  Across Gender")
```

Alzheimer's Across Gender
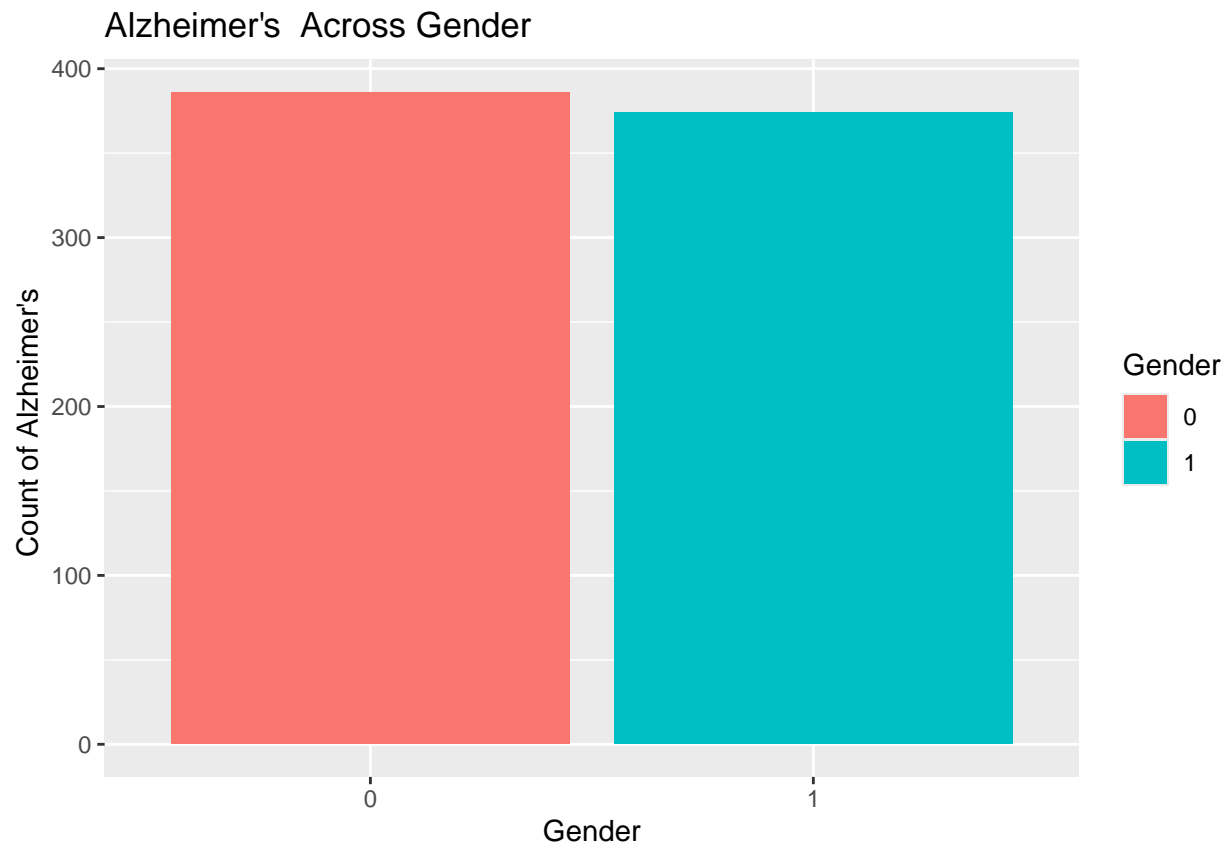

```
alzh_diab<-alzh_pos%>%
  group_by(Diabetes)%>%
  summarise(n = n()) %>%
  ggplot(aes(x = Diabetes, y = n,fill=Diabetes))+
  geom_col()+
  labs(y="Count of Alzheimer's ")
alzh_diab+ggtitle("Alzheimer's in Diabetics")
```

Alzheimer's in Diabetics
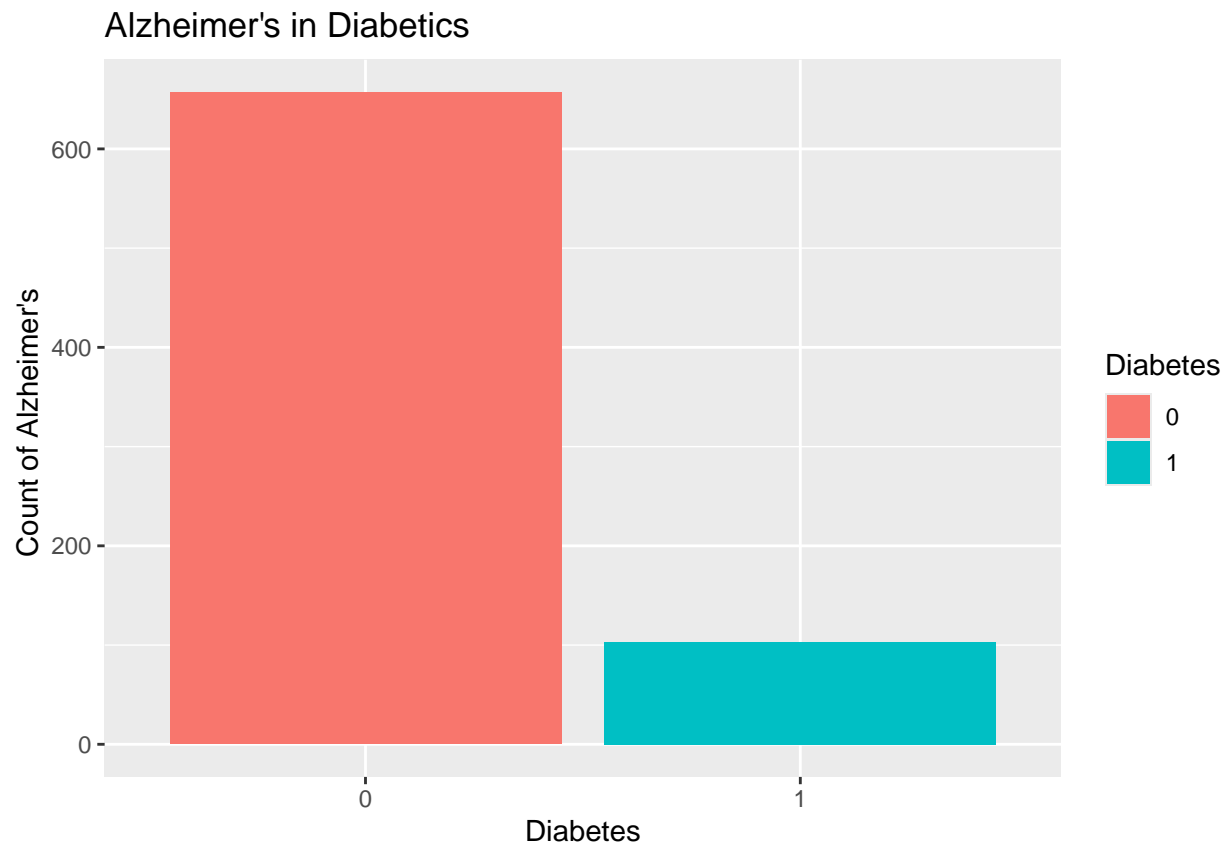

```r
alzh_smoke<-alzh_pos%>%
  group_by(Smoking)%>%
  summarise(n = n()) %>%
  ggplot(aes(x = Smoking, y = n,fill=Smoking))+
  geom_col()+
  labs(y="Count of Alzheimer's ")
alzh_smoke+ggtitle("Figure x.x Alzheimer's in Cigarette Users")
```

Figure x.x Alzheimer's in Cigarette Users
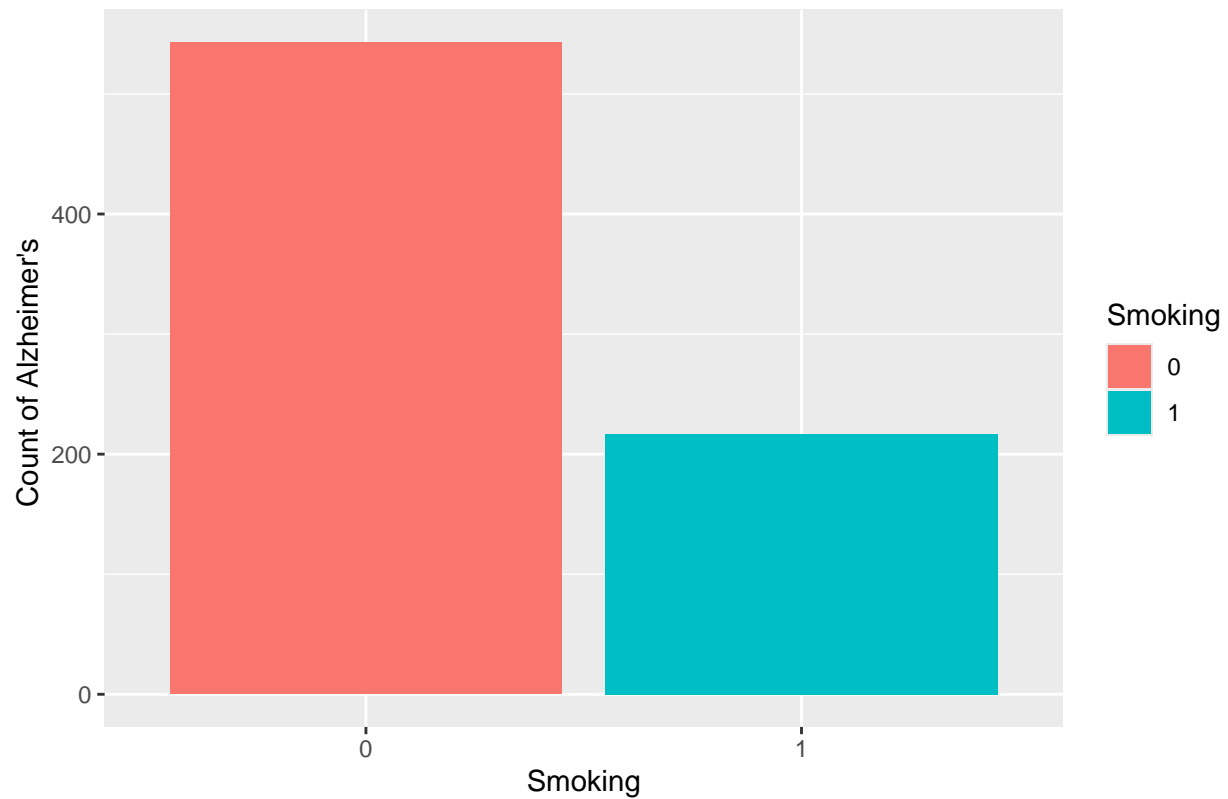

```r
alzh_edu<-alzh_pos%>%
  group_by(EducationLevel)%>%
  summarise(n = n()) %>%
  ggplot(aes(x = EducationLevel, y = n,fill=EducationLevel))+
  geom_col()+
  labs(y="Count of Alzheimer's ")
alzh_edu+ggtitle("Alzheimer's Disease and Education")
```

Alzheimer's Disease and Education
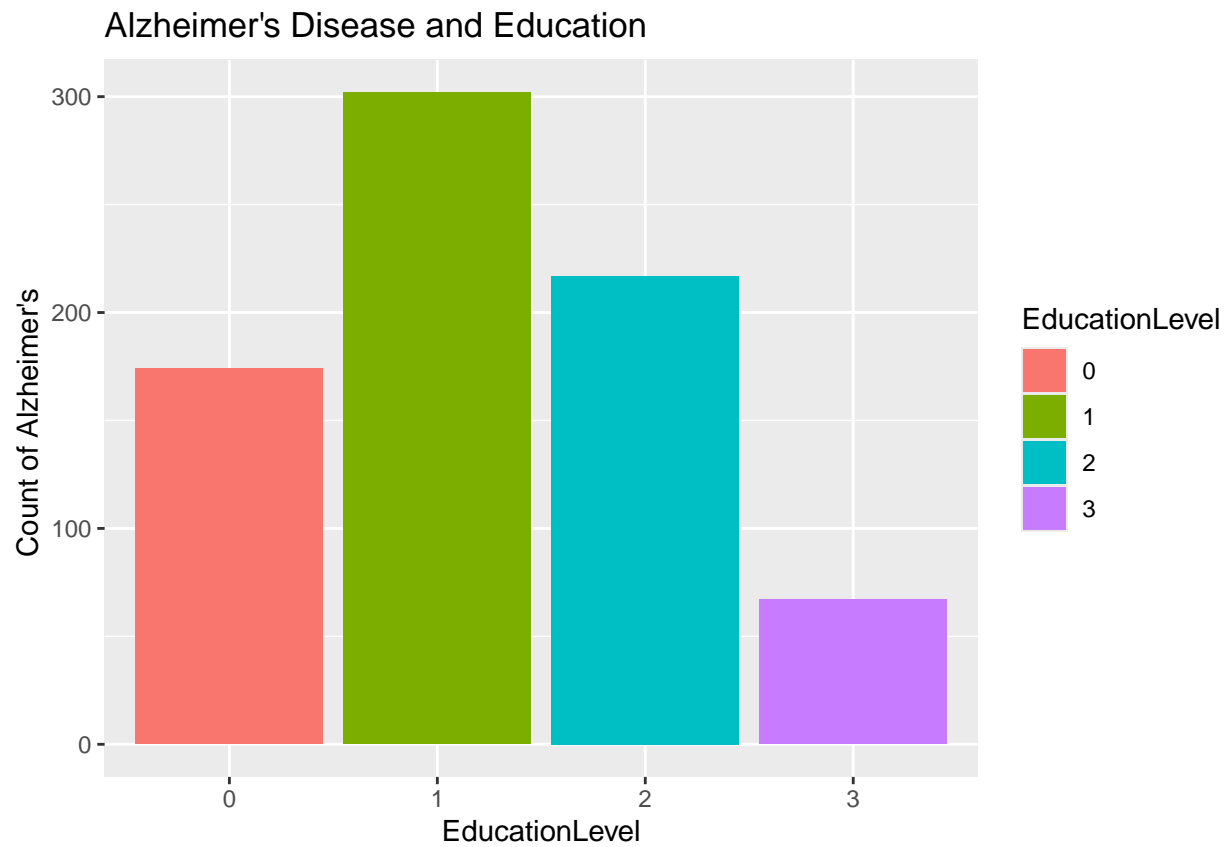

```
alzh_ethnicity<-alzh_pos%>%
  group_by(Ethnicity)%>%
  summarise(n = n()) %>%
  ggplot(aes(x = Ethnicity, y = n,fill=Ethnicity))+
  geom_col()+
  labs(y="Count of Alzheimer's ")
alzh_edu+ggtitle("Alzheimer's and Ethnicity")
```

Alzheimer's and Ethnicity
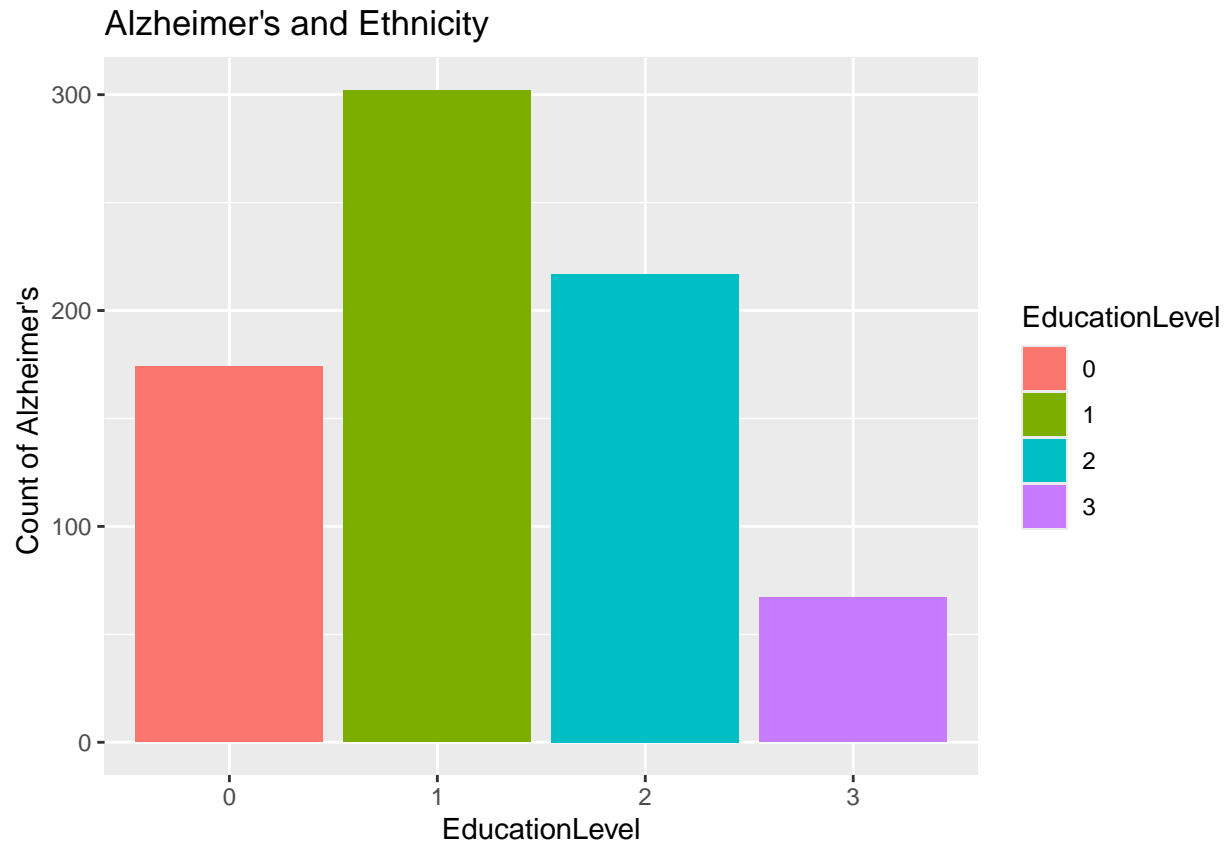
Exploration of Corerlation of 4 Variables related to

```
correlation.mtx.4var<-cor(ALZH_for_explore[,c("CholesterolHDL", "CholesterolLDL", "CholesterolTotal", "C
correlation.mtx.4var
```

```
##                        CholesterolHDL CholesterolLDL CholesterolTotal
## CholesterolHDL            1.00000000    -0.037148129     0.010116206
## CholesterolLDL           -0.03714813     1.000000000     0.010335686
## CholesterolTotal          0.01011621     0.010335686     1.000000000
## CholesterolTriglycerides  0.01523465    -0.005582058    -0.001959256
##                        CholesterolTriglycerides
## CholesterolHDL                     0.015234649
## CholesterolLDL                    -0.005582058
## CholesterolTotal                  -0.001959256
## CholesterolTriglycerides           1.000000000
```

```
correlation.mtx.4var<-as.data.frame(correlation.mtx.4var)
knitr::kable(correlation.mtx.4var)
```

	CholesterolHDL	CholesterolLDL	CholesterolTotal	CholesterolTriglycerides
CholesterolHDL	1.0000000	-0.0371481	0.0101162	0.0152346
CholesterolLDL	-0.0371481	1.0000000	0.0103357	-0.0055821

	CholesterolHDL	CholesterolLDL	CholesterolTotal	CholesterolTriglycerides
CholesterolTotal	0.0101162	0.0103357	1.0000000	-0.0019593
CholesterolTriglycerides	0.0152346	-0.0055821	-0.0019593	1.0000000

##4 *logistic regression models with only response and one of the 4 cholesterol variables*
hdl.logistic<-**glm**(Diagnosis~CholesterolHDL,data=ALZH_for_explore,family = binomial);**summary**(hdl.logistic

```
##
## Call:
## glm(formula = Diagnosis ~ CholesterolHDL, family = binomial,
##     data = ALZH_for_explore)
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -0.833278   0.125691  -6.630 3.37e-11 ***
## CholesterolHDL  0.003853   0.001953   1.973   0.0485 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2792.3  on 2148  degrees of freedom
## Residual deviance: 2788.4  on 2147  degrees of freedom
## AIC: 2792.4
##
## Number of Fisher Scoring iterations: 4
```

ldl.logistic<-**glm**(Diagnosis~CholesterolLDL,data=ALZH_for_explore,family = binomial);**summary**(ldl.logistic

```
##
## Call:
## glm(formula = Diagnosis ~ CholesterolLDL, family = binomial,
##     data = ALZH_for_explore)
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -0.411680   0.136372  -3.019  0.00254 **
## CholesterolLDL -0.001544   0.001042  -1.482  0.13839
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2792.3  on 2148  degrees of freedom
## Residual deviance: 2790.1  on 2147  degrees of freedom
## AIC: 2794.1
##
## Number of Fisher Scoring iterations: 4
```

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```
total.logistic<-glm(Diagnosis~CholesterolTotal,data=ALZH_for_explore,family = binomial);summary(total.l
```

```
##
## Call:
## glm(formula = Diagnosis ~ CholesterolTotal, family = binomial,
##     data = ALZH_for_explore)
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)     -0.6738669  0.2433093  -2.770  0.00561 **
## CholesterolTotal 0.0003145  0.0010609   0.296  0.76690
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2792.3  on 2148  degrees of freedom
## Residual deviance: 2792.2  on 2147  degrees of freedom
## AIC: 2796.2
##
## Number of Fisher Scoring iterations: 4
```

```
tryglycerides.logistic<-glm(Diagnosis~CholesterolTriglycerides,data=ALZH_for_explore,family = binomial)
```

```
##
## Call:
## glm(formula = Diagnosis ~ CholesterolTriglycerides, family = binomial,
##     data = ALZH_for_explore)
##
## Coefficients:
##                            Estimate Std. Error z value Pr(>|z|)
## (Intercept)              -0.7095795  0.1112808  -6.376 1.81e-10 ***
## CholesterolTriglycerides  0.0004653  0.0004428   1.051    0.293
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2792.3  on 2148  degrees of freedom
## Residual deviance: 2791.2  on 2147  degrees of freedom
## AIC: 2795.2
##
## Number of Fisher Scoring iterations: 4
```

```
##HDL is most correlated with the response variable
```

logistic

```
ALZH.logistic<-ALZH.gbm%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglycerides))###set fo
n <-nrow(ALZH.logistic);n
```

```
## [1] 2149
```

```
set.seed(114514)
draw<-sample(1:n,size = 1934)##1934 is 90% of the data,here is the rows we use fall all trainig and val
##This is the ultimate sample data indces!
train <-ALZH.logistic[draw,]
train_x<-train%>%dplyr::select(-Diagnosis)
train_y<-train%>%dplyr::select(Diagnosis)

test <- ALZH.logistic[-draw,]
test_x<-test%>%dplyr::select(-Diagnosis)
test_y <-test$Diagnosis


x <-model.matrix(Diagnosis~.,data=ALZH.logistic)
y <- ALZH.logistic$Diagnosis
```

```
ALZH_logistic <-glm(Diagnosis~.,data=train,family = binomial)
summary(ALZH_logistic)
```

```
##
## Call:
## glm(formula = Diagnosis ~ ., family = binomial, data = train)
##
## Coefficients:
##                           Estimate Std. Error z value Pr(>|z|)
## (Intercept)              4.868e+00  9.281e-01   5.246 1.56e-07 ***
## Age                     -1.075e-02  7.399e-03  -1.452   0.1464
## Gender1                 -2.646e-02  1.339e-01  -0.198   0.8433
## Ethnicity1              -2.031e-01  1.741e-01  -1.167   0.2434
## Ethnicity2               2.548e-01  2.318e-01   1.099   0.2716
## Ethnicity3              -2.037e-01  2.361e-01  -0.863   0.3882
## EducationLevel1         -2.070e-01  1.815e-01  -1.141   0.2540
## EducationLevel2         -1.131e-01  1.920e-01  -0.589   0.5557
## EducationLevel3         -2.875e-01  2.583e-01  -1.113   0.2658
## BMI                     -4.568e-03  9.238e-03  -0.494   0.6210
## Smoking1                -1.409e-01  1.500e-01  -0.939   0.3476
## AlcoholConsumption      -7.706e-03  1.157e-02  -0.666   0.5052
## PhysicalActivity        -1.073e-02  2.313e-02  -0.464   0.6427
## DietQuality              2.592e-02  2.333e-02   1.111   0.2666
## SleepQuality            -5.889e-02  3.802e-02  -1.549   0.1214
## FamilyHistoryAlzheimers1 -6.129e-02  1.555e-01  -0.394   0.6936
## CardiovascularDisease1   1.089e-01  1.825e-01   0.596   0.5509
## Diabetes1                1.081e-02  1.916e-01   0.056   0.9550
## Depression1              1.066e-01  1.638e-01   0.651   0.5149
## HeadInjury1             -2.628e-01  2.287e-01  -1.149   0.2506
## Hypertension1            1.636e-01  1.846e-01   0.886   0.3755
## SystolicBP              -6.674e-05  2.575e-03  -0.026   0.9793
## DiastolicBP              2.271e-03  3.775e-03   0.602   0.5475
## CholesterolHDL           6.086e-03  2.921e-03   2.084   0.0372 *
## MMSE                    -1.079e-01  8.573e-03 -12.582  < 2e-16 ***
## FunctionalAssessment    -4.412e-01  2.780e-02 -15.869  < 2e-16 ***
## MemoryComplaints1        2.574e+00  1.748e-01  14.727  < 2e-16 ***
```

```
## BehavioralProblems1          2.461e+00  1.923e-01  12.800  < 2e-16 ***
## ADL                         -4.013e-01  2.686e-02 -14.939  < 2e-16 ***
## Confusion1                  -2.260e-01  1.685e-01  -1.341   0.1798
## Disorientation1             -1.468e-01  1.833e-01  -0.801   0.4232
## PersonalityChanges1         -1.557e-01  1.925e-01  -0.809   0.4187
## DifficultyCompletingTasks1   1.337e-01  1.818e-01   0.735   0.4621
## Forgetfulness1              -3.051e-02  1.462e-01  -0.209   0.8347
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2502.0  on 1933  degrees of freedom
## Residual deviance: 1437.3  on 1900  degrees of freedom
## AIC: 1505.3
##
## Number of Fisher Scoring iterations: 6
```

```r
pred_test<-predict(ALZH_logistic,type='response',newdata = test)
glm.pred <- ifelse(pred_test > 0.5, 1, 0)
table(glm.pred, test_y)
```

```
##         test_y
## glm.pred   0   1
##        0 121  19
##        1   9  66
```

```r
Recall.regular.glm<-sum(glm.pred == 1 & test_y == 1)/sum(test_y == 1);Recall.regular.glm
```

```
## [1] 0.7764706
```

```r
Precision.regular.glm<-sum(glm.pred == 1 & test_y == 1)/sum(glm.pred == 1);Precision.regular.glm
```

```
## [1] 0.88
```

```r
F1Score.regular.glm<-2*Precision.regular.glm*Recall.regular.glm/(Precision.regular.glm+Recall.regular.gl
```

```
## [1] 0.825
```

```r
Accuracy.regular.glm<-sum(glm.pred == test_y)/length(test_y);Accuracy.regular.glm
```

```
## [1] 0.8697674
```

MLR with best subset

```r
ALZH_leaning<-ALZH_noID%>%dplyr::select(-DoctorInCharge)
bestsubset <- regsubsets(Diagnosis~., data = ALZH_leanning)
bestsubsum<-summary(bestsubset)
bestsubsum
```

```
## Subset selection object
## Call: regsubsets.formula(Diagnosis ~ ., data = ALZH_leaning)
## 36 Variables  (and intercept)
##                           Forced in Forced out
## Age                           FALSE      FALSE
## Gender1                       FALSE      FALSE
## Ethnicity1                    FALSE      FALSE
## Ethnicity2                    FALSE      FALSE
## Ethnicity3                    FALSE      FALSE
## EducationLevel1               FALSE      FALSE
## EducationLevel2               FALSE      FALSE
## EducationLevel3               FALSE      FALSE
## BMI                           FALSE      FALSE
## Smoking1                      FALSE      FALSE
## AlcoholConsumption            FALSE      FALSE
## PhysicalActivity              FALSE      FALSE
## DietQuality                   FALSE      FALSE
## SleepQuality                  FALSE      FALSE
## FamilyHistoryAlzheimers1      FALSE      FALSE
## CardiovascularDisease1        FALSE      FALSE
## Diabetes1                     FALSE      FALSE
## Depression1                   FALSE      FALSE
## HeadInjury1                   FALSE      FALSE
## Hypertension1                 FALSE      FALSE
## SystolicBP                    FALSE      FALSE
## DiastolicBP                   FALSE      FALSE
## CholesterolTotal              FALSE      FALSE
## CholesterolLDL                FALSE      FALSE
## CholesterolHDL                FALSE      FALSE
## CholesterolTriglycerides      FALSE      FALSE
## MMSE                          FALSE      FALSE
## FunctionalAssessment          FALSE      FALSE
## MemoryComplaints1             FALSE      FALSE
## BehavioralProblems1           FALSE      FALSE
## ADL                           FALSE      FALSE
## Confusion1                    FALSE      FALSE
## Disorientation1               FALSE      FALSE
## PersonalityChanges1           FALSE      FALSE
## DifficultyCompletingTasks1    FALSE      FALSE
## Forgetfulness1                FALSE      FALSE
## 1 subsets of each size up to 8
## Selection Algorithm: exhaustive
##          Age Gender1 Ethnicity1 Ethnicity2 Ethnicity3 EducationLevel1
## 1  ( 1 ) " " " "     " "        " "        " "        " "
## 2  ( 1 ) " " " "     " "        " "        " "        " "
## 3  ( 1 ) " " " "     " "        " "        " "        " "
## 4  ( 1 ) " " " "     " "        " "        " "        " "
## 5  ( 1 ) " " " "     " "        " "        " "        " "
## 6  ( 1 ) " " " "     " "        " "        " "        " "
## 7  ( 1 ) "*" " "     " "        " "        " "        " "
## 8  ( 1 ) "*" " "     " "        " "        " "        " "
##          EducationLevel2 EducationLevel3 BMI Smoking1 AlcoholConsumption
## 1  ( 1 ) " "             " "             " " " "      " "
## 2  ( 1 ) " "             " "             " " " "      " "
```

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```
## 3  ( 1 ) " "              " "              " " " "        " "
## 4  ( 1 ) " "              " "              " " " "        " "
## 5  ( 1 ) " "              " "              " " " "        " "
## 6  ( 1 ) " "              " "              " " " "        " "
## 7  ( 1 ) " "              " "              " " " "        " "
## 8  ( 1 ) " "              " "              " " " "        " "
##           PhysicalActivity DietQuality SleepQuality FamilyHistoryAlzheimers1
## 1  ( 1 ) " "              " "          " "          " "
## 2  ( 1 ) " "              " "          " "          " "
## 3  ( 1 ) " "              " "          " "          " "
## 4  ( 1 ) " "              " "          " "          " "
## 5  ( 1 ) " "              " "          " "          " "
## 6  ( 1 ) " "              " "          " "          " "
## 7  ( 1 ) " "              " "          " "          " "
## 8  ( 1 ) " "              " "          "*"          " "
##           CardiovascularDisease1 Diabetes1 Depression1 HeadInjury1 Hypertension1
## 1  ( 1 ) " "                    " "       " "         " "         " "
## 2  ( 1 ) " "                    " "       " "         " "         " "
## 3  ( 1 ) " "                    " "       " "         " "         " "
## 4  ( 1 ) " "                    " "       " "         " "         " "
## 5  ( 1 ) " "                    " "       " "         " "         " "
## 6  ( 1 ) " "                    " "       " "         " "         " "
## 7  ( 1 ) " "                    " "       " "         " "         " "
## 8  ( 1 ) " "                    " "       " "         " "         " "
##           SystolicBP DiastolicBP CholesterolTotal CholesterolLDL CholesterolHDL
## 1  ( 1 ) " "        " "         " "              " "            " "
## 2  ( 1 ) " "        " "         " "              " "            " "
## 3  ( 1 ) " "        " "         " "              " "            " "
## 4  ( 1 ) " "        " "         " "              " "            " "
## 5  ( 1 ) " "        " "         " "              " "            " "
## 6  ( 1 ) " "        " "         " "              "*"            " "
## 7  ( 1 ) " "        " "         " "              "*"            " "
## 8  ( 1 ) " "        " "         " "              "*"            " "
##           CholesterolTriglycerides MMSE FunctionalAssessment MemoryComplaints1
## 1  ( 1 ) " "                      " "  "*"                  " "
## 2  ( 1 ) " "                      " "  "*"                  " "
## 3  ( 1 ) " "                      " "  "*"                  "*"
## 4  ( 1 ) " "                      " "  "*"                  "*"
## 5  ( 1 ) " "                      "*"  "*"                  "*"
## 6  ( 1 ) " "                      "*"  "*"                  "*"
## 7  ( 1 ) " "                      "*"  "*"                  "*"
## 8  ( 1 ) " "                      "*"  "*"                  "*"
##           BehavioralProblems1 ADL Confusion1 Disorientation1 PersonalityChanges1
## 1  ( 1 ) " "                 " " " "        " "             " "
## 2  ( 1 ) " "                 "*" " "        " "             " "
## 3  ( 1 ) " "                 "*" " "        " "             " "
## 4  ( 1 ) "*"                 "*" " "        " "             " "
## 5  ( 1 ) "*"                 "*" " "        " "             " "
## 6  ( 1 ) "*"                 "*" " "        " "             " "
## 7  ( 1 ) "*"                 "*" " "        " "             " "
## 8  ( 1 ) "*"                 "*" " "        " "             " "
##           DifficultyCompletingTasks1 Forgetfulness1
## 1  ( 1 ) " "                        " "
## 2  ( 1 ) " "                        " "
```

```
## 3  ( 1 ) " "                              " "
## 4  ( 1 ) " "                              " "
## 5  ( 1 ) " "                              " "
## 6  ( 1 ) " "                              " "
## 7  ( 1 ) " "                              " "
## 8  ( 1 ) " "                              " "
```

```
which.min(bestsubsum$cp)
```

```
## [1] 8
```

```
which.min(bestsubsum$bic)
```

```
## [1] 5
```

```
which.min(bestsubsum$adjr2)
```

```
## [1] 1
```

```
knitr::kable(coef(bestsubset,8))
```

	x
(Intercept)	2.1734842
Age	-0.0015068
SleepQuality	-0.0074936
CholesterolLDL	-0.0003843
MMSE	-0.0130444
FunctionalAssessment	-0.0557346
MemoryComplaints1	0.3528825
BehavioralProblems1	0.3154456
ADL	-0.0508926

```
bestSubset_vars <- names(coef(bestsubset, 8))[-1]
bestSubset_vars
```

```
## [1] "Age"                  "SleepQuality"         "CholesterolLDL"
## [4] "MMSE"                 "FunctionalAssessment" "MemoryComplaints1"
## [7] "BehavioralProblems1"  "ADL"
```

```
bestSubset_STR<-paste(bestSubset_vars,collapse = ",")
```

A MLR with best subset

```
set.with.BestsubsetVar<-train%>%dplyr::select(Diagnosis,Age,SleepQuality,CholesterolHDL,MMSE,FunctionalA
MLR_bestsubset<-glm(Diagnosis~.,data=set.with.BestsubsetVar,family="binomial")
pred.bestsubset<-predict(MLR_bestsubset,newdata = test,type = "response",family="binomial")
class.bestsubset<-ifelse(pred.bestsubset>0.5,1,0)
table(class.bestsubset,test_y)
```

```
##                 test_y
## class.bestsubset   0    1
##                 0 119  20
##                 1  11  65
```

lasso

```r
##subject to fix
library(glmnet)
grid <- 10^seq(10,-2, length = 100)
train_y.lasso<-train_y%>%mutate(Diagnosis=as.factor(Diagnosis))
train_x_lasso<-as.matrix(train_x)
lasso.mod<-glmnet(train_x_lasso,train_y.lasso$Diagnosis,alpha = 1,lambda = grid,family = "binomial")

summary(lasso.mod)
```

```
##             Length Class      Mode
## a0            100   -none-     numeric
## beta         2900   dgCMatrix  S4
## df            100   -none-     numeric
## dim             2   -none-     numeric
## lambda        100   -none-     numeric
## dev.ratio     100   -none-     numeric
## nulldev         1   -none-     numeric
## npasses         1   -none-     numeric
## jerr            1   -none-     numeric
## offset          1   -none-     logical
## classnames      2   -none-     character
## call            6   -none-     call
## nobs            1   -none-     numeric
```

```r
cv.out <-cv.glmnet(train_x_lasso, train_y.lasso$Diagnosis, alpha = 1,family="binomial",nfolds = 10)
plot(cv.out)
```
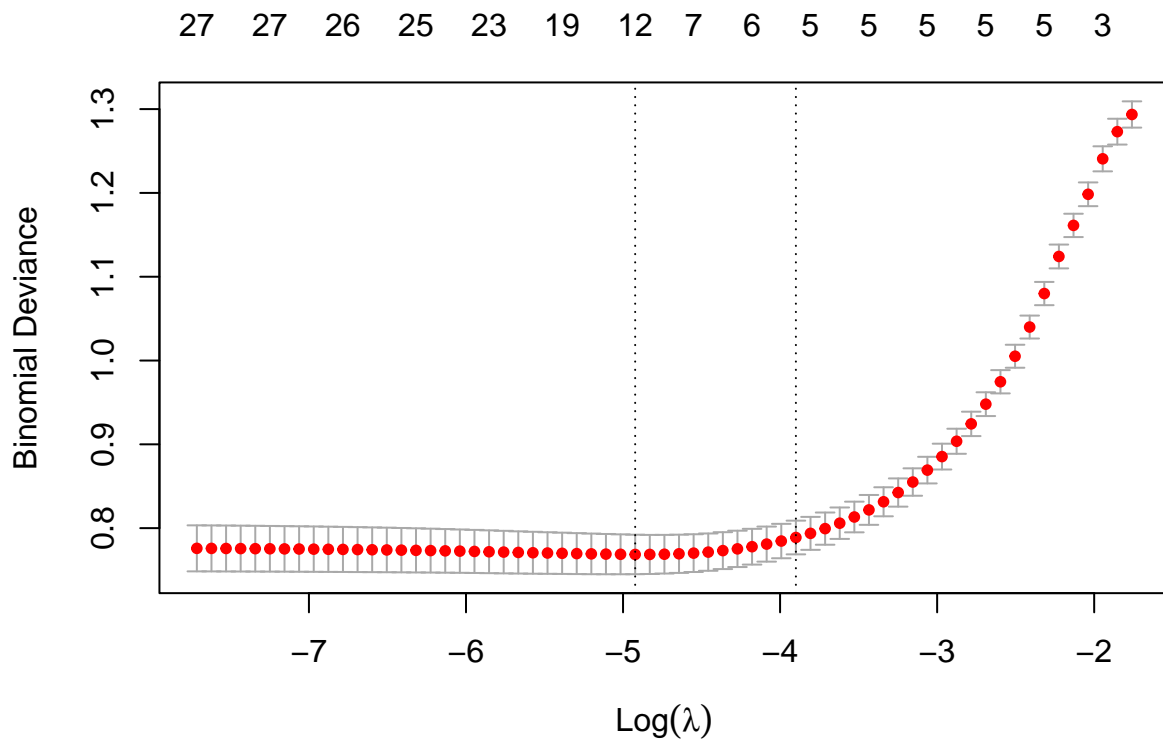
```
best_lambda <- cv.out$lambda.min;best_lambda
```

```
## [1] 0.007279412
```

```
train_y<-as.matrix(train_y)
lasso.final<-glmnet(train_x_lasso,train_y.lasso$Diagnosis,alpha = 1,lambda = best_lambda,family = "binor
lasso.pred <- predict(lasso.final, s = best_lambda, newx = as.matrix(test_x))
lasso.pred.class<-ifelse(lasso.pred > 0.5,1,0)
table(prediction=lasso.pred.class,actual=test_y)
```

```
##           actual
## prediction   0   1
##          0 126  34
##          1   4  51
```

```
Recall.lasso<-sum(lasso.pred.class == 1 & test_y == 1)/sum(test_y == 1);Recall.lasso
```

```
## [1] 0.6
```

```
Precision.lasso<-sum(lasso.pred.class == 1 & test_y == 1)/sum(lasso.pred.class == 1);Precision.lasso
```

```
## [1] 0.9272727
```

```
F1Score.lasso<-2*Precision.lasso*Recall.lasso/(Precision.lasso+Recall.lasso);F1Score.lasso
```

[1] 0.7285714

```
Accuracy.lasso<-sum(lasso.pred.class == test_y)/length(test_y);Accuracy.lasso
```

[1] 0.8232558

```
ALZH_noID_noCholest<-
  ALZH_noID%>%
  dplyr::select(-CholesterolTotal,-CholesterolHDL,-CholesterolLDL,-CholesterolTriglycerides)
```

KNN

```
ALZH_IntOnly<-ALZH_noID[,sapply(ALZH.gbm,is.integer)]
ALZH_double<-ALZH_noID[,sapply(ALZH.gbm,is.double)]
ALZH_NumOnly<-cbind(ALZH_IntOnly,ALZH_double)
ALZH_fct<-ALZH_noID[,sapply(ALZH.gbm,is.factor)]
```

```
plot_correlation(ALZH_NumOnly)
```

Warning in cor(x = structure(list(Age = c(73L, 89L, 73L, 74L, 89L, 86L, : the
standard deviation is zero

Warning: Removed 34 rows containing missing values or values outside the scale range
('geom_text()').

Correlation Meter
−1.0 −0.5 0.0 0.5 1.0
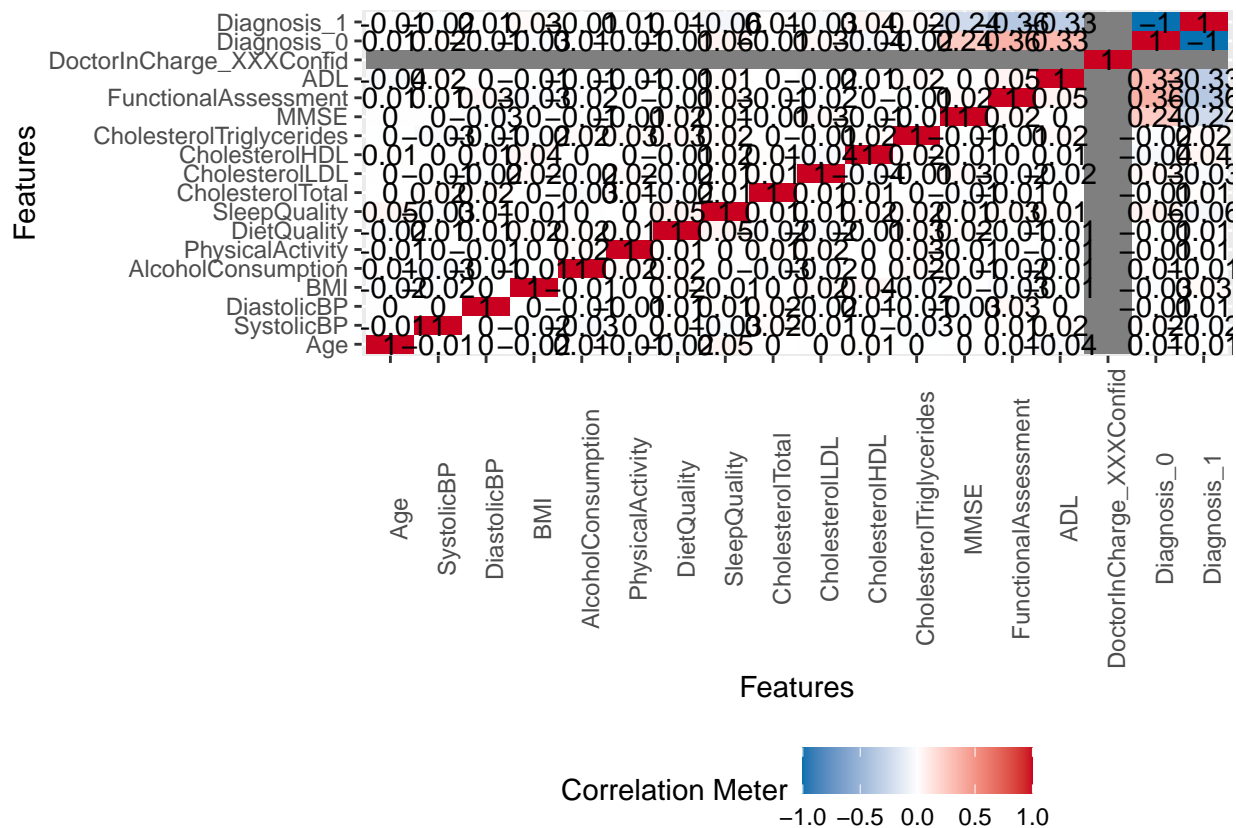
```r
#RFE.featureSet<-ALZH_NumOnly[draw,]%>%dplyr::select(-Diagnosis,DoctorInCharge)
#RFE.featureSet<-as.data.frame(RFE.featureSet)
#RFE.response<-ALZH_NumOnly[draw,]%>%dplyr::select(Diagnosis)

RFE.featureSet <- ALZH_NumOnly[draw,-which(names(ALZH_NumOnly) == "Diagnosis")]
RFE.featureSet<-RFE.featureSet[,-which(names(RFE.featureSet) == "DoctorInCharge")]
RFE.featureSet<-RFE.featureSet%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglycerides))
RFE.response <- ALZH_NumOnly[draw, "Diagnosis"]

set.seed(12345)
control<-rfeControl(functions = rfFuncs, method = "cv", number = 10)
RFE.result<-rfe(RFE.featureSet,RFE.response, sizes = c(1:13), rfeControl = control)
print(RFE.result)
```

Feature Selection for kNN

```
##
## Recursive feature selection
##
## Outer resampling method: Cross-Validated (10 fold)
##
## Resampling performance over subset size:
##
```

```
##   Variables Accuracy  Kappa AccuracySD KappaSD Selected
##           1   0.6257 0.1754    0.03259 0.07033
##           2   0.7384 0.4200    0.02731 0.05662
##           3   0.8082 0.5522    0.02179 0.05236
##           4   0.8180 0.5737    0.02604 0.06161
##           5   0.8221 0.5819    0.02253 0.05103
##           6   0.8206 0.5757    0.02336 0.05581
##           7   0.8216 0.5787    0.02289 0.05282
##           8   0.8263 0.5876    0.02226 0.05202
##           9   0.8268 0.5886    0.01838 0.04473
##          10   0.8293 0.5934    0.02156 0.05172
##          11   0.8273 0.5885    0.01896 0.04517
##          12   0.8304 0.5936    0.01932 0.04743        *
##
## The top 5 variables (out of 12):
##    FunctionalAssessment, MMSE, ADL, SleepQuality, DietQuality
```

```r
#alzh_secondKNN and the later alzh.gbm.forTuning are the same
alzh_secondKNN<-ALZH_NumOnly[draw,]%>%
dplyr::select(FunctionalAssessment, MMSE, ADL, DietQuality, SleepQuality,Diagnosis)%>%
mutate(Diagnosis=as.factor(Diagnosis))
alzh_secondKNN.test<-ALZH.gbm[-draw,]%>%dplyr::select(FunctionalAssessment, MMSE, ADL, DietQuality, Sle
mutate(Diagnosis=as.factor(Diagnosis))
```

```r
set.seed(12345)
k_list<-seq(1,20,by=1)
nk<-length(k_list);nk
```

```
## [1] 20
```

```r
Perf.Metric.knn<-data.frame(k=rep(0,nk),Recall=rep(0,length(k_list)),Precision=rep(0,length(k_list)),F1_
Accuracy=rep(0,length(k_list)))

set.seed(12345)
n<-nrow(alzh_secondKNN)
pool<-rep(1:10,ceiling(n/10))
fold<-sample(pool,n,replace = FALSE)

for(k in 1:nk){
  Perf.Metric.knn$k[k]<-k

  recall.sum<-0
  precision.sum<-0
  f1_score.sum<-0
  accuracy.sum<-0


  for(i in 1:10){
    #Find data in each fold
    infold<-which(fold == i)

    #Create training and testing sets
    Train<-alzh_secondKNN[-infold,]
```

```
    Test<-alzh_secondKNN[infold,]
    #Run kNN
    k_preds<-knn(Train%>%select(-Diagnosis),Test%>%select(-Diagnosis),k=k,cl=Train$Diagnosis)

    Recall<-sum(k_preds == 1 & Test$Diagnosis == 1)/sum(Test$Diagnosis == 1);recall.sum<-recall.sum+Rec
    Precision<-sum(k_preds == 1 & Test$Diagnosis == 1)/sum(k_preds == 1);precision.sum<-precision.sum+Pr
    F1_Score<-2*Precision*Recall/(Precision+Recall);f1_score.sum<-f1_score.sum+F1_Score
    Accuracy<-sum(k_preds == Test$Diagnosis)/length(Test$Diagnosis);accuracy.sum<-accuracy.sum+Accuracy

  }

    Perf.Metric.knn$Recall[k]<-recall.sum/10
    Perf.Metric.knn$Precision[k]<-precision.sum/10
    Perf.Metric.knn$F1_Score[k]<-f1_score.sum/10
    Perf.Metric.knn$Accuracy[k]<-accuracy.sum/10

}

Perf.Metric.knn$k[which.max(Perf.Metric.knn$Recall)]
```

```
## [1] 1
```

```
Perf.Metric.knn
```

```
##       k    Recall Precision  F1_Score  Accuracy
## 1    1 0.6403017 0.6298578 0.6338582 0.7440575
## 2    2 0.6329861 0.6525068 0.6414886 0.7539131
## 3    3 0.6295043 0.7049775 0.6642345 0.7787034
## 4    4 0.6311181 0.7129507 0.6680106 0.7827976
## 5    5 0.6083041 0.7309030 0.6624085 0.7843520
## 6    6 0.6062049 0.7484180 0.6678650 0.7900329
## 7    7 0.6059796 0.7604216 0.6726508 0.7946586
## 8    8 0.5963425 0.7485469 0.6621445 0.7889617
## 9    9 0.5943695 0.7772002 0.6719153 0.7993487
## 10 10 0.6100336 0.7785780 0.6820490 0.8029758
## 11 11 0.6004353 0.7807016 0.6772721 0.8019073
## 12 12 0.5978152 0.7877733 0.6782483 0.8024362
## 13 13 0.5912956 0.7864132 0.6735401 0.8008844
## 14 14 0.5978156 0.7955327 0.6807846 0.8055450
## 15 15 0.5918308 0.7970315 0.6776401 0.8045195
## 16 16 0.5927360 0.7979270 0.6783759 0.8055639
## 17 17 0.5902186 0.7992625 0.6774772 0.8050323
## 18 18 0.5964732 0.7960977 0.6803138 0.8055558
## 19 19 0.6023228 0.7998812 0.6856613 0.8091855
## 20 20 0.5931489 0.7914241 0.6756385 0.8035020
```

```
knn.final<-knn(train = alzh_secondKNN%>%select(-Diagnosis),test = alzh_secondKNN.test%>%select(-Diagnos
table(knn.final,alzh_secondKNN.test$Diagnosis)
```

```
##
## knn.final   0    1
##         0 101   30
##         1  29   55
```

```
Recall.knn.final<-sum(knn.final == 1 & alzh_secondKNN.test$Diagnosis == 1)/sum(alzh_secondKNN.test$Diag
```

```
## [1] 0.6470588
```

```
Precision.knn.final<-sum(knn.final == 1 & alzh_secondKNN.test$Diagnosis == 1)/sum(knn.final == 1);Precis
```

```
## [1] 0.6547619
```

```
F1Score.knn.final<-2*Precision.knn.final*Recall.knn.final/(Precision.knn.final+Recall.knn.final);F1Score
```

```
## [1] 0.6508876
```

```
Accuracy.knn.final<-sum(knn.final == alzh_secondKNN.test$Diagnosis)/length(alzh_secondKNN.test$Diagnosis
```

```
## [1] 0.7255814
```

gbm

```
set.seed(12345)
ALZH.boosting<-ALZH.gbm%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglycerides))
boosting.try <- gbm(Diagnosis ~ ., data = ALZH.boosting[draw,], distribution = "bernoulli", n.trees = 50
```

```
yhat.gbm<-predict(boosting.try,newdata = ALZH.gbm[-draw,],n.trees = 5000,interaction.depth = 4,shrinkag
pred_gbm_class <- ifelse(yhat.gbm > 0.5, 1, 0)
table(pred_gbm_class,ALZH.gbm[-draw,]$Diagnosis)
```

```
##
## pred_gbm_class   0   1
##             0 125   5
##             1   5  80
```

```
set.seed(12345)
lambda_val <- seq(0.01, 0.05, by = 0.01)
result_container <- data.frame(Lambda = lambda_val, Recall = rep(0, length(lambda_val)), Precision = rep
ALZH.boosting.forTunine<-ALZH.gbm[draw,]
ALZH.boosting.realTest<-ALZH.gbm[-draw,]
```

Tune Together with 10 fold cv

This one is correct!!

```
ALZH.gbm.forTuning<-ALZH.gbm[draw,]
ALZH.gbm.realTest<-ALZH.gbm[-draw,]
```

```r
set.seed(12345)
lambda_val <- seq(0.01, 0.03, by = 0.01)
ntree_val <- c(1000, 2000, 3000)

ALZH.gbm.forGrid<-ALZH.gbm.forTuning%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglyceride
ALZH.gbm.forGrid$Diagnosis <- factor(ALZH.gbm.forGrid$Diagnosis, levels = c(0, 1), labels = c("No", "Ye
ALZH.gbm.realTest<-ALZH.gbm[-draw,]%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglycerides

### Grid Creation
train.control<-trainControl(method="cv",number=10,summaryFunction=twoClassSummary,classProbs=TRUE,saveP
grid<-expand.grid(shrinkage=lambda_val,
n.trees=ntree_val,
interaction.depth=4,n.minobsinnode=10)##default is 10

set.seed(12345)
Boosting_alzh_grid <- train(
  Diagnosis ~ .,
  data = ALZH.gbm.forGrid,
  method = "gbm",
  trControl = train.control,
  tuneGrid = grid,
  distribution = "bernoulli",
  metric = "Recall",
  verbose=TRUE,
  train.fraction = 0.9
)
```

```
## Warning in train.default(x, y, weights = w, ...): The metric "Recall" was not
## in the result set. ROC will be used instead.
```

```
## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1       1.2866          1.2502        0.0100    0.0051
##     2       1.2778          1.2411        0.0100    0.0042
##     3       1.2682          1.2318        0.0100    0.0049
##     4       1.2582          1.2221        0.0100    0.0045
##     5       1.2492          1.2134        0.0100    0.0041
##     6       1.2406          1.2047        0.0100    0.0042
##     7       1.2313          1.1954        0.0100    0.0045
##     8       1.2223          1.1866        0.0100    0.0046
##     9       1.2137          1.1775        0.0100    0.0039
##    10       1.2053          1.1692        0.0100    0.0041
##    20       1.1270          1.0902        0.0100    0.0034
##    40       1.0052          0.9675        0.0100    0.0026
##    60       0.9118          0.8734        0.0100    0.0020
##    80       0.8375          0.7970        0.0100    0.0016
##   100       0.7756          0.7379        0.0100    0.0013
##   120       0.7235          0.6860        0.0100    0.0010
```

```
##    140      0.6804        0.6423       0.0100      0.0008
##    160      0.6443        0.6059       0.0100      0.0008
##    180      0.6139        0.5760       0.0100      0.0005
##    200      0.5858        0.5477       0.0100      0.0006
##    220      0.5634        0.5254       0.0100      0.0004
##    240      0.5431        0.5053       0.0100      0.0003
##    260      0.5264        0.4885       0.0100      0.0002
##    280      0.5106        0.4723       0.0100      0.0002
##    300      0.4973        0.4589       0.0100      0.0003
##    320      0.4857        0.4477       0.0100      0.0001
##    340      0.4760        0.4403       0.0100      0.0002
##    360      0.4670        0.4346       0.0100      0.0001
##    380      0.4589        0.4284       0.0100      0.0000
##    400      0.4511        0.4227       0.0100      0.0001
##    420      0.4448        0.4182       0.0100      0.0001
##    440      0.4381        0.4131       0.0100      0.0001
##    460      0.4322        0.4105       0.0100     -0.0001
##    480      0.4265        0.4069       0.0100      0.0001
##    500      0.4212        0.4043       0.0100      0.0000
##    520      0.4155        0.3999       0.0100     -0.0000
##    540      0.4100        0.3975       0.0100      0.0000
##    560      0.4053        0.3960       0.0100     -0.0000
##    580      0.4005        0.3934       0.0100     -0.0001
##    600      0.3958        0.3908       0.0100      0.0000
##    620      0.3913        0.3895       0.0100      0.0000
##    640      0.3873        0.3887       0.0100     -0.0000
##    660      0.3830        0.3876       0.0100     -0.0001
##    680      0.3793        0.3885       0.0100     -0.0000
##    700      0.3752        0.3874       0.0100     -0.0000
##    720      0.3711        0.3864       0.0100     -0.0000
##    740      0.3674        0.3863       0.0100     -0.0000
##    760      0.3635        0.3854       0.0100     -0.0001
##    780      0.3602        0.3837       0.0100     -0.0001
##    800      0.3568        0.3824       0.0100     -0.0000
##    820      0.3535        0.3825       0.0100     -0.0000
##    840      0.3504        0.3813       0.0100     -0.0000
##    860      0.3472        0.3807       0.0100     -0.0000
##    880      0.3439        0.3809       0.0100     -0.0001
##    900      0.3407        0.3802       0.0100     -0.0000
##    920      0.3379        0.3807       0.0100     -0.0001
##    940      0.3346        0.3807       0.0100     -0.0001
##    960      0.3311        0.3802       0.0100     -0.0001
##    980      0.3285        0.3815       0.0100     -0.0000
##   1000      0.3257        0.3816       0.0100     -0.0000
##   1020      0.3231        0.3812       0.0100     -0.0000
##   1040      0.3204        0.3816       0.0100     -0.0000
##   1060      0.3175        0.3805       0.0100     -0.0000
##   1080      0.3151        0.3814       0.0100     -0.0000
##   1100      0.3124        0.3811       0.0100     -0.0001
##   1120      0.3099        0.3804       0.0100     -0.0001
##   1140      0.3071        0.3809       0.0100     -0.0001
##   1160      0.3042        0.3812       0.0100     -0.0001
##   1180      0.3021        0.3820       0.0100     -0.0000
##   1200      0.2995        0.3827       0.0100     -0.0000
```

```
## 1220    0.2969    0.3829    0.0100    -0.0000
## 1240    0.2945    0.3830    0.0100    -0.0001
## 1260    0.2919    0.3838    0.0100    -0.0000
## 1280    0.2898    0.3832    0.0100    -0.0001
## 1300    0.2873    0.3839    0.0100    -0.0000
## 1320    0.2851    0.3844    0.0100    -0.0000
## 1340    0.2827    0.3848    0.0100    -0.0001
## 1360    0.2805    0.3848    0.0100    -0.0000
## 1380    0.2780    0.3855    0.0100    -0.0001
## 1400    0.2757    0.3865    0.0100    -0.0000
## 1420    0.2738    0.3855    0.0100    -0.0000
## 1440    0.2717    0.3859    0.0100    -0.0000
## 1460    0.2696    0.3868    0.0100    -0.0001
## 1480    0.2674    0.3872    0.0100    -0.0000
## 1500    0.2652    0.3877    0.0100    -0.0000
## 1520    0.2631    0.3888    0.0100    -0.0000
## 1540    0.2610    0.3896    0.0100    -0.0000
## 1560    0.2591    0.3905    0.0100    -0.0000
## 1580    0.2570    0.3921    0.0100    -0.0000
## 1600    0.2551    0.3912    0.0100    -0.0001
## 1620    0.2532    0.3907    0.0100    -0.0001
## 1640    0.2509    0.3920    0.0100     0.0000
## 1660    0.2492    0.3917    0.0100    -0.0000
## 1680    0.2470    0.3921    0.0100    -0.0000
## 1700    0.2452    0.3931    0.0100    -0.0000
## 1720    0.2429    0.3928    0.0100    -0.0000
## 1740    0.2407    0.3923    0.0100    -0.0000
## 1760    0.2389    0.3928    0.0100    -0.0000
## 1780    0.2372    0.3939    0.0100    -0.0000
## 1800    0.2353    0.3937    0.0100    -0.0000
## 1820    0.2337    0.3941    0.0100    -0.0000
## 1840    0.2320    0.3936    0.0100    -0.0000
## 1860    0.2304    0.3944    0.0100    -0.0000
## 1880    0.2287    0.3951    0.0100    -0.0000
## 1900    0.2270    0.3950    0.0100    -0.0000
## 1920    0.2253    0.3951    0.0100    -0.0000
## 1940    0.2238    0.3946    0.0100    -0.0000
## 1960    0.2222    0.3945    0.0100    -0.0000
## 1980    0.2207    0.3951    0.0100    -0.0000
## 2000    0.2188    0.3954    0.0100    -0.0000
## 2020    0.2174    0.3948    0.0100    -0.0000
## 2040    0.2158    0.3951    0.0100    -0.0000
## 2060    0.2145    0.3939    0.0100    -0.0001
## 2080    0.2128    0.3944    0.0100    -0.0000
## 2100    0.2113    0.3958    0.0100    -0.0000
## 2120    0.2098    0.3963    0.0100    -0.0001
## 2140    0.2083    0.3959    0.0100    -0.0000
## 2160    0.2069    0.3958    0.0100    -0.0000
## 2180    0.2054    0.3964    0.0100    -0.0000
## 2200    0.2039    0.3956    0.0100    -0.0000
## 2220    0.2024    0.3962    0.0100    -0.0000
## 2240    0.2010    0.3958    0.0100    -0.0000
## 2260    0.1994    0.3959    0.0100    -0.0000
## 2280    0.1979    0.3953    0.0100    -0.0000
```

```
##     2300        0.1965          0.3949        0.0100    -0.0001
##     2320        0.1951          0.3945        0.0100    -0.0000
##     2340        0.1934          0.3950        0.0100    -0.0000
##     2360        0.1922          0.3955        0.0100    -0.0000
##     2380        0.1909          0.3955        0.0100    -0.0000
##     2400        0.1897          0.3948        0.0100    -0.0000
##     2420        0.1883          0.3943        0.0100    -0.0000
##     2440        0.1872          0.3946        0.0100    -0.0000
##     2460        0.1859          0.3937        0.0100    -0.0000
##     2480        0.1845          0.3939        0.0100    -0.0001
##     2500        0.1831          0.3942        0.0100    -0.0000
##     2520        0.1818          0.3938        0.0100    -0.0000
##     2540        0.1806          0.3937        0.0100    -0.0000
##     2560        0.1793          0.3950        0.0100    -0.0000
##     2580        0.1782          0.3967        0.0100    -0.0000
##     2600        0.1769          0.3971        0.0100    -0.0000
##     2620        0.1758          0.3976        0.0100    -0.0000
##     2640        0.1745          0.3974        0.0100    -0.0000
##     2660        0.1735          0.3972        0.0100    -0.0000
##     2680        0.1724          0.3970        0.0100    -0.0000
##     2700        0.1713          0.3970        0.0100    -0.0000
##     2720        0.1700          0.3964        0.0100    -0.0000
##     2740        0.1689          0.3965        0.0100    -0.0000
##     2760        0.1678          0.3963        0.0100    -0.0001
##     2780        0.1665          0.3970        0.0100     0.0000
##     2800        0.1655          0.3967        0.0100    -0.0000
##     2820        0.1642          0.3977        0.0100    -0.0000
##     2840        0.1632          0.3978        0.0100    -0.0000
##     2860        0.1620          0.3976        0.0100    -0.0000
##     2880        0.1608          0.3977        0.0100    -0.0000
##     2900        0.1598          0.3983        0.0100    -0.0000
##     2920        0.1587          0.3978        0.0100    -0.0000
##     2940        0.1577          0.3989        0.0100    -0.0000
##     2960        0.1565          0.3981        0.0100    -0.0001
##     2980        0.1555          0.3980        0.0100    -0.0000
##     3000        0.1544          0.3974        0.0100    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1       1.2762          1.2403      0.0200     0.0106
##      2       1.2572          1.2213      0.0200     0.0091
##      3       1.2384          1.2028      0.0200     0.0094
##      4       1.2215          1.1859      0.0200     0.0081
##      5       1.2041          1.1683      0.0200     0.0090
##      6       1.1869          1.1508      0.0200     0.0079
##      7       1.1708          1.1360      0.0200     0.0073
##      8       1.1558          1.1205      0.0200     0.0073
##      9       1.1410          1.1051      0.0200     0.0070
##     10       1.1268          1.0904      0.0200     0.0066
##     20       1.0059          0.9668      0.0200     0.0052
##     40       0.8381          0.7979      0.0200     0.0029
```

```
##       60        0.7275        0.6895        0.0200        0.0021
##       80        0.6469        0.6107        0.0200        0.0016
##      100        0.5892        0.5519        0.0200        0.0011
##      120        0.5459        0.5080        0.0200        0.0007
##      140        0.5122        0.4737        0.0200        0.0007
##      160        0.4900        0.4537        0.0200        0.0005
##      180        0.4705        0.4365        0.0200        0.0002
##      200        0.4540        0.4249        0.0200        0.0003
##      220        0.4407        0.4159        0.0200        0.0000
##      240        0.4293        0.4086        0.0200       -0.0000
##      260        0.4182        0.4026        0.0200        0.0001
##      280        0.4088        0.3960        0.0200        0.0002
##      300        0.3991        0.3944        0.0200        0.0001
##      320        0.3905        0.3945        0.0200       -0.0002
##      340        0.3826        0.3915        0.0200       -0.0001
##      360        0.3754        0.3881        0.0200       -0.0002
##      380        0.3692        0.3857        0.0200       -0.0001
##      400        0.3616        0.3833        0.0200       -0.0000
##      420        0.3552        0.3832        0.0200        0.0001
##      440        0.3487        0.3808        0.0200       -0.0002
##      460        0.3422        0.3797        0.0200        0.0001
##      480        0.3360        0.3780        0.0200       -0.0001
##      500        0.3303        0.3755        0.0200       -0.0001
##      520        0.3248        0.3770        0.0200       -0.0000
##      540        0.3196        0.3783        0.0200       -0.0002
##      560        0.3139        0.3788        0.0200       -0.0001
##      580        0.3086        0.3827        0.0200       -0.0001
##      600        0.3033        0.3821        0.0200       -0.0001
##      620        0.2988        0.3833        0.0200       -0.0002
##      640        0.2940        0.3826        0.0200       -0.0000
##      660        0.2896        0.3853        0.0200       -0.0001
##      680        0.2847        0.3857        0.0200        0.0000
##      700        0.2802        0.3838        0.0200       -0.0000
##      720        0.2763        0.3827        0.0200       -0.0001
##      740        0.2720        0.3834        0.0200       -0.0002
##      760        0.2679        0.3879        0.0200       -0.0001
##      780        0.2636        0.3886        0.0200       -0.0002
##      800        0.2600        0.3873        0.0200       -0.0001
##      820        0.2563        0.3895        0.0200       -0.0001
##      840        0.2525        0.3893        0.0200       -0.0001
##      860        0.2484        0.3882        0.0200       -0.0001
##      880        0.2449        0.3888        0.0200       -0.0001
##      900        0.2408        0.3908        0.0200       -0.0000
##      920        0.2369        0.3926        0.0200       -0.0001
##      940        0.2340        0.3915        0.0200       -0.0001
##      960        0.2309        0.3918        0.0200       -0.0001
##      980        0.2275        0.3922        0.0200       -0.0001
##     1000        0.2243        0.3955        0.0200       -0.0001
##     1020        0.2212        0.3956        0.0200       -0.0001
##     1040        0.2180        0.3948        0.0200       -0.0001
##     1060        0.2151        0.3959        0.0200       -0.0001
##     1080        0.2124        0.3969        0.0200       -0.0001
##     1100        0.2093        0.3947        0.0200       -0.0001
##     1120        0.2066        0.3940        0.0200       -0.0000
```

```
## 1140    0.2039    0.3951    0.0200    -0.0001
## 1160    0.2007    0.3957    0.0200    -0.0001
## 1180    0.1979    0.3969    0.0200    -0.0000
## 1200    0.1947    0.3962    0.0200    -0.0001
## 1220    0.1916    0.3967    0.0200    -0.0000
## 1240    0.1890    0.3969    0.0200    -0.0001
## 1260    0.1865    0.3983    0.0200    -0.0001
## 1280    0.1840    0.3975    0.0200    -0.0001
## 1300    0.1815    0.3975    0.0200    -0.0001
## 1320    0.1784    0.3951    0.0200    -0.0001
## 1340    0.1758    0.3958    0.0200    -0.0000
## 1360    0.1732    0.3953    0.0200    -0.0001
## 1380    0.1707    0.3941    0.0200    -0.0000
## 1400    0.1684    0.3948    0.0200    -0.0001
## 1420    0.1661    0.3958    0.0200    -0.0000
## 1440    0.1637    0.3958    0.0200    -0.0000
## 1460    0.1614    0.3949    0.0200    -0.0000
## 1480    0.1591    0.3950    0.0200    -0.0001
## 1500    0.1575    0.3964    0.0200    -0.0001
## 1520    0.1554    0.3949    0.0200    -0.0001
## 1540    0.1532    0.3935    0.0200    -0.0000
## 1560    0.1514    0.3941    0.0200    -0.0001
## 1580    0.1494    0.3938    0.0200    -0.0001
## 1600    0.1476    0.3950    0.0200    -0.0000
## 1620    0.1457    0.3953    0.0200    -0.0001
## 1640    0.1439    0.3947    0.0200    -0.0001
## 1660    0.1421    0.3952    0.0200    -0.0000
## 1680    0.1403    0.3965    0.0200    -0.0001
## 1700    0.1385    0.3973    0.0200    -0.0001
## 1720    0.1367    0.3977    0.0200    -0.0001
## 1740    0.1351    0.4000    0.0200    -0.0000
## 1760    0.1334    0.3997    0.0200    -0.0001
## 1780    0.1317    0.3993    0.0200    -0.0000
## 1800    0.1298    0.3994    0.0200    -0.0001
## 1820    0.1284    0.3995    0.0200    -0.0000
## 1840    0.1269    0.3980    0.0200    -0.0000
## 1860    0.1253    0.3974    0.0200     0.0000
## 1880    0.1239    0.3973    0.0200    -0.0000
## 1900    0.1223    0.3973    0.0200    -0.0000
## 1920    0.1206    0.3962    0.0200    -0.0001
## 1940    0.1192    0.3981    0.0200    -0.0000
## 1960    0.1178    0.3979    0.0200    -0.0001
## 1980    0.1161    0.3984    0.0200    -0.0000
## 2000    0.1147    0.3977    0.0200    -0.0000
## 2020    0.1133    0.4009    0.0200    -0.0000
## 2040    0.1119    0.4020    0.0200    -0.0000
## 2060    0.1104    0.4017    0.0200    -0.0000
## 2080    0.1091    0.4017    0.0200    -0.0001
## 2100    0.1080    0.4020    0.0200    -0.0000
## 2120    0.1067    0.4005    0.0200    -0.0000
## 2140    0.1052    0.4019    0.0200    -0.0000
## 2160    0.1040    0.4015    0.0200    -0.0000
## 2180    0.1026    0.4007    0.0200     0.0000
## 2200    0.1014    0.4015    0.0200    -0.0000
```

```
## 2220          0.1002               0.4015          0.0200     -0.0000
## 2240          0.0989               0.3999          0.0200      0.0000
## 2260          0.0975               0.4001          0.0200     -0.0000
## 2280          0.0963               0.4006          0.0200     -0.0000
## 2300          0.0952               0.4008          0.0200     -0.0000
## 2320          0.0940               0.4009          0.0200     -0.0000
## 2340          0.0929               0.4004          0.0200     -0.0000
## 2360          0.0918               0.3983          0.0200     -0.0000
## 2380          0.0908               0.3991          0.0200     -0.0000
## 2400          0.0896               0.3989          0.0200     -0.0000
## 2420          0.0887               0.4000          0.0200     -0.0000
## 2440          0.0877               0.3971          0.0200     -0.0000
## 2460          0.0868               0.3974          0.0200     -0.0000
## 2480          0.0858               0.3981          0.0200     -0.0000
## 2500          0.0848               0.3985          0.0200     -0.0000
## 2520          0.0838               0.3978          0.0200     -0.0000
## 2540          0.0828               0.3985          0.0200     -0.0000
## 2560          0.0818               0.3984          0.0200     -0.0000
## 2580          0.0808               0.3988          0.0200     -0.0000
## 2600          0.0799               0.3977          0.0200     -0.0000
## 2620          0.0789               0.3969          0.0200     -0.0000
## 2640          0.0781               0.3969          0.0200     -0.0000
## 2660          0.0772               0.3977          0.0200     -0.0000
## 2680          0.0764               0.3984          0.0200     -0.0000
## 2700          0.0756               0.3979          0.0200     -0.0000
## 2720          0.0748               0.3984          0.0200     -0.0000
## 2740          0.0741               0.3977          0.0200     -0.0000
## 2760          0.0733               0.3992          0.0200     -0.0000
## 2780          0.0725               0.3999          0.0200     -0.0000
## 2800          0.0717               0.4013          0.0200     -0.0000
## 2820          0.0709               0.4008          0.0200     -0.0000
## 2840          0.0701               0.3990          0.0200     -0.0000
## 2860          0.0692               0.3980          0.0200     -0.0000
## 2880          0.0685               0.3986          0.0200     -0.0000
## 2900          0.0677               0.3985          0.0200     -0.0000
## 2920          0.0668               0.3993          0.0200     -0.0000
## 2940          0.0662               0.3990          0.0200     -0.0000
## 2960          0.0655               0.3974          0.0200     -0.0000
## 2980          0.0647               0.3964          0.0200     -0.0000
## 3000          0.0640               0.3983          0.0200     -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1          1.2658          1.2293     0.0300    0.0154
##      2          1.2373          1.2013     0.0300    0.0143
##      3          1.2091          1.1731     0.0300    0.0133
##      4          1.1839          1.1474     0.0300    0.0126
##      5          1.1600          1.1232     0.0300    0.0111
##      6          1.1364          1.0989     0.0300    0.0114
##      7          1.1139          1.0756     0.0300    0.0106
##      8          1.0932          1.0541     0.0300    0.0095
```

```
##        9        1.0737        1.0357        0.0300        0.0092
##       10        1.0548        1.0165        0.0300        0.0091
##       20        0.9094        0.8683        0.0300        0.0055
##       40        0.7216        0.6840        0.0300        0.0030
##       60        0.6096        0.5673        0.0300        0.0018
##       80        0.5409        0.5028        0.0300        0.0015
##      100        0.4965        0.4600        0.0300        0.0004
##      120        0.4671        0.4323        0.0300        0.0001
##      140        0.4453        0.4159        0.0300        0.0002
##      160        0.4271        0.4067        0.0300        0.0001
##      180        0.4112        0.3994        0.0300        0.0000
##      200        0.3968        0.3931        0.0300        0.0001
##      220        0.3841        0.3894        0.0300        0.0000
##      240        0.3714        0.3898        0.0300        0.0000
##      260        0.3603        0.3922        0.0300       -0.0001
##      280        0.3506        0.3890        0.0300       -0.0000
##      300        0.3405        0.3895        0.0300       -0.0001
##      320        0.3316        0.3907        0.0300        0.0001
##      340        0.3223        0.3900        0.0300       -0.0001
##      360        0.3137        0.3899        0.0300       -0.0004
##      380        0.3051        0.3882        0.0300       -0.0002
##      400        0.2971        0.3878        0.0300       -0.0001
##      420        0.2898        0.3874        0.0300        0.0000
##      440        0.2834        0.3888        0.0300       -0.0001
##      460        0.2761        0.3871        0.0300       -0.0002
##      480        0.2696        0.3872        0.0300       -0.0001
##      500        0.2620        0.3893        0.0300       -0.0001
##      520        0.2557        0.3855        0.0300       -0.0002
##      540        0.2498        0.3844        0.0300       -0.0001
##      560        0.2445        0.3832        0.0300       -0.0001
##      580        0.2382        0.3823        0.0300       -0.0001
##      600        0.2331        0.3834        0.0300       -0.0001
##      620        0.2273        0.3824        0.0300       -0.0003
##      640        0.2226        0.3841        0.0300       -0.0001
##      660        0.2180        0.3824        0.0300       -0.0001
##      680        0.2133        0.3817        0.0300       -0.0002
##      700        0.2079        0.3821        0.0300       -0.0001
##      720        0.2035        0.3792        0.0300       -0.0000
##      740        0.1987        0.3825        0.0300       -0.0001
##      760        0.1944        0.3850        0.0300        0.0001
##      780        0.1903        0.3813        0.0300       -0.0001
##      800        0.1866        0.3823        0.0300       -0.0001
##      820        0.1826        0.3840        0.0300       -0.0001
##      840        0.1791        0.3853        0.0300       -0.0001
##      860        0.1752        0.3852        0.0300       -0.0001
##      880        0.1718        0.3849        0.0300       -0.0001
##      900        0.1687        0.3842        0.0300       -0.0001
##      920        0.1652        0.3845        0.0300       -0.0001
##      940        0.1612        0.3850        0.0300       -0.0001
##      960        0.1578        0.3831        0.0300       -0.0001
##      980        0.1547        0.3828        0.0300       -0.0001
##     1000        0.1512        0.3823        0.0300       -0.0001
##     1020        0.1486        0.3816        0.0300       -0.0001
##     1040        0.1456        0.3809        0.0300       -0.0001
```

```
##    1060    0.1426    0.3841    0.0300    -0.0000
##    1080    0.1401    0.3853    0.0300    -0.0000
##    1100    0.1373    0.3843    0.0300    -0.0000
##    1120    0.1345    0.3830    0.0300    -0.0000
##    1140    0.1320    0.3813    0.0300    -0.0000
##    1160    0.1296    0.3802    0.0300    -0.0001
##    1180    0.1273    0.3800    0.0300    -0.0000
##    1200    0.1247    0.3815    0.0300    -0.0001
##    1220    0.1221    0.3836    0.0300    -0.0000
##    1240    0.1194    0.3809    0.0300    -0.0001
##    1260    0.1173    0.3830    0.0300     0.0000
##    1280    0.1151    0.3824    0.0300    -0.0001
##    1300    0.1130    0.3814    0.0300    -0.0001
##    1320    0.1107    0.3821    0.0300    -0.0001
##    1340    0.1087    0.3841    0.0300    -0.0000
##    1360    0.1071    0.3845    0.0300    -0.0001
##    1380    0.1051    0.3843    0.0300    -0.0001
##    1400    0.1031    0.3859    0.0300    -0.0000
##    1420    0.1009    0.3833    0.0300    -0.0001
##    1440    0.0991    0.3829    0.0300    -0.0000
##    1460    0.0972    0.3817    0.0300    -0.0000
##    1480    0.0957    0.3829    0.0300    -0.0000
##    1500    0.0939    0.3814    0.0300    -0.0000
##    1520    0.0923    0.3808    0.0300    -0.0000
##    1540    0.0906    0.3790    0.0300    -0.0001
##    1560    0.0891    0.3817    0.0300    -0.0000
##    1580    0.0874    0.3802    0.0300    -0.0001
##    1600    0.0861    0.3812    0.0300    -0.0000
##    1620    0.0845    0.3808    0.0300    -0.0001
##    1640    0.0831    0.3834    0.0300    -0.0001
##    1660    0.0818    0.3860    0.0300    -0.0000
##    1680    0.0804    0.3867    0.0300    -0.0001
##    1700    0.0789    0.3858    0.0300    -0.0000
##    1720    0.0775    0.3852    0.0300    -0.0001
##    1740    0.0761    0.3853    0.0300    -0.0000
##    1760    0.0750    0.3853    0.0300    -0.0000
##    1780    0.0739    0.3870    0.0300    -0.0000
##    1800    0.0728    0.3881    0.0300    -0.0000
##    1820    0.0715    0.3857    0.0300    -0.0000
##    1840    0.0702    0.3860    0.0300    -0.0001
##    1860    0.0691    0.3865    0.0300    -0.0000
##    1880    0.0680    0.3869    0.0300    -0.0000
##    1900    0.0669    0.3864    0.0300    -0.0000
##    1920    0.0658    0.3888    0.0300    -0.0000
##    1940    0.0648    0.3896    0.0300    -0.0000
##    1960    0.0637    0.3898    0.0300    -0.0000
##    1980    0.0627    0.3917    0.0300    -0.0000
##    2000    0.0617    0.3959    0.0300    -0.0000
##    2020    0.0607    0.3973    0.0300    -0.0000
##    2040    0.0597    0.3996    0.0300    -0.0000
##    2060    0.0588    0.4007    0.0300    -0.0000
##    2080    0.0578    0.4022    0.0300    -0.0000
##    2100    0.0569    0.4036    0.0300    -0.0000
##    2120    0.0560    0.4061    0.0300    -0.0000
```

```
##    2140         0.0551            0.4064        0.0300      -0.0000
##    2160         0.0541            0.4069        0.0300      -0.0000
##    2180         0.0533            0.4066        0.0300      -0.0000
##    2200         0.0523            0.4064        0.0300      -0.0000
##    2220         0.0516            0.4106        0.0300      -0.0000
##    2240         0.0508            0.4111        0.0300      -0.0000
##    2260         0.0499            0.4096        0.0300      -0.0000
##    2280         0.0490            0.4065        0.0300       0.0000
##    2300         0.0482            0.4070        0.0300      -0.0000
##    2320         0.0475            0.4081        0.0300      -0.0000
##    2340         0.0467            0.4079        0.0300      -0.0000
##    2360         0.0459            0.4090        0.0300      -0.0000
##    2380         0.0450            0.4081        0.0300      -0.0000
##    2400         0.0443            0.4080        0.0300      -0.0000
##    2420         0.0434            0.4080        0.0300      -0.0000
##    2440         0.0425            0.4073        0.0300      -0.0000
##    2460         0.0417            0.4092        0.0300      -0.0000
##    2480         0.0412            0.4092        0.0300      -0.0000
##    2500         0.0404            0.4069        0.0300      -0.0000
##    2520         0.0398            0.4068        0.0300      -0.0000
##    2540         0.0392            0.4052        0.0300      -0.0000
##    2560         0.0385            0.4027        0.0300      -0.0000
##    2580         0.0379            0.4018        0.0300      -0.0000
##    2600         0.0374            0.4056        0.0300      -0.0000
##    2620         0.0368            0.4065        0.0300      -0.0000
##    2640         0.0363            0.4079        0.0300      -0.0000
##    2660         0.0358            0.4090        0.0300      -0.0000
##    2680         0.0353            0.4090        0.0300      -0.0000
##    2700         0.0348            0.4084        0.0300      -0.0000
##    2720         0.0342            0.4094        0.0300      -0.0000
##    2740         0.0335            0.4097        0.0300      -0.0000
##    2760         0.0331            0.4095        0.0300      -0.0000
##    2780         0.0326            0.4117        0.0300      -0.0000
##    2800         0.0321            0.4118        0.0300      -0.0000
##    2820         0.0316            0.4127        0.0300      -0.0000
##    2840         0.0311            0.4145        0.0300      -0.0000
##    2860         0.0306            0.4128        0.0300      -0.0000
##    2880         0.0301            0.4127        0.0300      -0.0000
##    2900         0.0296            0.4120        0.0300      -0.0000
##    2920         0.0292            0.4129        0.0300      -0.0000
##    2940         0.0288            0.4127        0.0300      -0.0000
##    2960         0.0283            0.4120        0.0300      -0.0000
##    2980         0.0278            0.4115        0.0300      -0.0000
##    3000         0.0274            0.4136        0.0300      -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.2853            1.2682        0.0100     0.0053
##      2         1.2750            1.2572        0.0100     0.0049
##      3         1.2651            1.2468        0.0100     0.0049
##      4         1.2551            1.2362        0.0100     0.0048
```

```
##     5      1.2455      1.2267      0.0100      0.0044
##     6      1.2364      1.2173      0.0100      0.0041
##     7      1.2271      1.2076      0.0100      0.0046
##     8      1.2187      1.1990      0.0100      0.0044
##     9      1.2110      1.1913      0.0100      0.0035
##    10      1.2024      1.1823      0.0100      0.0044
##    20      1.1261      1.1032      0.0100      0.0035
##    40      1.0066      0.9789      0.0100      0.0026
##    60      0.9145      0.8832      0.0100      0.0019
##    80      0.8412      0.8077      0.0100      0.0016
##   100      0.7809      0.7473      0.0100      0.0014
##   120      0.7296      0.6928      0.0100      0.0011
##   140      0.6856      0.6482      0.0100      0.0008
##   160      0.6495      0.6109      0.0100      0.0007
##   180      0.6188      0.5801      0.0100      0.0006
##   200      0.5917      0.5533      0.0100      0.0005
##   220      0.5692      0.5296      0.0100      0.0004
##   240      0.5494      0.5080      0.0100      0.0004
##   260      0.5326      0.4929      0.0100      0.0004
##   280      0.5179      0.4789      0.0100      0.0003
##   300      0.5050      0.4663      0.0100      0.0003
##   320      0.4937      0.4570      0.0100      0.0002
##   340      0.4837      0.4476      0.0100      0.0002
##   360      0.4744      0.4392      0.0100      0.0000
##   380      0.4663      0.4339      0.0100     -0.0000
##   400      0.4587      0.4277      0.0100      0.0001
##   420      0.4509      0.4221      0.0100      0.0000
##   440      0.4446      0.4177      0.0100      0.0000
##   460      0.4381      0.4120      0.0100      0.0001
##   480      0.4318      0.4091      0.0100      0.0001
##   500      0.4266      0.4063      0.0100      0.0000
##   520      0.4210      0.4022      0.0100     -0.0000
##   540      0.4163      0.3991      0.0100     -0.0000
##   560      0.4113      0.3969      0.0100     -0.0001
##   580      0.4070      0.3959      0.0100     -0.0000
##   600      0.4028      0.3942      0.0100     -0.0000
##   620      0.3975      0.3927      0.0100     -0.0001
##   640      0.3936      0.3923      0.0100      0.0000
##   660      0.3893      0.3905      0.0100      0.0000
##   680      0.3854      0.3886      0.0100     -0.0000
##   700      0.3814      0.3873      0.0100     -0.0000
##   720      0.3777      0.3854      0.0100      0.0000
##   740      0.3743      0.3858      0.0100     -0.0000
##   760      0.3710      0.3856      0.0100     -0.0001
##   780      0.3677      0.3839      0.0100     -0.0001
##   800      0.3642      0.3824      0.0100     -0.0000
##   820      0.3610      0.3824      0.0100      0.0000
##   840      0.3572      0.3815      0.0100      0.0001
##   860      0.3537      0.3800      0.0100      0.0000
##   880      0.3501      0.3792      0.0100      0.0000
##   900      0.3471      0.3808      0.0100     -0.0000
##   920      0.3442      0.3814      0.0100     -0.0001
##   940      0.3415      0.3805      0.0100     -0.0000
##   960      0.3387      0.3798      0.0100     -0.0001
```

```
##    980    0.3359    0.3799    0.0100    -0.0001
##   1000    0.3332    0.3793    0.0100    -0.0001
##   1020    0.3300    0.3799    0.0100    -0.0000
##   1040    0.3272    0.3781    0.0100    -0.0001
##   1060    0.3242    0.3779    0.0100    -0.0000
##   1080    0.3214    0.3770    0.0100    -0.0000
##   1100    0.3183    0.3767    0.0100    -0.0000
##   1120    0.3157    0.3777    0.0100    -0.0000
##   1140    0.3131    0.3771    0.0100    -0.0000
##   1160    0.3101    0.3761    0.0100    -0.0000
##   1180    0.3080    0.3764    0.0100    -0.0001
##   1200    0.3056    0.3769    0.0100    -0.0000
##   1220    0.3033    0.3775    0.0100    -0.0000
##   1240    0.3004    0.3779    0.0100    -0.0001
##   1260    0.2982    0.3766    0.0100    -0.0000
##   1280    0.2955    0.3753    0.0100    -0.0001
##   1300    0.2934    0.3752    0.0100    -0.0001
##   1320    0.2911    0.3758    0.0100    -0.0001
##   1340    0.2888    0.3758    0.0100    -0.0000
##   1360    0.2865    0.3759    0.0100    -0.0000
##   1380    0.2843    0.3751    0.0100    -0.0000
##   1400    0.2822    0.3747    0.0100    -0.0000
##   1420    0.2798    0.3740    0.0100    -0.0001
##   1440    0.2773    0.3738    0.0100    -0.0000
##   1460    0.2751    0.3751    0.0100    -0.0000
##   1480    0.2730    0.3748    0.0100    -0.0000
##   1500    0.2707    0.3747    0.0100    -0.0000
##   1520    0.2686    0.3756    0.0100    -0.0000
##   1540    0.2665    0.3748    0.0100    -0.0000
##   1560    0.2645    0.3742    0.0100    -0.0001
##   1580    0.2623    0.3745    0.0100    -0.0000
##   1600    0.2604    0.3754    0.0100    -0.0001
##   1620    0.2585    0.3755    0.0100    -0.0000
##   1640    0.2565    0.3752    0.0100    -0.0000
##   1660    0.2546    0.3751    0.0100    -0.0000
##   1680    0.2528    0.3751    0.0100    -0.0000
##   1700    0.2509    0.3753    0.0100    -0.0001
##   1720    0.2490    0.3751    0.0100    -0.0000
##   1740    0.2471    0.3772    0.0100    -0.0000
##   1760    0.2453    0.3768    0.0100    -0.0000
##   1780    0.2436    0.3776    0.0100    -0.0001
##   1800    0.2418    0.3767    0.0100    -0.0000
##   1820    0.2401    0.3765    0.0100    -0.0001
##   1840    0.2383    0.3761    0.0100    -0.0001
##   1860    0.2367    0.3765    0.0100    -0.0000
##   1880    0.2349    0.3768    0.0100    -0.0000
##   1900    0.2329    0.3774    0.0100    -0.0000
##   1920    0.2312    0.3779    0.0100    -0.0000
##   1940    0.2294    0.3790    0.0100    -0.0000
##   1960    0.2278    0.3796    0.0100    -0.0000
##   1980    0.2263    0.3800    0.0100    -0.0001
##   2000    0.2249    0.3801    0.0100    -0.0000
##   2020    0.2232    0.3801    0.0100    -0.0000
##   2040    0.2214    0.3800    0.0100    -0.0000
```

```
##    2060      0.2198         0.3798       0.0100     -0.0001
##    2080      0.2183         0.3803       0.0100     -0.0001
##    2100      0.2166         0.3801       0.0100     -0.0001
##    2120      0.2148         0.3788       0.0100     -0.0000
##    2140      0.2131         0.3795       0.0100     -0.0000
##    2160      0.2116         0.3794       0.0100     -0.0000
##    2180      0.2101         0.3789       0.0100     -0.0000
##    2200      0.2088         0.3786       0.0100     -0.0000
##    2220      0.2072         0.3785       0.0100     -0.0000
##    2240      0.2055         0.3788       0.0100     -0.0000
##    2260      0.2042         0.3798       0.0100     -0.0001
##    2280      0.2029         0.3791       0.0100     -0.0000
##    2300      0.2013         0.3788       0.0100     -0.0000
##    2320      0.2000         0.3796       0.0100      0.0000
##    2340      0.1984         0.3798       0.0100     -0.0000
##    2360      0.1969         0.3788       0.0100     -0.0000
##    2380      0.1954         0.3786       0.0100     -0.0000
##    2400      0.1942         0.3788       0.0100     -0.0000
##    2420      0.1927         0.3784       0.0100     -0.0000
##    2440      0.1914         0.3783       0.0100     -0.0000
##    2460      0.1901         0.3780       0.0100     -0.0000
##    2480      0.1887         0.3781       0.0100     -0.0000
##    2500      0.1876         0.3785       0.0100     -0.0000
##    2520      0.1863         0.3794       0.0100     -0.0001
##    2540      0.1852         0.3796       0.0100     -0.0001
##    2560      0.1839         0.3789       0.0100     -0.0000
##    2580      0.1826         0.3783       0.0100     -0.0000
##    2600      0.1814         0.3789       0.0100     -0.0000
##    2620      0.1803         0.3794       0.0100     -0.0000
##    2640      0.1791         0.3798       0.0100     -0.0000
##    2660      0.1778         0.3791       0.0100     -0.0000
##    2680      0.1767         0.3795       0.0100     -0.0000
##    2700      0.1756         0.3790       0.0100     -0.0000
##    2720      0.1744         0.3784       0.0100     -0.0000
##    2740      0.1730         0.3777       0.0100     -0.0000
##    2760      0.1718         0.3776       0.0100     -0.0000
##    2780      0.1707         0.3778       0.0100     -0.0000
##    2800      0.1695         0.3770       0.0100     -0.0000
##    2820      0.1683         0.3756       0.0100     -0.0000
##    2840      0.1673         0.3760       0.0100     -0.0000
##    2860      0.1662         0.3769       0.0100     -0.0000
##    2880      0.1652         0.3764       0.0100     -0.0000
##    2900      0.1641         0.3764       0.0100     -0.0000
##    2920      0.1629         0.3761       0.0100     -0.0000
##    2940      0.1619         0.3759       0.0100     -0.0000
##    2960      0.1608         0.3758       0.0100     -0.0000
##    2980      0.1597         0.3755       0.0100     -0.0000
##    3000      0.1587         0.3749       0.0100     -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
```

```
##       1     1.2745         1.2568      0.0200     0.0103
##       2     1.2553         1.2376      0.0200     0.0097
##       3     1.2373         1.2195      0.0200     0.0089
##       4     1.2188         1.2008      0.0200     0.0088
##       5     1.2018         1.1836      0.0200     0.0086
##       6     1.1848         1.1656      0.0200     0.0082
##       7     1.1689         1.1487      0.0200     0.0082
##       8     1.1538         1.1326      0.0200     0.0077
##       9     1.1379         1.1159      0.0200     0.0071
##      10     1.1238         1.1013      0.0200     0.0067
##      20     1.0047         0.9774      0.0200     0.0053
##      40     0.8394         0.8068      0.0200     0.0031
##      60     0.7251         0.6882      0.0200     0.0020
##      80     0.6459         0.6055      0.0200     0.0015
##     100     0.5883         0.5481      0.0200     0.0014
##     120     0.5467         0.5060      0.0200     0.0006
##     140     0.5148         0.4734      0.0200     0.0004
##     160     0.4906         0.4497      0.0200     0.0001
##     180     0.4711         0.4329      0.0200     0.0002
##     200     0.4537         0.4171      0.0200     0.0001
##     220     0.4413         0.4081      0.0200     0.0002
##     240     0.4290         0.4035      0.0200     0.0000
##     260     0.4176         0.3945      0.0200    -0.0001
##     280     0.4074         0.3898      0.0200     0.0000
##     300     0.3983         0.3860      0.0200     0.0000
##     320     0.3901         0.3813      0.0200    -0.0001
##     340     0.3827         0.3800      0.0200     0.0001
##     360     0.3753         0.3791      0.0200    -0.0001
##     380     0.3684         0.3784      0.0200    -0.0001
##     400     0.3615         0.3789      0.0200     0.0000
##     420     0.3551         0.3777      0.0200    -0.0001
##     440     0.3482         0.3770      0.0200    -0.0000
##     460     0.3413         0.3764      0.0200    -0.0002
##     480     0.3355         0.3779      0.0200    -0.0001
##     500     0.3283         0.3769      0.0200    -0.0002
##     520     0.3232         0.3753      0.0200    -0.0000
##     540     0.3177         0.3764      0.0200    -0.0000
##     560     0.3129         0.3740      0.0200    -0.0001
##     580     0.3077         0.3722      0.0200    -0.0001
##     600     0.3034         0.3729      0.0200    -0.0001
##     620     0.2977         0.3732      0.0200    -0.0001
##     640     0.2934         0.3753      0.0200    -0.0000
##     660     0.2886         0.3785      0.0200    -0.0000
##     680     0.2843         0.3775      0.0200    -0.0001
##     700     0.2804         0.3774      0.0200    -0.0001
##     720     0.2759         0.3770      0.0200    -0.0000
##     740     0.2720         0.3753      0.0200    -0.0001
##     760     0.2677         0.3732      0.0200    -0.0001
##     780     0.2638         0.3706      0.0200    -0.0001
##     800     0.2603         0.3696      0.0200    -0.0001
##     820     0.2562         0.3702      0.0200    -0.0001
##     840     0.2528         0.3718      0.0200    -0.0001
##     860     0.2492         0.3723      0.0200    -0.0002
##     880     0.2450         0.3737      0.0200    -0.0000
```

```
##     900      0.2410          0.3742      0.0200      -0.0001
##     920      0.2377          0.3742      0.0200      -0.0001
##     940      0.2341          0.3713      0.0200      -0.0001
##     960      0.2306          0.3712      0.0200      -0.0001
##     980      0.2270          0.3732      0.0200      -0.0000
##    1000      0.2238          0.3730      0.0200      -0.0000
##    1020      0.2207          0.3700      0.0200      -0.0002
##    1040      0.2178          0.3691      0.0200      -0.0001
##    1060      0.2145          0.3703      0.0200      -0.0001
##    1080      0.2109          0.3700      0.0200      -0.0000
##    1100      0.2080          0.3711      0.0200      -0.0000
##    1120      0.2050          0.3704      0.0200      -0.0001
##    1140      0.2023          0.3694      0.0200      -0.0001
##    1160      0.1995          0.3720      0.0200      -0.0001
##    1180      0.1967          0.3725      0.0200      -0.0001
##    1200      0.1938          0.3717      0.0200      -0.0001
##    1220      0.1908          0.3730      0.0200      -0.0001
##    1240      0.1881          0.3723      0.0200      -0.0001
##    1260      0.1857          0.3717      0.0200      -0.0001
##    1280      0.1830          0.3722      0.0200      -0.0001
##    1300      0.1801          0.3718      0.0200      -0.0001
##    1320      0.1777          0.3724      0.0200      -0.0001
##    1340      0.1752          0.3726      0.0200      -0.0001
##    1360      0.1729          0.3720      0.0200      -0.0000
##    1380      0.1704          0.3717      0.0200      -0.0000
##    1400      0.1680          0.3696      0.0200      -0.0001
##    1420      0.1658          0.3698      0.0200      -0.0000
##    1440      0.1635          0.3688      0.0200      -0.0000
##    1460      0.1616          0.3694      0.0200      -0.0001
##    1480      0.1594          0.3699      0.0200      -0.0001
##    1500      0.1575          0.3695      0.0200      -0.0000
##    1520      0.1556          0.3697      0.0200      -0.0001
##    1540      0.1534          0.3695      0.0200      -0.0001
##    1560      0.1513          0.3682      0.0200      -0.0001
##    1580      0.1494          0.3696      0.0200      -0.0001
##    1600      0.1476          0.3698      0.0200      -0.0000
##    1620      0.1458          0.3708      0.0200      -0.0000
##    1640      0.1440          0.3716      0.0200      -0.0000
##    1660      0.1424          0.3723      0.0200      -0.0000
##    1680      0.1405          0.3704      0.0200      -0.0000
##    1700      0.1387          0.3711      0.0200      -0.0001
##    1720      0.1367          0.3723      0.0200      -0.0000
##    1740      0.1349          0.3718      0.0200      -0.0000
##    1760      0.1333          0.3739      0.0200      -0.0000
##    1780      0.1317          0.3740      0.0200      -0.0000
##    1800      0.1296          0.3729      0.0200      -0.0000
##    1820      0.1283          0.3719      0.0200      -0.0000
##    1840      0.1269          0.3721      0.0200      -0.0000
##    1860      0.1255          0.3730      0.0200      -0.0000
##    1880      0.1241          0.3739      0.0200      -0.0000
##    1900      0.1226          0.3748      0.0200      -0.0001
##    1920      0.1211          0.3752      0.0200      -0.0000
##    1940      0.1197          0.3766      0.0200      -0.0000
##    1960      0.1183          0.3779      0.0200      -0.0000
```

```
## 1980    0.1167        0.3764        0.0200    -0.0000
## 2000    0.1153        0.3762        0.0200    -0.0000
## 2020    0.1138        0.3761        0.0200    -0.0000
## 2040    0.1125        0.3770        0.0200    -0.0001
## 2060    0.1109        0.3772        0.0200    -0.0000
## 2080    0.1095        0.3774        0.0200    -0.0000
## 2100    0.1081        0.3768        0.0200    -0.0000
## 2120    0.1068        0.3779        0.0200    -0.0001
## 2140    0.1056        0.3788        0.0200    -0.0000
## 2160    0.1043        0.3803        0.0200    -0.0000
## 2180    0.1031        0.3817        0.0200    -0.0000
## 2200    0.1019        0.3802        0.0200    -0.0001
## 2220    0.1007        0.3788        0.0200    -0.0000
## 2240    0.0993        0.3769        0.0200    -0.0000
## 2260    0.0981        0.3769        0.0200    -0.0000
## 2280    0.0971        0.3774        0.0200    -0.0000
## 2300    0.0960        0.3782        0.0200    -0.0000
## 2320    0.0948        0.3768        0.0200    -0.0000
## 2340    0.0936        0.3771        0.0200    -0.0000
## 2360    0.0926        0.3767        0.0200    -0.0000
## 2380    0.0916        0.3776        0.0200    -0.0000
## 2400    0.0906        0.3786        0.0200    -0.0000
## 2420    0.0896        0.3780        0.0200    -0.0001
## 2440    0.0882        0.3766        0.0200    -0.0000
## 2460    0.0872        0.3754        0.0200    -0.0000
## 2480    0.0863        0.3768        0.0200    -0.0000
## 2500    0.0851        0.3765        0.0200    -0.0000
## 2520    0.0841        0.3770        0.0200    -0.0000
## 2540    0.0832        0.3788        0.0200    -0.0000
## 2560    0.0823        0.3794        0.0200    -0.0000
## 2580    0.0812        0.3778        0.0200    -0.0000
## 2600    0.0803        0.3776        0.0200    -0.0000
## 2620    0.0795        0.3773        0.0200    -0.0000
## 2640    0.0785        0.3761        0.0200    -0.0000
## 2660    0.0775        0.3749        0.0200    -0.0000
## 2680    0.0767        0.3736        0.0200    -0.0000
## 2700    0.0758        0.3743        0.0200    -0.0000
## 2720    0.0749        0.3749        0.0200    -0.0000
## 2740    0.0740        0.3754        0.0200    -0.0000
## 2760    0.0732        0.3773        0.0200    -0.0000
## 2780    0.0724        0.3764        0.0200    -0.0000
## 2800    0.0715        0.3755        0.0200     0.0000
## 2820    0.0706        0.3740        0.0200    -0.0000
## 2840    0.0698        0.3727        0.0200    -0.0000
## 2860    0.0691        0.3724        0.0200    -0.0000
## 2880    0.0684        0.3734        0.0200    -0.0000
## 2900    0.0676        0.3738        0.0200    -0.0000
## 2920    0.0667        0.3725        0.0200    -0.0000
## 2940    0.0660        0.3725        0.0200    -0.0000
## 2960    0.0652        0.3744        0.0200     0.0000
## 2980    0.0645        0.3751        0.0200    -0.0000
## 3000    0.0639        0.3758        0.0200    -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
```

```
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1        1.2647          1.2465      0.0300    0.0159
##     2        1.2364          1.2167      0.0300    0.0139
##     3        1.2088          1.1879      0.0300    0.0132
##     4        1.1836          1.1612      0.0300    0.0122
##     5        1.1609          1.1383      0.0300    0.0122
##     6        1.1380          1.1153      0.0300    0.0109
##     7        1.1159          1.0916      0.0300    0.0104
##     8        1.0967          1.0722      0.0300    0.0091
##     9        1.0774          1.0522      0.0300    0.0092
##    10        1.0586          1.0319      0.0300    0.0085
##    20        0.9116          0.8806      0.0300    0.0055
##    40        0.7272          0.6915      0.0300    0.0034
##    60        0.6181          0.5813      0.0300    0.0020
##    80        0.5498          0.5110      0.0300    0.0010
##   100        0.5052          0.4633      0.0300    0.0007
##   120        0.4729          0.4317      0.0300    0.0005
##   140        0.4488          0.4119      0.0300   -0.0000
##   160        0.4319          0.4002      0.0300    0.0001
##   180        0.4163          0.3965      0.0300    0.0000
##   200        0.4020          0.3896      0.0300    0.0000
##   220        0.3895          0.3850      0.0300   -0.0001
##   240        0.3778          0.3843      0.0300   -0.0000
##   260        0.3678          0.3786      0.0300   -0.0000
##   280        0.3566          0.3782      0.0300    0.0001
##   300        0.3480          0.3780      0.0300   -0.0000
##   320        0.3387          0.3803      0.0300   -0.0001
##   340        0.3306          0.3794      0.0300   -0.0001
##   360        0.3229          0.3748      0.0300   -0.0001
##   380        0.3146          0.3741      0.0300   -0.0001
##   400        0.3068          0.3711      0.0300   -0.0003
##   420        0.2984          0.3733      0.0300   -0.0001
##   440        0.2916          0.3791      0.0300   -0.0001
##   460        0.2855          0.3800      0.0300   -0.0002
##   480        0.2793          0.3808      0.0300   -0.0001
##   500        0.2731          0.3818      0.0300   -0.0002
##   520        0.2666          0.3771      0.0300   -0.0000
##   540        0.2602          0.3776      0.0300   -0.0001
##   560        0.2551          0.3786      0.0300   -0.0001
##   580        0.2499          0.3808      0.0300   -0.0002
##   600        0.2440          0.3784      0.0300   -0.0002
##   620        0.2389          0.3776      0.0300   -0.0001
##   640        0.2338          0.3763      0.0300   -0.0001
##   660        0.2284          0.3777      0.0300   -0.0001
##   680        0.2233          0.3762      0.0300   -0.0002
##   700        0.2182          0.3783      0.0300   -0.0001
##   720        0.2137          0.3775      0.0300   -0.0002
##   740        0.2095          0.3765      0.0300   -0.0001
##   760        0.2055          0.3780      0.0300   -0.0001
##   780        0.2011          0.3838      0.0300   -0.0001
##   800        0.1966          0.3804      0.0300   -0.0002
```

```
##     820     0.1928          0.3804          0.0300     -0.0000
##     840     0.1886          0.3796          0.0300     -0.0001
##     860     0.1849          0.3801          0.0300     -0.0001
##     880     0.1813          0.3806          0.0300     -0.0001
##     900     0.1778          0.3818          0.0300     -0.0000
##     920     0.1744          0.3827          0.0300     -0.0001
##     940     0.1707          0.3819          0.0300     -0.0001
##     960     0.1671          0.3831          0.0300      0.0000
##     980     0.1640          0.3819          0.0300     -0.0001
##    1000     0.1604          0.3805          0.0300     -0.0001
##    1020     0.1573          0.3812          0.0300     -0.0000
##    1040     0.1539          0.3830          0.0300     -0.0000
##    1060     0.1510          0.3853          0.0300     -0.0002
##    1080     0.1481          0.3840          0.0300     -0.0001
##    1100     0.1455          0.3809          0.0300     -0.0001
##    1120     0.1431          0.3820          0.0300     -0.0000
##    1140     0.1404          0.3831          0.0300     -0.0001
##    1160     0.1379          0.3850          0.0300     -0.0001
##    1180     0.1353          0.3854          0.0300     -0.0000
##    1200     0.1325          0.3836          0.0300     -0.0001
##    1220     0.1299          0.3837          0.0300     -0.0001
##    1240     0.1271          0.3848          0.0300     -0.0000
##    1260     0.1249          0.3834          0.0300     -0.0001
##    1280     0.1225          0.3832          0.0300     -0.0001
##    1300     0.1204          0.3821          0.0300     -0.0001
##    1320     0.1180          0.3824          0.0300     -0.0001
##    1340     0.1159          0.3822          0.0300     -0.0001
##    1360     0.1141          0.3821          0.0300     -0.0001
##    1380     0.1119          0.3845          0.0300     -0.0001
##    1400     0.1099          0.3855          0.0300     -0.0001
##    1420     0.1079          0.3879          0.0300     -0.0000
##    1440     0.1063          0.3906          0.0300     -0.0001
##    1460     0.1042          0.3912          0.0300     -0.0000
##    1480     0.1025          0.3899          0.0300     -0.0000
##    1500     0.1005          0.3880          0.0300     -0.0000
##    1520     0.0986          0.3860          0.0300     -0.0001
##    1540     0.0968          0.3869          0.0300     -0.0001
##    1560     0.0954          0.3873          0.0300     -0.0000
##    1580     0.0938          0.3861          0.0300     -0.0000
##    1600     0.0924          0.3869          0.0300     -0.0001
##    1620     0.0910          0.3878          0.0300     -0.0000
##    1640     0.0894          0.3887          0.0300     -0.0000
##    1660     0.0876          0.3869          0.0300      0.0000
##    1680     0.0862          0.3861          0.0300     -0.0000
##    1700     0.0849          0.3848          0.0300     -0.0000
##    1720     0.0835          0.3871          0.0300     -0.0000
##    1740     0.0821          0.3884          0.0300     -0.0000
##    1760     0.0806          0.3895          0.0300     -0.0000
##    1780     0.0794          0.3901          0.0300     -0.0000
##    1800     0.0780          0.3898          0.0300     -0.0001
##    1820     0.0766          0.3915          0.0300     -0.0000
##    1840     0.0753          0.3911          0.0300     -0.0000
##    1860     0.0740          0.3900          0.0300     -0.0001
##    1880     0.0728          0.3910          0.0300     -0.0000
```

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```
## 1900      0.0717      0.3921      0.0300     -0.0000
## 1920      0.0705      0.3937      0.0300     -0.0000
## 1940      0.0693      0.3924      0.0300      0.0000
## 1960      0.0680      0.3913      0.0300     -0.0000
## 1980      0.0671      0.3930      0.0300     -0.0000
## 2000      0.0658      0.3925      0.0300     -0.0000
## 2020      0.0647      0.3929      0.0300     -0.0000
## 2040      0.0637      0.3912      0.0300     -0.0000
## 2060      0.0625      0.3904      0.0300      0.0000
## 2080      0.0613      0.3884      0.0300     -0.0001
## 2100      0.0604      0.3907      0.0300     -0.0000
## 2120      0.0595      0.3901      0.0300     -0.0000
## 2140      0.0584      0.3928      0.0300     -0.0000
## 2160      0.0575      0.3933      0.0300     -0.0000
## 2180      0.0566      0.3937      0.0300     -0.0000
## 2200      0.0556      0.3924      0.0300     -0.0000
## 2220      0.0547      0.3908      0.0300     -0.0000
## 2240      0.0538      0.3938      0.0300     -0.0000
## 2260      0.0530      0.3945      0.0300     -0.0000
## 2280      0.0521      0.3947      0.0300     -0.0000
## 2300      0.0512      0.3920      0.0300     -0.0000
## 2320      0.0505      0.3933      0.0300     -0.0000
## 2340      0.0496      0.3944      0.0300     -0.0000
## 2360      0.0488      0.3950      0.0300     -0.0000
## 2380      0.0481      0.3944      0.0300     -0.0000
## 2400      0.0473      0.3938      0.0300     -0.0000
## 2420      0.0464      0.3932      0.0300     -0.0000
## 2440      0.0457      0.3935      0.0300     -0.0000
## 2460      0.0449      0.3923      0.0300     -0.0000
## 2480      0.0442      0.3937      0.0300     -0.0000
## 2500      0.0434      0.3949      0.0300     -0.0000
## 2520      0.0427      0.3953      0.0300     -0.0000
## 2540      0.0421      0.3957      0.0300     -0.0000
## 2560      0.0414      0.3954      0.0300     -0.0000
## 2580      0.0408      0.3973      0.0300     -0.0000
## 2600      0.0401      0.3969      0.0300     -0.0000
## 2620      0.0395      0.3971      0.0300     -0.0000
## 2640      0.0389      0.3972      0.0300     -0.0000
## 2660      0.0383      0.3971      0.0300     -0.0000
## 2680      0.0377      0.3969      0.0300     -0.0000
## 2700      0.0371      0.3964      0.0300     -0.0000
## 2720      0.0365      0.3971      0.0300     -0.0000
## 2740      0.0360      0.3973      0.0300     -0.0000
## 2760      0.0354      0.3975      0.0300     -0.0000
## 2780      0.0348      0.3975      0.0300     -0.0000
## 2800      0.0343      0.3977      0.0300     -0.0000
## 2820      0.0337      0.3990      0.0300     -0.0000
## 2840      0.0332      0.3990      0.0300     -0.0000
## 2860      0.0326      0.3968      0.0300     -0.0000
## 2880      0.0321      0.3964      0.0300     -0.0000
## 2900      0.0316      0.3962      0.0300     -0.0000
## 2920      0.0310      0.3955      0.0300     -0.0000
## 2940      0.0305      0.3967      0.0300     -0.0000
## 2960      0.0301      0.3965      0.0300     -0.0000
```

```
## 2980        0.0296         0.3980      0.0300    -0.0000
## 3000        0.0292         0.3985      0.0300    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1       1.2877         1.2432      0.0100     0.0050
##     2       1.2782         1.2338      0.0100     0.0049
##     3       1.2689         1.2245      0.0100     0.0046
##     4       1.2589         1.2143      0.0100     0.0050
##     5       1.2492         1.2048      0.0100     0.0047
##     6       1.2404         1.1964      0.0100     0.0042
##     7       1.2313         1.1874      0.0100     0.0040
##     8       1.2226         1.1783      0.0100     0.0043
##     9       1.2142         1.1698      0.0100     0.0041
##    10       1.2052         1.1609      0.0100     0.0041
##    20       1.1297         1.0853      0.0100     0.0033
##    40       1.0108         0.9655      0.0100     0.0024
##    60       0.9203         0.8731      0.0100     0.0020
##    80       0.8460         0.7998      0.0100     0.0020
##   100       0.7833         0.7378      0.0100     0.0013
##   120       0.7325         0.6898      0.0100     0.0010
##   140       0.6894         0.6485      0.0100     0.0007
##   160       0.6530         0.6126      0.0100     0.0006
##   180       0.6222         0.5834      0.0100     0.0005
##   200       0.5957         0.5579      0.0100     0.0005
##   220       0.5718         0.5323      0.0100     0.0004
##   240       0.5525         0.5135      0.0100     0.0004
##   260       0.5344         0.4960      0.0100     0.0004
##   280       0.5191         0.4811      0.0100     0.0002
##   300       0.5067         0.4695      0.0100     0.0002
##   320       0.4955         0.4581      0.0100     0.0001
##   340       0.4853         0.4493      0.0100     0.0002
##   360       0.4757         0.4399      0.0100     0.0001
##   380       0.4678         0.4327      0.0100     0.0001
##   400       0.4595         0.4256      0.0100    -0.0000
##   420       0.4519         0.4188      0.0100     0.0002
##   440       0.4454         0.4157      0.0100     0.0001
##   460       0.4390         0.4111      0.0100     0.0000
##   480       0.4331         0.4078      0.0100     0.0000
##   500       0.4273         0.4042      0.0100    -0.0000
##   520       0.4222         0.4018      0.0100    -0.0000
##   540       0.4173         0.4000      0.0100    -0.0000
##   560       0.4123         0.3974      0.0100    -0.0000
##   580       0.4076         0.3951      0.0100     0.0000
##   600       0.4032         0.3943      0.0100    -0.0000
##   620       0.3989         0.3930      0.0100    -0.0000
##   640       0.3945         0.3922      0.0100    -0.0000
##   660       0.3904         0.3901      0.0100    -0.0001
##   680       0.3863         0.3887      0.0100    -0.0000
##   700       0.3821         0.3866      0.0100    -0.0000
##   720       0.3787         0.3851      0.0100    -0.0001
```

```
##    740      0.3752         0.3847       0.0100     -0.0001
##    760      0.3717         0.3836       0.0100     -0.0000
##    780      0.3683         0.3825       0.0100      0.0000
##    800      0.3647         0.3821       0.0100     -0.0000
##    820      0.3614         0.3798       0.0100     -0.0001
##    840      0.3583         0.3785       0.0100     -0.0000
##    860      0.3545         0.3779       0.0100     -0.0001
##    880      0.3511         0.3768       0.0100      0.0000
##    900      0.3479         0.3756       0.0100     -0.0000
##    920      0.3447         0.3754       0.0100     -0.0000
##    940      0.3419         0.3754       0.0100     -0.0000
##    960      0.3387         0.3764       0.0100     -0.0001
##    980      0.3357         0.3747       0.0100     -0.0001
##   1000      0.3328         0.3751       0.0100     -0.0000
##   1020      0.3297         0.3735       0.0100     -0.0000
##   1040      0.3265         0.3734       0.0100     -0.0000
##   1060      0.3232         0.3732       0.0100     -0.0001
##   1080      0.3203         0.3734       0.0100     -0.0000
##   1100      0.3172         0.3739       0.0100     -0.0001
##   1120      0.3147         0.3741       0.0100     -0.0000
##   1140      0.3119         0.3728       0.0100     -0.0001
##   1160      0.3093         0.3728       0.0100     -0.0000
##   1180      0.3071         0.3711       0.0100     -0.0001
##   1200      0.3045         0.3697       0.0100     -0.0000
##   1220      0.3015         0.3692       0.0100     -0.0001
##   1240      0.2989         0.3685       0.0100     -0.0000
##   1260      0.2965         0.3682       0.0100     -0.0001
##   1280      0.2942         0.3678       0.0100     -0.0000
##   1300      0.2915         0.3683       0.0100     -0.0001
##   1320      0.2888         0.3681       0.0100     -0.0000
##   1340      0.2869         0.3667       0.0100     -0.0001
##   1360      0.2847         0.3663       0.0100     -0.0000
##   1380      0.2823         0.3665       0.0100     -0.0000
##   1400      0.2800         0.3650       0.0100     -0.0001
##   1420      0.2775         0.3649       0.0100     -0.0000
##   1440      0.2752         0.3647       0.0100     -0.0000
##   1460      0.2729         0.3644       0.0100     -0.0001
##   1480      0.2706         0.3643       0.0100     -0.0000
##   1500      0.2685         0.3665       0.0100     -0.0000
##   1520      0.2662         0.3673       0.0100     -0.0000
##   1540      0.2641         0.3662       0.0100     -0.0000
##   1560      0.2620         0.3664       0.0100     -0.0001
##   1580      0.2598         0.3646       0.0100     -0.0000
##   1600      0.2579         0.3650       0.0100     -0.0000
##   1620      0.2561         0.3659       0.0100     -0.0000
##   1640      0.2539         0.3651       0.0100     -0.0000
##   1660      0.2518         0.3648       0.0100      0.0001
##   1680      0.2499         0.3633       0.0100      0.0000
##   1700      0.2482         0.3629       0.0100     -0.0000
##   1720      0.2464         0.3635       0.0100     -0.0000
##   1740      0.2446         0.3637       0.0100     -0.0000
##   1760      0.2427         0.3630       0.0100     -0.0000
##   1780      0.2407         0.3624       0.0100     -0.0000
##   1800      0.2388         0.3623       0.0100     -0.0000
```

```
## 1820     0.2370        0.3623        0.0100   -0.0001
## 1840     0.2352        0.3628        0.0100   -0.0000
## 1860     0.2335        0.3627        0.0100   -0.0000
## 1880     0.2319        0.3628        0.0100   -0.0000
## 1900     0.2304        0.3637        0.0100   -0.0001
## 1920     0.2283        0.3624        0.0100   -0.0000
## 1940     0.2265        0.3624        0.0100    0.0000
## 1960     0.2245        0.3629        0.0100   -0.0000
## 1980     0.2227        0.3624        0.0100   -0.0001
## 2000     0.2210        0.3617        0.0100   -0.0001
## 2020     0.2192        0.3611        0.0100   -0.0000
## 2040     0.2177        0.3613        0.0100   -0.0000
## 2060     0.2159        0.3605        0.0100   -0.0000
## 2080     0.2143        0.3609        0.0100   -0.0000
## 2100     0.2124        0.3609        0.0100   -0.0000
## 2120     0.2106        0.3607        0.0100   -0.0000
## 2140     0.2093        0.3610        0.0100   -0.0000
## 2160     0.2076        0.3602        0.0100   -0.0000
## 2180     0.2060        0.3604        0.0100   -0.0000
## 2200     0.2044        0.3609        0.0100   -0.0000
## 2220     0.2029        0.3618        0.0100   -0.0000
## 2240     0.2014        0.3613        0.0100   -0.0000
## 2260     0.1998        0.3614        0.0100   -0.0000
## 2280     0.1981        0.3618        0.0100   -0.0000
## 2300     0.1967        0.3615        0.0100   -0.0000
## 2320     0.1954        0.3607        0.0100   -0.0000
## 2340     0.1939        0.3603        0.0100   -0.0000
## 2360     0.1925        0.3603        0.0100   -0.0001
## 2380     0.1912        0.3599        0.0100   -0.0000
## 2400     0.1896        0.3601        0.0100   -0.0000
## 2420     0.1883        0.3594        0.0100   -0.0000
## 2440     0.1869        0.3590        0.0100   -0.0000
## 2460     0.1855        0.3586        0.0100    0.0000
## 2480     0.1841        0.3594        0.0100   -0.0000
## 2500     0.1828        0.3591        0.0100   -0.0001
## 2520     0.1817        0.3593        0.0100   -0.0000
## 2540     0.1805        0.3598        0.0100   -0.0000
## 2560     0.1793        0.3592        0.0100   -0.0000
## 2580     0.1781        0.3598        0.0100   -0.0000
## 2600     0.1768        0.3596        0.0100   -0.0000
## 2620     0.1754        0.3595        0.0100   -0.0000
## 2640     0.1741        0.3600        0.0100   -0.0000
## 2660     0.1730        0.3604        0.0100   -0.0000
## 2680     0.1718        0.3602        0.0100   -0.0000
## 2700     0.1706        0.3602        0.0100   -0.0000
## 2720     0.1695        0.3598        0.0100   -0.0000
## 2740     0.1683        0.3595        0.0100   -0.0000
## 2760     0.1671        0.3583        0.0100   -0.0000
## 2780     0.1659        0.3588        0.0100   -0.0000
## 2800     0.1649        0.3585        0.0100   -0.0000
## 2820     0.1637        0.3597        0.0100   -0.0000
## 2840     0.1626        0.3595        0.0100   -0.0000
## 2860     0.1615        0.3597        0.0100   -0.0000
## 2880     0.1605        0.3604        0.0100   -0.0000
```

```
##    2900         0.1594              0.3598        0.0100      -0.0000
##    2920         0.1584              0.3594        0.0100      -0.0000
##    2940         0.1573              0.3592        0.0100      -0.0000
##    2960         0.1563              0.3603        0.0100      -0.0000
##    2980         0.1551              0.3609        0.0100      -0.0000
##    3000         0.1541              0.3615        0.0100      -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##      1        1.2787          1.2344      0.0200     0.0083
##      2        1.2587          1.2146      0.0200     0.0097
##      3        1.2402          1.1956      0.0200     0.0083
##      4        1.2225          1.1779      0.0200     0.0082
##      5        1.2057          1.1606      0.0200     0.0084
##      6        1.1893          1.1432      0.0200     0.0082
##      7        1.1743          1.1279      0.0200     0.0078
##      8        1.1582          1.1119      0.0200     0.0079
##      9        1.1438          1.0973      0.0200     0.0068
##     10        1.1288          1.0822      0.0200     0.0073
##     20        1.0095          0.9603      0.0200     0.0050
##     40        0.8460          0.7965      0.0200     0.0032
##     60        0.7328          0.6844      0.0200     0.0023
##     80        0.6539          0.6086      0.0200     0.0017
##    100        0.5966          0.5516      0.0200     0.0012
##    120        0.5555          0.5127      0.0200     0.0008
##    140        0.5217          0.4781      0.0200     0.0006
##    160        0.4975          0.4558      0.0200     0.0004
##    180        0.4779          0.4380      0.0200     0.0003
##    200        0.4623          0.4244      0.0200     0.0001
##    220        0.4477          0.4160      0.0200     0.0002
##    240        0.4353          0.4079      0.0200     0.0001
##    260        0.4236          0.4020      0.0200     0.0001
##    280        0.4136          0.3956      0.0200    -0.0001
##    300        0.4048          0.3908      0.0200    -0.0001
##    320        0.3960          0.3885      0.0200    -0.0000
##    340        0.3883          0.3883      0.0200    -0.0001
##    360        0.3803          0.3847      0.0200    -0.0001
##    380        0.3720          0.3819      0.0200    -0.0001
##    400        0.3650          0.3780      0.0200    -0.0000
##    420        0.3583          0.3761      0.0200    -0.0002
##    440        0.3524          0.3751      0.0200    -0.0001
##    460        0.3463          0.3768      0.0200    -0.0000
##    480        0.3398          0.3764      0.0200    -0.0001
##    500        0.3341          0.3756      0.0200    -0.0002
##    520        0.3287          0.3762      0.0200    -0.0000
##    540        0.3237          0.3739      0.0200    -0.0000
##    560        0.3178          0.3730      0.0200    -0.0001
##    580        0.3120          0.3721      0.0200    -0.0000
##    600        0.3065          0.3694      0.0200    -0.0002
##    620        0.3019          0.3678      0.0200    -0.0001
##    640        0.2967          0.3658      0.0200    -0.0002
```

```
##     660     0.2920          0.3627          0.0200    -0.0000
##     680     0.2875          0.3608          0.0200    -0.0001
##     700     0.2824          0.3607          0.0200    -0.0001
##     720     0.2779          0.3603          0.0200     0.0000
##     740     0.2729          0.3618          0.0200    -0.0001
##     760     0.2681          0.3625          0.0200    -0.0000
##     780     0.2639          0.3599          0.0200    -0.0000
##     800     0.2595          0.3618          0.0200    -0.0000
##     820     0.2559          0.3616          0.0200    -0.0001
##     840     0.2519          0.3623          0.0200    -0.0001
##     860     0.2481          0.3630          0.0200    -0.0002
##     880     0.2440          0.3636          0.0200    -0.0000
##     900     0.2401          0.3627          0.0200    -0.0001
##     920     0.2366          0.3635          0.0200    -0.0001
##     940     0.2332          0.3633          0.0200    -0.0001
##     960     0.2291          0.3639          0.0200    -0.0001
##     980     0.2256          0.3649          0.0200    -0.0000
##    1000     0.2221          0.3636          0.0200    -0.0000
##    1020     0.2185          0.3640          0.0200    -0.0001
##    1040     0.2153          0.3628          0.0200     0.0000
##    1060     0.2123          0.3616          0.0200    -0.0001
##    1080     0.2091          0.3618          0.0200    -0.0001
##    1100     0.2066          0.3613          0.0200    -0.0001
##    1120     0.2036          0.3598          0.0200    -0.0000
##    1140     0.2008          0.3609          0.0200    -0.0001
##    1160     0.1979          0.3620          0.0200    -0.0001
##    1180     0.1953          0.3625          0.0200    -0.0001
##    1200     0.1926          0.3603          0.0200    -0.0000
##    1220     0.1903          0.3615          0.0200    -0.0001
##    1240     0.1878          0.3605          0.0200    -0.0000
##    1260     0.1846          0.3579          0.0200    -0.0000
##    1280     0.1818          0.3584          0.0200    -0.0001
##    1300     0.1793          0.3582          0.0200    -0.0001
##    1320     0.1768          0.3582          0.0200    -0.0001
##    1340     0.1745          0.3577          0.0200    -0.0000
##    1360     0.1722          0.3569          0.0200    -0.0001
##    1380     0.1700          0.3570          0.0200    -0.0000
##    1400     0.1675          0.3548          0.0200    -0.0001
##    1420     0.1650          0.3560          0.0200    -0.0000
##    1440     0.1625          0.3557          0.0200    -0.0001
##    1460     0.1604          0.3567          0.0200    -0.0000
##    1480     0.1581          0.3591          0.0200    -0.0001
##    1500     0.1560          0.3581          0.0200    -0.0001
##    1520     0.1542          0.3604          0.0200    -0.0001
##    1540     0.1520          0.3598          0.0200    -0.0000
##    1560     0.1499          0.3593          0.0200    -0.0000
##    1580     0.1481          0.3587          0.0200    -0.0001
##    1600     0.1463          0.3597          0.0200    -0.0000
##    1620     0.1447          0.3610          0.0200    -0.0000
##    1640     0.1428          0.3609          0.0200    -0.0001
##    1660     0.1409          0.3619          0.0200     0.0000
##    1680     0.1387          0.3608          0.0200    -0.0000
##    1700     0.1370          0.3609          0.0200    -0.0000
##    1720     0.1352          0.3597          0.0200    -0.0001
```

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```
## 1740    0.1336    0.3606    0.0200   -0.0001
## 1760    0.1316    0.3601    0.0200   -0.0000
## 1780    0.1298    0.3585    0.0200   -0.0000
## 1800    0.1281    0.3594    0.0200   -0.0001
## 1820    0.1265    0.3584    0.0200    0.0000
## 1840    0.1247    0.3582    0.0200   -0.0000
## 1860    0.1230    0.3578    0.0200   -0.0001
## 1880    0.1215    0.3584    0.0200   -0.0000
## 1900    0.1197    0.3571    0.0200    0.0000
## 1920    0.1182    0.3562    0.0200   -0.0001
## 1940    0.1165    0.3547    0.0200   -0.0000
## 1960    0.1151    0.3532    0.0200   -0.0000
## 1980    0.1136    0.3522    0.0200   -0.0000
## 2000    0.1121    0.3530    0.0200   -0.0001
## 2020    0.1110    0.3534    0.0200   -0.0001
## 2040    0.1097    0.3540    0.0200   -0.0000
## 2060    0.1086    0.3559    0.0200   -0.0000
## 2080    0.1073    0.3559    0.0200   -0.0000
## 2100    0.1061    0.3556    0.0200   -0.0001
## 2120    0.1047    0.3546    0.0200    0.0000
## 2140    0.1035    0.3552    0.0200   -0.0001
## 2160    0.1020    0.3537    0.0200   -0.0000
## 2180    0.1007    0.3548    0.0200   -0.0000
## 2200    0.0995    0.3562    0.0200   -0.0001
## 2220    0.0983    0.3566    0.0200   -0.0000
## 2240    0.0973    0.3567    0.0200   -0.0001
## 2260    0.0961    0.3563    0.0200   -0.0000
## 2280    0.0949    0.3555    0.0200   -0.0000
## 2300    0.0939    0.3548    0.0200   -0.0000
## 2320    0.0926    0.3555    0.0200   -0.0000
## 2340    0.0916    0.3559    0.0200   -0.0000
## 2360    0.0906    0.3555    0.0200   -0.0000
## 2380    0.0896    0.3557    0.0200   -0.0000
## 2400    0.0884    0.3557    0.0200   -0.0000
## 2420    0.0873    0.3558    0.0200   -0.0000
## 2440    0.0862    0.3564    0.0200   -0.0000
## 2460    0.0854    0.3556    0.0200   -0.0000
## 2480    0.0844    0.3562    0.0200   -0.0000
## 2500    0.0835    0.3564    0.0200   -0.0000
## 2520    0.0824    0.3537    0.0200   -0.0000
## 2540    0.0813    0.3527    0.0200   -0.0000
## 2560    0.0805    0.3531    0.0200   -0.0000
## 2580    0.0794    0.3536    0.0200   -0.0001
## 2600    0.0785    0.3529    0.0200   -0.0000
## 2620    0.0777    0.3534    0.0200   -0.0000
## 2640    0.0769    0.3525    0.0200   -0.0000
## 2660    0.0760    0.3530    0.0200   -0.0000
## 2680    0.0751    0.3530    0.0200   -0.0000
## 2700    0.0743    0.3531    0.0200   -0.0000
## 2720    0.0734    0.3519    0.0200   -0.0000
## 2740    0.0726    0.3511    0.0200   -0.0000
## 2760    0.0718    0.3517    0.0200   -0.0000
## 2780    0.0710    0.3509    0.0200   -0.0000
## 2800    0.0701    0.3515    0.0200   -0.0000
```

```
##    2820         0.0693          0.3510      0.0200    -0.0000
##    2840         0.0685          0.3514      0.0200    -0.0000
##    2860         0.0678          0.3519      0.0200    -0.0000
##    2880         0.0670          0.3528      0.0200    -0.0000
##    2900         0.0661          0.3527      0.0200    -0.0000
##    2920         0.0653          0.3527      0.0200    -0.0000
##    2940         0.0647          0.3531      0.0200    -0.0000
##    2960         0.0640          0.3531      0.0200    -0.0000
##    2980         0.0633          0.3540      0.0200    -0.0000
##    3000         0.0627          0.3539      0.0200    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##      1         1.2686          1.2250      0.0300     0.0148
##      2         1.2399          1.1955      0.0300     0.0129
##      3         1.2134          1.1704      0.0300     0.0126
##      4         1.1880          1.1443      0.0300     0.0130
##      5         1.1652          1.1210      0.0300     0.0110
##      6         1.1436          1.1002      0.0300     0.0105
##      7         1.1228          1.0793      0.0300     0.0095
##      8         1.1025          1.0579      0.0300     0.0100
##      9         1.0841          1.0403      0.0300     0.0091
##     10         1.0655          1.0227      0.0300     0.0089
##     20         0.9141          0.8694      0.0300     0.0071
##     40         0.7286          0.6856      0.0300     0.0029
##     60         0.6163          0.5741      0.0300     0.0020
##     80         0.5473          0.5040      0.0300     0.0008
##    100         0.5039          0.4618      0.0300     0.0009
##    120         0.4729          0.4345      0.0300     0.0002
##    140         0.4484          0.4136      0.0300     0.0002
##    160         0.4296          0.3996      0.0300     0.0001
##    180         0.4139          0.3908      0.0300    -0.0000
##    200         0.4001          0.3887      0.0300    -0.0001
##    220         0.3871          0.3803      0.0300    -0.0001
##    240         0.3745          0.3715      0.0300     0.0000
##    260         0.3631          0.3674      0.0300    -0.0002
##    280         0.3538          0.3672      0.0300    -0.0001
##    300         0.3438          0.3655      0.0300    -0.0001
##    320         0.3349          0.3654      0.0300    -0.0000
##    340         0.3257          0.3624      0.0300    -0.0001
##    360         0.3176          0.3618      0.0300    -0.0000
##    380         0.3106          0.3609      0.0300    -0.0002
##    400         0.3024          0.3582      0.0300    -0.0001
##    420         0.2951          0.3580      0.0300    -0.0000
##    440         0.2876          0.3541      0.0300    -0.0000
##    460         0.2805          0.3547      0.0300    -0.0001
##    480         0.2743          0.3541      0.0300    -0.0002
##    500         0.2674          0.3583      0.0300    -0.0001
##    520         0.2609          0.3601      0.0300    -0.0002
##    540         0.2543          0.3585      0.0300    -0.0001
##    560         0.2492          0.3580      0.0300    -0.0001
```

```
##     580      0.2432          0.3575        0.0300     -0.0002
##     600      0.2366          0.3587        0.0300     -0.0002
##     620      0.2315          0.3596        0.0300     -0.0002
##     640      0.2257          0.3601        0.0300     -0.0001
##     660      0.2203          0.3575        0.0300     -0.0001
##     680      0.2157          0.3587        0.0300     -0.0001
##     700      0.2112          0.3595        0.0300     -0.0001
##     720      0.2065          0.3606        0.0300     -0.0000
##     740      0.2024          0.3616        0.0300     -0.0001
##     760      0.1979          0.3592        0.0300      0.0000
##     780      0.1933          0.3586        0.0300     -0.0001
##     800      0.1886          0.3585        0.0300     -0.0002
##     820      0.1846          0.3588        0.0300     -0.0001
##     840      0.1809          0.3604        0.0300     -0.0000
##     860      0.1775          0.3633        0.0300     -0.0001
##     880      0.1736          0.3645        0.0300     -0.0002
##     900      0.1700          0.3641        0.0300     -0.0001
##     920      0.1664          0.3606        0.0300     -0.0001
##     940      0.1628          0.3609        0.0300     -0.0001
##     960      0.1595          0.3605        0.0300     -0.0001
##     980      0.1562          0.3591        0.0300     -0.0001
##    1000      0.1531          0.3586        0.0300     -0.0001
##    1020      0.1503          0.3584        0.0300     -0.0001
##    1040      0.1471          0.3610        0.0300     -0.0001
##    1060      0.1440          0.3616        0.0300     -0.0000
##    1080      0.1409          0.3613        0.0300     -0.0001
##    1100      0.1376          0.3623        0.0300     -0.0000
##    1120      0.1346          0.3626        0.0300     -0.0000
##    1140      0.1321          0.3629        0.0300     -0.0001
##    1160      0.1296          0.3633        0.0300     -0.0000
##    1180      0.1272          0.3622        0.0300     -0.0000
##    1200      0.1249          0.3633        0.0300     -0.0001
##    1220      0.1225          0.3665        0.0300     -0.0000
##    1240      0.1202          0.3658        0.0300     -0.0001
##    1260      0.1178          0.3651        0.0300     -0.0000
##    1280      0.1155          0.3671        0.0300     -0.0001
##    1300      0.1135          0.3687        0.0300     -0.0001
##    1320      0.1112          0.3677        0.0300     -0.0000
##    1340      0.1091          0.3676        0.0300     -0.0001
##    1360      0.1071          0.3678        0.0300     -0.0001
##    1380      0.1055          0.3689        0.0300     -0.0001
##    1400      0.1039          0.3677        0.0300     -0.0001
##    1420      0.1019          0.3656        0.0300     -0.0000
##    1440      0.1003          0.3666        0.0300     -0.0000
##    1460      0.0986          0.3664        0.0300     -0.0001
##    1480      0.0969          0.3643        0.0300     -0.0000
##    1500      0.0952          0.3631        0.0300     -0.0001
##    1520      0.0934          0.3625        0.0300     -0.0000
##    1540      0.0920          0.3625        0.0300     -0.0001
##    1560      0.0903          0.3606        0.0300     -0.0000
##    1580      0.0886          0.3594        0.0300     -0.0000
##    1600      0.0870          0.3590        0.0300     -0.0000
##    1620      0.0854          0.3582        0.0300     -0.0001
##    1640      0.0841          0.3592        0.0300     -0.0000
```

```
## 1660    0.0824    0.3584    0.0300    -0.0001
## 1680    0.0810    0.3598    0.0300    -0.0000
## 1700    0.0797    0.3594    0.0300    -0.0000
## 1720    0.0783    0.3608    0.0300    -0.0001
## 1740    0.0770    0.3608    0.0300    -0.0000
## 1760    0.0756    0.3594    0.0300     0.0000
## 1780    0.0743    0.3616    0.0300    -0.0001
## 1800    0.0729    0.3605    0.0300    -0.0000
## 1820    0.0717    0.3587    0.0300    -0.0001
## 1840    0.0704    0.3571    0.0300    -0.0000
## 1860    0.0691    0.3571    0.0300    -0.0000
## 1880    0.0679    0.3574    0.0300    -0.0000
## 1900    0.0669    0.3587    0.0300    -0.0000
## 1920    0.0659    0.3594    0.0300    -0.0000
## 1940    0.0649    0.3585    0.0300    -0.0001
## 1960    0.0637    0.3599    0.0300    -0.0000
## 1980    0.0625    0.3602    0.0300     0.0000
## 2000    0.0616    0.3603    0.0300    -0.0000
## 2020    0.0607    0.3591    0.0300    -0.0000
## 2040    0.0598    0.3595    0.0300    -0.0000
## 2060    0.0588    0.3587    0.0300    -0.0000
## 2080    0.0578    0.3600    0.0300    -0.0000
## 2100    0.0569    0.3629    0.0300    -0.0001
## 2120    0.0560    0.3635    0.0300    -0.0000
## 2140    0.0550    0.3614    0.0300    -0.0000
## 2160    0.0541    0.3617    0.0300    -0.0000
## 2180    0.0533    0.3632    0.0300    -0.0000
## 2200    0.0525    0.3612    0.0300    -0.0000
## 2220    0.0516    0.3618    0.0300    -0.0000
## 2240    0.0508    0.3612    0.0300    -0.0000
## 2260    0.0499    0.3614    0.0300    -0.0000
## 2280    0.0491    0.3631    0.0300    -0.0000
## 2300    0.0483    0.3617    0.0300    -0.0000
## 2320    0.0475    0.3634    0.0300    -0.0000
## 2340    0.0467    0.3632    0.0300    -0.0000
## 2360    0.0460    0.3621    0.0300    -0.0000
## 2380    0.0452    0.3609    0.0300    -0.0000
## 2400    0.0444    0.3592    0.0300    -0.0000
## 2420    0.0438    0.3593    0.0300    -0.0000
## 2440    0.0430    0.3620    0.0300     0.0000
## 2460    0.0423    0.3621    0.0300    -0.0000
## 2480    0.0416    0.3626    0.0300    -0.0000
## 2500    0.0410    0.3629    0.0300    -0.0000
## 2520    0.0402    0.3628    0.0300    -0.0000
## 2540    0.0395    0.3649    0.0300    -0.0000
## 2560    0.0388    0.3659    0.0300    -0.0000
## 2580    0.0381    0.3646    0.0300    -0.0000
## 2600    0.0375    0.3642    0.0300    -0.0000
## 2620    0.0369    0.3660    0.0300     0.0000
## 2640    0.0363    0.3667    0.0300    -0.0000
## 2660    0.0357    0.3651    0.0300    -0.0000
## 2680    0.0350    0.3653    0.0300    -0.0000
## 2700    0.0345    0.3646    0.0300    -0.0000
## 2720    0.0339    0.3644    0.0300    -0.0000
```

```
##    2740        0.0333            0.3628        0.0300    -0.0000
##    2760        0.0329            0.3642        0.0300    -0.0000
##    2780        0.0324            0.3639        0.0300    -0.0000
##    2800        0.0319            0.3644        0.0300    -0.0000
##    2820        0.0315            0.3648        0.0300    -0.0000
##    2840        0.0309            0.3643        0.0300    -0.0000
##    2860        0.0304            0.3643        0.0300    -0.0000
##    2880        0.0299            0.3643        0.0300    -0.0000
##    2900        0.0293            0.3633        0.0300    -0.0000
##    2920        0.0288            0.3607        0.0300    -0.0000
##    2940        0.0284            0.3608        0.0300    -0.0000
##    2960        0.0279            0.3616        0.0300    -0.0000
##    2980        0.0275            0.3629        0.0300    -0.0000
##    3000        0.0270            0.3637        0.0300    -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter    TrainDeviance    ValidDeviance    StepSize    Improve
##      1        1.2837            1.2828        0.0100     0.0050
##      2        1.2736            1.2724        0.0100     0.0049
##      3        1.2648            1.2629        0.0100     0.0045
##      4        1.2551            1.2527        0.0100     0.0048
##      5        1.2459            1.2434        0.0100     0.0045
##      6        1.2369            1.2345        0.0100     0.0043
##      7        1.2282            1.2258        0.0100     0.0042
##      8        1.2197            1.2174        0.0100     0.0044
##      9        1.2122            1.2095        0.0100     0.0037
##     10        1.2040            1.2014        0.0100     0.0041
##     20        1.1307            1.1257        0.0100     0.0030
##     40        1.0154            1.0051        0.0100     0.0023
##     60        0.9248            0.9040        0.0100     0.0021
##     80        0.8521            0.8240        0.0100     0.0017
##    100        0.7933            0.7579        0.0100     0.0012
##    120        0.7424            0.7027        0.0100     0.0011
##    140        0.6991            0.6545        0.0100     0.0009
##    160        0.6616            0.6117        0.0100     0.0009
##    180        0.6306            0.5775        0.0100     0.0007
##    200        0.6031            0.5466        0.0100     0.0007
##    220        0.5798            0.5202        0.0100     0.0004
##    240        0.5600            0.4972        0.0100     0.0004
##    260        0.5436            0.4796        0.0100     0.0003
##    280        0.5287            0.4641        0.0100     0.0002
##    300        0.5150            0.4484        0.0100     0.0003
##    320        0.5039            0.4366        0.0100     0.0002
##    340        0.4934            0.4250        0.0100     0.0001
##    360        0.4848            0.4179        0.0100     0.0001
##    380        0.4766            0.4103        0.0100     0.0001
##    400        0.4686            0.4027        0.0100     0.0001
##    420        0.4611            0.3960        0.0100     0.0001
##    440        0.4549            0.3913        0.0100     0.0001
##    460        0.4488            0.3853        0.0100     0.0000
##    480        0.4427            0.3813        0.0100     0.0001
```

```
##     500     0.4370     0.3760     0.0100     -0.0001
##     520     0.4315     0.3733     0.0100      0.0000
##     540     0.4261     0.3713     0.0100      0.0000
##     560     0.4212     0.3685     0.0100     -0.0000
##     580     0.4163     0.3661     0.0100     -0.0000
##     600     0.4116     0.3635     0.0100      0.0000
##     620     0.4069     0.3606     0.0100      0.0000
##     640     0.4024     0.3586     0.0100     -0.0001
##     660     0.3979     0.3565     0.0100     -0.0001
##     680     0.3941     0.3563     0.0100     -0.0001
##     700     0.3904     0.3542     0.0100     -0.0000
##     720     0.3864     0.3532     0.0100      0.0001
##     740     0.3824     0.3534     0.0100     -0.0001
##     760     0.3788     0.3522     0.0100     -0.0001
##     780     0.3751     0.3507     0.0100     -0.0000
##     800     0.3715     0.3484     0.0100      0.0000
##     820     0.3678     0.3479     0.0100     -0.0000
##     840     0.3644     0.3471     0.0100     -0.0001
##     860     0.3606     0.3461     0.0100     -0.0001
##     880     0.3573     0.3461     0.0100     -0.0000
##     900     0.3540     0.3460     0.0100     -0.0001
##     920     0.3507     0.3451     0.0100     -0.0001
##     940     0.3475     0.3449     0.0100     -0.0000
##     960     0.3445     0.3445     0.0100     -0.0000
##     980     0.3412     0.3429     0.0100     -0.0000
##    1000     0.3380     0.3424     0.0100     -0.0000
##    1020     0.3350     0.3430     0.0100      0.0000
##    1040     0.3319     0.3436     0.0100     -0.0001
##    1060     0.3289     0.3429     0.0100     -0.0001
##    1080     0.3257     0.3415     0.0100      0.0000
##    1100     0.3227     0.3421     0.0100     -0.0000
##    1120     0.3200     0.3406     0.0100     -0.0001
##    1140     0.3175     0.3400     0.0100     -0.0001
##    1160     0.3149     0.3399     0.0100     -0.0001
##    1180     0.3123     0.3399     0.0100     -0.0001
##    1200     0.3098     0.3397     0.0100     -0.0001
##    1220     0.3073     0.3400     0.0100     -0.0001
##    1240     0.3045     0.3400     0.0100     -0.0000
##    1260     0.3018     0.3393     0.0100     -0.0000
##    1280     0.2996     0.3385     0.0100     -0.0001
##    1300     0.2972     0.3380     0.0100     -0.0001
##    1320     0.2946     0.3378     0.0100     -0.0000
##    1340     0.2923     0.3384     0.0100     -0.0001
##    1360     0.2898     0.3392     0.0100     -0.0000
##    1380     0.2874     0.3400     0.0100      0.0000
##    1400     0.2846     0.3394     0.0100     -0.0000
##    1420     0.2828     0.3388     0.0100     -0.0001
##    1440     0.2808     0.3389     0.0100     -0.0001
##    1460     0.2785     0.3386     0.0100     -0.0000
##    1480     0.2762     0.3374     0.0100     -0.0000
##    1500     0.2739     0.3371     0.0100     -0.0000
##    1520     0.2716     0.3364     0.0100     -0.0001
##    1540     0.2695     0.3354     0.0100     -0.0000
##    1560     0.2671     0.3349     0.0100     -0.0000
```

```
##    1580        0.2648          0.3353        0.0100    -0.0000
##    1600        0.2628          0.3352        0.0100     0.0000
##    1620        0.2609          0.3358        0.0100    -0.0001
##    1640        0.2589          0.3360        0.0100    -0.0000
##    1660        0.2570          0.3360        0.0100    -0.0000
##    1680        0.2550          0.3354        0.0100    -0.0000
##    1700        0.2531          0.3347        0.0100    -0.0001
##    1720        0.2513          0.3341        0.0100    -0.0000
##    1740        0.2494          0.3345        0.0100    -0.0000
##    1760        0.2477          0.3342        0.0100    -0.0000
##    1780        0.2461          0.3336        0.0100    -0.0000
##    1800        0.2439          0.3340        0.0100    -0.0000
##    1820        0.2422          0.3338        0.0100    -0.0001
##    1840        0.2402          0.3331        0.0100    -0.0000
##    1860        0.2384          0.3330        0.0100    -0.0000
##    1880        0.2363          0.3340        0.0100    -0.0000
##    1900        0.2348          0.3337        0.0100    -0.0000
##    1920        0.2330          0.3339        0.0100    -0.0000
##    1940        0.2312          0.3342        0.0100     0.0000
##    1960        0.2296          0.3335        0.0100    -0.0000
##    1980        0.2278          0.3328        0.0100    -0.0000
##    2000        0.2263          0.3330        0.0100     0.0000
##    2020        0.2244          0.3336        0.0100    -0.0000
##    2040        0.2226          0.3335        0.0100    -0.0000
##    2060        0.2208          0.3327        0.0100    -0.0000
##    2080        0.2190          0.3337        0.0100    -0.0000
##    2100        0.2175          0.3342        0.0100    -0.0000
##    2120        0.2159          0.3346        0.0100     0.0000
##    2140        0.2146          0.3342        0.0100    -0.0000
##    2160        0.2131          0.3346        0.0100     0.0000
##    2180        0.2116          0.3344        0.0100    -0.0000
##    2200        0.2102          0.3344        0.0100    -0.0000
##    2220        0.2087          0.3349        0.0100    -0.0000
##    2240        0.2074          0.3348        0.0100    -0.0000
##    2260        0.2058          0.3346        0.0100    -0.0000
##    2280        0.2043          0.3334        0.0100    -0.0000
##    2300        0.2027          0.3341        0.0100    -0.0000
##    2320        0.2013          0.3338        0.0100    -0.0000
##    2340        0.1997          0.3338        0.0100    -0.0000
##    2360        0.1983          0.3338        0.0100    -0.0000
##    2380        0.1969          0.3338        0.0100    -0.0001
##    2400        0.1955          0.3337        0.0100    -0.0000
##    2420        0.1941          0.3338        0.0100    -0.0000
##    2440        0.1926          0.3336        0.0100    -0.0000
##    2460        0.1914          0.3339        0.0100    -0.0000
##    2480        0.1900          0.3337        0.0100    -0.0000
##    2500        0.1887          0.3336        0.0100    -0.0000
##    2520        0.1874          0.3332        0.0100    -0.0000
##    2540        0.1861          0.3342        0.0100    -0.0000
##    2560        0.1849          0.3333        0.0100    -0.0000
##    2580        0.1836          0.3320        0.0100    -0.0000
##    2600        0.1824          0.3336        0.0100    -0.0000
##    2620        0.1811          0.3334        0.0100    -0.0000
##    2640        0.1797          0.3336        0.0100    -0.0000
```

```
## 2660        0.1784            0.3328       0.0100    -0.0000
## 2680        0.1770            0.3322       0.0100    -0.0000
## 2700        0.1759            0.3326       0.0100    -0.0000
## 2720        0.1747            0.3336       0.0100    -0.0000
## 2740        0.1735            0.3342       0.0100    -0.0000
## 2760        0.1723            0.3333       0.0100    -0.0000
## 2780        0.1712            0.3338       0.0100    -0.0000
## 2800        0.1701            0.3340       0.0100    -0.0000
## 2820        0.1688            0.3329       0.0100    -0.0000
## 2840        0.1676            0.3326       0.0100     0.0000
## 2860        0.1665            0.3331       0.0100    -0.0000
## 2880        0.1654            0.3338       0.0100    -0.0000
## 2900        0.1641            0.3344       0.0100    -0.0000
## 2920        0.1632            0.3351       0.0100    -0.0000
## 2940        0.1622            0.3350       0.0100    -0.0000
## 2960        0.1610            0.3344       0.0100    -0.0000
## 2980        0.1598            0.3345       0.0100    -0.0000
## 3000        0.1587            0.3352       0.0100    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1        1.2732          1.2721       0.0200    0.0100
##      2        1.2547          1.2528       0.0200    0.0088
##      3        1.2363          1.2338       0.0200    0.0090
##      4        1.2183          1.2156       0.0200    0.0084
##      5        1.2033          1.2006       0.0200    0.0072
##      6        1.1871          1.1846       0.0200    0.0076
##      7        1.1726          1.1694       0.0200    0.0070
##      8        1.1575          1.1534       0.0200    0.0071
##      9        1.1432          1.1382       0.0200    0.0066
##     10        1.1285          1.1215       0.0200    0.0073
##     20        1.0117          0.9988       0.0200    0.0050
##     40        0.8465          0.8155       0.0200    0.0033
##     60        0.7351          0.6896       0.0200    0.0021
##     80        0.6587          0.6012       0.0200    0.0014
##    100        0.6015          0.5389       0.0200    0.0009
##    120        0.5584          0.4871       0.0200    0.0007
##    140        0.5263          0.4529       0.0200    0.0002
##    160        0.5020          0.4285       0.0200    0.0003
##    180        0.4841          0.4099       0.0200    0.0005
##    200        0.4675          0.3965       0.0200    0.0001
##    220        0.4541          0.3867       0.0200   -0.0000
##    240        0.4416          0.3787       0.0200   -0.0000
##    260        0.4300          0.3715       0.0200   -0.0001
##    280        0.4204          0.3701       0.0200    0.0000
##    300        0.4107          0.3665       0.0200    0.0000
##    320        0.4018          0.3595       0.0200    0.0000
##    340        0.3929          0.3560       0.0200    0.0001
##    360        0.3856          0.3539       0.0200   -0.0000
##    380        0.3785          0.3515       0.0200   -0.0002
##    400        0.3721          0.3472       0.0200   -0.0000
```

```
## 420    0.3650    0.3481    0.0200    -0.0000
## 440    0.3584    0.3479    0.0200    -0.0000
## 460    0.3519    0.3430    0.0200    -0.0000
## 480    0.3450    0.3440    0.0200    -0.0002
## 500    0.3388    0.3450    0.0200    -0.0002
## 520    0.3332    0.3448    0.0200     0.0000
## 540    0.3274    0.3440    0.0200    -0.0001
## 560    0.3214    0.3423    0.0200    -0.0001
## 580    0.3154    0.3427    0.0200    -0.0000
## 600    0.3097    0.3427    0.0200    -0.0001
## 620    0.3047    0.3436    0.0200    -0.0002
## 640    0.2999    0.3429    0.0200    -0.0001
## 660    0.2950    0.3413    0.0200    -0.0001
## 680    0.2905    0.3396    0.0200    -0.0002
## 700    0.2859    0.3398    0.0200    -0.0001
## 720    0.2816    0.3380    0.0200    -0.0001
## 740    0.2771    0.3364    0.0200    -0.0001
## 760    0.2730    0.3368    0.0200    -0.0001
## 780    0.2688    0.3365    0.0200    -0.0001
## 800    0.2647    0.3369    0.0200    -0.0001
## 820    0.2610    0.3354    0.0200    -0.0001
## 840    0.2569    0.3362    0.0200    -0.0001
## 860    0.2527    0.3350    0.0200    -0.0000
## 880    0.2489    0.3352    0.0200    -0.0001
## 900    0.2454    0.3349    0.0200    -0.0001
## 920    0.2420    0.3361    0.0200    -0.0000
## 940    0.2384    0.3363    0.0200    -0.0001
## 960    0.2345    0.3366    0.0200    -0.0000
## 980    0.2308    0.3352    0.0200    -0.0002
## 1000   0.2276    0.3355    0.0200    -0.0001
## 1020   0.2243    0.3356    0.0200    -0.0001
## 1040   0.2209    0.3358    0.0200    -0.0001
## 1060   0.2178    0.3371    0.0200    -0.0002
## 1080   0.2146    0.3378    0.0200    -0.0000
## 1100   0.2118    0.3378    0.0200    -0.0001
## 1120   0.2087    0.3373    0.0200    -0.0000
## 1140   0.2056    0.3354    0.0200    -0.0001
## 1160   0.2028    0.3357    0.0200    -0.0001
## 1180   0.2000    0.3349    0.0200    -0.0000
## 1200   0.1974    0.3333    0.0200    -0.0001
## 1220   0.1944    0.3320    0.0200    -0.0000
## 1240   0.1916    0.3323    0.0200     0.0000
## 1260   0.1889    0.3318    0.0200    -0.0001
## 1280   0.1861    0.3317    0.0200    -0.0000
## 1300   0.1832    0.3297    0.0200    -0.0001
## 1320   0.1805    0.3283    0.0200    -0.0001
## 1340   0.1780    0.3286    0.0200    -0.0000
## 1360   0.1756    0.3294    0.0200    -0.0000
## 1380   0.1735    0.3296    0.0200    -0.0001
## 1400   0.1711    0.3298    0.0200    -0.0001
## 1420   0.1689    0.3304    0.0200    -0.0001
## 1440   0.1664    0.3303    0.0200    -0.0000
## 1460   0.1642    0.3315    0.0200    -0.0001
## 1480   0.1620    0.3308    0.0200    -0.0001
```

```
##    1500    0.1596         0.3295      0.0200    -0.0000
##    1520    0.1575         0.3297      0.0200    -0.0000
##    1540    0.1555         0.3302      0.0200    -0.0001
##    1560    0.1533         0.3283      0.0200     0.0000
##    1580    0.1515         0.3290      0.0200    -0.0000
##    1600    0.1493         0.3287      0.0200    -0.0001
##    1620    0.1471         0.3281      0.0200    -0.0000
##    1640    0.1452         0.3285      0.0200    -0.0000
##    1660    0.1433         0.3292      0.0200    -0.0001
##    1680    0.1414         0.3281      0.0200    -0.0000
##    1700    0.1395         0.3267      0.0200    -0.0000
##    1720    0.1375         0.3269      0.0200    -0.0000
##    1740    0.1358         0.3268      0.0200    -0.0001
##    1760    0.1339         0.3258      0.0200     0.0000
##    1780    0.1327         0.3249      0.0200    -0.0001
##    1800    0.1310         0.3252      0.0200    -0.0000
##    1820    0.1295         0.3248      0.0200    -0.0000
##    1840    0.1279         0.3241      0.0200    -0.0001
##    1860    0.1264         0.3234      0.0200    -0.0000
##    1880    0.1246         0.3229      0.0200    -0.0000
##    1900    0.1231         0.3241      0.0200    -0.0000
##    1920    0.1216         0.3232      0.0200    -0.0001
##    1940    0.1203         0.3242      0.0200    -0.0000
##    1960    0.1189         0.3242      0.0200    -0.0000
##    1980    0.1174         0.3223      0.0200    -0.0000
##    2000    0.1159         0.3227      0.0200    -0.0000
##    2020    0.1145         0.3233      0.0200    -0.0000
##    2040    0.1132         0.3226      0.0200    -0.0001
##    2060    0.1119         0.3226      0.0200    -0.0000
##    2080    0.1104         0.3225      0.0200    -0.0000
##    2100    0.1093         0.3222      0.0200    -0.0000
##    2120    0.1080         0.3229      0.0200    -0.0000
##    2140    0.1066         0.3234      0.0200    -0.0000
##    2160    0.1055         0.3245      0.0200    -0.0001
##    2180    0.1041         0.3247      0.0200    -0.0001
##    2200    0.1027         0.3231      0.0200    -0.0000
##    2220    0.1014         0.3227      0.0200    -0.0000
##    2240    0.1003         0.3229      0.0200    -0.0000
##    2260    0.0992         0.3228      0.0200    -0.0000
##    2280    0.0982         0.3218      0.0200    -0.0000
##    2300    0.0970         0.3216      0.0200    -0.0000
##    2320    0.0958         0.3202      0.0200    -0.0000
##    2340    0.0947         0.3209      0.0200    -0.0000
##    2360    0.0936         0.3208      0.0200    -0.0000
##    2380    0.0924         0.3211      0.0200    -0.0000
##    2400    0.0913         0.3209      0.0200    -0.0000
##    2420    0.0903         0.3212      0.0200    -0.0000
##    2440    0.0892         0.3198      0.0200    -0.0001
##    2460    0.0882         0.3207      0.0200    -0.0000
##    2480    0.0872         0.3216      0.0200    -0.0000
##    2500    0.0862         0.3219      0.0200    -0.0000
##    2520    0.0852         0.3220      0.0200    -0.0000
##    2540    0.0843         0.3223      0.0200    -0.0000
##    2560    0.0834         0.3221      0.0200    -0.0000
```

```
##     2580         0.0823            0.3207       0.0200     0.0000
##     2600         0.0813            0.3195       0.0200    -0.0000
##     2620         0.0803            0.3197       0.0200    -0.0000
##     2640         0.0794            0.3201       0.0200    -0.0000
##     2660         0.0786            0.3191       0.0200    -0.0000
##     2680         0.0778            0.3189       0.0200    -0.0000
##     2700         0.0769            0.3191       0.0200    -0.0000
##     2720         0.0759            0.3185       0.0200    -0.0000
##     2740         0.0749            0.3180       0.0200    -0.0000
##     2760         0.0740            0.3188       0.0200    -0.0000
##     2780         0.0732            0.3178       0.0200    -0.0000
##     2800         0.0723            0.3177       0.0200    -0.0000
##     2820         0.0715            0.3190       0.0200    -0.0000
##     2840         0.0707            0.3184       0.0200    -0.0000
##     2860         0.0698            0.3188       0.0200    -0.0000
##     2880         0.0689            0.3170       0.0200    -0.0000
##     2900         0.0682            0.3182       0.0200    -0.0001
##     2920         0.0674            0.3180       0.0200    -0.0000
##     2940         0.0667            0.3177       0.0200    -0.0000
##     2960         0.0660            0.3186       0.0200    -0.0000
##     2980         0.0653            0.3179       0.0200    -0.0000
##     3000         0.0646            0.3181       0.0200    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##      1         1.2655          1.2626       0.0300     0.0133
##      2         1.2373          1.2331       0.0300     0.0133
##      3         1.2102          1.2065       0.0300     0.0129
##      4         1.1854          1.1813       0.0300     0.0120
##      5         1.1626          1.1584       0.0300     0.0113
##      6         1.1406          1.1361       0.0300     0.0105
##      7         1.1206          1.1161       0.0300     0.0093
##      8         1.1019          1.0960       0.0300     0.0088
##      9         1.0835          1.0778       0.0300     0.0087
##     10         1.0658          1.0576       0.0300     0.0087
##     20         0.9236          0.8997       0.0300     0.0061
##     40         0.7380          0.6951       0.0300     0.0033
##     60         0.6289          0.5721       0.0300     0.0020
##     80         0.5588          0.4894       0.0300     0.0009
##    100         0.5131          0.4424       0.0300     0.0010
##    120         0.4822          0.4112       0.0300     0.0003
##    140         0.4598          0.3940       0.0300    -0.0000
##    160         0.4401          0.3776       0.0300    -0.0000
##    180         0.4240          0.3679       0.0300    -0.0001
##    200         0.4102          0.3653       0.0300    -0.0001
##    220         0.3967          0.3591       0.0300    -0.0000
##    240         0.3855          0.3582       0.0300    -0.0002
##    260         0.3747          0.3554       0.0300    -0.0002
##    280         0.3633          0.3519       0.0300    -0.0002
##    300         0.3536          0.3472       0.0300    -0.0005
##    320         0.3443          0.3472       0.0300    -0.0002
```

```
##    340    0.3350    0.3515    0.0300    -0.0001
##    360    0.3257    0.3494    0.0300    -0.0001
##    380    0.3174    0.3517    0.0300    -0.0001
##    400    0.3097    0.3486    0.0300    -0.0002
##    420    0.3013    0.3492    0.0300    -0.0001
##    440    0.2938    0.3471    0.0300    -0.0001
##    460    0.2871    0.3445    0.0300    -0.0002
##    480    0.2809    0.3452    0.0300    -0.0000
##    500    0.2738    0.3423    0.0300    -0.0000
##    520    0.2674    0.3408    0.0300    -0.0003
##    540    0.2615    0.3397    0.0300    -0.0001
##    560    0.2549    0.3381    0.0300    -0.0002
##    580    0.2493    0.3353    0.0300    -0.0000
##    600    0.2434    0.3360    0.0300    -0.0002
##    620    0.2377    0.3356    0.0300    -0.0001
##    640    0.2323    0.3354    0.0300    -0.0001
##    660    0.2271    0.3340    0.0300    -0.0000
##    680    0.2226    0.3347    0.0300    -0.0001
##    700    0.2171    0.3348    0.0300    -0.0002
##    720    0.2123    0.3367    0.0300    -0.0001
##    740    0.2079    0.3382    0.0300    -0.0000
##    760    0.2034    0.3358    0.0300    -0.0001
##    780    0.1994    0.3341    0.0300    -0.0002
##    800    0.1954    0.3350    0.0300    -0.0001
##    820    0.1912    0.3375    0.0300    -0.0001
##    840    0.1869    0.3372    0.0300    -0.0001
##    860    0.1828    0.3387    0.0300    -0.0001
##    880    0.1792    0.3374    0.0300    -0.0001
##    900    0.1755    0.3357    0.0300    -0.0001
##    920    0.1722    0.3361    0.0300    -0.0001
##    940    0.1685    0.3355    0.0300    -0.0000
##    960    0.1649    0.3349    0.0300    -0.0001
##    980    0.1613    0.3328    0.0300    -0.0000
##   1000    0.1582    0.3326    0.0300    -0.0001
##   1020    0.1551    0.3317    0.0300    -0.0001
##   1040    0.1518    0.3309    0.0300    -0.0000
##   1060    0.1482    0.3316    0.0300    -0.0001
##   1080    0.1455    0.3331    0.0300    -0.0001
##   1100    0.1427    0.3319    0.0300    -0.0000
##   1120    0.1397    0.3307    0.0300    -0.0000
##   1140    0.1370    0.3311    0.0300    -0.0001
##   1160    0.1345    0.3304    0.0300    -0.0001
##   1180    0.1316    0.3319    0.0300    -0.0000
##   1200    0.1290    0.3316    0.0300    -0.0000
##   1220    0.1268    0.3325    0.0300    -0.0000
##   1240    0.1243    0.3297    0.0300    -0.0000
##   1260    0.1222    0.3307    0.0300    -0.0001
##   1280    0.1196    0.3312    0.0300     0.0000
##   1300    0.1175    0.3303    0.0300    -0.0001
##   1320    0.1152    0.3290    0.0300    -0.0001
##   1340    0.1131    0.3280    0.0300    -0.0001
##   1360    0.1112    0.3277    0.0300    -0.0001
##   1380    0.1092    0.3281    0.0300    -0.0000
##   1400    0.1075    0.3283    0.0300    -0.0000
```

```
##    1420       0.1055         0.3286         0.0300      -0.0000
##    1440       0.1037         0.3296         0.0300      -0.0000
##    1460       0.1015         0.3292         0.0300      -0.0001
##    1480       0.0994         0.3275         0.0300      -0.0000
##    1500       0.0973         0.3279         0.0300      -0.0000
##    1520       0.0956         0.3273         0.0300      -0.0000
##    1540       0.0939         0.3288         0.0300      -0.0000
##    1560       0.0921         0.3300         0.0300      -0.0001
##    1580       0.0903         0.3293         0.0300      -0.0000
##    1600       0.0890         0.3312         0.0300      -0.0001
##    1620       0.0873         0.3323         0.0300      -0.0000
##    1640       0.0857         0.3320         0.0300      -0.0000
##    1660       0.0841         0.3330         0.0300      -0.0000
##    1680       0.0827         0.3328         0.0300      -0.0001
##    1700       0.0811         0.3327         0.0300      -0.0000
##    1720       0.0798         0.3329         0.0300      -0.0000
##    1740       0.0787         0.3328         0.0300      -0.0001
##    1760       0.0772         0.3337         0.0300      -0.0000
##    1780       0.0758         0.3354         0.0300      -0.0000
##    1800       0.0746         0.3353         0.0300      -0.0000
##    1820       0.0733         0.3342         0.0300      -0.0000
##    1840       0.0720         0.3321         0.0300      -0.0000
##    1860       0.0706         0.3327         0.0300      -0.0000
##    1880       0.0693         0.3322         0.0300      -0.0001
##    1900       0.0681         0.3343         0.0300      -0.0001
##    1920       0.0672         0.3338         0.0300      -0.0000
##    1940       0.0660         0.3325         0.0300      -0.0000
##    1960       0.0650         0.3318         0.0300      -0.0001
##    1980       0.0638         0.3316         0.0300      -0.0000
##    2000       0.0625         0.3323         0.0300      -0.0000
##    2020       0.0615         0.3310         0.0300      -0.0000
##    2040       0.0606         0.3316         0.0300      -0.0001
##    2060       0.0595         0.3304         0.0300      -0.0000
##    2080       0.0586         0.3300         0.0300      -0.0000
##    2100       0.0577         0.3291         0.0300      -0.0000
##    2120       0.0568         0.3289         0.0300      -0.0000
##    2140       0.0558         0.3284         0.0300      -0.0000
##    2160       0.0548         0.3265         0.0300      -0.0000
##    2180       0.0540         0.3271         0.0300      -0.0000
##    2200       0.0531         0.3274         0.0300      -0.0000
##    2220       0.0522         0.3288         0.0300       0.0000
##    2240       0.0513         0.3302         0.0300      -0.0000
##    2260       0.0504         0.3302         0.0300      -0.0000
##    2280       0.0496         0.3307         0.0300      -0.0000
##    2300       0.0489         0.3287         0.0300      -0.0000
##    2320       0.0482         0.3294         0.0300      -0.0000
##    2340       0.0474         0.3301         0.0300      -0.0000
##    2360       0.0467         0.3304         0.0300      -0.0000
##    2380       0.0459         0.3310         0.0300      -0.0000
##    2400       0.0451         0.3301         0.0300      -0.0000
##    2420       0.0444         0.3304         0.0300      -0.0000
##    2440       0.0437         0.3284         0.0300      -0.0000
##    2460       0.0429         0.3297         0.0300      -0.0000
##    2480       0.0422         0.3299         0.0300      -0.0000
```

```
##    2500        0.0415            0.3296         0.0300     -0.0000
##    2520        0.0407            0.3283         0.0300     -0.0000
##    2540        0.0401            0.3277         0.0300      0.0000
##    2560        0.0395            0.3260         0.0300      0.0000
##    2580        0.0388            0.3249         0.0300     -0.0000
##    2600        0.0382            0.3241         0.0300     -0.0000
##    2620        0.0377            0.3246         0.0300     -0.0000
##    2640        0.0371            0.3237         0.0300     -0.0000
##    2660        0.0366            0.3236         0.0300     -0.0000
##    2680        0.0360            0.3254         0.0300     -0.0000
##    2700        0.0354            0.3266         0.0300     -0.0000
##    2720        0.0347            0.3261         0.0300      0.0000
##    2740        0.0342            0.3279         0.0300     -0.0000
##    2760        0.0336            0.3277         0.0300     -0.0000
##    2780        0.0332            0.3283         0.0300     -0.0000
##    2800        0.0327            0.3287         0.0300     -0.0000
##    2820        0.0322            0.3290         0.0300     -0.0000
##    2840        0.0316            0.3296         0.0300     -0.0000
##    2860        0.0311            0.3298         0.0300     -0.0000
##    2880        0.0306            0.3295         0.0300     -0.0000
##    2900        0.0302            0.3280         0.0300     -0.0000
##    2920        0.0297            0.3268         0.0300     -0.0000
##    2940        0.0293            0.3284         0.0300     -0.0000
##    2960        0.0289            0.3293         0.0300     -0.0000
##    2980        0.0285            0.3289         0.0300     -0.0000
##    3000        0.0280            0.3300         0.0300     -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter    TrainDeviance    ValidDeviance    StepSize    Improve
##      1         1.2865          1.2620        0.0100     0.0048
##      2         1.2763          1.2515        0.0100     0.0050
##      3         1.2665          1.2416        0.0100     0.0049
##      4         1.2576          1.2330        0.0100     0.0042
##      5         1.2487          1.2244        0.0100     0.0045
##      6         1.2392          1.2147        0.0100     0.0046
##      7         1.2301          1.2059        0.0100     0.0045
##      8         1.2210          1.1966        0.0100     0.0042
##      9         1.2126          1.1881        0.0100     0.0040
##     10         1.2048          1.1799        0.0100     0.0035
##     20         1.1317          1.1063        0.0100     0.0035
##     40         1.0135          0.9873        0.0100     0.0025
##     60         0.9221          0.8930        0.0100     0.0019
##     80         0.8463          0.8176        0.0100     0.0017
##    100         0.7840          0.7566        0.0100     0.0011
##    120         0.7317          0.7031        0.0100     0.0011
##    140         0.6879          0.6606        0.0100     0.0008
##    160         0.6498          0.6227        0.0100     0.0008
##    180         0.6186          0.5913        0.0100     0.0007
##    200         0.5912          0.5634        0.0100     0.0005
##    220         0.5679          0.5401        0.0100     0.0005
##    240         0.5474          0.5183        0.0100     0.0003
```

```
##    260      0.5290        0.4984      0.0100     0.0002
##    280      0.5138        0.4831      0.0100     0.0003
##    300      0.5004        0.4697      0.0100     0.0002
##    320      0.4891        0.4591      0.0100     0.0001
##    340      0.4786        0.4498      0.0100     0.0001
##    360      0.4698        0.4421      0.0100     0.0001
##    380      0.4619        0.4358      0.0100     0.0000
##    400      0.4536        0.4320      0.0100     0.0001
##    420      0.4465        0.4260      0.0100     0.0001
##    440      0.4396        0.4216      0.0100     0.0001
##    460      0.4329        0.4181      0.0100     0.0000
##    480      0.4274        0.4143      0.0100     0.0000
##    500      0.4211        0.4118      0.0100     0.0001
##    520      0.4160        0.4106      0.0100     0.0000
##    540      0.4109        0.4072      0.0100     0.0001
##    560      0.4057        0.4055      0.0100    -0.0000
##    580      0.4007        0.4027      0.0100     0.0000
##    600      0.3962        0.4007      0.0100    -0.0000
##    620      0.3915        0.3983      0.0100    -0.0001
##    640      0.3875        0.3981      0.0100     0.0000
##    660      0.3835        0.3984      0.0100    -0.0001
##    680      0.3793        0.3981      0.0100     0.0000
##    700      0.3755        0.3987      0.0100    -0.0001
##    720      0.3717        0.3984      0.0100     0.0000
##    740      0.3682        0.3976      0.0100     0.0000
##    760      0.3644        0.3969      0.0100    -0.0000
##    780      0.3612        0.3951      0.0100    -0.0001
##    800      0.3579        0.3932      0.0100    -0.0001
##    820      0.3544        0.3939      0.0100    -0.0000
##    840      0.3512        0.3929      0.0100     0.0000
##    860      0.3479        0.3916      0.0100    -0.0000
##    880      0.3449        0.3919      0.0100    -0.0001
##    900      0.3417        0.3920      0.0100    -0.0000
##    920      0.3385        0.3919      0.0100    -0.0001
##    940      0.3355        0.3923      0.0100    -0.0001
##    960      0.3326        0.3920      0.0100    -0.0000
##    980      0.3299        0.3918      0.0100    -0.0000
##   1000      0.3272        0.3912      0.0100    -0.0000
##   1020      0.3245        0.3906      0.0100    -0.0000
##   1040      0.3220        0.3904      0.0100    -0.0000
##   1060      0.3187        0.3887      0.0100     0.0000
##   1080      0.3162        0.3886      0.0100    -0.0000
##   1100      0.3134        0.3892      0.0100    -0.0000
##   1120      0.3106        0.3890      0.0100     0.0000
##   1140      0.3081        0.3886      0.0100    -0.0001
##   1160      0.3052        0.3881      0.0100    -0.0000
##   1180      0.3024        0.3878      0.0100    -0.0001
##   1200      0.2999        0.3869      0.0100    -0.0001
##   1220      0.2973        0.3854      0.0100    -0.0000
##   1240      0.2946        0.3851      0.0100    -0.0000
##   1260      0.2922        0.3855      0.0100    -0.0001
##   1280      0.2899        0.3862      0.0100    -0.0001
##   1300      0.2878        0.3866      0.0100    -0.0001
##   1320      0.2856        0.3847      0.0100    -0.0001
```

```
## 1340   0.2833     0.3841     0.0100   -0.0000
## 1360   0.2809     0.3834     0.0100   -0.0000
## 1380   0.2785     0.3836     0.0100   -0.0001
## 1400   0.2763     0.3842     0.0100   -0.0000
## 1420   0.2741     0.3852     0.0100   -0.0001
## 1440   0.2718     0.3862     0.0100   -0.0000
## 1460   0.2696     0.3860     0.0100    0.0000
## 1480   0.2674     0.3864     0.0100   -0.0001
## 1500   0.2654     0.3844     0.0100   -0.0001
## 1520   0.2635     0.3846     0.0100   -0.0000
## 1540   0.2616     0.3848     0.0100   -0.0001
## 1560   0.2596     0.3847     0.0100   -0.0001
## 1580   0.2577     0.3852     0.0100   -0.0001
## 1600   0.2554     0.3841     0.0100   -0.0001
## 1620   0.2534     0.3843     0.0100   -0.0000
## 1640   0.2515     0.3840     0.0100   -0.0000
## 1660   0.2495     0.3855     0.0100   -0.0000
## 1680   0.2476     0.3861     0.0100   -0.0001
## 1700   0.2454     0.3878     0.0100   -0.0000
## 1720   0.2433     0.3873     0.0100   -0.0000
## 1740   0.2414     0.3873     0.0100   -0.0000
## 1760   0.2396     0.3887     0.0100   -0.0001
## 1780   0.2377     0.3886     0.0100   -0.0001
## 1800   0.2358     0.3883     0.0100   -0.0000
## 1820   0.2339     0.3877     0.0100   -0.0000
## 1840   0.2322     0.3879     0.0100    0.0000
## 1860   0.2305     0.3886     0.0100    0.0000
## 1880   0.2286     0.3881     0.0100   -0.0000
## 1900   0.2266     0.3882     0.0100   -0.0000
## 1920   0.2247     0.3873     0.0100   -0.0000
## 1940   0.2230     0.3870     0.0100   -0.0000
## 1960   0.2215     0.3864     0.0100   -0.0000
## 1980   0.2199     0.3856     0.0100    0.0000
## 2000   0.2183     0.3856     0.0100   -0.0000
## 2020   0.2166     0.3859     0.0100   -0.0001
## 2040   0.2147     0.3862     0.0100   -0.0000
## 2060   0.2128     0.3866     0.0100   -0.0000
## 2080   0.2113     0.3877     0.0100   -0.0000
## 2100   0.2096     0.3882     0.0100   -0.0000
## 2120   0.2078     0.3889     0.0100   -0.0000
## 2140   0.2063     0.3887     0.0100   -0.0000
## 2160   0.2050     0.3891     0.0100   -0.0001
## 2180   0.2036     0.3888     0.0100   -0.0000
## 2200   0.2022     0.3887     0.0100   -0.0000
## 2220   0.2007     0.3899     0.0100   -0.0001
## 2240   0.1991     0.3895     0.0100   -0.0000
## 2260   0.1976     0.3887     0.0100   -0.0000
## 2280   0.1962     0.3887     0.0100   -0.0000
## 2300   0.1947     0.3889     0.0100   -0.0000
## 2320   0.1933     0.3894     0.0100   -0.0001
## 2340   0.1920     0.3892     0.0100   -0.0000
## 2360   0.1906     0.3880     0.0100   -0.0000
## 2380   0.1892     0.3873     0.0100   -0.0000
## 2400   0.1879     0.3880     0.0100   -0.0000
```

```
## 2420       0.1865          0.3878          0.0100     -0.0000
## 2440       0.1851          0.3880          0.0100     -0.0000
## 2460       0.1837          0.3880          0.0100     -0.0000
## 2480       0.1826          0.3881          0.0100     -0.0000
## 2500       0.1814          0.3878          0.0100     -0.0001
## 2520       0.1801          0.3875          0.0100     -0.0000
## 2540       0.1787          0.3866          0.0100     -0.0000
## 2560       0.1773          0.3866          0.0100     -0.0000
## 2580       0.1762          0.3872          0.0100     -0.0000
## 2600       0.1748          0.3867          0.0100     -0.0000
## 2620       0.1735          0.3869          0.0100     -0.0001
## 2640       0.1723          0.3865          0.0100     -0.0000
## 2660       0.1710          0.3868          0.0100     -0.0000
## 2680       0.1697          0.3864          0.0100     -0.0000
## 2700       0.1685          0.3866          0.0100     -0.0001
## 2720       0.1670          0.3860          0.0100     -0.0000
## 2740       0.1659          0.3869          0.0100     -0.0000
## 2760       0.1648          0.3876          0.0100     -0.0000
## 2780       0.1637          0.3880          0.0100     -0.0000
## 2800       0.1625          0.3877          0.0100     -0.0000
## 2820       0.1615          0.3883          0.0100     -0.0000
## 2840       0.1603          0.3879          0.0100     -0.0000
## 2860       0.1590          0.3866          0.0100     -0.0000
## 2880       0.1579          0.3863          0.0100     -0.0000
## 2900       0.1570          0.3864          0.0100     -0.0000
## 2920       0.1560          0.3871          0.0100     -0.0000
## 2940       0.1550          0.3875          0.0100     -0.0000
## 2960       0.1539          0.3883          0.0100     -0.0000
## 2980       0.1529          0.3884          0.0100     -0.0000
## 3000       0.1518          0.3871          0.0100     -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1       1.2767          1.2523        0.0200     0.0099
##     2       1.2572          1.2334        0.0200     0.0096
##     3       1.2382          1.2147        0.0200     0.0090
##     4       1.2209          1.1979        0.0200     0.0090
##     5       1.2043          1.1818        0.0200     0.0086
##     6       1.1880          1.1658        0.0200     0.0080
##     7       1.1729          1.1512        0.0200     0.0080
##     8       1.1584          1.1362        0.0200     0.0065
##     9       1.1434          1.1209        0.0200     0.0071
##    10       1.1292          1.1072        0.0200     0.0066
##    20       1.0126          0.9899        0.0200     0.0046
##    40       0.8480          0.8239        0.0200     0.0035
##    60       0.7321          0.7092        0.0200     0.0020
##    80       0.6508          0.6265        0.0200     0.0015
##   100       0.5905          0.5636        0.0200     0.0011
##   120       0.5456          0.5152        0.0200     0.0008
##   140       0.5104          0.4791        0.0200     0.0004
##   160       0.4862          0.4594        0.0200     0.0004
```

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##      180        0.4667          0.4389        0.0200      0.0003
##      200        0.4499          0.4245        0.0200      0.0000
##      220        0.4368          0.4194        0.0200      0.0001
##      240        0.4229          0.4086        0.0200      0.0001
##      260        0.4116          0.3998        0.0200     -0.0001
##      280        0.4014          0.3953        0.0200      0.0001
##      300        0.3927          0.3904        0.0200      0.0001
##      320        0.3838          0.3888        0.0200      0.0000
##      340        0.3761          0.3854        0.0200     -0.0000
##      360        0.3677          0.3854        0.0200     -0.0001
##      380        0.3607          0.3864        0.0200     -0.0001
##      400        0.3542          0.3867        0.0200     -0.0002
##      420        0.3473          0.3876        0.0200     -0.0001
##      440        0.3412          0.3877        0.0200     -0.0000
##      460        0.3350          0.3890        0.0200      0.0001
##      480        0.3280          0.3881        0.0200      0.0000
##      500        0.3221          0.3879        0.0200      0.0001
##      520        0.3169          0.3876        0.0200     -0.0002
##      540        0.3115          0.3856        0.0200     -0.0000
##      560        0.3065          0.3867        0.0200     -0.0001
##      580        0.3008          0.3857        0.0200     -0.0001
##      600        0.2958          0.3864        0.0200     -0.0001
##      620        0.2910          0.3862        0.0200     -0.0000
##      640        0.2857          0.3861        0.0200     -0.0000
##      660        0.2810          0.3853        0.0200     -0.0001
##      680        0.2770          0.3835        0.0200     -0.0001
##      700        0.2722          0.3826        0.0200     -0.0001
##      720        0.2680          0.3822        0.0200     -0.0001
##      740        0.2642          0.3811        0.0200     -0.0001
##      760        0.2603          0.3791        0.0200     -0.0001
##      780        0.2562          0.3791        0.0200     -0.0000
##      800        0.2526          0.3786        0.0200     -0.0001
##      820        0.2489          0.3784        0.0200      0.0000
##      840        0.2457          0.3773        0.0200     -0.0001
##      860        0.2419          0.3777        0.0200     -0.0000
##      880        0.2381          0.3795        0.0200     -0.0000
##      900        0.2343          0.3827        0.0200     -0.0000
##      920        0.2306          0.3845        0.0200     -0.0002
##      940        0.2268          0.3834        0.0200     -0.0000
##      960        0.2229          0.3840        0.0200     -0.0001
##      980        0.2198          0.3866        0.0200     -0.0000
##     1000        0.2165          0.3876        0.0200     -0.0001
##     1020        0.2132          0.3885        0.0200      0.0000
##     1040        0.2098          0.3893        0.0200     -0.0001
##     1060        0.2068          0.3910        0.0200     -0.0000
##     1080        0.2036          0.3912        0.0200     -0.0001
##     1100        0.2008          0.3909        0.0200     -0.0001
##     1120        0.1978          0.3926        0.0200     -0.0001
##     1140        0.1946          0.3913        0.0200     -0.0001
##     1160        0.1917          0.3923        0.0200     -0.0001
##     1180        0.1890          0.3936        0.0200     -0.0001
##     1200        0.1860          0.3949        0.0200     -0.0000
##     1220        0.1837          0.3954        0.0200     -0.0001
##     1240        0.1811          0.3954        0.0200     -0.0000
```

```
## 1260    0.1786    0.3942    0.0200   -0.0001
## 1280    0.1762    0.3944    0.0200    0.0000
## 1300    0.1735    0.3932    0.0200    0.0000
## 1320    0.1713    0.3921    0.0200   -0.0001
## 1340    0.1690    0.3945    0.0200   -0.0001
## 1360    0.1666    0.3960    0.0200   -0.0001
## 1380    0.1644    0.3961    0.0200   -0.0001
## 1400    0.1621    0.3940    0.0200   -0.0000
## 1420    0.1601    0.3947    0.0200   -0.0001
## 1440    0.1578    0.3952    0.0200   -0.0001
## 1460    0.1555    0.3930    0.0200   -0.0000
## 1480    0.1534    0.3924    0.0200   -0.0000
## 1500    0.1512    0.3932    0.0200   -0.0001
## 1520    0.1492    0.3935    0.0200   -0.0000
## 1540    0.1473    0.3946    0.0200   -0.0001
## 1560    0.1453    0.3937    0.0200   -0.0001
## 1580    0.1434    0.3941    0.0200   -0.0001
## 1600    0.1415    0.3942    0.0200   -0.0000
## 1620    0.1397    0.3948    0.0200   -0.0000
## 1640    0.1380    0.3923    0.0200   -0.0000
## 1660    0.1362    0.3934    0.0200   -0.0000
## 1680    0.1346    0.3926    0.0200   -0.0001
## 1700    0.1329    0.3932    0.0200   -0.0000
## 1720    0.1314    0.3931    0.0200   -0.0000
## 1740    0.1297    0.3916    0.0200   -0.0000
## 1760    0.1278    0.3917    0.0200   -0.0000
## 1780    0.1262    0.3917    0.0200   -0.0000
## 1800    0.1246    0.3911    0.0200   -0.0000
## 1820    0.1233    0.3892    0.0200   -0.0000
## 1840    0.1217    0.3896    0.0200   -0.0001
## 1860    0.1202    0.3904    0.0200   -0.0000
## 1880    0.1186    0.3920    0.0200   -0.0001
## 1900    0.1171    0.3923    0.0200   -0.0000
## 1920    0.1156    0.3926    0.0200   -0.0001
## 1940    0.1140    0.3928    0.0200   -0.0000
## 1960    0.1127    0.3922    0.0200   -0.0000
## 1980    0.1114    0.3937    0.0200   -0.0000
## 2000    0.1100    0.3942    0.0200   -0.0000
## 2020    0.1087    0.3961    0.0200   -0.0000
## 2040    0.1074    0.3966    0.0200   -0.0000
## 2060    0.1062    0.3968    0.0200   -0.0001
## 2080    0.1048    0.3958    0.0200   -0.0000
## 2100    0.1035    0.3964    0.0200   -0.0000
## 2120    0.1023    0.3961    0.0200   -0.0000
## 2140    0.1010    0.3956    0.0200   -0.0000
## 2160    0.0997    0.3958    0.0200   -0.0000
## 2180    0.0985    0.3965    0.0200   -0.0001
## 2200    0.0974    0.3970    0.0200   -0.0000
## 2220    0.0962    0.3954    0.0200   -0.0000
## 2240    0.0953    0.3953    0.0200   -0.0000
## 2260    0.0940    0.3938    0.0200   -0.0001
## 2280    0.0930    0.3944    0.0200   -0.0000
## 2300    0.0920    0.3952    0.0200   -0.0000
## 2320    0.0909    0.3949    0.0200   -0.0000
```

```
##    2340       0.0898        0.3955     0.0200    -0.0000
##    2360       0.0888        0.3944     0.0200    -0.0000
##    2380       0.0878        0.3952     0.0200    -0.0000
##    2400       0.0868        0.3953     0.0200    -0.0000
##    2420       0.0857        0.3962     0.0200    -0.0000
##    2440       0.0847        0.3962     0.0200    -0.0000
##    2460       0.0835        0.3964     0.0200    -0.0000
##    2480       0.0824        0.3967     0.0200    -0.0000
##    2500       0.0814        0.3967     0.0200     0.0000
##    2520       0.0805        0.3971     0.0200    -0.0000
##    2540       0.0795        0.3975     0.0200    -0.0000
##    2560       0.0785        0.3975     0.0200    -0.0000
##    2580       0.0775        0.3985     0.0200    -0.0000
##    2600       0.0766        0.3979     0.0200    -0.0000
##    2620       0.0759        0.3982     0.0200    -0.0000
##    2640       0.0751        0.3988     0.0200    -0.0000
##    2660       0.0743        0.3991     0.0200    -0.0000
##    2680       0.0733        0.4004     0.0200    -0.0000
##    2700       0.0725        0.4017     0.0200    -0.0000
##    2720       0.0716        0.4020     0.0200    -0.0000
##    2740       0.0710        0.4015     0.0200    -0.0000
##    2760       0.0702        0.4007     0.0200    -0.0000
##    2780       0.0694        0.4004     0.0200    -0.0000
##    2800       0.0687        0.4000     0.0200    -0.0000
##    2820       0.0680        0.4007     0.0200    -0.0000
##    2840       0.0672        0.4012     0.0200    -0.0000
##    2860       0.0662        0.4005     0.0200    -0.0000
##    2880       0.0655        0.4013     0.0200    -0.0000
##    2900       0.0648        0.4012     0.0200    -0.0000
##    2920       0.0641        0.4021     0.0200    -0.0000
##    2940       0.0634        0.4021     0.0200    -0.0000
##    2960       0.0627        0.4025     0.0200    -0.0000
##    2980       0.0619        0.4031     0.0200    -0.0000
##    3000       0.0610        0.4042     0.0200    -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1        1.2658         1.2425     0.0300    0.0146
##      2        1.2365         1.2127     0.0300    0.0141
##      3        1.2106         1.1872     0.0300    0.0125
##      4        1.1861         1.1624     0.0300    0.0123
##      5        1.1640         1.1408     0.0300    0.0107
##      6        1.1428         1.1188     0.0300    0.0104
##      7        1.1217         1.0973     0.0300    0.0107
##      8        1.1009         1.0778     0.0300    0.0099
##      9        1.0819         1.0592     0.0300    0.0093
##     10        1.0642         1.0413     0.0300    0.0087
##     20        0.9173         0.8935     0.0300    0.0052
##     40        0.7307         0.7143     0.0300    0.0026
##     60        0.6174         0.5969     0.0300    0.0025
##     80        0.5493         0.5291     0.0300    0.0013
```

```
##    100    0.5053    0.4850    0.0300     0.0006
##    120    0.4709    0.4504    0.0300     0.0004
##    140    0.4465    0.4296    0.0300     0.0002
##    160    0.4275    0.4157    0.0300    -0.0000
##    180    0.4112    0.4074    0.0300    -0.0000
##    200    0.3977    0.4043    0.0300    -0.0001
##    220    0.3847    0.4000    0.0300     0.0000
##    240    0.3722    0.3951    0.0300     0.0000
##    260    0.3605    0.3911    0.0300     0.0000
##    280    0.3508    0.3894    0.0300    -0.0002
##    300    0.3409    0.3863    0.0300    -0.0001
##    320    0.3320    0.3869    0.0300     0.0000
##    340    0.3230    0.3860    0.0300    -0.0002
##    360    0.3150    0.3886    0.0300    -0.0002
##    380    0.3070    0.3887    0.0300    -0.0003
##    400    0.3001    0.3914    0.0300    -0.0002
##    420    0.2922    0.3920    0.0300    -0.0000
##    440    0.2852    0.3871    0.0300    -0.0001
##    460    0.2780    0.3821    0.0300    -0.0002
##    480    0.2707    0.3828    0.0300    -0.0001
##    500    0.2638    0.3817    0.0300    -0.0001
##    520    0.2581    0.3833    0.0300    -0.0002
##    540    0.2520    0.3827    0.0300    -0.0000
##    560    0.2456    0.3794    0.0300    -0.0002
##    580    0.2402    0.3802    0.0300    -0.0002
##    600    0.2346    0.3786    0.0300    -0.0001
##    620    0.2294    0.3793    0.0300    -0.0002
##    640    0.2242    0.3771    0.0300    -0.0001
##    660    0.2187    0.3778    0.0300    -0.0001
##    680    0.2140    0.3770    0.0300    -0.0000
##    700    0.2094    0.3796    0.0300    -0.0001
##    720    0.2047    0.3830    0.0300    -0.0001
##    740    0.2009    0.3816    0.0300    -0.0002
##    760    0.1966    0.3783    0.0300    -0.0000
##    780    0.1927    0.3767    0.0300    -0.0001
##    800    0.1890    0.3727    0.0300    -0.0002
##    820    0.1853    0.3748    0.0300    -0.0002
##    840    0.1814    0.3759    0.0300    -0.0001
##    860    0.1775    0.3748    0.0300    -0.0001
##    880    0.1737    0.3756    0.0300    -0.0001
##    900    0.1696    0.3780    0.0300    -0.0001
##    920    0.1659    0.3790    0.0300    -0.0001
##    940    0.1624    0.3803    0.0300    -0.0000
##    960    0.1590    0.3800    0.0300    -0.0000
##    980    0.1559    0.3795    0.0300    -0.0000
##   1000    0.1528    0.3808    0.0300    -0.0000
##   1020    0.1497    0.3795    0.0300    -0.0001
##   1040    0.1470    0.3802    0.0300    -0.0001
##   1060    0.1439    0.3795    0.0300    -0.0001
##   1080    0.1409    0.3817    0.0300    -0.0001
##   1100    0.1384    0.3835    0.0300    -0.0002
##   1120    0.1359    0.3847    0.0300    -0.0001
##   1140    0.1333    0.3859    0.0300    -0.0001
##   1160    0.1306    0.3864    0.0300    -0.0001
```

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```
## 1180      0.1282        0.3844        0.0300    -0.0001
## 1200      0.1259        0.3832        0.0300    -0.0001
## 1220      0.1237        0.3825        0.0300    -0.0000
## 1240      0.1216        0.3807        0.0300    -0.0001
## 1260      0.1191        0.3797        0.0300     0.0000
## 1280      0.1168        0.3812        0.0300    -0.0000
## 1300      0.1145        0.3833        0.0300    -0.0001
## 1320      0.1124        0.3853        0.0300    -0.0001
## 1340      0.1103        0.3838        0.0300    -0.0001
## 1360      0.1080        0.3836        0.0300    -0.0001
## 1380      0.1061        0.3830        0.0300    -0.0001
## 1400      0.1041        0.3850        0.0300    -0.0000
## 1420      0.1020        0.3853        0.0300    -0.0000
## 1440      0.1003        0.3857        0.0300    -0.0000
## 1460      0.0987        0.3849        0.0300    -0.0000
## 1480      0.0970        0.3853        0.0300    -0.0000
## 1500      0.0952        0.3856        0.0300    -0.0001
## 1520      0.0937        0.3875        0.0300    -0.0001
## 1540      0.0921        0.3876        0.0300    -0.0000
## 1560      0.0904        0.3879        0.0300    -0.0000
## 1580      0.0885        0.3895        0.0300     0.0000
## 1600      0.0869        0.3899        0.0300    -0.0001
## 1620      0.0855        0.3904        0.0300    -0.0000
## 1640      0.0840        0.3920        0.0300    -0.0001
## 1660      0.0826        0.3933        0.0300    -0.0000
## 1680      0.0812        0.3939        0.0300    -0.0000
## 1700      0.0798        0.3954        0.0300    -0.0000
## 1720      0.0784        0.3973        0.0300    -0.0001
## 1740      0.0769        0.3975        0.0300    -0.0000
## 1760      0.0756        0.3990        0.0300    -0.0000
## 1780      0.0742        0.3988        0.0300    -0.0000
## 1800      0.0728        0.3975        0.0300    -0.0000
## 1820      0.0716        0.3975        0.0300    -0.0001
## 1840      0.0703        0.3955        0.0300    -0.0001
## 1860      0.0692        0.3975        0.0300    -0.0000
## 1880      0.0680        0.3973        0.0300    -0.0000
## 1900      0.0669        0.3969        0.0300    -0.0001
## 1920      0.0659        0.3960        0.0300    -0.0000
## 1940      0.0647        0.3959        0.0300    -0.0000
## 1960      0.0636        0.3986        0.0300    -0.0000
## 1980      0.0626        0.3988        0.0300    -0.0000
## 2000      0.0615        0.3988        0.0300    -0.0000
## 2020      0.0603        0.3984        0.0300    -0.0000
## 2040      0.0594        0.3997        0.0300    -0.0000
## 2060      0.0583        0.4001        0.0300     0.0000
## 2080      0.0574        0.3991        0.0300    -0.0000
## 2100      0.0565        0.4001        0.0300    -0.0000
## 2120      0.0554        0.4028        0.0300     0.0000
## 2140      0.0543        0.4037        0.0300    -0.0000
## 2160      0.0534        0.4064        0.0300    -0.0000
## 2180      0.0525        0.4053        0.0300     0.0000
## 2200      0.0517        0.4073        0.0300    -0.0000
## 2220      0.0509        0.4083        0.0300    -0.0000
## 2240      0.0500        0.4084        0.0300    -0.0000
```

```
##   2260        0.0491        0.4086        0.0300    -0.0000
##   2280        0.0483        0.4089        0.0300    -0.0000
##   2300        0.0475        0.4107        0.0300    -0.0000
##   2320        0.0468        0.4128        0.0300    -0.0000
##   2340        0.0461        0.4120        0.0300    -0.0000
##   2360        0.0454        0.4126        0.0300    -0.0000
##   2380        0.0445        0.4141        0.0300    -0.0000
##   2400        0.0437        0.4157        0.0300    -0.0000
##   2420        0.0431        0.4160        0.0300    -0.0000
##   2440        0.0425        0.4158        0.0300    -0.0001
##   2460        0.0418        0.4173        0.0300    -0.0000
##   2480        0.0411        0.4151        0.0300    -0.0000
##   2500        0.0405        0.4153        0.0300     0.0000
##   2520        0.0398        0.4150        0.0300    -0.0000
##   2540        0.0392        0.4161        0.0300    -0.0000
##   2560        0.0385        0.4144        0.0300    -0.0000
##   2580        0.0380        0.4138        0.0300    -0.0000
##   2600        0.0374        0.4157        0.0300    -0.0000
##   2620        0.0368        0.4166        0.0300    -0.0000
##   2640        0.0362        0.4160        0.0300    -0.0000
##   2660        0.0356        0.4171        0.0300    -0.0000
##   2680        0.0350        0.4170        0.0300    -0.0000
##   2700        0.0343        0.4180        0.0300    -0.0000
##   2720        0.0338        0.4204        0.0300    -0.0000
##   2740        0.0332        0.4224        0.0300    -0.0000
##   2760        0.0327        0.4232        0.0300    -0.0000
##   2780        0.0322        0.4229        0.0300    -0.0000
##   2800        0.0317        0.4238        0.0300    -0.0000
##   2820        0.0312        0.4242        0.0300    -0.0000
##   2840        0.0307        0.4253        0.0300    -0.0000
##   2860        0.0303        0.4276        0.0300    -0.0000
##   2880        0.0299        0.4295        0.0300    -0.0000
##   2900        0.0294        0.4306        0.0300    -0.0000
##   2920        0.0290        0.4329        0.0300    -0.0000
##   2940        0.0285        0.4345        0.0300    -0.0000
##   2960        0.0281        0.4349        0.0300    -0.0000
##   2980        0.0276        0.4343        0.0300    -0.0000
##   3000        0.0271        0.4353        0.0300    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1        1.2868        1.2579        0.0100     0.0047
##     2        1.2772        1.2483        0.0100     0.0045
##     3        1.2673        1.2382        0.0100     0.0048
##     4        1.2573        1.2279        0.0100     0.0048
##     5        1.2482        1.2184        0.0100     0.0046
##     6        1.2398        1.2096        0.0100     0.0039
##     7        1.2308        1.2000        0.0100     0.0046
##     8        1.2225        1.1915        0.0100     0.0042
##     9        1.2139        1.1830        0.0100     0.0043
##    10        1.2057        1.1745        0.0100     0.0045
```

```
##      20     1.1285        1.0941       0.0100     0.0036
##      40     1.0102        0.9699       0.0100     0.0027
##      60     0.9191        0.8743       0.0100     0.0020
##      80     0.8459        0.7987       0.0100     0.0014
##     100     0.7859        0.7384       0.0100     0.0013
##     120     0.7370        0.6877       0.0100     0.0010
##     140     0.6939        0.6448       0.0100     0.0009
##     160     0.6568        0.6078       0.0100     0.0007
##     180     0.6256        0.5748       0.0100     0.0006
##     200     0.5992        0.5495       0.0100     0.0005
##     220     0.5756        0.5259       0.0100     0.0005
##     240     0.5565        0.5062       0.0100     0.0004
##     260     0.5399        0.4883       0.0100     0.0003
##     280     0.5251        0.4730       0.0100     0.0002
##     300     0.5132        0.4622       0.0100     0.0002
##     320     0.5013        0.4506       0.0100     0.0001
##     340     0.4916        0.4429       0.0100     0.0002
##     360     0.4825        0.4357       0.0100     0.0002
##     380     0.4743        0.4288       0.0100     0.0001
##     400     0.4666        0.4222       0.0100     0.0001
##     420     0.4593        0.4163       0.0100     0.0001
##     440     0.4522        0.4121       0.0100     0.0001
##     460     0.4456        0.4075       0.0100    -0.0000
##     480     0.4401        0.4039       0.0100     0.0001
##     500     0.4347        0.4015       0.0100     0.0000
##     520     0.4297        0.3990       0.0100     0.0000
##     540     0.4246        0.3967       0.0100     0.0000
##     560     0.4198        0.3945       0.0100    -0.0000
##     580     0.4152        0.3927       0.0100    -0.0000
##     600     0.4107        0.3912       0.0100    -0.0000
##     620     0.4064        0.3905       0.0100     0.0000
##     640     0.4020        0.3889       0.0100    -0.0001
##     660     0.3978        0.3869       0.0100    -0.0000
##     680     0.3938        0.3848       0.0100    -0.0000
##     700     0.3898        0.3831       0.0100    -0.0000
##     720     0.3861        0.3817       0.0100     0.0000
##     740     0.3823        0.3813       0.0100    -0.0000
##     760     0.3788        0.3809       0.0100     0.0000
##     780     0.3751        0.3798       0.0100    -0.0000
##     800     0.3719        0.3784       0.0100    -0.0000
##     820     0.3687        0.3784       0.0100    -0.0001
##     840     0.3654        0.3785       0.0100    -0.0001
##     860     0.3617        0.3786       0.0100     0.0000
##     880     0.3585        0.3784       0.0100    -0.0000
##     900     0.3553        0.3775       0.0100     0.0000
##     920     0.3524        0.3774       0.0100    -0.0001
##     940     0.3491        0.3756       0.0100    -0.0000
##     960     0.3460        0.3750       0.0100    -0.0000
##     980     0.3428        0.3748       0.0100    -0.0000
##    1000     0.3399        0.3735       0.0100    -0.0000
##    1020     0.3371        0.3738       0.0100    -0.0000
##    1040     0.3343        0.3733       0.0100     0.0000
##    1060     0.3317        0.3729       0.0100    -0.0000
##    1080     0.3293        0.3734       0.0100    -0.0000
```

```
## 1100     0.3261        0.3725        0.0100   -0.0000
## 1120     0.3236        0.3735        0.0100   -0.0000
## 1140     0.3209        0.3736        0.0100   -0.0000
## 1160     0.3185        0.3742        0.0100   -0.0001
## 1180     0.3161        0.3742        0.0100    0.0000
## 1200     0.3134        0.3738        0.0100   -0.0001
## 1220     0.3109        0.3738        0.0100   -0.0000
## 1240     0.3084        0.3731        0.0100   -0.0001
## 1260     0.3063        0.3739        0.0100   -0.0000
## 1280     0.3039        0.3737        0.0100   -0.0001
## 1300     0.3019        0.3729        0.0100   -0.0001
## 1320     0.2995        0.3735        0.0100   -0.0001
## 1340     0.2974        0.3741        0.0100   -0.0000
## 1360     0.2953        0.3741        0.0100   -0.0000
## 1380     0.2932        0.3737        0.0100   -0.0001
## 1400     0.2911        0.3746        0.0100   -0.0000
## 1420     0.2889        0.3745        0.0100   -0.0001
## 1440     0.2865        0.3742        0.0100   -0.0000
## 1460     0.2843        0.3745        0.0100   -0.0001
## 1480     0.2824        0.3730        0.0100   -0.0001
## 1500     0.2801        0.3724        0.0100   -0.0000
## 1520     0.2782        0.3733        0.0100   -0.0000
## 1540     0.2762        0.3736        0.0100   -0.0000
## 1560     0.2742        0.3731        0.0100   -0.0001
## 1580     0.2717        0.3732        0.0100    0.0000
## 1600     0.2698        0.3737        0.0100   -0.0000
## 1620     0.2678        0.3733        0.0100   -0.0000
## 1640     0.2659        0.3729        0.0100   -0.0001
## 1660     0.2641        0.3744        0.0100   -0.0001
## 1680     0.2623        0.3745        0.0100   -0.0000
## 1700     0.2601        0.3738        0.0100   -0.0001
## 1720     0.2583        0.3742        0.0100   -0.0001
## 1740     0.2568        0.3738        0.0100   -0.0000
## 1760     0.2551        0.3737        0.0100   -0.0001
## 1780     0.2533        0.3743        0.0100   -0.0000
## 1800     0.2514        0.3747        0.0100   -0.0000
## 1820     0.2495        0.3746        0.0100   -0.0000
## 1840     0.2476        0.3747        0.0100   -0.0001
## 1860     0.2456        0.3753        0.0100   -0.0000
## 1880     0.2441        0.3746        0.0100   -0.0000
## 1900     0.2425        0.3745        0.0100   -0.0000
## 1920     0.2405        0.3741        0.0100   -0.0000
## 1940     0.2390        0.3739        0.0100   -0.0001
## 1960     0.2373        0.3738        0.0100   -0.0000
## 1980     0.2357        0.3740        0.0100   -0.0000
## 2000     0.2340        0.3738        0.0100   -0.0000
## 2020     0.2326        0.3748        0.0100   -0.0001
## 2040     0.2310        0.3746        0.0100   -0.0000
## 2060     0.2294        0.3743        0.0100   -0.0000
## 2080     0.2278        0.3751        0.0100   -0.0001
## 2100     0.2264        0.3759        0.0100   -0.0000
## 2120     0.2249        0.3763        0.0100   -0.0000
## 2140     0.2233        0.3767        0.0100   -0.0000
## 2160     0.2217        0.3773        0.0100   -0.0000
```

```
##    2180         0.2201          0.3769       0.0100      -0.0000
##    2200         0.2186          0.3776       0.0100      -0.0000
##    2220         0.2170          0.3777       0.0100      -0.0000
##    2240         0.2155          0.3780       0.0100      -0.0000
##    2260         0.2141          0.3792       0.0100      -0.0000
##    2280         0.2127          0.3786       0.0100      -0.0000
##    2300         0.2112          0.3787       0.0100      -0.0000
##    2320         0.2097          0.3784       0.0100      -0.0000
##    2340         0.2083          0.3788       0.0100      -0.0000
##    2360         0.2069          0.3784       0.0100      -0.0001
##    2380         0.2053          0.3779       0.0100      -0.0000
##    2400         0.2039          0.3781       0.0100      -0.0000
##    2420         0.2025          0.3782       0.0100      -0.0000
##    2440         0.2011          0.3780       0.0100      -0.0001
##    2460         0.1998          0.3782       0.0100      -0.0000
##    2480         0.1984          0.3784       0.0100      -0.0000
##    2500         0.1972          0.3788       0.0100      -0.0001
##    2520         0.1960          0.3787       0.0100      -0.0000
##    2540         0.1946          0.3797       0.0100      -0.0000
##    2560         0.1935          0.3798       0.0100      -0.0000
##    2580         0.1921          0.3797       0.0100      -0.0000
##    2600         0.1906          0.3800       0.0100      -0.0000
##    2620         0.1893          0.3804       0.0100      -0.0000
##    2640         0.1878          0.3790       0.0100      -0.0000
##    2660         0.1864          0.3796       0.0100      -0.0001
##    2680         0.1851          0.3797       0.0100      -0.0000
##    2700         0.1840          0.3807       0.0100      -0.0000
##    2720         0.1825          0.3806       0.0100      -0.0000
##    2740         0.1813          0.3814       0.0100      -0.0000
##    2760         0.1802          0.3809       0.0100      -0.0000
##    2780         0.1790          0.3811       0.0100      -0.0000
##    2800         0.1779          0.3820       0.0100      -0.0000
##    2820         0.1767          0.3827       0.0100      -0.0000
##    2840         0.1755          0.3830       0.0100      -0.0000
##    2860         0.1744          0.3828       0.0100      -0.0000
##    2880         0.1733          0.3836       0.0100      -0.0000
##    2900         0.1722          0.3840       0.0100      -0.0000
##    2920         0.1709          0.3837       0.0100      -0.0000
##    2940         0.1699          0.3842       0.0100      -0.0000
##    2960         0.1688          0.3849       0.0100      -0.0000
##    2980         0.1677          0.3841       0.0100      -0.0001
##    3000         0.1666          0.3839       0.0100      -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.2761          1.2459       0.0200      0.0093
##      2         1.2562          1.2255       0.0200      0.0092
##      3         1.2376          1.2068       0.0200      0.0092
##      4         1.2195          1.1885       0.0200      0.0088
##      5         1.2042          1.1718       0.0200      0.0076
##      6         1.1875          1.1543       0.0200      0.0078
```

```
##        7        1.1720        1.1385        0.0200        0.0078
##        8        1.1567        1.1212        0.0200        0.0073
##        9        1.1415        1.1058        0.0200        0.0073
##       10        1.1275        1.0916        0.0200        0.0068
##       20        1.0107        0.9693        0.0200        0.0043
##       40        0.8493        0.8026        0.0200        0.0033
##       60        0.7357        0.6883        0.0200        0.0022
##       80        0.6573        0.6095        0.0200        0.0013
##      100        0.5999        0.5505        0.0200        0.0010
##      120        0.5580        0.5079        0.0200        0.0006
##      140        0.5274        0.4791        0.0200        0.0004
##      160        0.5031        0.4550        0.0200        0.0002
##      180        0.4854        0.4409        0.0200        0.0003
##      200        0.4688        0.4274        0.0200        0.0001
##      220        0.4552        0.4180        0.0200       -0.0001
##      240        0.4433        0.4104        0.0200        0.0001
##      260        0.4323        0.4012        0.0200       -0.0001
##      280        0.4208        0.3923        0.0200        0.0000
##      300        0.4114        0.3873        0.0200        0.0000
##      320        0.4026        0.3856        0.0200       -0.0000
##      340        0.3940        0.3828        0.0200       -0.0001
##      360        0.3868        0.3832        0.0200       -0.0002
##      380        0.3797        0.3814        0.0200       -0.0000
##      400        0.3736        0.3814        0.0200        0.0001
##      420        0.3669        0.3815        0.0200       -0.0002
##      440        0.3607        0.3794        0.0200       -0.0001
##      460        0.3538        0.3781        0.0200        0.0001
##      480        0.3479        0.3764        0.0200       -0.0001
##      500        0.3426        0.3779        0.0200       -0.0000
##      520        0.3366        0.3793        0.0200       -0.0001
##      540        0.3307        0.3796        0.0200       -0.0001
##      560        0.3250        0.3788        0.0200       -0.0001
##      580        0.3200        0.3798        0.0200       -0.0001
##      600        0.3156        0.3820        0.0200       -0.0002
##      620        0.3109        0.3811        0.0200       -0.0001
##      640        0.3060        0.3809        0.0200       -0.0000
##      660        0.3008        0.3803        0.0200       -0.0001
##      680        0.2958        0.3829        0.0200       -0.0001
##      700        0.2913        0.3819        0.0200       -0.0001
##      720        0.2872        0.3816        0.0200       -0.0001
##      740        0.2835        0.3806        0.0200       -0.0002
##      760        0.2793        0.3832        0.0200       -0.0002
##      780        0.2752        0.3819        0.0200       -0.0001
##      800        0.2717        0.3815        0.0200       -0.0001
##      820        0.2679        0.3833        0.0200       -0.0001
##      840        0.2640        0.3835        0.0200       -0.0001
##      860        0.2601        0.3823        0.0200       -0.0001
##      880        0.2566        0.3821        0.0200       -0.0001
##      900        0.2533        0.3823        0.0200       -0.0002
##      920        0.2498        0.3809        0.0200       -0.0001
##      940        0.2464        0.3809        0.0200       -0.0001
##      960        0.2430        0.3806        0.0200       -0.0001
##      980        0.2397        0.3791        0.0200       -0.0000
##     1000        0.2362        0.3807        0.0200       -0.0001
```

```
## 1020    0.2328    0.3774    0.0200    -0.0000
## 1040    0.2292    0.3769    0.0200    -0.0001
## 1060    0.2259    0.3774    0.0200    -0.0001
## 1080    0.2227    0.3752    0.0200    -0.0000
## 1100    0.2194    0.3752    0.0200    -0.0001
## 1120    0.2163    0.3769    0.0200    -0.0001
## 1140    0.2130    0.3779    0.0200    -0.0000
## 1160    0.2099    0.3780    0.0200    -0.0001
## 1180    0.2071    0.3779    0.0200    -0.0001
## 1200    0.2042    0.3782    0.0200    -0.0001
## 1220    0.2015    0.3792    0.0200    -0.0001
## 1240    0.1993    0.3779    0.0200    -0.0001
## 1260    0.1966    0.3756    0.0200    -0.0001
## 1280    0.1941    0.3753    0.0200    -0.0001
## 1300    0.1915    0.3756    0.0200    -0.0000
## 1320    0.1886    0.3747    0.0200    -0.0001
## 1340    0.1863    0.3738    0.0200    -0.0000
## 1360    0.1841    0.3731    0.0200    -0.0001
## 1380    0.1821    0.3719    0.0200    -0.0001
## 1400    0.1793    0.3757    0.0200    -0.0000
## 1420    0.1772    0.3758    0.0200    -0.0001
## 1440    0.1750    0.3759    0.0200    -0.0001
## 1460    0.1728    0.3768    0.0200    -0.0001
## 1480    0.1705    0.3764    0.0200    -0.0001
## 1500    0.1681    0.3755    0.0200    -0.0000
## 1520    0.1657    0.3752    0.0200    -0.0001
## 1540    0.1635    0.3760    0.0200    -0.0001
## 1560    0.1614    0.3753    0.0200    -0.0000
## 1580    0.1593    0.3745    0.0200    -0.0001
## 1600    0.1571    0.3741    0.0200    -0.0000
## 1620    0.1551    0.3755    0.0200    -0.0000
## 1640    0.1530    0.3745    0.0200    -0.0001
## 1660    0.1508    0.3719    0.0200    -0.0000
## 1680    0.1489    0.3740    0.0200    -0.0001
## 1700    0.1471    0.3739    0.0200    -0.0001
## 1720    0.1455    0.3739    0.0200    -0.0001
## 1740    0.1436    0.3733    0.0200    -0.0001
## 1760    0.1420    0.3735    0.0200    -0.0000
## 1780    0.1401    0.3732    0.0200    -0.0000
## 1800    0.1387    0.3744    0.0200    -0.0000
## 1820    0.1372    0.3753    0.0200    -0.0000
## 1840    0.1354    0.3742    0.0200    -0.0000
## 1860    0.1338    0.3747    0.0200    -0.0000
## 1880    0.1322    0.3735    0.0200    -0.0000
## 1900    0.1305    0.3736    0.0200    -0.0001
## 1920    0.1292    0.3731    0.0200    -0.0000
## 1940    0.1276    0.3730    0.0200    -0.0001
## 1960    0.1259    0.3741    0.0200    -0.0000
## 1980    0.1244    0.3736    0.0200    -0.0000
## 2000    0.1227    0.3732    0.0200    -0.0001
## 2020    0.1211    0.3733    0.0200    -0.0000
## 2040    0.1196    0.3735    0.0200    -0.0001
## 2060    0.1181    0.3745    0.0200    -0.0000
## 2080    0.1167    0.3747    0.0200    -0.0001
```

```
## 2100        0.1155           0.3762          0.0200       -0.0001
## 2120        0.1142           0.3764          0.0200       -0.0001
## 2140        0.1126           0.3785          0.0200       -0.0000
## 2160        0.1113           0.3779          0.0200       -0.0000
## 2180        0.1101           0.3774          0.0200       -0.0000
## 2200        0.1088           0.3781          0.0200       -0.0001
## 2220        0.1075           0.3799          0.0200       -0.0000
## 2240        0.1062           0.3823          0.0200       -0.0000
## 2260        0.1050           0.3825          0.0200       -0.0000
## 2280        0.1040           0.3837          0.0200       -0.0000
## 2300        0.1029           0.3839          0.0200       -0.0000
## 2320        0.1016           0.3817          0.0200       -0.0000
## 2340        0.1005           0.3818          0.0200       -0.0001
## 2360        0.0994           0.3816          0.0200       -0.0000
## 2380        0.0983           0.3831          0.0200       -0.0000
## 2400        0.0973           0.3853          0.0200       -0.0000
## 2420        0.0962           0.3847          0.0200       -0.0000
## 2440        0.0950           0.3858          0.0200       -0.0000
## 2460        0.0939           0.3862          0.0200       -0.0000
## 2480        0.0929           0.3865          0.0200       -0.0000
## 2500        0.0918           0.3866          0.0200       -0.0000
## 2520        0.0907           0.3880          0.0200       -0.0000
## 2540        0.0898           0.3866          0.0200       -0.0000
## 2560        0.0888           0.3867          0.0200       -0.0000
## 2580        0.0878           0.3869          0.0200       -0.0001
## 2600        0.0870           0.3869          0.0200       -0.0000
## 2620        0.0862           0.3874          0.0200       -0.0001
## 2640        0.0853           0.3873          0.0200       -0.0000
## 2660        0.0844           0.3870          0.0200       -0.0000
## 2680        0.0835           0.3873          0.0200       -0.0000
## 2700        0.0826           0.3875          0.0200       -0.0000
## 2720        0.0817           0.3871          0.0200       -0.0000
## 2740        0.0809           0.3855          0.0200       -0.0000
## 2760        0.0800           0.3868          0.0200       -0.0000
## 2780        0.0792           0.3867          0.0200       -0.0000
## 2800        0.0785           0.3862          0.0200       -0.0000
## 2820        0.0776           0.3854          0.0200       -0.0000
## 2840        0.0768           0.3852          0.0200       -0.0000
## 2860        0.0760           0.3852          0.0200       -0.0000
## 2880        0.0753           0.3854          0.0200       -0.0000
## 2900        0.0746           0.3856          0.0200       -0.0000
## 2920        0.0738           0.3863          0.0200       -0.0000
## 2940        0.0729           0.3864          0.0200       -0.0000
## 2960        0.0722           0.3866          0.0200       -0.0000
## 2980        0.0714           0.3867          0.0200       -0.0000
## 3000        0.0707           0.3870          0.0200       -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1        1.2661          1.2375      0.0300     0.0151
##     2        1.2366          1.2058      0.0300     0.0131
```

```
##      3        1.2091         1.1773       0.0300       0.0129
##      4        1.1842         1.1526       0.0300       0.0123
##      5        1.1607         1.1277       0.0300       0.0112
##      6        1.1390         1.1048       0.0300       0.0108
##      7        1.1183         1.0828       0.0300       0.0101
##      8        1.0986         1.0621       0.0300       0.0087
##      9        1.0804         1.0432       0.0300       0.0088
##     10        1.0607         1.0208       0.0300       0.0091
##     20        0.9169         0.8677       0.0300       0.0057
##     40        0.7307         0.6823       0.0300       0.0029
##     60        0.6222         0.5705       0.0300       0.0018
##     80        0.5543         0.5020       0.0300       0.0013
##    100        0.5096         0.4585       0.0300       0.0004
##    120        0.4794         0.4326       0.0300       0.0004
##    140        0.4569         0.4144       0.0300       0.0003
##    160        0.4398         0.4036       0.0300       0.0000
##    180        0.4237         0.3936       0.0300       0.0001
##    200        0.4094         0.3871       0.0300      -0.0001
##    220        0.3975         0.3864       0.0300      -0.0002
##    240        0.3857         0.3846       0.0300      -0.0001
##    260        0.3759         0.3786       0.0300      -0.0002
##    280        0.3657         0.3766       0.0300      -0.0002
##    300        0.3562         0.3715       0.0300      -0.0000
##    320        0.3467         0.3718       0.0300       0.0001
##    340        0.3387         0.3701       0.0300      -0.0001
##    360        0.3311         0.3704       0.0300      -0.0001
##    380        0.3235         0.3713       0.0300      -0.0001
##    400        0.3169         0.3738       0.0300      -0.0001
##    420        0.3101         0.3754       0.0300      -0.0002
##    440        0.3030         0.3726       0.0300      -0.0001
##    460        0.2964         0.3730       0.0300      -0.0001
##    480        0.2898         0.3685       0.0300      -0.0001
##    500        0.2831         0.3694       0.0300      -0.0002
##    520        0.2773         0.3705       0.0300      -0.0003
##    540        0.2709         0.3687       0.0300      -0.0001
##    560        0.2649         0.3714       0.0300      -0.0002
##    580        0.2590         0.3682       0.0300      -0.0002
##    600        0.2539         0.3721       0.0300      -0.0002
##    620        0.2484         0.3727       0.0300      -0.0001
##    640        0.2434         0.3707       0.0300      -0.0001
##    660        0.2381         0.3716       0.0300      -0.0001
##    680        0.2333         0.3734       0.0300      -0.0001
##    700        0.2287         0.3746       0.0300      -0.0001
##    720        0.2234         0.3733       0.0300      -0.0001
##    740        0.2187         0.3735       0.0300      -0.0001
##    760        0.2141         0.3747       0.0300      -0.0001
##    780        0.2099         0.3758       0.0300      -0.0002
##    800        0.2054         0.3759       0.0300      -0.0001
##    820        0.2014         0.3768       0.0300      -0.0001
##    840        0.1971         0.3785       0.0300      -0.0001
##    860        0.1933         0.3798       0.0300      -0.0001
##    880        0.1889         0.3765       0.0300      -0.0002
##    900        0.1852         0.3753       0.0300      -0.0001
##    920        0.1815         0.3764       0.0300      -0.0001
```

```
##    940    0.1783    0.3735    0.0300    -0.0000
##    960    0.1750    0.3728    0.0300    -0.0001
##    980    0.1718    0.3747    0.0300    -0.0001
##   1000    0.1688    0.3764    0.0300    -0.0001
##   1020    0.1655    0.3745    0.0300    -0.0001
##   1040    0.1623    0.3744    0.0300    -0.0001
##   1060    0.1593    0.3733    0.0300    -0.0001
##   1080    0.1564    0.3723    0.0300    -0.0001
##   1100    0.1533    0.3717    0.0300    -0.0001
##   1120    0.1505    0.3722    0.0300    -0.0001
##   1140    0.1484    0.3713    0.0300    -0.0001
##   1160    0.1459    0.3726    0.0300    -0.0001
##   1180    0.1434    0.3740    0.0300    -0.0000
##   1200    0.1407    0.3740    0.0300    -0.0001
##   1220    0.1379    0.3728    0.0300    -0.0001
##   1240    0.1358    0.3749    0.0300    -0.0001
##   1260    0.1335    0.3793    0.0300    -0.0000
##   1280    0.1306    0.3793    0.0300    -0.0000
##   1300    0.1281    0.3770    0.0300    -0.0000
##   1320    0.1259    0.3789    0.0300    -0.0001
##   1340    0.1234    0.3783    0.0300    -0.0001
##   1360    0.1217    0.3816    0.0300    -0.0001
##   1380    0.1198    0.3844    0.0300    -0.0001
##   1400    0.1177    0.3870    0.0300    -0.0000
##   1420    0.1154    0.3845    0.0300    -0.0001
##   1440    0.1136    0.3863    0.0300    -0.0001
##   1460    0.1114    0.3875    0.0300    -0.0001
##   1480    0.1094    0.3840    0.0300    -0.0000
##   1500    0.1076    0.3850    0.0300    -0.0001
##   1520    0.1060    0.3871    0.0300    -0.0001
##   1540    0.1041    0.3885    0.0300    -0.0000
##   1560    0.1021    0.3859    0.0300    -0.0000
##   1580    0.1005    0.3881    0.0300    -0.0000
##   1600    0.0985    0.3883    0.0300    -0.0000
##   1620    0.0968    0.3898    0.0300    -0.0001
##   1640    0.0950    0.3924    0.0300    -0.0001
##   1660    0.0934    0.3932    0.0300    -0.0000
##   1680    0.0918    0.3925    0.0300    -0.0001
##   1700    0.0900    0.3924    0.0300    -0.0001
##   1720    0.0884    0.3916    0.0300    -0.0001
##   1740    0.0866    0.3895    0.0300    -0.0000
##   1760    0.0853    0.3908    0.0300    -0.0000
##   1780    0.0840    0.3927    0.0300    -0.0000
##   1800    0.0826    0.3928    0.0300    -0.0000
##   1820    0.0811    0.3908    0.0300    -0.0000
##   1840    0.0799    0.3924    0.0300    -0.0001
##   1860    0.0784    0.3941    0.0300    -0.0000
##   1880    0.0773    0.3966    0.0300    -0.0000
##   1900    0.0761    0.3975    0.0300    -0.0000
##   1920    0.0750    0.3957    0.0300    -0.0000
##   1940    0.0738    0.3972    0.0300    -0.0000
##   1960    0.0725    0.3971    0.0300    -0.0000
##   1980    0.0713    0.3983    0.0300    -0.0001
##   2000    0.0702    0.4011    0.0300    -0.0000
```

```
##     2020        0.0691          0.4028      0.0300      -0.0000
##     2040        0.0680          0.4016      0.0300      -0.0000
##     2060        0.0669          0.4020      0.0300      -0.0000
##     2080        0.0659          0.4049      0.0300      -0.0000
##     2100        0.0648          0.4038      0.0300      -0.0001
##     2120        0.0639          0.4058      0.0300      -0.0000
##     2140        0.0628          0.4047      0.0300      -0.0000
##     2160        0.0618          0.4051      0.0300      -0.0000
##     2180        0.0609          0.4078      0.0300      -0.0000
##     2200        0.0601          0.4092      0.0300      -0.0000
##     2220        0.0591          0.4094      0.0300      -0.0000
##     2240        0.0582          0.4099      0.0300      -0.0000
##     2260        0.0574          0.4113      0.0300      -0.0000
##     2280        0.0565          0.4105      0.0300      -0.0000
##     2300        0.0555          0.4120      0.0300      -0.0000
##     2320        0.0545          0.4116      0.0300      -0.0000
##     2340        0.0537          0.4118      0.0300      -0.0000
##     2360        0.0529          0.4137      0.0300      -0.0000
##     2380        0.0520          0.4145      0.0300      -0.0000
##     2400        0.0512          0.4144      0.0300      -0.0000
##     2420        0.0503          0.4154      0.0300      -0.0000
##     2440        0.0496          0.4154      0.0300      -0.0000
##     2460        0.0488          0.4146      0.0300      -0.0000
##     2480        0.0481          0.4121      0.0300      -0.0000
##     2500        0.0474          0.4126      0.0300      -0.0000
##     2520        0.0467          0.4118      0.0300      -0.0000
##     2540        0.0459          0.4104      0.0300      -0.0000
##     2560        0.0451          0.4094      0.0300      -0.0000
##     2580        0.0444          0.4067      0.0300      -0.0000
##     2600        0.0437          0.4072      0.0300      -0.0000
##     2620        0.0430          0.4074      0.0300      -0.0000
##     2640        0.0421          0.4091      0.0300      -0.0000
##     2660        0.0415          0.4079      0.0300      -0.0000
##     2680        0.0408          0.4096      0.0300      -0.0000
##     2700        0.0402          0.4112      0.0300      -0.0000
##     2720        0.0396          0.4136      0.0300      -0.0000
##     2740        0.0390          0.4133      0.0300      -0.0000
##     2760        0.0384          0.4125      0.0300      -0.0000
##     2780        0.0378          0.4127      0.0300      -0.0000
##     2800        0.0371          0.4104      0.0300      -0.0000
##     2820        0.0367          0.4138      0.0300      -0.0000
##     2840        0.0361          0.4144      0.0300      -0.0000
##     2860        0.0356          0.4156      0.0300      -0.0000
##     2880        0.0350          0.4146      0.0300      -0.0000
##     2900        0.0345          0.4146      0.0300      -0.0000
##     2920        0.0340          0.4129      0.0300      -0.0000
##     2940        0.0335          0.4139      0.0300      -0.0000
##     2960        0.0330          0.4163      0.0300      -0.0000
##     2980        0.0325          0.4154      0.0300      -0.0000
##     3000        0.0320          0.4139      0.0300      -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1       1.2829          1.2850       0.0100    0.0052
##      2       1.2728          1.2741       0.0100    0.0047
##      3       1.2630          1.2635       0.0100    0.0046
##      4       1.2535          1.2539       0.0100    0.0048
##      5       1.2444          1.2445       0.0100    0.0041
##      6       1.2354          1.2352       0.0100    0.0045
##      7       1.2265          1.2257       0.0100    0.0042
##      8       1.2180          1.2169       0.0100    0.0043
##      9       1.2104          1.2089       0.0100    0.0037
##     10       1.2021          1.2004       0.0100    0.0039
##     20       1.1271          1.1232       0.0100    0.0036
##     40       1.0067          0.9960       0.0100    0.0025
##     60       0.9146          0.9000       0.0100    0.0019
##     80       0.8409          0.8232       0.0100    0.0016
##    100       0.7792          0.7584       0.0100    0.0012
##    120       0.7293          0.7060       0.0100    0.0011
##    140       0.6856          0.6602       0.0100    0.0008
##    160       0.6487          0.6205       0.0100    0.0008
##    180       0.6163          0.5871       0.0100    0.0007
##    200       0.5887          0.5579       0.0100    0.0005
##    220       0.5648          0.5309       0.0100    0.0005
##    240       0.5451          0.5097       0.0100    0.0004
##    260       0.5274          0.4897       0.0100    0.0003
##    280       0.5123          0.4727       0.0100    0.0002
##    300       0.4993          0.4579       0.0100    0.0003
##    320       0.4880          0.4470       0.0100    0.0003
##    340       0.4772          0.4371       0.0100    0.0002
##    360       0.4682          0.4292       0.0100    0.0001
##    380       0.4595          0.4208       0.0100    0.0001
##    400       0.4521          0.4148       0.0100    0.0001
##    420       0.4454          0.4094       0.0100    0.0000
##    440       0.4384          0.4038       0.0100   -0.0000
##    460       0.4323          0.4006       0.0100    0.0000
##    480       0.4266          0.3970       0.0100   -0.0000
##    500       0.4209          0.3934       0.0100    0.0000
##    520       0.4159          0.3907       0.0100    0.0000
##    540       0.4109          0.3877       0.0100    0.0000
##    560       0.4058          0.3855       0.0100   -0.0000
##    580       0.4007          0.3832       0.0100   -0.0000
##    600       0.3957          0.3807       0.0100   -0.0001
##    620       0.3915          0.3799       0.0100    0.0000
##    640       0.3869          0.3788       0.0100   -0.0000
##    660       0.3831          0.3769       0.0100    0.0000
##    680       0.3787          0.3756       0.0100   -0.0000
##    700       0.3748          0.3726       0.0100    0.0001
##    720       0.3713          0.3710       0.0100   -0.0001
##    740       0.3676          0.3709       0.0100    0.0001
##    760       0.3636          0.3704       0.0100   -0.0000
##    780       0.3601          0.3692       0.0100   -0.0000
##    800       0.3565          0.3688       0.0100   -0.0000
##    820       0.3530          0.3675       0.0100   -0.0000
##    840       0.3497          0.3660       0.0100   -0.0001
##    860       0.3467          0.3656       0.0100   -0.0001
```

```
##    880      0.3434      0.3652      0.0100    -0.0001
##    900      0.3399      0.3642      0.0100    -0.0000
##    920      0.3367      0.3645      0.0100    -0.0000
##    940      0.3334      0.3644      0.0100    -0.0001
##    960      0.3302      0.3637      0.0100    -0.0000
##    980      0.3270      0.3630      0.0100    -0.0001
##   1000      0.3243      0.3642      0.0100    -0.0000
##   1020      0.3214      0.3640      0.0100    -0.0000
##   1040      0.3182      0.3640      0.0100    -0.0000
##   1060      0.3153      0.3641      0.0100    -0.0000
##   1080      0.3124      0.3639      0.0100    -0.0001
##   1100      0.3097      0.3636      0.0100    -0.0000
##   1120      0.3069      0.3640      0.0100    -0.0000
##   1140      0.3042      0.3639      0.0100    -0.0001
##   1160      0.3019      0.3633      0.0100    -0.0000
##   1180      0.2993      0.3631      0.0100    -0.0000
##   1200      0.2968      0.3628      0.0100    -0.0000
##   1220      0.2945      0.3631      0.0100    -0.0001
##   1240      0.2918      0.3634      0.0100    -0.0000
##   1260      0.2893      0.3648      0.0100    -0.0000
##   1280      0.2871      0.3653      0.0100    -0.0001
##   1300      0.2847      0.3654      0.0100    -0.0000
##   1320      0.2822      0.3640      0.0100    -0.0000
##   1340      0.2799      0.3632      0.0100    -0.0000
##   1360      0.2776      0.3632      0.0100    -0.0000
##   1380      0.2752      0.3629      0.0100    -0.0000
##   1400      0.2729      0.3637      0.0100    -0.0000
##   1420      0.2705      0.3645      0.0100    -0.0000
##   1440      0.2680      0.3646      0.0100    -0.0000
##   1460      0.2659      0.3651      0.0100     0.0000
##   1480      0.2636      0.3640      0.0100    -0.0001
##   1500      0.2615      0.3637      0.0100    -0.0000
##   1520      0.2595      0.3640      0.0100    -0.0000
##   1540      0.2576      0.3631      0.0100    -0.0000
##   1560      0.2557      0.3625      0.0100    -0.0000
##   1580      0.2538      0.3621      0.0100    -0.0001
##   1600      0.2516      0.3625      0.0100    -0.0000
##   1620      0.2492      0.3623      0.0100    -0.0000
##   1640      0.2471      0.3626      0.0100    -0.0000
##   1660      0.2453      0.3629      0.0100    -0.0001
##   1680      0.2432      0.3630      0.0100    -0.0000
##   1700      0.2414      0.3625      0.0100    -0.0000
##   1720      0.2396      0.3635      0.0100    -0.0001
##   1740      0.2378      0.3641      0.0100    -0.0000
##   1760      0.2361      0.3643      0.0100    -0.0000
##   1780      0.2343      0.3643      0.0100    -0.0000
##   1800      0.2326      0.3649      0.0100    -0.0001
##   1820      0.2306      0.3652      0.0100    -0.0000
##   1840      0.2289      0.3656      0.0100    -0.0000
##   1860      0.2271      0.3653      0.0100    -0.0000
##   1880      0.2253      0.3649      0.0100    -0.0000
##   1900      0.2234      0.3638      0.0100    -0.0000
##   1920      0.2217      0.3633      0.0100    -0.0000
##   1940      0.2201      0.3641      0.0100    -0.0001
```

```
##   1960       0.2187          0.3645        0.0100     -0.0000
##   1980       0.2169          0.3654        0.0100     -0.0000
##   2000       0.2152          0.3651        0.0100     -0.0000
##   2020       0.2136          0.3637        0.0100     -0.0000
##   2040       0.2122          0.3631        0.0100     -0.0000
##   2060       0.2108          0.3635        0.0100     -0.0000
##   2080       0.2092          0.3629        0.0100     -0.0000
##   2100       0.2077          0.3632        0.0100     -0.0000
##   2120       0.2062          0.3625        0.0100     -0.0000
##   2140       0.2045          0.3628        0.0100     -0.0000
##   2160       0.2029          0.3624        0.0100     -0.0001
##   2180       0.2015          0.3626        0.0100     -0.0000
##   2200       0.2001          0.3628        0.0100     -0.0001
##   2220       0.1985          0.3634        0.0100     -0.0000
##   2240       0.1970          0.3632        0.0100     -0.0000
##   2260       0.1956          0.3636        0.0100     -0.0000
##   2280       0.1941          0.3635        0.0100     -0.0000
##   2300       0.1926          0.3632        0.0100     -0.0000
##   2320       0.1912          0.3634        0.0100     -0.0000
##   2340       0.1898          0.3631        0.0100     -0.0000
##   2360       0.1886          0.3643        0.0100     -0.0000
##   2380       0.1872          0.3649        0.0100     -0.0000
##   2400       0.1859          0.3652        0.0100     -0.0000
##   2420       0.1846          0.3653        0.0100     -0.0000
##   2440       0.1831          0.3646        0.0100     -0.0000
##   2460       0.1819          0.3652        0.0100     -0.0001
##   2480       0.1805          0.3658        0.0100      0.0000
##   2500       0.1792          0.3657        0.0100     -0.0000
##   2520       0.1779          0.3663        0.0100     -0.0000
##   2540       0.1767          0.3663        0.0100     -0.0000
##   2560       0.1755          0.3660        0.0100     -0.0000
##   2580       0.1743          0.3665        0.0100     -0.0000
##   2600       0.1731          0.3663        0.0100     -0.0000
##   2620       0.1717          0.3670        0.0100     -0.0000
##   2640       0.1704          0.3671        0.0100     -0.0000
##   2660       0.1691          0.3665        0.0100     -0.0000
##   2680       0.1678          0.3656        0.0100     -0.0000
##   2700       0.1667          0.3655        0.0100     -0.0000
##   2720       0.1656          0.3661        0.0100     -0.0000
##   2740       0.1644          0.3665        0.0100     -0.0001
##   2760       0.1633          0.3670        0.0100     -0.0000
##   2780       0.1624          0.3669        0.0100     -0.0001
##   2800       0.1612          0.3671        0.0100     -0.0000
##   2820       0.1601          0.3677        0.0100     -0.0000
##   2840       0.1589          0.3682        0.0100     -0.0000
##   2860       0.1578          0.3681        0.0100     -0.0000
##   2880       0.1567          0.3689        0.0100     -0.0001
##   2900       0.1556          0.3684        0.0100     -0.0000
##   2920       0.1546          0.3679        0.0100     -0.0000
##   2940       0.1535          0.3678        0.0100     -0.0000
##   2960       0.1525          0.3685        0.0100     -0.0000
##   2980       0.1516          0.3698        0.0100     -0.0001
##   3000       0.1506          0.3702        0.0100     -0.0000
```

```
## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1          1.2729          1.2752     0.0200     0.0099
##     2          1.2527          1.2541     0.0200     0.0093
##     3          1.2356          1.2359     0.0200     0.0087
##     4          1.2191          1.2184     0.0200     0.0081
##     5          1.2021          1.2003     0.0200     0.0086
##     6          1.1856          1.1830     0.0200     0.0085
##     7          1.1701          1.1664     0.0200     0.0071
##     8          1.1545          1.1498     0.0200     0.0074
##     9          1.1408          1.1366     0.0200     0.0065
##    10          1.1271          1.1221     0.0200     0.0064
##    20          1.0096          1.0015     0.0200     0.0053
##    40          0.8417          0.8227     0.0200     0.0028
##    60          0.7294          0.7073     0.0200     0.0022
##    80          0.6499          0.6218     0.0200     0.0015
##   100          0.5907          0.5569     0.0200     0.0011
##   120          0.5465          0.5115     0.0200     0.0009
##   140          0.5140          0.4794     0.0200     0.0003
##   160          0.4891          0.4532     0.0200     0.0002
##   180          0.4698          0.4345     0.0200     0.0002
##   200          0.4529          0.4194     0.0200     0.0001
##   220          0.4392          0.4088     0.0200     0.0001
##   240          0.4271          0.4025     0.0200     0.0001
##   260          0.4165          0.3963     0.0200     0.0001
##   280          0.4064          0.3914     0.0200    -0.0000
##   300          0.3975          0.3892     0.0200    -0.0000
##   320          0.3891          0.3857     0.0200    -0.0001
##   340          0.3807          0.3829     0.0200     0.0000
##   360          0.3739          0.3809     0.0200    -0.0001
##   380          0.3663          0.3805     0.0200    -0.0002
##   400          0.3593          0.3783     0.0200     0.0000
##   420          0.3521          0.3767     0.0200    -0.0001
##   440          0.3460          0.3770     0.0200    -0.0001
##   460          0.3397          0.3779     0.0200    -0.0002
##   480          0.3330          0.3770     0.0200    -0.0001
##   500          0.3276          0.3782     0.0200    -0.0000
##   520          0.3220          0.3763     0.0200     0.0000
##   540          0.3164          0.3771     0.0200    -0.0001
##   560          0.3115          0.3773     0.0200    -0.0001
##   580          0.3063          0.3759     0.0200    -0.0000
##   600          0.3008          0.3747     0.0200    -0.0001
##   620          0.2956          0.3735     0.0200    -0.0001
##   640          0.2911          0.3720     0.0200    -0.0001
##   660          0.2862          0.3737     0.0200    -0.0001
##   680          0.2821          0.3746     0.0200    -0.0001
##   700          0.2781          0.3746     0.0200    -0.0001
##   720          0.2738          0.3748     0.0200    -0.0001
##   740          0.2687          0.3736     0.0200    -0.0000
##   760          0.2646          0.3749     0.0200    -0.0001
##   780          0.2603          0.3764     0.0200    -0.0001
```

```
##    800    0.2558    0.3757    0.0200    -0.0000
##    820    0.2515    0.3769    0.0200    -0.0001
##    840    0.2475    0.3770    0.0200    -0.0002
##    860    0.2438    0.3780    0.0200    -0.0000
##    880    0.2404    0.3772    0.0200    -0.0001
##    900    0.2376    0.3790    0.0200    -0.0001
##    920    0.2341    0.3786    0.0200    -0.0002
##    940    0.2307    0.3806    0.0200    -0.0001
##    960    0.2271    0.3800    0.0200    -0.0001
##    980    0.2237    0.3781    0.0200    -0.0000
##   1000    0.2207    0.3775    0.0200    -0.0001
##   1020    0.2177    0.3771    0.0200    -0.0001
##   1040    0.2148    0.3769    0.0200    -0.0001
##   1060    0.2115    0.3788    0.0200    -0.0000
##   1080    0.2085    0.3782    0.0200    -0.0001
##   1100    0.2056    0.3767    0.0200    -0.0001
##   1120    0.2026    0.3769    0.0200    -0.0001
##   1140    0.1994    0.3779    0.0200    -0.0000
##   1160    0.1963    0.3775    0.0200    -0.0000
##   1180    0.1934    0.3776    0.0200    -0.0000
##   1200    0.1907    0.3791    0.0200    -0.0000
##   1220    0.1880    0.3805    0.0200    -0.0001
##   1240    0.1852    0.3807    0.0200    -0.0000
##   1260    0.1826    0.3798    0.0200    -0.0000
##   1280    0.1802    0.3793    0.0200    -0.0001
##   1300    0.1771    0.3776    0.0200     0.0000
##   1320    0.1746    0.3796    0.0200    -0.0001
##   1340    0.1719    0.3814    0.0200    -0.0001
##   1360    0.1695    0.3840    0.0200    -0.0000
##   1380    0.1671    0.3844    0.0200     0.0000
##   1400    0.1647    0.3840    0.0200    -0.0000
##   1420    0.1624    0.3822    0.0200    -0.0001
##   1440    0.1603    0.3808    0.0200    -0.0000
##   1460    0.1580    0.3810    0.0200    -0.0001
##   1480    0.1558    0.3808    0.0200    -0.0000
##   1500    0.1537    0.3830    0.0200    -0.0001
##   1520    0.1517    0.3829    0.0200    -0.0000
##   1540    0.1497    0.3837    0.0200    -0.0000
##   1560    0.1478    0.3821    0.0200    -0.0000
##   1580    0.1459    0.3815    0.0200    -0.0000
##   1600    0.1440    0.3812    0.0200    -0.0001
##   1620    0.1420    0.3805    0.0200    -0.0001
##   1640    0.1402    0.3798    0.0200    -0.0000
##   1660    0.1384    0.3803    0.0200    -0.0000
##   1680    0.1368    0.3811    0.0200    -0.0001
##   1700    0.1353    0.3830    0.0200    -0.0001
##   1720    0.1336    0.3835    0.0200    -0.0000
##   1740    0.1318    0.3842    0.0200    -0.0000
##   1760    0.1301    0.3853    0.0200    -0.0001
##   1780    0.1283    0.3850    0.0200    -0.0000
##   1800    0.1266    0.3844    0.0200    -0.0000
##   1820    0.1253    0.3835    0.0200    -0.0000
##   1840    0.1237    0.3842    0.0200    -0.0001
##   1860    0.1220    0.3825    0.0200    -0.0000
```

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```
## 1880   0.1204   0.3836   0.0200   -0.0000
## 1900   0.1189   0.3850   0.0200   -0.0000
## 1920   0.1175   0.3855   0.0200   -0.0000
## 1940   0.1161   0.3870   0.0200   -0.0000
## 1960   0.1145   0.3882   0.0200   -0.0000
## 1980   0.1128   0.3883   0.0200   -0.0000
## 2000   0.1114   0.3868   0.0200   -0.0001
## 2020   0.1101   0.3874   0.0200   -0.0000
## 2040   0.1088   0.3884   0.0200   -0.0000
## 2060   0.1076   0.3879   0.0200   -0.0000
## 2080   0.1063   0.3874   0.0200   -0.0000
## 2100   0.1049   0.3872   0.0200    0.0000
## 2120   0.1036   0.3872   0.0200   -0.0001
## 2140   0.1023   0.3850   0.0200   -0.0001
## 2160   0.1010   0.3843   0.0200   -0.0000
## 2180   0.0997   0.3854   0.0200   -0.0000
## 2200   0.0986   0.3845   0.0200   -0.0000
## 2220   0.0974   0.3852   0.0200   -0.0000
## 2240   0.0963   0.3845   0.0200   -0.0001
## 2260   0.0950   0.3841   0.0200   -0.0000
## 2280   0.0936   0.3849   0.0200   -0.0000
## 2300   0.0927   0.3861   0.0200   -0.0000
## 2320   0.0914   0.3864   0.0200   -0.0000
## 2340   0.0904   0.3876   0.0200   -0.0000
## 2360   0.0894   0.3883   0.0200   -0.0000
## 2380   0.0883   0.3885   0.0200   -0.0001
## 2400   0.0871   0.3891   0.0200   -0.0000
## 2420   0.0859   0.3898   0.0200   -0.0000
## 2440   0.0851   0.3893   0.0200   -0.0000
## 2460   0.0842   0.3891   0.0200   -0.0000
## 2480   0.0832   0.3883   0.0200   -0.0000
## 2500   0.0823   0.3871   0.0200   -0.0000
## 2520   0.0813   0.3860   0.0200   -0.0000
## 2540   0.0804   0.3861   0.0200   -0.0000
## 2560   0.0794   0.3858   0.0200   -0.0000
## 2580   0.0785   0.3872   0.0200   -0.0000
## 2600   0.0777   0.3884   0.0200   -0.0000
## 2620   0.0767   0.3884   0.0200   -0.0000
## 2640   0.0759   0.3880   0.0200   -0.0001
## 2660   0.0750   0.3882   0.0200   -0.0000
## 2680   0.0742   0.3889   0.0200   -0.0000
## 2700   0.0733   0.3876   0.0200   -0.0000
## 2720   0.0725   0.3884   0.0200   -0.0000
## 2740   0.0718   0.3894   0.0200   -0.0000
## 2760   0.0711   0.3901   0.0200   -0.0000
## 2780   0.0704   0.3914   0.0200   -0.0000
## 2800   0.0696   0.3932   0.0200   -0.0000
## 2820   0.0689   0.3937   0.0200   -0.0000
## 2840   0.0681   0.3938   0.0200   -0.0000
## 2860   0.0674   0.3933   0.0200   -0.0000
## 2880   0.0667   0.3930   0.0200   -0.0000
## 2900   0.0659   0.3937   0.0200   -0.0000
## 2920   0.0652   0.3927   0.0200   -0.0000
## 2940   0.0644   0.3911   0.0200   -0.0000
```

```
##   2960        0.0637           0.3924       0.0200    -0.0000
##   2980        0.0631           0.3953       0.0200    -0.0000
##   3000        0.0624           0.3932       0.0200    -0.0000
```

```
## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1        1.2634           1.2647       0.0300    0.0149
##      2        1.2360           1.2356       0.0300    0.0139
##      3        1.2092           1.2072       0.0300    0.0132
##      4        1.1849           1.1813       0.0300    0.0119
##      5        1.1648           1.1611       0.0300    0.0092
##      6        1.1436           1.1374       0.0300    0.0099
##      7        1.1214           1.1138       0.0300    0.0105
##      8        1.1006           1.0918       0.0300    0.0098
##      9        1.0798           1.0698       0.0300    0.0101
##     10        1.0622           1.0513       0.0300    0.0086
##     20        0.9190           0.9019       0.0300    0.0059
##     40        0.7323           0.7062       0.0300    0.0033
##     60        0.6203           0.5919       0.0300    0.0019
##     80        0.5487           0.5135       0.0300    0.0011
##    100        0.5019           0.4676       0.0300    0.0007
##    120        0.4701           0.4350       0.0300    0.0002
##    140        0.4453           0.4137       0.0300    0.0003
##    160        0.4251           0.3932       0.0300    0.0004
##    180        0.4086           0.3853       0.0300    0.0001
##    200        0.3944           0.3774       0.0300   -0.0001
##    220        0.3819           0.3734       0.0300    0.0000
##    240        0.3704           0.3678       0.0300   -0.0001
##    260        0.3588           0.3656       0.0300   -0.0001
##    280        0.3485           0.3648       0.0300   -0.0000
##    300        0.3375           0.3638       0.0300   -0.0001
##    320        0.3279           0.3631       0.0300    0.0000
##    340        0.3182           0.3625       0.0300   -0.0002
##    360        0.3098           0.3621       0.0300   -0.0002
##    380        0.3013           0.3636       0.0300    0.0000
##    400        0.2933           0.3631       0.0300   -0.0001
##    420        0.2871           0.3627       0.0300    0.0000
##    440        0.2805           0.3618       0.0300   -0.0001
##    460        0.2737           0.3652       0.0300   -0.0002
##    480        0.2674           0.3663       0.0300   -0.0002
##    500        0.2611           0.3692       0.0300   -0.0001
##    520        0.2550           0.3681       0.0300   -0.0002
##    540        0.2481           0.3666       0.0300   -0.0002
##    560        0.2422           0.3683       0.0300   -0.0001
##    580        0.2362           0.3701       0.0300   -0.0001
##    600        0.2306           0.3735       0.0300   -0.0001
##    620        0.2252           0.3712       0.0300   -0.0001
##    640        0.2202           0.3703       0.0300   -0.0000
##    660        0.2156           0.3699       0.0300   -0.0001
##    680        0.2107           0.3697       0.0300   -0.0001
##    700        0.2056           0.3705       0.0300   -0.0001
```

```
##     720      0.2010        0.3667       0.0300     -0.0001
##     740      0.1968        0.3674       0.0300     -0.0002
##     760      0.1924        0.3684       0.0300     -0.0000
##     780      0.1888        0.3689       0.0300     -0.0001
##     800      0.1850        0.3676       0.0300      0.0000
##     820      0.1808        0.3691       0.0300     -0.0001
##     840      0.1771        0.3717       0.0300     -0.0002
##     860      0.1738        0.3711       0.0300     -0.0001
##     880      0.1703        0.3712       0.0300     -0.0001
##     900      0.1665        0.3694       0.0300     -0.0001
##     920      0.1632        0.3724       0.0300     -0.0002
##     940      0.1599        0.3745       0.0300     -0.0001
##     960      0.1563        0.3746       0.0300     -0.0000
##     980      0.1531        0.3742       0.0300     -0.0000
##    1000      0.1504        0.3718       0.0300     -0.0002
##    1020      0.1476        0.3751       0.0300     -0.0001
##    1040      0.1449        0.3780       0.0300     -0.0001
##    1060      0.1418        0.3794       0.0300     -0.0000
##    1080      0.1389        0.3789       0.0300     -0.0000
##    1100      0.1357        0.3787       0.0300     -0.0000
##    1120      0.1329        0.3826       0.0300     -0.0000
##    1140      0.1303        0.3846       0.0300     -0.0002
##    1160      0.1278        0.3871       0.0300     -0.0001
##    1180      0.1255        0.3867       0.0300     -0.0001
##    1200      0.1234        0.3875       0.0300     -0.0001
##    1220      0.1213        0.3881       0.0300     -0.0001
##    1240      0.1192        0.3901       0.0300     -0.0001
##    1260      0.1170        0.3900       0.0300     -0.0000
##    1280      0.1148        0.3920       0.0300     -0.0000
##    1300      0.1128        0.3930       0.0300     -0.0000
##    1320      0.1103        0.3929       0.0300     -0.0001
##    1340      0.1086        0.3925       0.0300     -0.0000
##    1360      0.1062        0.3923       0.0300     -0.0000
##    1380      0.1042        0.3940       0.0300     -0.0001
##    1400      0.1023        0.3935       0.0300     -0.0000
##    1420      0.1005        0.3942       0.0300     -0.0001
##    1440      0.0990        0.3971       0.0300     -0.0000
##    1460      0.0973        0.4002       0.0300     -0.0001
##    1480      0.0955        0.4013       0.0300     -0.0001
##    1500      0.0939        0.4012       0.0300     -0.0000
##    1520      0.0924        0.4022       0.0300     -0.0000
##    1540      0.0906        0.3995       0.0300     -0.0000
##    1560      0.0891        0.4008       0.0300     -0.0000
##    1580      0.0876        0.3996       0.0300     -0.0000
##    1600      0.0861        0.3986       0.0300     -0.0000
##    1620      0.0846        0.3973       0.0300     -0.0000
##    1640      0.0832        0.3978       0.0300     -0.0000
##    1660      0.0819        0.3990       0.0300     -0.0000
##    1680      0.0806        0.4007       0.0300     -0.0000
##    1700      0.0792        0.4002       0.0300     -0.0001
##    1720      0.0779        0.3987       0.0300     -0.0000
##    1740      0.0766        0.4004       0.0300     -0.0000
##    1760      0.0753        0.4013       0.0300     -0.0000
##    1780      0.0741        0.4016       0.0300     -0.0001
```

```
## 1800    0.0729    0.4046    0.0300    -0.0000
## 1820    0.0717    0.4045    0.0300    -0.0000
## 1840    0.0707    0.4046    0.0300    -0.0000
## 1860    0.0695    0.4059    0.0300    -0.0000
## 1880    0.0684    0.4070    0.0300    -0.0000
## 1900    0.0674    0.4091    0.0300    -0.0000
## 1920    0.0662    0.4079    0.0300    -0.0000
## 1940    0.0652    0.4093    0.0300    -0.0000
## 1960    0.0641    0.4107    0.0300    -0.0000
## 1980    0.0631    0.4140    0.0300    -0.0000
## 2000    0.0622    0.4134    0.0300    -0.0000
## 2020    0.0610    0.4117    0.0300    -0.0000
## 2040    0.0598    0.4115    0.0300    -0.0001
## 2060    0.0589    0.4107    0.0300    -0.0000
## 2080    0.0579    0.4120    0.0300    -0.0000
## 2100    0.0568    0.4118    0.0300    -0.0000
## 2120    0.0555    0.4097    0.0300    -0.0000
## 2140    0.0548    0.4110    0.0300    -0.0000
## 2160    0.0539    0.4126    0.0300    -0.0000
## 2180    0.0528    0.4133    0.0300    -0.0000
## 2200    0.0520    0.4145    0.0300    -0.0000
## 2220    0.0510    0.4158    0.0300    -0.0000
## 2240    0.0503    0.4165    0.0300    -0.0000
## 2260    0.0495    0.4140    0.0300    -0.0000
## 2280    0.0488    0.4181    0.0300    -0.0000
## 2300    0.0480    0.4193    0.0300    -0.0000
## 2320    0.0472    0.4211    0.0300    -0.0000
## 2340    0.0463    0.4204    0.0300    -0.0000
## 2360    0.0455    0.4211    0.0300    -0.0000
## 2380    0.0447    0.4201    0.0300    -0.0000
## 2400    0.0440    0.4199    0.0300    -0.0000
## 2420    0.0433    0.4190    0.0300    -0.0000
## 2440    0.0426    0.4211    0.0300    -0.0000
## 2460    0.0420    0.4231    0.0300    -0.0000
## 2480    0.0413    0.4228    0.0300    -0.0000
## 2500    0.0406    0.4205    0.0300    -0.0000
## 2520    0.0399    0.4220    0.0300    -0.0000
## 2540    0.0393    0.4221    0.0300    -0.0000
## 2560    0.0386    0.4226    0.0300    -0.0000
## 2580    0.0380    0.4238    0.0300    -0.0000
## 2600    0.0374    0.4250    0.0300    -0.0000
## 2620    0.0368    0.4257    0.0300    -0.0000
## 2640    0.0361    0.4262    0.0300    -0.0000
## 2660    0.0355    0.4269    0.0300    -0.0000
## 2680    0.0350    0.4307    0.0300    -0.0000
## 2700    0.0344    0.4297    0.0300    -0.0000
## 2720    0.0339    0.4292    0.0300    -0.0000
## 2740    0.0334    0.4306    0.0300    -0.0000
## 2760    0.0329    0.4310    0.0300    -0.0000
## 2780    0.0324    0.4312    0.0300    -0.0000
## 2800    0.0319    0.4324    0.0300    -0.0000
## 2820    0.0314    0.4355    0.0300    -0.0000
## 2840    0.0309    0.4351    0.0300    -0.0000
## 2860    0.0304    0.4378    0.0300    -0.0000
```

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##    2880         0.0299          0.4367      0.0300    -0.0000
##    2900         0.0295          0.4369      0.0300    -0.0000
##    2920         0.0291          0.4364      0.0300    -0.0000
##    2940         0.0286          0.4352      0.0300    -0.0000
##    2960         0.0281          0.4369      0.0300    -0.0000
##    2980         0.0278          0.4386      0.0300    -0.0000
##    3000         0.0274          0.4405      0.0300    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter ‘train.fraction‘ is deprecated, please specify
## ‘nTrain‘ instead.

## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##      1        1.2862          1.2541      0.0100     0.0054
##      2        1.2761          1.2442      0.0100     0.0052
##      3        1.2666          1.2351      0.0100     0.0048
##      4        1.2566          1.2256      0.0100     0.0049
##      5        1.2467          1.2157      0.0100     0.0049
##      6        1.2374          1.2068      0.0100     0.0045
##      7        1.2289          1.1987      0.0100     0.0042
##      8        1.2201          1.1904      0.0100     0.0043
##      9        1.2111          1.1812      0.0100     0.0042
##     10        1.2029          1.1728      0.0100     0.0042
##     20        1.1283          1.1015      0.0100     0.0034
##     40        1.0075          0.9789      0.0100     0.0025
##     60        0.9145          0.8833      0.0100     0.0019
##     80        0.8402          0.8062      0.0100     0.0015
##    100        0.7774          0.7429      0.0100     0.0015
##    120        0.7260          0.6916      0.0100     0.0010
##    140        0.6833          0.6474      0.0100     0.0009
##    160        0.6466          0.6093      0.0100     0.0007
##    180        0.6156          0.5768      0.0100     0.0005
##    200        0.5891          0.5496      0.0100     0.0004
##    220        0.5667          0.5261      0.0100     0.0006
##    240        0.5475          0.5075      0.0100     0.0002
##    260        0.5291          0.4883      0.0100     0.0004
##    280        0.5151          0.4735      0.0100     0.0002
##    300        0.5022          0.4611      0.0100     0.0001
##    320        0.4919          0.4529      0.0100     0.0002
##    340        0.4823          0.4450      0.0100     0.0001
##    360        0.4730          0.4372      0.0100     0.0000
##    380        0.4652          0.4302      0.0100     0.0001
##    400        0.4580          0.4236      0.0100     0.0000
##    420        0.4508          0.4171      0.0100     0.0001
##    440        0.4441          0.4127      0.0100     0.0000
##    460        0.4384          0.4091      0.0100     0.0001
##    480        0.4330          0.4057      0.0100     0.0000
##    500        0.4276          0.4019      0.0100     0.0000
##    520        0.4223          0.3978      0.0100     0.0001
##    540        0.4174          0.3943      0.0100     0.0000
##    560        0.4127          0.3932      0.0100    -0.0000
##    580        0.4083          0.3909      0.0100    -0.0001
##    600        0.4042          0.3892      0.0100     0.0000
##    620        0.3996          0.3877      0.0100     0.0000
```

```
##     640      0.3951          0.3852        0.0100     0.0000
##     660      0.3910          0.3848        0.0100    -0.0001
##     680      0.3868          0.3824        0.0100     0.0000
##     700      0.3830          0.3810        0.0100    -0.0000
##     720      0.3797          0.3801        0.0100    -0.0001
##     740      0.3763          0.3793        0.0100    -0.0000
##     760      0.3727          0.3780        0.0100     0.0000
##     780      0.3692          0.3779        0.0100    -0.0000
##     800      0.3655          0.3766        0.0100     0.0000
##     820      0.3620          0.3759        0.0100    -0.0000
##     840      0.3584          0.3759        0.0100    -0.0000
##     860      0.3552          0.3756        0.0100    -0.0000
##     880      0.3517          0.3760        0.0100    -0.0000
##     900      0.3491          0.3760        0.0100    -0.0001
##     920      0.3459          0.3755        0.0100    -0.0001
##     940      0.3429          0.3759        0.0100    -0.0000
##     960      0.3397          0.3765        0.0100    -0.0000
##     980      0.3369          0.3757        0.0100    -0.0001
##    1000      0.3339          0.3750        0.0100    -0.0001
##    1020      0.3311          0.3751        0.0100    -0.0000
##    1040      0.3277          0.3754        0.0100    -0.0000
##    1060      0.3247          0.3746        0.0100     0.0000
##    1080      0.3222          0.3748        0.0100    -0.0001
##    1100      0.3195          0.3742        0.0100    -0.0001
##    1120      0.3170          0.3740        0.0100    -0.0000
##    1140      0.3146          0.3737        0.0100    -0.0000
##    1160      0.3119          0.3746        0.0100    -0.0000
##    1180      0.3094          0.3745        0.0100    -0.0001
##    1200      0.3069          0.3756        0.0100    -0.0001
##    1220      0.3046          0.3747        0.0100    -0.0000
##    1240      0.3025          0.3750        0.0100    -0.0001
##    1260      0.2999          0.3747        0.0100    -0.0001
##    1280      0.2973          0.3739        0.0100    -0.0000
##    1300      0.2952          0.3745        0.0100    -0.0000
##    1320      0.2928          0.3745        0.0100    -0.0001
##    1340      0.2906          0.3750        0.0100    -0.0000
##    1360      0.2883          0.3745        0.0100     0.0000
##    1380      0.2862          0.3731        0.0100    -0.0000
##    1400      0.2838          0.3729        0.0100    -0.0001
##    1420      0.2818          0.3732        0.0100    -0.0000
##    1440      0.2797          0.3730        0.0100    -0.0001
##    1460      0.2774          0.3731        0.0100    -0.0000
##    1480      0.2751          0.3735        0.0100    -0.0001
##    1500      0.2731          0.3751        0.0100     0.0000
##    1520      0.2709          0.3746        0.0100    -0.0000
##    1540      0.2688          0.3736        0.0100    -0.0000
##    1560      0.2669          0.3752        0.0100    -0.0001
##    1580      0.2648          0.3750        0.0100    -0.0000
##    1600      0.2626          0.3746        0.0100    -0.0000
##    1620      0.2607          0.3753        0.0100    -0.0000
##    1640      0.2587          0.3755        0.0100    -0.0000
##    1660      0.2567          0.3766        0.0100    -0.0000
##    1680      0.2548          0.3761        0.0100    -0.0000
##    1700      0.2528          0.3751        0.0100    -0.0000
```

```
##    1720    0.2511       0.3751      0.0100    -0.0001
##    1740    0.2492       0.3757      0.0100    -0.0000
##    1760    0.2475       0.3748      0.0100    -0.0000
##    1780    0.2457       0.3748      0.0100    -0.0000
##    1800    0.2439       0.3757      0.0100    -0.0000
##    1820    0.2420       0.3756      0.0100    -0.0000
##    1840    0.2399       0.3755      0.0100    -0.0000
##    1860    0.2382       0.3751      0.0100    -0.0001
##    1880    0.2362       0.3747      0.0100    -0.0001
##    1900    0.2345       0.3747      0.0100    -0.0000
##    1920    0.2327       0.3736      0.0100    -0.0001
##    1940    0.2308       0.3736      0.0100    -0.0000
##    1960    0.2290       0.3738      0.0100    -0.0000
##    1980    0.2273       0.3730      0.0100    -0.0000
##    2000    0.2258       0.3734      0.0100    -0.0000
##    2020    0.2237       0.3737      0.0100    -0.0000
##    2040    0.2218       0.3747      0.0100    -0.0000
##    2060    0.2204       0.3760      0.0100    -0.0001
##    2080    0.2187       0.3755      0.0100    -0.0000
##    2100    0.2171       0.3759      0.0100    -0.0000
##    2120    0.2155       0.3758      0.0100    -0.0001
##    2140    0.2139       0.3773      0.0100    -0.0000
##    2160    0.2124       0.3774      0.0100    -0.0000
##    2180    0.2109       0.3770      0.0100    -0.0001
##    2200    0.2092       0.3759      0.0100    -0.0000
##    2220    0.2076       0.3762      0.0100    -0.0000
##    2240    0.2061       0.3757      0.0100    -0.0000
##    2260    0.2047       0.3763      0.0100    -0.0001
##    2280    0.2033       0.3771      0.0100     0.0000
##    2300    0.2020       0.3764      0.0100    -0.0000
##    2320    0.2007       0.3762      0.0100    -0.0000
##    2340    0.1990       0.3764      0.0100    -0.0000
##    2360    0.1976       0.3766      0.0100    -0.0000
##    2380    0.1962       0.3765      0.0100    -0.0000
##    2400    0.1948       0.3769      0.0100    -0.0000
##    2420    0.1934       0.3766      0.0100    -0.0000
##    2440    0.1920       0.3765      0.0100    -0.0000
##    2460    0.1907       0.3759      0.0100    -0.0000
##    2480    0.1895       0.3758      0.0100    -0.0000
##    2500    0.1881       0.3762      0.0100    -0.0000
##    2520    0.1868       0.3764      0.0100    -0.0000
##    2540    0.1855       0.3764      0.0100    -0.0000
##    2560    0.1841       0.3762      0.0100    -0.0000
##    2580    0.1830       0.3760      0.0100    -0.0001
##    2600    0.1818       0.3759      0.0100    -0.0000
##    2620    0.1806       0.3757      0.0100    -0.0000
##    2640    0.1793       0.3756      0.0100    -0.0000
##    2660    0.1780       0.3761      0.0100    -0.0000
##    2680    0.1769       0.3774      0.0100    -0.0000
##    2700    0.1756       0.3769      0.0100    -0.0000
##    2720    0.1743       0.3773      0.0100    -0.0000
##    2740    0.1731       0.3770      0.0100    -0.0000
##    2760    0.1720       0.3762      0.0100    -0.0000
##    2780    0.1708       0.3761      0.0100    -0.0000
```

```
## 2800        0.1695          0.3767       0.0100    -0.0000
## 2820        0.1683          0.3768       0.0100    -0.0000
## 2840        0.1671          0.3764       0.0100    -0.0000
## 2860        0.1660          0.3766       0.0100    -0.0000
## 2880        0.1649          0.3765       0.0100    -0.0000
## 2900        0.1637          0.3764       0.0100    -0.0000
## 2920        0.1626          0.3764       0.0100    -0.0000
## 2940        0.1616          0.3759       0.0100    -0.0000
## 2960        0.1607          0.3759       0.0100    -0.0000
## 2980        0.1595          0.3756       0.0100    -0.0000
## 3000        0.1584          0.3763       0.0100    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter    TrainDeviance   ValidDeviance   StepSize    Improve
##      1        1.2775          1.2466       0.0200     0.0100
##      2        1.2575          1.2270       0.0200     0.0098
##      3        1.2402          1.2099       0.0200     0.0085
##      4        1.2219          1.1921       0.0200     0.0087
##      5        1.2037          1.1744       0.0200     0.0084
##      6        1.1868          1.1591       0.0200     0.0079
##      7        1.1704          1.1434       0.0200     0.0082
##      8        1.1543          1.1271       0.0200     0.0078
##      9        1.1389          1.1120       0.0200     0.0072
##     10        1.1247          1.0981       0.0200     0.0070
##     20        1.0057          0.9745       0.0200     0.0051
##     40        0.8379          0.8046       0.0200     0.0033
##     60        0.7251          0.6916       0.0200     0.0021
##     80        0.6450          0.6093       0.0200     0.0013
##    100        0.5878          0.5520       0.0200     0.0010
##    120        0.5466          0.5078       0.0200     0.0007
##    140        0.5170          0.4783       0.0200     0.0004
##    160        0.4929          0.4557       0.0200     0.0001
##    180        0.4743          0.4396       0.0200     0.0002
##    200        0.4586          0.4280       0.0200     0.0001
##    220        0.4447          0.4165       0.0200     0.0001
##    240        0.4337          0.4088       0.0200     0.0001
##    260        0.4241          0.4041       0.0200     0.0001
##    280        0.4145          0.3978       0.0200    -0.0001
##    300        0.4058          0.3939       0.0200    -0.0001
##    320        0.3969          0.3899       0.0200    -0.0000
##    340        0.3892          0.3877       0.0200    -0.0000
##    360        0.3811          0.3828       0.0200    -0.0001
##    380        0.3740          0.3823       0.0200    -0.0001
##    400        0.3673          0.3792       0.0200    -0.0001
##    420        0.3604          0.3776       0.0200    -0.0001
##    440        0.3543          0.3763       0.0200     0.0000
##    460        0.3479          0.3746       0.0200    -0.0001
##    480        0.3418          0.3749       0.0200    -0.0001
##    500        0.3361          0.3764       0.0200    -0.0001
##    520        0.3308          0.3745       0.0200    -0.0001
##    540        0.3255          0.3715       0.0200     0.0000
```

```
##    560      0.3202         0.3711       0.0200      -0.0001
##    580      0.3137         0.3680       0.0200      -0.0001
##    600      0.3078         0.3686       0.0200      -0.0001
##    620      0.3032         0.3660       0.0200      -0.0001
##    640      0.2972         0.3648       0.0200      -0.0001
##    660      0.2928         0.3640       0.0200      -0.0001
##    680      0.2880         0.3627       0.0200      -0.0001
##    700      0.2838         0.3623       0.0200      -0.0001
##    720      0.2792         0.3640       0.0200      -0.0001
##    740      0.2750         0.3623       0.0200      -0.0001
##    760      0.2705         0.3636       0.0200      -0.0001
##    780      0.2664         0.3620       0.0200      -0.0001
##    800      0.2619         0.3637       0.0200       0.0000
##    820      0.2576         0.3628       0.0200      -0.0000
##    840      0.2535         0.3612       0.0200      -0.0001
##    860      0.2501         0.3591       0.0200      -0.0001
##    880      0.2464         0.3599       0.0200      -0.0001
##    900      0.2424         0.3608       0.0200      -0.0001
##    920      0.2390         0.3615       0.0200      -0.0001
##    940      0.2355         0.3624       0.0200      -0.0001
##    960      0.2326         0.3623       0.0200      -0.0001
##    980      0.2292         0.3625       0.0200      -0.0001
##   1000      0.2257         0.3622       0.0200      -0.0000
##   1020      0.2223         0.3621       0.0200      -0.0000
##   1040      0.2190         0.3653       0.0200      -0.0000
##   1060      0.2156         0.3666       0.0200      -0.0001
##   1080      0.2120         0.3649       0.0200      -0.0000
##   1100      0.2089         0.3659       0.0200      -0.0001
##   1120      0.2059         0.3666       0.0200      -0.0001
##   1140      0.2027         0.3650       0.0200      -0.0001
##   1160      0.1996         0.3649       0.0200      -0.0001
##   1180      0.1968         0.3638       0.0200      -0.0001
##   1200      0.1939         0.3638       0.0200      -0.0001
##   1220      0.1907         0.3662       0.0200      -0.0000
##   1240      0.1880         0.3655       0.0200      -0.0001
##   1260      0.1852         0.3637       0.0200      -0.0001
##   1280      0.1826         0.3639       0.0200      -0.0000
##   1300      0.1804         0.3640       0.0200      -0.0001
##   1320      0.1780         0.3649       0.0200      -0.0001
##   1340      0.1754         0.3660       0.0200      -0.0001
##   1360      0.1729         0.3648       0.0200      -0.0001
##   1380      0.1703         0.3659       0.0200      -0.0001
##   1400      0.1677         0.3664       0.0200      -0.0000
##   1420      0.1657         0.3656       0.0200      -0.0000
##   1440      0.1635         0.3654       0.0200      -0.0001
##   1460      0.1615         0.3662       0.0200      -0.0001
##   1480      0.1594         0.3665       0.0200      -0.0001
##   1500      0.1569         0.3664       0.0200      -0.0000
##   1520      0.1550         0.3664       0.0200      -0.0000
##   1540      0.1529         0.3678       0.0200      -0.0000
##   1560      0.1510         0.3670       0.0200      -0.0000
##   1580      0.1490         0.3666       0.0200      -0.0001
##   1600      0.1471         0.3679       0.0200      -0.0001
##   1620      0.1452         0.3676       0.0200      -0.0000
```

```
## 1640    0.1432    0.3671    0.0200    -0.0001
## 1660    0.1413    0.3685    0.0200    -0.0000
## 1680    0.1395    0.3684    0.0200    -0.0000
## 1700    0.1376    0.3666    0.0200    -0.0000
## 1720    0.1357    0.3667    0.0200    -0.0001
## 1740    0.1341    0.3673    0.0200    -0.0001
## 1760    0.1324    0.3667    0.0200    -0.0000
## 1780    0.1303    0.3665    0.0200    -0.0001
## 1800    0.1287    0.3684    0.0200    -0.0001
## 1820    0.1272    0.3693    0.0200    -0.0000
## 1840    0.1258    0.3706    0.0200    -0.0000
## 1860    0.1243    0.3720    0.0200    -0.0000
## 1880    0.1226    0.3726    0.0200    -0.0000
## 1900    0.1212    0.3721    0.0200    -0.0000
## 1920    0.1197    0.3710    0.0200    -0.0000
## 1940    0.1182    0.3711    0.0200    -0.0000
## 1960    0.1168    0.3710    0.0200    -0.0000
## 1980    0.1152    0.3709    0.0200    -0.0001
## 2000    0.1139    0.3700    0.0200    -0.0000
## 2020    0.1126    0.3716    0.0200    -0.0001
## 2040    0.1112    0.3716    0.0200    -0.0000
## 2060    0.1101    0.3723    0.0200    -0.0000
## 2080    0.1085    0.3722    0.0200    -0.0000
## 2100    0.1072    0.3703    0.0200    -0.0000
## 2120    0.1059    0.3693    0.0200    -0.0000
## 2140    0.1045    0.3708    0.0200    -0.0001
## 2160    0.1032    0.3713    0.0200    -0.0001
## 2180    0.1022    0.3740    0.0200    -0.0000
## 2200    0.1008    0.3734    0.0200    -0.0000
## 2220    0.0997    0.3753    0.0200    -0.0000
## 2240    0.0985    0.3764    0.0200    -0.0000
## 2260    0.0972    0.3768    0.0200     0.0000
## 2280    0.0958    0.3756    0.0200    -0.0000
## 2300    0.0949    0.3763    0.0200    -0.0000
## 2320    0.0938    0.3767    0.0200    -0.0000
## 2340    0.0929    0.3777    0.0200    -0.0000
## 2360    0.0918    0.3774    0.0200    -0.0000
## 2380    0.0909    0.3788    0.0200    -0.0000
## 2400    0.0900    0.3776    0.0200    -0.0000
## 2420    0.0888    0.3781    0.0200    -0.0000
## 2440    0.0877    0.3776    0.0200    -0.0000
## 2460    0.0867    0.3775    0.0200    -0.0000
## 2480    0.0857    0.3786    0.0200    -0.0000
## 2500    0.0847    0.3795    0.0200    -0.0000
## 2520    0.0840    0.3789    0.0200    -0.0000
## 2540    0.0830    0.3802    0.0200    -0.0000
## 2560    0.0822    0.3795    0.0200    -0.0000
## 2580    0.0812    0.3794    0.0200    -0.0000
## 2600    0.0803    0.3791    0.0200    -0.0000
## 2620    0.0793    0.3812    0.0200    -0.0000
## 2640    0.0784    0.3817    0.0200    -0.0000
## 2660    0.0775    0.3834    0.0200    -0.0000
## 2680    0.0767    0.3832    0.0200    -0.0000
## 2700    0.0758    0.3831    0.0200    -0.0000
```

```
##   2720      0.0750         0.3841       0.0200    -0.0000
##   2740      0.0741         0.3845       0.0200    -0.0000
##   2760      0.0733         0.3842       0.0200    -0.0000
##   2780      0.0725         0.3844       0.0200    -0.0000
##   2800      0.0717         0.3842       0.0200    -0.0000
##   2820      0.0708         0.3840       0.0200    -0.0000
##   2840      0.0699         0.3853       0.0200    -0.0000
##   2860      0.0690         0.3849       0.0200    -0.0000
##   2880      0.0682         0.3855       0.0200    -0.0000
##   2900      0.0674         0.3859       0.0200    -0.0000
##   2920      0.0667         0.3882       0.0200    -0.0000
##   2940      0.0659         0.3884       0.0200    -0.0000
##   2960      0.0652         0.3881       0.0200    -0.0000
##   2980      0.0645         0.3885       0.0200    -0.0000
##   3000      0.0638         0.3905       0.0200    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1       1.2650         1.2334       0.0300     0.0167
##      2       1.2365         1.2044       0.0300     0.0140
##      3       1.2091         1.1767       0.0300     0.0136
##      4       1.1833         1.1505       0.0300     0.0138
##      5       1.1600         1.1276       0.0300     0.0111
##      6       1.1371         1.1054       0.0300     0.0107
##      7       1.1158         1.0837       0.0300     0.0106
##      8       1.0968         1.0648       0.0300     0.0096
##      9       1.0779         1.0463       0.0300     0.0091
##     10       1.0596         1.0279       0.0300     0.0094
##     20       0.9092         0.8716       0.0300     0.0061
##     40       0.7180         0.6745       0.0300     0.0035
##     60       0.6082         0.5620       0.0300     0.0018
##     80       0.5440         0.4999       0.0300     0.0012
##    100       0.4990         0.4529       0.0300     0.0003
##    120       0.4687         0.4254       0.0300     0.0005
##    140       0.4483         0.4130       0.0300     0.0001
##    160       0.4291         0.3979       0.0300     0.0001
##    180       0.4142         0.3936       0.0300    -0.0001
##    200       0.4012         0.3876       0.0300    -0.0001
##    220       0.3896         0.3833       0.0300    -0.0002
##    240       0.3785         0.3804       0.0300     0.0000
##    260       0.3672         0.3801       0.0300    -0.0001
##    280       0.3576         0.3781       0.0300    -0.0002
##    300       0.3477         0.3758       0.0300     0.0000
##    320       0.3397         0.3748       0.0300    -0.0002
##    340       0.3312         0.3751       0.0300    -0.0000
##    360       0.3230         0.3748       0.0300    -0.0002
##    380       0.3160         0.3710       0.0300    -0.0002
##    400       0.3081         0.3702       0.0300    -0.0002
##    420       0.3001         0.3675       0.0300    -0.0001
##    440       0.2929         0.3672       0.0300    -0.0001
##    460       0.2853         0.3696       0.0300    -0.0001
```

```
##      480         0.2786            0.3713          0.0300       -0.0001
##      500         0.2715            0.3709          0.0300       -0.0000
##      520         0.2658            0.3721          0.0300       -0.0001
##      540         0.2602            0.3760          0.0300       -0.0001
##      560         0.2543            0.3768          0.0300       -0.0002
##      580         0.2487            0.3792          0.0300        0.0000
##      600         0.2434            0.3786          0.0300       -0.0001
##      620         0.2381            0.3782          0.0300       -0.0001
##      640         0.2327            0.3799          0.0300       -0.0000
##      660         0.2275            0.3790          0.0300       -0.0001
##      680         0.2223            0.3787          0.0300       -0.0001
##      700         0.2182            0.3796          0.0300       -0.0002
##      720         0.2142            0.3780          0.0300       -0.0002
##      740         0.2095            0.3768          0.0300       -0.0002
##      760         0.2046            0.3796          0.0300       -0.0001
##      780         0.2006            0.3829          0.0300       -0.0001
##      800         0.1966            0.3831          0.0300       -0.0002
##      820         0.1928            0.3830          0.0300       -0.0001
##      840         0.1893            0.3872          0.0300       -0.0001
##      860         0.1848            0.3890          0.0300       -0.0001
##      880         0.1806            0.3851          0.0300       -0.0001
##      900         0.1767            0.3895          0.0300       -0.0001
##      920         0.1728            0.3870          0.0300       -0.0001
##      940         0.1695            0.3864          0.0300       -0.0001
##      960         0.1662            0.3835          0.0300       -0.0000
##      980         0.1632            0.3842          0.0300       -0.0001
##     1000         0.1597            0.3862          0.0300       -0.0001
##     1020         0.1563            0.3851          0.0300       -0.0001
##     1040         0.1532            0.3860          0.0300       -0.0001
##     1060         0.1504            0.3878          0.0300       -0.0001
##     1080         0.1475            0.3894          0.0300       -0.0001
##     1100         0.1445            0.3903          0.0300       -0.0001
##     1120         0.1418            0.3891          0.0300       -0.0001
##     1140         0.1393            0.3914          0.0300       -0.0000
##     1160         0.1362            0.3911          0.0300       -0.0001
##     1180         0.1336            0.3942          0.0300       -0.0001
##     1200         0.1311            0.3980          0.0300       -0.0001
##     1220         0.1287            0.3963          0.0300        0.0001
##     1240         0.1260            0.3976          0.0300       -0.0000
##     1260         0.1239            0.3975          0.0300       -0.0001
##     1280         0.1217            0.4001          0.0300       -0.0000
##     1300         0.1197            0.4006          0.0300       -0.0000
##     1320         0.1175            0.4013          0.0300       -0.0000
##     1340         0.1153            0.4024          0.0300       -0.0001
##     1360         0.1133            0.4008          0.0300       -0.0001
##     1380         0.1112            0.4032          0.0300       -0.0001
##     1400         0.1090            0.4035          0.0300       -0.0000
##     1420         0.1072            0.4044          0.0300       -0.0001
##     1440         0.1052            0.4047          0.0300       -0.0001
##     1460         0.1032            0.4039          0.0300       -0.0001
##     1480         0.1013            0.4046          0.0300       -0.0001
##     1500         0.0995            0.4050          0.0300       -0.0001
##     1520         0.0978            0.4037          0.0300       -0.0001
##     1540         0.0957            0.4034          0.0300       -0.0000
```

```
## 1560    0.0940    0.4028    0.0300    0.0000
## 1580    0.0924    0.4026    0.0300   -0.0000
## 1600    0.0907    0.4015    0.0300   -0.0001
## 1620    0.0892    0.4024    0.0300   -0.0000
## 1640    0.0876    0.4017    0.0300   -0.0000
## 1660    0.0859    0.4016    0.0300   -0.0000
## 1680    0.0847    0.4015    0.0300   -0.0001
## 1700    0.0832    0.4037    0.0300    0.0000
## 1720    0.0819    0.4055    0.0300   -0.0001
## 1740    0.0805    0.4085    0.0300   -0.0001
## 1760    0.0794    0.4056    0.0300   -0.0001
## 1780    0.0781    0.4054    0.0300   -0.0001
## 1800    0.0767    0.4041    0.0300   -0.0001
## 1820    0.0753    0.4062    0.0300   -0.0000
## 1840    0.0740    0.4092    0.0300   -0.0001
## 1860    0.0728    0.4094    0.0300   -0.0001
## 1880    0.0716    0.4105    0.0300   -0.0000
## 1900    0.0702    0.4091    0.0300   -0.0000
## 1920    0.0688    0.4104    0.0300   -0.0001
## 1940    0.0677    0.4113    0.0300   -0.0000
## 1960    0.0666    0.4108    0.0300   -0.0000
## 1980    0.0657    0.4106    0.0300   -0.0001
## 2000    0.0647    0.4100    0.0300   -0.0000
## 2020    0.0635    0.4112    0.0300   -0.0001
## 2040    0.0623    0.4130    0.0300   -0.0000
## 2060    0.0614    0.4141    0.0300   -0.0001
## 2080    0.0604    0.4106    0.0300   -0.0000
## 2100    0.0595    0.4114    0.0300    0.0000
## 2120    0.0583    0.4131    0.0300   -0.0000
## 2140    0.0572    0.4139    0.0300    0.0000
## 2160    0.0564    0.4150    0.0300   -0.0000
## 2180    0.0554    0.4189    0.0300   -0.0000
## 2200    0.0543    0.4193    0.0300   -0.0000
## 2220    0.0535    0.4175    0.0300   -0.0000
## 2240    0.0527    0.4182    0.0300   -0.0000
## 2260    0.0517    0.4170    0.0300   -0.0000
## 2280    0.0508    0.4133    0.0300   -0.0000
## 2300    0.0500    0.4131    0.0300   -0.0000
## 2320    0.0493    0.4134    0.0300   -0.0000
## 2340    0.0486    0.4152    0.0300   -0.0000
## 2360    0.0478    0.4196    0.0300   -0.0000
## 2380    0.0470    0.4194    0.0300   -0.0000
## 2400    0.0462    0.4193    0.0300   -0.0000
## 2420    0.0454    0.4193    0.0300   -0.0000
## 2440    0.0447    0.4218    0.0300   -0.0000
## 2460    0.0441    0.4226    0.0300   -0.0000
## 2480    0.0435    0.4223    0.0300   -0.0000
## 2500    0.0428    0.4225    0.0300   -0.0000
## 2520    0.0421    0.4228    0.0300   -0.0000
## 2540    0.0414    0.4248    0.0300   -0.0000
## 2560    0.0408    0.4269    0.0300   -0.0000
## 2580    0.0402    0.4290    0.0300   -0.0000
## 2600    0.0395    0.4266    0.0300   -0.0000
## 2620    0.0390    0.4261    0.0300   -0.0000
```

```
## 2640       0.0383          0.4250       0.0300     -0.0000
## 2660       0.0377          0.4277       0.0300     -0.0000
## 2680       0.0371          0.4296       0.0300     -0.0000
## 2700       0.0364          0.4281       0.0300      0.0000
## 2720       0.0358          0.4275       0.0300     -0.0000
## 2740       0.0353          0.4279       0.0300     -0.0000
## 2760       0.0348          0.4291       0.0300     -0.0000
## 2780       0.0342          0.4288       0.0300     -0.0000
## 2800       0.0337          0.4325       0.0300     -0.0000
## 2820       0.0333          0.4346       0.0300     -0.0000
## 2840       0.0327          0.4357       0.0300     -0.0000
## 2860       0.0322          0.4347       0.0300     -0.0000
## 2880       0.0318          0.4342       0.0300     -0.0000
## 2900       0.0313          0.4332       0.0300     -0.0000
## 2920       0.0308          0.4320       0.0300     -0.0000
## 2940       0.0303          0.4326       0.0300     -0.0000
## 2960       0.0298          0.4333       0.0300     -0.0000
## 2980       0.0294          0.4354       0.0300     -0.0000
## 3000       0.0289          0.4373       0.0300     -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##      1       1.2858          1.2613       0.0100     0.0050
##      2       1.2758          1.2512       0.0100     0.0050
##      3       1.2660          1.2416       0.0100     0.0048
##      4       1.2571          1.2326       0.0100     0.0044
##      5       1.2473          1.2227       0.0100     0.0048
##      6       1.2376          1.2129       0.0100     0.0046
##      7       1.2290          1.2041       0.0100     0.0042
##      8       1.2204          1.1952       0.0100     0.0043
##      9       1.2123          1.1867       0.0100     0.0036
##     10       1.2036          1.1782       0.0100     0.0041
##     20       1.1271          1.1005       0.0100     0.0032
##     40       1.0064          0.9769       0.0100     0.0025
##     60       0.9139          0.8819       0.0100     0.0023
##     80       0.8360          0.8039       0.0100     0.0015
##    100       0.7753          0.7424       0.0100     0.0013
##    120       0.7226          0.6898       0.0100     0.0012
##    140       0.6794          0.6476       0.0100     0.0008
##    160       0.6412          0.6099       0.0100     0.0009
##    180       0.6100          0.5782       0.0100     0.0006
##    200       0.5832          0.5517       0.0100     0.0006
##    220       0.5599          0.5291       0.0100     0.0004
##    240       0.5397          0.5078       0.0100     0.0003
##    260       0.5223          0.4906       0.0100     0.0002
##    280       0.5072          0.4768       0.0100     0.0004
##    300       0.4946          0.4661       0.0100     0.0001
##    320       0.4834          0.4556       0.0100     0.0001
##    340       0.4735          0.4474       0.0100     0.0001
##    360       0.4642          0.4383       0.0100     0.0001
##    380       0.4559          0.4314       0.0100     0.0000
```

```
##      400      0.4485         0.4246       0.0100    -0.0000
##      420      0.4417         0.4202       0.0100     0.0001
##      440      0.4352         0.4148       0.0100     0.0002
##      460      0.4286         0.4101       0.0100     0.0001
##      480      0.4231         0.4075       0.0100     0.0000
##      500      0.4177         0.4051       0.0100     0.0000
##      520      0.4126         0.4037       0.0100     0.0000
##      540      0.4071         0.4001       0.0100     0.0000
##      560      0.4024         0.3978       0.0100    -0.0000
##      580      0.3975         0.3964       0.0100    -0.0000
##      600      0.3930         0.3944       0.0100     0.0000
##      620      0.3884         0.3916       0.0100    -0.0000
##      640      0.3844         0.3902       0.0100     0.0000
##      660      0.3804         0.3889       0.0100     0.0001
##      680      0.3767         0.3875       0.0100    -0.0000
##      700      0.3730         0.3869       0.0100     0.0000
##      720      0.3694         0.3865       0.0100    -0.0000
##      740      0.3658         0.3859       0.0100    -0.0000
##      760      0.3621         0.3848       0.0100    -0.0000
##      780      0.3588         0.3836       0.0100     0.0000
##      800      0.3555         0.3845       0.0100    -0.0001
##      820      0.3517         0.3855       0.0100    -0.0000
##      840      0.3483         0.3845       0.0100    -0.0000
##      860      0.3449         0.3834       0.0100    -0.0001
##      880      0.3413         0.3841       0.0100     0.0000
##      900      0.3381         0.3833       0.0100     0.0000
##      920      0.3349         0.3838       0.0100    -0.0000
##      940      0.3317         0.3841       0.0100     0.0000
##      960      0.3285         0.3837       0.0100    -0.0000
##      980      0.3255         0.3828       0.0100    -0.0000
##     1000      0.3221         0.3824       0.0100    -0.0000
##     1020      0.3193         0.3822       0.0100    -0.0000
##     1040      0.3165         0.3817       0.0100    -0.0001
##     1060      0.3135         0.3814       0.0100    -0.0001
##     1080      0.3108         0.3832       0.0100    -0.0000
##     1100      0.3081         0.3841       0.0100    -0.0000
##     1120      0.3054         0.3846       0.0100    -0.0000
##     1140      0.3027         0.3847       0.0100    -0.0000
##     1160      0.2995         0.3852       0.0100    -0.0000
##     1180      0.2968         0.3848       0.0100    -0.0001
##     1200      0.2944         0.3846       0.0100    -0.0001
##     1220      0.2921         0.3847       0.0100    -0.0001
##     1240      0.2894         0.3851       0.0100    -0.0000
##     1260      0.2870         0.3849       0.0100    -0.0001
##     1280      0.2846         0.3855       0.0100    -0.0000
##     1300      0.2822         0.3860       0.0100    -0.0001
##     1320      0.2795         0.3846       0.0100    -0.0000
##     1340      0.2769         0.3845       0.0100    -0.0001
##     1360      0.2746         0.3852       0.0100    -0.0001
##     1380      0.2724         0.3853       0.0100    -0.0000
##     1400      0.2701         0.3869       0.0100    -0.0000
##     1420      0.2677         0.3856       0.0100    -0.0000
##     1440      0.2656         0.3856       0.0100    -0.0000
##     1460      0.2636         0.3861       0.0100    -0.0000
```

```
## 1480       0.2613        0.3865        0.0100    -0.0001
## 1500       0.2591        0.3858        0.0100    -0.0000
## 1520       0.2573        0.3856        0.0100    -0.0000
## 1540       0.2553        0.3858        0.0100    -0.0001
## 1560       0.2531        0.3864        0.0100    -0.0000
## 1580       0.2510        0.3871        0.0100    -0.0000
## 1600       0.2491        0.3870        0.0100    -0.0000
## 1620       0.2472        0.3873        0.0100    -0.0000
## 1640       0.2453        0.3861        0.0100    -0.0000
## 1660       0.2428        0.3862        0.0100    -0.0000
## 1680       0.2409        0.3869        0.0100    -0.0000
## 1700       0.2391        0.3878        0.0100     0.0000
## 1720       0.2371        0.3878        0.0100    -0.0001
## 1740       0.2354        0.3880        0.0100    -0.0000
## 1760       0.2335        0.3883        0.0100    -0.0000
## 1780       0.2319        0.3887        0.0100    -0.0000
## 1800       0.2304        0.3889        0.0100    -0.0000
## 1820       0.2285        0.3888        0.0100    -0.0001
## 1840       0.2268        0.3893        0.0100    -0.0001
## 1860       0.2251        0.3895        0.0100    -0.0000
## 1880       0.2235        0.3898        0.0100     0.0000
## 1900       0.2219        0.3905        0.0100    -0.0000
## 1920       0.2201        0.3892        0.0100    -0.0001
## 1940       0.2185        0.3889        0.0100    -0.0000
## 1960       0.2170        0.3888        0.0100    -0.0000
## 1980       0.2153        0.3884        0.0100     0.0000
## 2000       0.2138        0.3886        0.0100    -0.0000
## 2020       0.2119        0.3881        0.0100    -0.0000
## 2040       0.2104        0.3877        0.0100    -0.0000
## 2060       0.2088        0.3872        0.0100    -0.0000
## 2080       0.2070        0.3871        0.0100    -0.0000
## 2100       0.2056        0.3874        0.0100    -0.0000
## 2120       0.2040        0.3885        0.0100    -0.0000
## 2140       0.2025        0.3891        0.0100    -0.0000
## 2160       0.2011        0.3904        0.0100    -0.0000
## 2180       0.1997        0.3913        0.0100    -0.0000
## 2200       0.1981        0.3928        0.0100    -0.0000
## 2220       0.1967        0.3936        0.0100    -0.0001
## 2240       0.1953        0.3938        0.0100    -0.0000
## 2260       0.1937        0.3944        0.0100    -0.0000
## 2280       0.1923        0.3944        0.0100    -0.0000
## 2300       0.1910        0.3945        0.0100    -0.0000
## 2320       0.1898        0.3948        0.0100    -0.0000
## 2340       0.1884        0.3950        0.0100    -0.0001
## 2360       0.1869        0.3937        0.0100    -0.0000
## 2380       0.1855        0.3942        0.0100    -0.0001
## 2400       0.1841        0.3942        0.0100    -0.0000
## 2420       0.1828        0.3945        0.0100    -0.0000
## 2440       0.1816        0.3954        0.0100    -0.0000
## 2460       0.1802        0.3943        0.0100    -0.0000
## 2480       0.1786        0.3934        0.0100    -0.0000
## 2500       0.1774        0.3939        0.0100    -0.0001
## 2520       0.1763        0.3936        0.0100    -0.0000
## 2540       0.1752        0.3941        0.0100    -0.0000
```

```
##    2560        0.1739          0.3932        0.0100    -0.0000
##    2580        0.1726          0.3936        0.0100    -0.0000
##    2600        0.1713          0.3936        0.0100    -0.0000
##    2620        0.1701          0.3941        0.0100    -0.0000
##    2640        0.1690          0.3950        0.0100    -0.0000
##    2660        0.1680          0.3950        0.0100    -0.0000
##    2680        0.1667          0.3948        0.0100    -0.0000
##    2700        0.1656          0.3954        0.0100    -0.0000
##    2720        0.1645          0.3960        0.0100    -0.0000
##    2740        0.1633          0.3959        0.0100     0.0000
##    2760        0.1621          0.3952        0.0100    -0.0000
##    2780        0.1609          0.3951        0.0100    -0.0000
##    2800        0.1598          0.3947        0.0100    -0.0000
##    2820        0.1587          0.3960        0.0100    -0.0000
##    2840        0.1576          0.3957        0.0100    -0.0000
##    2860        0.1564          0.3956        0.0100    -0.0000
##    2880        0.1553          0.3952        0.0100    -0.0000
##    2900        0.1542          0.3955        0.0100    -0.0000
##    2920        0.1532          0.3966        0.0100    -0.0000
##    2940        0.1522          0.3964        0.0100    -0.0000
##    2960        0.1512          0.3961        0.0100    -0.0000
##    2980        0.1503          0.3975        0.0100    -0.0000
##    3000        0.1494          0.3968        0.0100    -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance    StepSize    Improve
##     1        1.2758          1.2519        0.0200     0.0102
##     2        1.2560          1.2317        0.0200     0.0100
##     3        1.2370          1.2120        0.0200     0.0094
##     4        1.2194          1.1931        0.0200     0.0083
##     5        1.2015          1.1743        0.0200     0.0089
##     6        1.1864          1.1588        0.0200     0.0072
##     7        1.1704          1.1430        0.0200     0.0079
##     8        1.1550          1.1270        0.0200     0.0071
##     9        1.1402          1.1124        0.0200     0.0073
##    10        1.1255          1.0978        0.0200     0.0071
##    20        1.0053          0.9754        0.0200     0.0047
##    40        0.8352          0.8032        0.0200     0.0030
##    60        0.7212          0.6883        0.0200     0.0021
##    80        0.6418          0.6072        0.0200     0.0016
##   100        0.5833          0.5442        0.0200     0.0011
##   120        0.5423          0.5065        0.0200     0.0003
##   140        0.5106          0.4755        0.0200     0.0005
##   160        0.4858          0.4549        0.0200     0.0002
##   180        0.4668          0.4372        0.0200     0.0003
##   200        0.4508          0.4260        0.0200     0.0001
##   220        0.4362          0.4155        0.0200     0.0001
##   240        0.4236          0.4072        0.0200    -0.0001
##   260        0.4130          0.4002        0.0200     0.0001
##   280        0.4038          0.3969        0.0200     0.0000
##   300        0.3947          0.3943        0.0200    -0.0002
```

```
## 320    0.3862    0.3922    0.0200    -0.0001
## 340    0.3785    0.3893    0.0200     0.0000
## 360    0.3713    0.3897    0.0200    -0.0001
## 380    0.3639    0.3866    0.0200    -0.0002
## 400    0.3569    0.3840    0.0200    -0.0001
## 420    0.3502    0.3855    0.0200    -0.0001
## 440    0.3435    0.3833    0.0200    -0.0001
## 460    0.3367    0.3801    0.0200    -0.0001
## 480    0.3310    0.3809    0.0200    -0.0001
## 500    0.3248    0.3808    0.0200    -0.0001
## 520    0.3188    0.3803    0.0200    -0.0000
## 540    0.3130    0.3793    0.0200    -0.0001
## 560    0.3071    0.3787    0.0200    -0.0001
## 580    0.3012    0.3795    0.0200    -0.0001
## 600    0.2962    0.3805    0.0200    -0.0001
## 620    0.2914    0.3809    0.0200    -0.0001
## 640    0.2866    0.3828    0.0200    -0.0001
## 660    0.2821    0.3824    0.0200    -0.0000
## 680    0.2769    0.3843    0.0200    -0.0000
## 700    0.2728    0.3848    0.0200    -0.0000
## 720    0.2679    0.3857    0.0200    -0.0002
## 740    0.2636    0.3863    0.0200    -0.0001
## 760    0.2592    0.3878    0.0200    -0.0001
## 780    0.2550    0.3882    0.0200    -0.0001
## 800    0.2507    0.3869    0.0200    -0.0001
## 820    0.2469    0.3877    0.0200    -0.0001
## 840    0.2430    0.3884    0.0200    -0.0001
## 860    0.2393    0.3880    0.0200    -0.0000
## 880    0.2355    0.3875    0.0200    -0.0001
## 900    0.2317    0.3879    0.0200    -0.0001
## 920    0.2282    0.3879    0.0200    -0.0000
## 940    0.2248    0.3873    0.0200    -0.0001
## 960    0.2218    0.3859    0.0200    -0.0001
## 980    0.2185    0.3863    0.0200    -0.0001
## 1000   0.2151    0.3883    0.0200    -0.0001
## 1020   0.2112    0.3860    0.0200    -0.0001
## 1040   0.2080    0.3857    0.0200    -0.0001
## 1060   0.2047    0.3861    0.0200    -0.0001
## 1080   0.2014    0.3876    0.0200    -0.0001
## 1100   0.1987    0.3869    0.0200    -0.0001
## 1120   0.1958    0.3872    0.0200    -0.0000
## 1140   0.1929    0.3868    0.0200    -0.0001
## 1160   0.1899    0.3878    0.0200    -0.0000
## 1180   0.1869    0.3876    0.0200    -0.0001
## 1200   0.1846    0.3871    0.0200    -0.0000
## 1220   0.1817    0.3864    0.0200    -0.0000
## 1240   0.1788    0.3865    0.0200    -0.0000
## 1260   0.1765    0.3871    0.0200    -0.0000
## 1280   0.1739    0.3883    0.0200    -0.0001
## 1300   0.1713    0.3899    0.0200    -0.0001
## 1320   0.1691    0.3887    0.0200    -0.0001
## 1340   0.1668    0.3880    0.0200     0.0000
## 1360   0.1642    0.3885    0.0200    -0.0001
## 1380   0.1620    0.3879    0.0200    -0.0001
```

```
## 1400    0.1599    0.3896    0.0200    -0.0002
## 1420    0.1578    0.3883    0.0200    -0.0000
## 1440    0.1555    0.3904    0.0200    -0.0001
## 1460    0.1530    0.3902    0.0200    -0.0001
## 1480    0.1509    0.3896    0.0200    -0.0000
## 1500    0.1490    0.3906    0.0200    -0.0001
## 1520    0.1472    0.3911    0.0200    -0.0001
## 1540    0.1452    0.3910    0.0200    -0.0000
## 1560    0.1432    0.3906    0.0200    -0.0000
## 1580    0.1413    0.3917    0.0200    -0.0001
## 1600    0.1396    0.3921    0.0200    -0.0001
## 1620    0.1377    0.3932    0.0200    -0.0001
## 1640    0.1359    0.3933    0.0200    -0.0001
## 1660    0.1341    0.3949    0.0200    -0.0000
## 1680    0.1324    0.3939    0.0200    -0.0000
## 1700    0.1307    0.3933    0.0200    -0.0001
## 1720    0.1290    0.3944    0.0200    -0.0001
## 1740    0.1273    0.3956    0.0200    -0.0001
## 1760    0.1257    0.3953    0.0200    -0.0000
## 1780    0.1241    0.3955    0.0200    -0.0000
## 1800    0.1225    0.3939    0.0200    -0.0000
## 1820    0.1209    0.3946    0.0200    -0.0001
## 1840    0.1196    0.3931    0.0200    -0.0000
## 1860    0.1183    0.3932    0.0200    -0.0000
## 1880    0.1167    0.3934    0.0200    -0.0000
## 1900    0.1152    0.3935    0.0200    -0.0000
## 1920    0.1138    0.3931    0.0200    -0.0000
## 1940    0.1123    0.3932    0.0200    -0.0000
## 1960    0.1109    0.3934    0.0200    -0.0000
## 1980    0.1094    0.3926    0.0200    -0.0000
## 2000    0.1084    0.3916    0.0200    -0.0000
## 2020    0.1068    0.3903    0.0200    -0.0000
## 2040    0.1055    0.3912    0.0200    -0.0000
## 2060    0.1042    0.3919    0.0200    -0.0000
## 2080    0.1029    0.3929    0.0200    -0.0000
## 2100    0.1018    0.3938    0.0200    -0.0000
## 2120    0.1004    0.3936    0.0200    -0.0000
## 2140    0.0991    0.3934    0.0200    -0.0000
## 2160    0.0977    0.3937    0.0200     0.0000
## 2180    0.0965    0.3924    0.0200    -0.0000
## 2200    0.0953    0.3926    0.0200    -0.0000
## 2220    0.0941    0.3932    0.0200    -0.0000
## 2240    0.0930    0.3925    0.0200    -0.0000
## 2260    0.0917    0.3938    0.0200    -0.0000
## 2280    0.0905    0.3925    0.0200    -0.0000
## 2300    0.0893    0.3927    0.0200    -0.0000
## 2320    0.0882    0.3939    0.0200    -0.0000
## 2340    0.0873    0.3952    0.0200    -0.0000
## 2360    0.0863    0.3956    0.0200    -0.0000
## 2380    0.0852    0.3955    0.0200    -0.0000
## 2400    0.0843    0.3965    0.0200    -0.0000
## 2420    0.0833    0.3970    0.0200    -0.0000
## 2440    0.0824    0.3973    0.0200    -0.0000
## 2460    0.0813    0.3964    0.0200    -0.0000
```

```
## 2480      0.0803        0.3973      0.0200    -0.0000
## 2500      0.0792        0.3976      0.0200    -0.0000
## 2520      0.0783        0.3982      0.0200    -0.0000
## 2540      0.0773        0.3999      0.0200    -0.0000
## 2560      0.0763        0.4007      0.0200    -0.0000
## 2580      0.0754        0.4009      0.0200    -0.0000
## 2600      0.0746        0.4014      0.0200    -0.0000
## 2620      0.0737        0.4020      0.0200    -0.0000
## 2640      0.0729        0.4033      0.0200    -0.0000
## 2660      0.0719        0.4026      0.0200    -0.0000
## 2680      0.0711        0.4034      0.0200    -0.0000
## 2700      0.0702        0.4034      0.0200    -0.0000
## 2720      0.0693        0.4050      0.0200    -0.0000
## 2740      0.0685        0.4036      0.0200    -0.0000
## 2760      0.0678        0.4039      0.0200    -0.0000
## 2780      0.0671        0.4046      0.0200    -0.0000
## 2800      0.0663        0.4035      0.0200    -0.0000
## 2820      0.0655        0.4043      0.0200    -0.0000
## 2840      0.0647        0.4034      0.0200    -0.0000
## 2860      0.0639        0.4045      0.0200    -0.0000
## 2880      0.0632        0.4049      0.0200    -0.0000
## 2900      0.0625        0.4054      0.0200    -0.0000
## 2920      0.0617        0.4060      0.0200    -0.0000
## 2940      0.0609        0.4044      0.0200    -0.0000
## 2960      0.0602        0.4045      0.0200    -0.0000
## 2980      0.0595        0.4047      0.0200    -0.0000
## 3000      0.0587        0.4034      0.0200    -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1       1.2635          1.2381       0.0300    0.0160
##      2       1.2342          1.2083       0.0300    0.0154
##      3       1.2080          1.1814       0.0300    0.0122
##      4       1.1823          1.1569       0.0300    0.0127
##      5       1.1576          1.1318       0.0300    0.0124
##      6       1.1341          1.1077       0.0300    0.0110
##      7       1.1132          1.0870       0.0300    0.0101
##      8       1.0949          1.0676       0.0300    0.0088
##      9       1.0761          1.0491       0.0300    0.0093
##     10       1.0560          1.0274       0.0300    0.0094
##     20       0.9109          0.8748       0.0300    0.0054
##     40       0.7209          0.6903       0.0300    0.0030
##     60       0.6088          0.5747       0.0300    0.0020
##     80       0.5391          0.5096       0.0300    0.0011
##    100       0.4945          0.4664       0.0300    0.0007
##    120       0.4652          0.4382       0.0300    0.0003
##    140       0.4436          0.4216       0.0300    0.0003
##    160       0.4268          0.4108       0.0300    0.0001
##    180       0.4119          0.4041       0.0300   -0.0002
##    200       0.3980          0.3993       0.0300   -0.0000
##    220       0.3855          0.3977       0.0300   -0.0002
```

```
##      240      0.3738       0.3956      0.0300   -0.0000
##      260      0.3628       0.3921      0.0300    0.0001
##      280      0.3527       0.3918      0.0300   -0.0001
##      300      0.3429       0.3916      0.0300   -0.0000
##      320      0.3333       0.3887      0.0300   -0.0001
##      340      0.3241       0.3845      0.0300   -0.0001
##      360      0.3152       0.3846      0.0300   -0.0001
##      380      0.3074       0.3870      0.0300   -0.0002
##      400      0.3000       0.3903      0.0300   -0.0002
##      420      0.2933       0.3877      0.0300   -0.0004
##      440      0.2860       0.3890      0.0300   -0.0001
##      460      0.2790       0.3893      0.0300   -0.0001
##      480      0.2716       0.3901      0.0300   -0.0002
##      500      0.2651       0.3886      0.0300   -0.0001
##      520      0.2585       0.3882      0.0300   -0.0000
##      540      0.2532       0.3895      0.0300   -0.0001
##      560      0.2475       0.3924      0.0300   -0.0001
##      580      0.2415       0.3890      0.0300   -0.0001
##      600      0.2356       0.3916      0.0300   -0.0001
##      620      0.2308       0.3912      0.0300   -0.0001
##      640      0.2260       0.3914      0.0300   -0.0002
##      660      0.2210       0.3951      0.0300   -0.0001
##      680      0.2160       0.3949      0.0300   -0.0001
##      700      0.2111       0.3962      0.0300   -0.0001
##      720      0.2056       0.3957      0.0300    0.0000
##      740      0.2012       0.4005      0.0300   -0.0001
##      760      0.1969       0.3998      0.0300   -0.0002
##      780      0.1923       0.4013      0.0300   -0.0001
##      800      0.1880       0.4029      0.0300   -0.0001
##      820      0.1840       0.4020      0.0300   -0.0002
##      840      0.1798       0.4025      0.0300   -0.0001
##      860      0.1758       0.4029      0.0300   -0.0000
##      880      0.1719       0.4033      0.0300   -0.0001
##      900      0.1679       0.4069      0.0300   -0.0001
##      920      0.1644       0.4013      0.0300   -0.0001
##      940      0.1610       0.4034      0.0300   -0.0000
##      960      0.1575       0.4060      0.0300   -0.0001
##      980      0.1543       0.4031      0.0300   -0.0000
##     1000      0.1510       0.4027      0.0300   -0.0001
##     1020      0.1484       0.4029      0.0300   -0.0001
##     1040      0.1454       0.4053      0.0300   -0.0001
##     1060      0.1423       0.4060      0.0300   -0.0001
##     1080      0.1398       0.4072      0.0300   -0.0001
##     1100      0.1368       0.4073      0.0300   -0.0000
##     1120      0.1338       0.4061      0.0300   -0.0000
##     1140      0.1311       0.4044      0.0300   -0.0001
##     1160      0.1291       0.4046      0.0300   -0.0001
##     1180      0.1269       0.4056      0.0300   -0.0001
##     1200      0.1247       0.4053      0.0300   -0.0001
##     1220      0.1223       0.4038      0.0300   -0.0001
##     1240      0.1200       0.4046      0.0300   -0.0001
##     1260      0.1178       0.4051      0.0300   -0.0000
##     1280      0.1158       0.4077      0.0300   -0.0001
##     1300      0.1136       0.4105      0.0300   -0.0001
```

```
## 1320     0.1115          0.4130          0.0300    -0.0000
## 1340     0.1093          0.4105          0.0300    -0.0000
## 1360     0.1073          0.4106          0.0300    -0.0000
## 1380     0.1052          0.4072          0.0300    -0.0000
## 1400     0.1030          0.4093          0.0300    -0.0000
## 1420     0.1013          0.4094          0.0300    -0.0000
## 1440     0.0993          0.4105          0.0300    -0.0001
## 1460     0.0976          0.4118          0.0300    -0.0000
## 1480     0.0956          0.4125          0.0300    -0.0001
## 1500     0.0941          0.4102          0.0300    -0.0000
## 1520     0.0922          0.4119          0.0300    -0.0001
## 1540     0.0909          0.4128          0.0300    -0.0000
## 1560     0.0891          0.4127          0.0300    -0.0000
## 1580     0.0875          0.4105          0.0300    -0.0001
## 1600     0.0860          0.4075          0.0300    -0.0001
## 1620     0.0845          0.4079          0.0300    -0.0000
## 1640     0.0833          0.4088          0.0300    -0.0001
## 1660     0.0817          0.4071          0.0300    -0.0000
## 1680     0.0802          0.4083          0.0300    -0.0000
## 1700     0.0788          0.4066          0.0300    -0.0001
## 1720     0.0774          0.4084          0.0300    -0.0001
## 1740     0.0759          0.4060          0.0300    -0.0001
## 1760     0.0748          0.4055          0.0300    -0.0001
## 1780     0.0737          0.4051          0.0300    -0.0000
## 1800     0.0725          0.4041          0.0300    -0.0000
## 1820     0.0712          0.4047          0.0300    -0.0001
## 1840     0.0700          0.4069          0.0300    -0.0000
## 1860     0.0688          0.4068          0.0300    -0.0000
## 1880     0.0674          0.4080          0.0300    -0.0000
## 1900     0.0663          0.4089          0.0300    -0.0000
## 1920     0.0652          0.4098          0.0300    -0.0000
## 1940     0.0641          0.4109          0.0300    -0.0000
## 1960     0.0629          0.4105          0.0300    -0.0000
## 1980     0.0618          0.4106          0.0300    -0.0000
## 2000     0.0608          0.4113          0.0300    -0.0000
## 2020     0.0598          0.4113          0.0300    -0.0000
## 2040     0.0588          0.4129          0.0300    -0.0000
## 2060     0.0577          0.4122          0.0300    -0.0000
## 2080     0.0567          0.4087          0.0300    -0.0000
## 2100     0.0559          0.4094          0.0300    -0.0000
## 2120     0.0550          0.4130          0.0300    -0.0000
## 2140     0.0540          0.4140          0.0300    -0.0000
## 2160     0.0531          0.4124          0.0300    -0.0000
## 2180     0.0522          0.4119          0.0300    -0.0000
## 2200     0.0510          0.4104          0.0300    -0.0000
## 2220     0.0502          0.4101          0.0300    -0.0000
## 2240     0.0494          0.4129          0.0300    -0.0000
## 2260     0.0484          0.4074          0.0300    -0.0000
## 2280     0.0476          0.4070          0.0300    -0.0000
## 2300     0.0469          0.4076          0.0300    -0.0000
## 2320     0.0461          0.4080          0.0300    -0.0000
## 2340     0.0454          0.4094          0.0300    -0.0000
## 2360     0.0447          0.4099          0.0300    -0.0000
## 2380     0.0439          0.4095          0.0300    -0.0000
```

```
## 2400     0.0432          0.4092      0.0300   -0.0000
## 2420     0.0426          0.4102      0.0300   -0.0000
## 2440     0.0419          0.4094      0.0300   -0.0000
## 2460     0.0411          0.4095      0.0300   -0.0000
## 2480     0.0403          0.4111      0.0300   -0.0000
## 2500     0.0397          0.4114      0.0300   -0.0000
## 2520     0.0391          0.4125      0.0300   -0.0000
## 2540     0.0385          0.4146      0.0300   -0.0000
## 2560     0.0379          0.4154      0.0300   -0.0000
## 2580     0.0374          0.4173      0.0300   -0.0000
## 2600     0.0367          0.4155      0.0300   -0.0000
## 2620     0.0360          0.4139      0.0300   -0.0000
## 2640     0.0355          0.4139      0.0300   -0.0000
## 2660     0.0348          0.4152      0.0300   -0.0000
## 2680     0.0343          0.4150      0.0300    0.0000
## 2700     0.0337          0.4154      0.0300   -0.0000
## 2720     0.0331          0.4148      0.0300   -0.0000
## 2740     0.0326          0.4170      0.0300   -0.0000
## 2760     0.0322          0.4184      0.0300   -0.0000
## 2780     0.0317          0.4169      0.0300   -0.0000
## 2800     0.0311          0.4173      0.0300   -0.0000
## 2820     0.0306          0.4201      0.0300   -0.0000
## 2840     0.0301          0.4210      0.0300   -0.0000
## 2860     0.0296          0.4219      0.0300   -0.0000
## 2880     0.0291          0.4224      0.0300    0.0000
## 2900     0.0285          0.4236      0.0300   -0.0000
## 2920     0.0281          0.4225      0.0300   -0.0000
## 2940     0.0277          0.4254      0.0300   -0.0000
## 2960     0.0272          0.4263      0.0300   -0.0000
## 2980     0.0268          0.4270      0.0300   -0.0000
## 3000     0.0264          0.4292      0.0300   -0.0000


## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.


## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##     1       1.2851          1.2633      0.0100    0.0054
##     2       1.2752          1.2530      0.0100    0.0046
##     3       1.2651          1.2423      0.0100    0.0048
##     4       1.2559          1.2324      0.0100    0.0046
##     5       1.2466          1.2226      0.0100    0.0045
##     6       1.2371          1.2133      0.0100    0.0043
##     7       1.2285          1.2040      0.0100    0.0039
##     8       1.2197          1.1953      0.0100    0.0042
##     9       1.2118          1.1869      0.0100    0.0037
##    10       1.2033          1.1777      0.0100    0.0041
##    20       1.1276          1.0986      0.0100    0.0033
##    40       1.0077          0.9703      0.0100    0.0025
##    60       0.9140          0.8719      0.0100    0.0023
##    80       0.8384          0.7896      0.0100    0.0015
##   100       0.7792          0.7267      0.0100    0.0012
##   120       0.7268          0.6706      0.0100    0.0010
##   140       0.6845          0.6284      0.0100    0.0007
```

```
##     160     0.6486     0.5918     0.0100      0.0007
##     180     0.6166     0.5572     0.0100      0.0007
##     200     0.5909     0.5312     0.0100      0.0005
##     220     0.5683     0.5079     0.0100      0.0006
##     240     0.5486     0.4870     0.0100      0.0003
##     260     0.5325     0.4700     0.0100      0.0003
##     280     0.5167     0.4529     0.0100      0.0003
##     300     0.5037     0.4400     0.0100      0.0002
##     320     0.4920     0.4282     0.0100      0.0001
##     340     0.4816     0.4185     0.0100      0.0001
##     360     0.4733     0.4114     0.0100      0.0001
##     380     0.4647     0.4038     0.0100      0.0002
##     400     0.4573     0.3986     0.0100      0.0000
##     420     0.4504     0.3937     0.0100      0.0001
##     440     0.4442     0.3881     0.0100     -0.0000
##     460     0.4380     0.3830     0.0100      0.0000
##     480     0.4320     0.3791     0.0100     -0.0000
##     500     0.4265     0.3761     0.0100     -0.0000
##     520     0.4211     0.3746     0.0100      0.0000
##     540     0.4159     0.3709     0.0100      0.0000
##     560     0.4114     0.3689     0.0100     -0.0000
##     580     0.4071     0.3666     0.0100      0.0000
##     600     0.4027     0.3658     0.0100      0.0000
##     620     0.3986     0.3644     0.0100     -0.0001
##     640     0.3946     0.3611     0.0100     -0.0000
##     660     0.3902     0.3587     0.0100      0.0000
##     680     0.3864     0.3568     0.0100      0.0000
##     700     0.3827     0.3552     0.0100      0.0000
##     720     0.3791     0.3541     0.0100     -0.0000
##     740     0.3750     0.3513     0.0100      0.0000
##     760     0.3713     0.3512     0.0100     -0.0000
##     780     0.3677     0.3520     0.0100     -0.0000
##     800     0.3639     0.3516     0.0100     -0.0000
##     820     0.3608     0.3508     0.0100     -0.0001
##     840     0.3576     0.3501     0.0100     -0.0000
##     860     0.3538     0.3496     0.0100     -0.0001
##     880     0.3508     0.3494     0.0100     -0.0001
##     900     0.3481     0.3495     0.0100     -0.0000
##     920     0.3452     0.3487     0.0100     -0.0001
##     940     0.3419     0.3483     0.0100     -0.0000
##     960     0.3391     0.3483     0.0100     -0.0000
##     980     0.3366     0.3475     0.0100     -0.0001
##    1000     0.3338     0.3464     0.0100     -0.0001
##    1020     0.3310     0.3469     0.0100      0.0000
##    1040     0.3279     0.3468     0.0100     -0.0000
##    1060     0.3250     0.3477     0.0100     -0.0000
##    1080     0.3223     0.3475     0.0100     -0.0001
##    1100     0.3193     0.3448     0.0100     -0.0001
##    1120     0.3164     0.3431     0.0100     -0.0000
##    1140     0.3136     0.3425     0.0100     -0.0000
##    1160     0.3111     0.3422     0.0100     -0.0001
##    1180     0.3085     0.3405     0.0100     -0.0000
##    1200     0.3054     0.3399     0.0100     -0.0000
##    1220     0.3033     0.3386     0.0100     -0.0001
```

```
##   1240      0.3009        0.3378        0.0100      -0.0000
##   1260      0.2983        0.3381        0.0100      -0.0000
##   1280      0.2961        0.3376        0.0100      -0.0001
##   1300      0.2937        0.3364        0.0100      -0.0000
##   1320      0.2915        0.3360        0.0100      -0.0000
##   1340      0.2892        0.3355        0.0100      -0.0001
##   1360      0.2870        0.3352        0.0100      -0.0001
##   1380      0.2846        0.3344        0.0100      -0.0000
##   1400      0.2825        0.3344        0.0100      -0.0000
##   1420      0.2805        0.3343        0.0100      -0.0001
##   1440      0.2782        0.3333        0.0100       0.0000
##   1460      0.2759        0.3332        0.0100      -0.0000
##   1480      0.2737        0.3327        0.0100      -0.0000
##   1500      0.2717        0.3326        0.0100      -0.0001
##   1520      0.2696        0.3315        0.0100      -0.0000
##   1540      0.2677        0.3304        0.0100      -0.0001
##   1560      0.2658        0.3305        0.0100      -0.0000
##   1580      0.2639        0.3306        0.0100      -0.0000
##   1600      0.2615        0.3296        0.0100      -0.0000
##   1620      0.2593        0.3289        0.0100      -0.0000
##   1640      0.2575        0.3287        0.0100      -0.0000
##   1660      0.2555        0.3293        0.0100      -0.0000
##   1680      0.2537        0.3296        0.0100      -0.0000
##   1700      0.2517        0.3300        0.0100      -0.0000
##   1720      0.2498        0.3300        0.0100      -0.0001
##   1740      0.2479        0.3297        0.0100      -0.0000
##   1760      0.2461        0.3307        0.0100      -0.0000
##   1780      0.2443        0.3306        0.0100      -0.0000
##   1800      0.2424        0.3312        0.0100      -0.0000
##   1820      0.2406        0.3297        0.0100      -0.0001
##   1840      0.2389        0.3297        0.0100      -0.0000
##   1860      0.2371        0.3288        0.0100      -0.0000
##   1880      0.2353        0.3292        0.0100      -0.0000
##   1900      0.2336        0.3295        0.0100      -0.0000
##   1920      0.2320        0.3291        0.0100      -0.0000
##   1940      0.2299        0.3292        0.0100      -0.0001
##   1960      0.2283        0.3283        0.0100      -0.0000
##   1980      0.2267        0.3283        0.0100      -0.0000
##   2000      0.2252        0.3286        0.0100      -0.0000
##   2020      0.2233        0.3287        0.0100      -0.0000
##   2040      0.2219        0.3282        0.0100      -0.0000
##   2060      0.2204        0.3282        0.0100      -0.0000
##   2080      0.2189        0.3276        0.0100      -0.0000
##   2100      0.2173        0.3278        0.0100      -0.0000
##   2120      0.2157        0.3275        0.0100      -0.0000
##   2140      0.2141        0.3271        0.0100      -0.0000
##   2160      0.2126        0.3275        0.0100      -0.0000
##   2180      0.2113        0.3277        0.0100      -0.0000
##   2200      0.2098        0.3267        0.0100      -0.0000
##   2220      0.2085        0.3267        0.0100      -0.0000
##   2240      0.2069        0.3264        0.0100      -0.0000
##   2260      0.2054        0.3255        0.0100      -0.0000
##   2280      0.2041        0.3263        0.0100      -0.0000
##   2300      0.2028        0.3262        0.0100      -0.0000
```

```
## 2320       0.2014          0.3258        0.0100      -0.0001
## 2340       0.1999          0.3253        0.0100      -0.0000
## 2360       0.1985          0.3251        0.0100      -0.0000
## 2380       0.1972          0.3244        0.0100      -0.0001
## 2400       0.1958          0.3234        0.0100      -0.0000
## 2420       0.1943          0.3224        0.0100      -0.0000
## 2440       0.1929          0.3221        0.0100      -0.0000
## 2460       0.1913          0.3213        0.0100      -0.0000
## 2480       0.1898          0.3207        0.0100      -0.0000
## 2500       0.1885          0.3213        0.0100      -0.0000
## 2520       0.1874          0.3207        0.0100      -0.0000
## 2540       0.1861          0.3207        0.0100      -0.0000
## 2560       0.1848          0.3209        0.0100      -0.0000
## 2580       0.1834          0.3216        0.0100      -0.0001
## 2600       0.1820          0.3207        0.0100      -0.0000
## 2620       0.1807          0.3208        0.0100      -0.0001
## 2640       0.1795          0.3199        0.0100      -0.0001
## 2660       0.1781          0.3198        0.0100      -0.0000
## 2680       0.1770          0.3200        0.0100      -0.0000
## 2700       0.1757          0.3198        0.0100      -0.0000
## 2720       0.1743          0.3197        0.0100      -0.0000
## 2740       0.1732          0.3195        0.0100      -0.0000
## 2760       0.1720          0.3200        0.0100      -0.0000
## 2780       0.1709          0.3210        0.0100      -0.0000
## 2800       0.1696          0.3207        0.0100      -0.0000
## 2820       0.1684          0.3209        0.0100      -0.0000
## 2840       0.1673          0.3208        0.0100      -0.0000
## 2860       0.1662          0.3208        0.0100      -0.0000
## 2880       0.1651          0.3209        0.0100      -0.0000
## 2900       0.1640          0.3203        0.0100      -0.0000
## 2920       0.1628          0.3199        0.0100      -0.0000
## 2940       0.1617          0.3190        0.0100      -0.0000
## 2960       0.1606          0.3191        0.0100      -0.0001
## 2980       0.1595          0.3197        0.0100      -0.0000
## 3000       0.1585          0.3196        0.0100      -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.2759          1.2528     0.0200    0.0094
##      2         1.2569          1.2329     0.0200    0.0097
##      3         1.2384          1.2136     0.0200    0.0088
##      4         1.2215          1.1959     0.0200    0.0085
##      5         1.2054          1.1788     0.0200    0.0081
##      6         1.1886          1.1606     0.0200    0.0085
##      7         1.1735          1.1447     0.0200    0.0076
##      8         1.1582          1.1296     0.0200    0.0078
##      9         1.1430          1.1131     0.0200    0.0076
##     10         1.1273          1.0961     0.0200    0.0073
##     20         1.0056          0.9674     0.0200    0.0053
##     40         0.8428          0.7889     0.0200    0.0031
##     60         0.7305          0.6753     0.0200    0.0022
```

```
##      80      0.6542      0.5986      0.0200      0.0016
##     100      0.5947      0.5378      0.0200      0.0011
##     120      0.5494      0.4904      0.0200      0.0006
##     140      0.5191      0.4620      0.0200      0.0007
##     160      0.4924      0.4360      0.0200      0.0005
##     180      0.4736      0.4210      0.0200      0.0000
##     200      0.4577      0.4062      0.0200      0.0002
##     220      0.4440      0.3971      0.0200     -0.0000
##     240      0.4320      0.3852      0.0200      0.0001
##     260      0.4218      0.3779      0.0200      0.0000
##     280      0.4129      0.3746      0.0200     -0.0000
##     300      0.4031      0.3689      0.0200      0.0000
##     320      0.3950      0.3652      0.0200      0.0000
##     340      0.3861      0.3636      0.0200     -0.0001
##     360      0.3788      0.3619      0.0200     -0.0001
##     380      0.3712      0.3602      0.0200     -0.0001
##     400      0.3644      0.3583      0.0200     -0.0001
##     420      0.3585      0.3600      0.0200     -0.0001
##     440      0.3520      0.3602      0.0200      0.0001
##     460      0.3459      0.3569      0.0200     -0.0001
##     480      0.3400      0.3567      0.0200     -0.0000
##     500      0.3347      0.3541      0.0200     -0.0000
##     520      0.3288      0.3532      0.0200     -0.0001
##     540      0.3233      0.3517      0.0200     -0.0002
##     560      0.3178      0.3506      0.0200      0.0000
##     580      0.3128      0.3493      0.0200     -0.0002
##     600      0.3071      0.3474      0.0200     -0.0000
##     620      0.3021      0.3470      0.0200     -0.0000
##     640      0.2971      0.3453      0.0200     -0.0000
##     660      0.2922      0.3455      0.0200     -0.0001
##     680      0.2878      0.3466      0.0200     -0.0001
##     700      0.2831      0.3458      0.0200     -0.0001
##     720      0.2788      0.3440      0.0200     -0.0001
##     740      0.2742      0.3439      0.0200     -0.0000
##     760      0.2696      0.3417      0.0200     -0.0001
##     780      0.2652      0.3414      0.0200     -0.0001
##     800      0.2615      0.3423      0.0200     -0.0001
##     820      0.2583      0.3433      0.0200     -0.0000
##     840      0.2548      0.3438      0.0200     -0.0001
##     860      0.2513      0.3425      0.0200     -0.0001
##     880      0.2477      0.3415      0.0200     -0.0002
##     900      0.2439      0.3435      0.0200     -0.0000
##     920      0.2401      0.3411      0.0200     -0.0001
##     940      0.2369      0.3417      0.0200     -0.0001
##     960      0.2337      0.3418      0.0200     -0.0001
##     980      0.2305      0.3406      0.0200     -0.0003
##    1000      0.2272      0.3404      0.0200     -0.0000
##    1020      0.2235      0.3408      0.0200     -0.0000
##    1040      0.2201      0.3403      0.0200     -0.0000
##    1060      0.2166      0.3381      0.0200     -0.0000
##    1080      0.2137      0.3367      0.0200     -0.0002
##    1100      0.2108      0.3377      0.0200     -0.0001
##    1120      0.2078      0.3358      0.0200      0.0000
##    1140      0.2049      0.3352      0.0200     -0.0001
```

```
## 1160    0.2019    0.3355    0.0200    -0.0001
## 1180    0.1991    0.3359    0.0200    -0.0000
## 1200    0.1963    0.3368    0.0200    -0.0001
## 1220    0.1935    0.3391    0.0200    -0.0001
## 1240    0.1908    0.3370    0.0200    -0.0001
## 1260    0.1879    0.3365    0.0200    -0.0000
## 1280    0.1856    0.3351    0.0200    -0.0000
## 1300    0.1828    0.3359    0.0200    -0.0001
## 1320    0.1800    0.3343    0.0200    -0.0000
## 1340    0.1775    0.3335    0.0200    -0.0000
## 1360    0.1753    0.3332    0.0200    -0.0000
## 1380    0.1727    0.3326    0.0200     0.0000
## 1400    0.1702    0.3322    0.0200    -0.0000
## 1420    0.1680    0.3326    0.0200    -0.0000
## 1440    0.1655    0.3313    0.0200    -0.0000
## 1460    0.1636    0.3305    0.0200    -0.0000
## 1480    0.1615    0.3312    0.0200    -0.0001
## 1500    0.1595    0.3317    0.0200    -0.0001
## 1520    0.1574    0.3304    0.0200    -0.0001
## 1540    0.1556    0.3311    0.0200    -0.0001
## 1560    0.1536    0.3317    0.0200    -0.0000
## 1580    0.1516    0.3311    0.0200    -0.0000
## 1600    0.1497    0.3307    0.0200    -0.0001
## 1620    0.1478    0.3320    0.0200    -0.0000
## 1640    0.1458    0.3314    0.0200    -0.0000
## 1660    0.1438    0.3308    0.0200     0.0000
## 1680    0.1418    0.3307    0.0200    -0.0001
## 1700    0.1401    0.3319    0.0200    -0.0000
## 1720    0.1382    0.3317    0.0200    -0.0001
## 1740    0.1365    0.3315    0.0200    -0.0001
## 1760    0.1345    0.3303    0.0200    -0.0000
## 1780    0.1329    0.3298    0.0200    -0.0000
## 1800    0.1312    0.3303    0.0200    -0.0000
## 1820    0.1295    0.3284    0.0200    -0.0001
## 1840    0.1279    0.3275    0.0200    -0.0000
## 1860    0.1265    0.3280    0.0200    -0.0000
## 1880    0.1249    0.3270    0.0200    -0.0000
## 1900    0.1235    0.3251    0.0200    -0.0001
## 1920    0.1219    0.3248    0.0200    -0.0001
## 1940    0.1202    0.3251    0.0200    -0.0000
## 1960    0.1187    0.3257    0.0200    -0.0000
## 1980    0.1171    0.3268    0.0200    -0.0000
## 2000    0.1158    0.3267    0.0200    -0.0000
## 2020    0.1144    0.3284    0.0200    -0.0001
## 2040    0.1129    0.3294    0.0200    -0.0000
## 2060    0.1116    0.3291    0.0200     0.0001
## 2080    0.1102    0.3297    0.0200    -0.0000
## 2100    0.1089    0.3299    0.0200    -0.0000
## 2120    0.1076    0.3306    0.0200    -0.0000
## 2140    0.1063    0.3294    0.0200    -0.0000
## 2160    0.1049    0.3297    0.0200    -0.0001
## 2180    0.1039    0.3293    0.0200    -0.0000
## 2200    0.1026    0.3287    0.0200    -0.0000
## 2220    0.1012    0.3292    0.0200    -0.0001
```

```
##    2240        0.1001           0.3308       0.0200     -0.0000
##    2260        0.0988           0.3307       0.0200     -0.0000
##    2280        0.0975           0.3289       0.0200     -0.0000
##    2300        0.0965           0.3284       0.0200     -0.0000
##    2320        0.0953           0.3262       0.0200     -0.0000
##    2340        0.0942           0.3237       0.0200     -0.0000
##    2360        0.0929           0.3242       0.0200     -0.0000
##    2380        0.0918           0.3246       0.0200      0.0000
##    2400        0.0907           0.3243       0.0200     -0.0000
##    2420        0.0896           0.3241       0.0200     -0.0000
##    2440        0.0885           0.3233       0.0200     -0.0000
##    2460        0.0875           0.3258       0.0200     -0.0000
##    2480        0.0865           0.3254       0.0200     -0.0000
##    2500        0.0857           0.3250       0.0200     -0.0000
##    2520        0.0846           0.3243       0.0200     -0.0000
##    2540        0.0836           0.3245       0.0200     -0.0000
##    2560        0.0827           0.3228       0.0200     -0.0000
##    2580        0.0816           0.3235       0.0200     -0.0000
##    2600        0.0807           0.3235       0.0200     -0.0000
##    2620        0.0798           0.3226       0.0200     -0.0000
##    2640        0.0788           0.3233       0.0200     -0.0000
##    2660        0.0780           0.3229       0.0200     -0.0000
##    2680        0.0772           0.3235       0.0200     -0.0000
##    2700        0.0764           0.3236       0.0200     -0.0000
##    2720        0.0754           0.3245       0.0200     -0.0000
##    2740        0.0746           0.3251       0.0200     -0.0000
##    2760        0.0738           0.3248       0.0200     -0.0000
##    2780        0.0730           0.3247       0.0200     -0.0000
##    2800        0.0722           0.3232       0.0200     -0.0000
##    2820        0.0715           0.3228       0.0200     -0.0000
##    2840        0.0708           0.3226       0.0200     -0.0000
##    2860        0.0700           0.3228       0.0200     -0.0000
##    2880        0.0692           0.3228       0.0200     -0.0000
##    2900        0.0684           0.3216       0.0200     -0.0000
##    2920        0.0677           0.3209       0.0200     -0.0000
##    2940        0.0671           0.3216       0.0200     -0.0000
##    2960        0.0664           0.3208       0.0200     -0.0000
##    2980        0.0656           0.3201       0.0200     -0.0000
##    3000        0.0649           0.3197       0.0200     -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1        1.2643           1.2410       0.0300     0.0155
##      2        1.2347           1.2097       0.0300     0.0144
##      3        1.2085           1.1819       0.0300     0.0125
##      4        1.1849           1.1571       0.0300     0.0119
##      5        1.1626           1.1334       0.0300     0.0102
##      6        1.1394           1.1086       0.0300     0.0113
##      7        1.1196           1.0885       0.0300     0.0093
##      8        1.1002           1.0688       0.0300     0.0092
##      9        1.0806           1.0484       0.0300     0.0090
```

```
##     10      1.0629          1.0294          0.0300      0.0082
##     20      0.9181          0.8763          0.0300      0.0060
##     40      0.7283          0.6767          0.0300      0.0033
##     60      0.6169          0.5596          0.0300      0.0018
##     80      0.5450          0.4889          0.0300      0.0014
##    100      0.5008          0.4457          0.0300      0.0004
##    120      0.4710          0.4176          0.0300      0.0002
##    140      0.4491          0.3982          0.0300      0.0000
##    160      0.4315          0.3852          0.0300     -0.0000
##    180      0.4157          0.3780          0.0300     -0.0001
##    200      0.4033          0.3737          0.0300     -0.0001
##    220      0.3910          0.3707          0.0300     -0.0001
##    240      0.3799          0.3671          0.0300     -0.0002
##    260      0.3695          0.3656          0.0300     -0.0001
##    280      0.3594          0.3613          0.0300     -0.0001
##    300      0.3491          0.3578          0.0300     -0.0002
##    320      0.3401          0.3572          0.0300     -0.0002
##    340      0.3322          0.3569          0.0300     -0.0001
##    360      0.3239          0.3551          0.0300     -0.0002
##    380      0.3166          0.3556          0.0300     -0.0002
##    400      0.3091          0.3538          0.0300     -0.0002
##    420      0.3023          0.3554          0.0300     -0.0001
##    440      0.2954          0.3522          0.0300     -0.0000
##    460      0.2893          0.3509          0.0300     -0.0001
##    480      0.2815          0.3492          0.0300     -0.0001
##    500      0.2753          0.3487          0.0300     -0.0002
##    520      0.2696          0.3458          0.0300     -0.0000
##    540      0.2633          0.3487          0.0300     -0.0001
##    560      0.2574          0.3503          0.0300     -0.0001
##    580      0.2519          0.3517          0.0300     -0.0001
##    600      0.2462          0.3498          0.0300     -0.0000
##    620      0.2409          0.3490          0.0300     -0.0001
##    640      0.2354          0.3482          0.0300     -0.0001
##    660      0.2305          0.3459          0.0300     -0.0001
##    680      0.2255          0.3478          0.0300     -0.0002
##    700      0.2207          0.3487          0.0300     -0.0002
##    720      0.2154          0.3463          0.0300     -0.0000
##    740      0.2108          0.3454          0.0300     -0.0001
##    760      0.2062          0.3422          0.0300     -0.0001
##    780      0.2015          0.3432          0.0300     -0.0001
##    800      0.1973          0.3408          0.0300     -0.0001
##    820      0.1933          0.3404          0.0300     -0.0001
##    840      0.1889          0.3385          0.0300     -0.0001
##    860      0.1851          0.3387          0.0300     -0.0001
##    880      0.1815          0.3387          0.0300     -0.0000
##    900      0.1778          0.3369          0.0300     -0.0001
##    920      0.1740          0.3391          0.0300     -0.0001
##    940      0.1709          0.3395          0.0300     -0.0000
##    960      0.1670          0.3372          0.0300     -0.0001
##    980      0.1634          0.3363          0.0300     -0.0001
##   1000      0.1600          0.3367          0.0300     -0.0000
##   1020      0.1568          0.3358          0.0300     -0.0000
##   1040      0.1538          0.3347          0.0300     -0.0001
##   1060      0.1508          0.3371          0.0300     -0.0001
```

```
## 1080     0.1475          0.3391          0.0300    -0.0001
## 1100     0.1445          0.3387          0.0300    -0.0000
## 1120     0.1424          0.3383          0.0300    -0.0001
## 1140     0.1395          0.3379          0.0300    -0.0000
## 1160     0.1369          0.3394          0.0300    -0.0000
## 1180     0.1341          0.3404          0.0300    -0.0000
## 1200     0.1314          0.3408          0.0300    -0.0001
## 1220     0.1289          0.3411          0.0300    -0.0001
## 1240     0.1268          0.3409          0.0300    -0.0001
## 1260     0.1245          0.3424          0.0300    -0.0000
## 1280     0.1223          0.3418          0.0300    -0.0000
## 1300     0.1199          0.3405          0.0300    -0.0001
## 1320     0.1178          0.3395          0.0300    -0.0001
## 1340     0.1155          0.3413          0.0300    -0.0000
## 1360     0.1136          0.3401          0.0300    -0.0000
## 1380     0.1113          0.3370          0.0300    -0.0001
## 1400     0.1092          0.3367          0.0300    -0.0001
## 1420     0.1072          0.3376          0.0300    -0.0001
## 1440     0.1050          0.3360          0.0300    -0.0000
## 1460     0.1033          0.3351          0.0300    -0.0000
## 1480     0.1016          0.3356          0.0300    -0.0000
## 1500     0.0998          0.3349          0.0300    -0.0000
## 1520     0.0979          0.3338          0.0300    -0.0001
## 1540     0.0963          0.3348          0.0300    -0.0000
## 1560     0.0946          0.3333          0.0300    -0.0000
## 1580     0.0931          0.3344          0.0300    -0.0001
## 1600     0.0916          0.3343          0.0300    -0.0000
## 1620     0.0901          0.3321          0.0300    -0.0001
## 1640     0.0887          0.3331          0.0300    -0.0001
## 1660     0.0873          0.3338          0.0300    -0.0000
## 1680     0.0859          0.3342          0.0300    -0.0000
## 1700     0.0843          0.3348          0.0300    -0.0001
## 1720     0.0831          0.3340          0.0300    -0.0001
## 1740     0.0817          0.3349          0.0300    -0.0000
## 1760     0.0804          0.3362          0.0300    -0.0001
## 1780     0.0790          0.3358          0.0300    -0.0000
## 1800     0.0777          0.3347          0.0300    -0.0001
## 1820     0.0763          0.3333          0.0300    -0.0000
## 1840     0.0748          0.3324          0.0300    -0.0000
## 1860     0.0737          0.3307          0.0300    -0.0001
## 1880     0.0724          0.3311          0.0300    -0.0000
## 1900     0.0712          0.3311          0.0300    -0.0001
## 1920     0.0699          0.3313          0.0300    -0.0000
## 1940     0.0687          0.3301          0.0300    -0.0000
## 1960     0.0677          0.3290          0.0300    -0.0000
## 1980     0.0664          0.3275          0.0300    -0.0000
## 2000     0.0653          0.3272          0.0300    -0.0000
## 2020     0.0642          0.3285          0.0300    -0.0000
## 2040     0.0632          0.3268          0.0300    -0.0000
## 2060     0.0620          0.3247          0.0300    -0.0000
## 2080     0.0611          0.3253          0.0300    -0.0000
## 2100     0.0600          0.3245          0.0300    -0.0000
## 2120     0.0591          0.3251          0.0300    -0.0000
## 2140     0.0583          0.3251          0.0300    -0.0000
```

```
## 2160       0.0574          0.3253        0.0300      -0.0000
## 2180       0.0566          0.3244        0.0300      -0.0000
## 2200       0.0557          0.3246        0.0300      -0.0000
## 2220       0.0548          0.3237        0.0300      -0.0000
## 2240       0.0541          0.3254        0.0300      -0.0000
## 2260       0.0531          0.3237        0.0300       0.0000
## 2280       0.0523          0.3228        0.0300      -0.0000
## 2300       0.0513          0.3234        0.0300      -0.0001
## 2320       0.0504          0.3235        0.0300      -0.0000
## 2340       0.0496          0.3250        0.0300      -0.0000
## 2360       0.0489          0.3262        0.0300      -0.0001
## 2380       0.0481          0.3267        0.0300      -0.0000
## 2400       0.0472          0.3265        0.0300      -0.0000
## 2420       0.0464          0.3262        0.0300      -0.0000
## 2440       0.0456          0.3271        0.0300      -0.0000
## 2460       0.0450          0.3277        0.0300      -0.0000
## 2480       0.0443          0.3292        0.0300      -0.0000
## 2500       0.0437          0.3287        0.0300      -0.0000
## 2520       0.0430          0.3285        0.0300      -0.0000
## 2540       0.0424          0.3287        0.0300      -0.0000
## 2560       0.0417          0.3292        0.0300      -0.0000
## 2580       0.0411          0.3299        0.0300      -0.0000
## 2600       0.0404          0.3287        0.0300      -0.0000
## 2620       0.0399          0.3295        0.0300      -0.0000
## 2640       0.0394          0.3295        0.0300      -0.0000
## 2660       0.0386          0.3271        0.0300      -0.0000
## 2680       0.0380          0.3277        0.0300      -0.0000
## 2700       0.0374          0.3273        0.0300      -0.0000
## 2720       0.0369          0.3275        0.0300      -0.0000
## 2740       0.0363          0.3278        0.0300      -0.0000
## 2760       0.0355          0.3261        0.0300       0.0000
## 2780       0.0350          0.3270        0.0300      -0.0000
## 2800       0.0344          0.3277        0.0300      -0.0000
## 2820       0.0339          0.3306        0.0300      -0.0000
## 2840       0.0334          0.3329        0.0300      -0.0000
## 2860       0.0329          0.3330        0.0300      -0.0000
## 2880       0.0323          0.3327        0.0300      -0.0000
## 2900       0.0318          0.3313        0.0300      -0.0000
## 2920       0.0313          0.3319        0.0300      -0.0000
## 2940       0.0308          0.3317        0.0300      -0.0000
## 2960       0.0303          0.3309        0.0300      -0.0000
## 2980       0.0298          0.3319        0.0300      -0.0000
## 3000       0.0293          0.3324        0.0300      -0.0000

## Warning in (function (x, y, offset = NULL, misc = NULL, distribution =
## "bernoulli", : Parameter 'train.fraction' is deprecated, please specify
## 'nTrain' instead.

## Iter   TrainDeviance   ValidDeviance   StepSize    Improve
##     1       1.2852          1.2658        0.0100      0.0051
##     2       1.2752          1.2561        0.0100      0.0049
##     3       1.2653          1.2463        0.0100      0.0047
##     4       1.2561          1.2368        0.0100      0.0047
##     5       1.2467          1.2277        0.0100      0.0044
```

```
##      6       1.2374          1.2183          0.0100    0.0046
##      7       1.2295          1.2104          0.0100    0.0039
##      8       1.2206          1.2012          0.0100    0.0044
##      9       1.2118          1.1923          0.0100    0.0045
##     10       1.2036          1.1837          0.0100    0.0038
##     20       1.1271          1.1065          0.0100    0.0036
##     40       1.0046          0.9812          0.0100    0.0023
##     60       0.9136          0.8848          0.0100    0.0018
##     80       0.8411          0.8100          0.0100    0.0016
##    100       0.7791          0.7467          0.0100    0.0013
##    120       0.7287          0.6961          0.0100    0.0011
##    140       0.6865          0.6541          0.0100    0.0008
##    160       0.6498          0.6164          0.0100    0.0008
##    180       0.6174          0.5821          0.0100    0.0006
##    200       0.5908          0.5547          0.0100    0.0006
##    220       0.5677          0.5313          0.0100    0.0005
##    240       0.5466          0.5091          0.0100    0.0004
##    260       0.5300          0.4928          0.0100    0.0002
##    280       0.5154          0.4787          0.0100    0.0003
##    300       0.5018          0.4644          0.0100    0.0003
##    320       0.4901          0.4522          0.0100    0.0002
##    340       0.4803          0.4432          0.0100    0.0001
##    360       0.4723          0.4373          0.0100    0.0000
##    380       0.4640          0.4299          0.0100    0.0002
##    400       0.4560          0.4226          0.0100    0.0002
##    420       0.4490          0.4159          0.0100    0.0000
##    440       0.4426          0.4108          0.0100    0.0001
##    460       0.4365          0.4068          0.0100    0.0000
##    480       0.4308          0.4032          0.0100    0.0000
##    500       0.4255          0.4003          0.0100    0.0000
##    520       0.4205          0.3978          0.0100   -0.0000
##    540       0.4155          0.3949          0.0100   -0.0000
##    560       0.4106          0.3936          0.0100    0.0000
##    580       0.4065          0.3919          0.0100   -0.0000
##    600       0.4021          0.3899          0.0100    0.0000
##    620       0.3980          0.3887          0.0100   -0.0000
##    640       0.3938          0.3873          0.0100    0.0000
##    660       0.3899          0.3873          0.0100   -0.0000
##    680       0.3859          0.3852          0.0100   -0.0000
##    700       0.3823          0.3839          0.0100   -0.0001
##    720       0.3791          0.3832          0.0100   -0.0000
##    740       0.3755          0.3807          0.0100   -0.0000
##    760       0.3718          0.3801          0.0100   -0.0000
##    780       0.3687          0.3786          0.0100    0.0000
##    800       0.3658          0.3780          0.0100   -0.0000
##    820       0.3625          0.3777          0.0100   -0.0001
##    840       0.3591          0.3775          0.0100   -0.0000
##    860       0.3559          0.3769          0.0100   -0.0000
##    880       0.3530          0.3750          0.0100   -0.0000
##    900       0.3499          0.3752          0.0100   -0.0000
##    920       0.3470          0.3745          0.0100   -0.0000
##    940       0.3444          0.3750          0.0100   -0.0001
##    960       0.3415          0.3741          0.0100   -0.0001
##    980       0.3388          0.3735          0.0100   -0.0001
```

```
##    1000          0.3362           0.3730        0.0100    -0.0001
```

```
Boosting_alzh_grid$results
```

```
##    shrinkage interaction.depth n.minobsinnode n.trees        ROC       Sens
## 1       0.01                 4             10    1000 0.9493692 0.9690222
## 4       0.02                 4             10    1000 0.9486949 0.9690222
## 7       0.03                 4             10    1000 0.9465241 0.9650540
## 2       0.01                 4             10    2000 0.9489826 0.9674349
## 5       0.02                 4             10    2000 0.9473324 0.9674349
## 8       0.03                 4             10    2000 0.9455770 0.9586984
## 3       0.01                 4             10    3000 0.9477571 0.9650540
## 6       0.02                 4             10    3000 0.9471899 0.9634667
## 9       0.03                 4             10    3000 0.9458380 0.9571048
##        Spec       ROCSD      SensSD      SpecSD
## 1 0.9112160 0.006962202 0.01422369 0.03009368
## 4 0.9126646 0.008422485 0.01372282 0.02535632
## 7 0.9067164 0.008898221 0.02021263 0.02594369
## 2 0.9097015 0.007934899 0.01517295 0.02529561
## 5 0.9141352 0.008922000 0.01732643 0.02368915
## 8 0.9008121 0.008730881 0.01900079 0.02180900
## 3 0.9097015 0.008431509 0.01877661 0.02529561
## 6 0.9067384 0.008462095 0.01550782 0.02590600
## 9 0.9008121 0.009116034 0.01841613 0.02489594
```

```
Boosting_alzh_grid$bestTune
```

```
##   n.trees interaction.depth shrinkage n.minobsinnode
## 1    1000                 4      0.01             10
```

```
set.seed(12345)
for.final.gbm<-ALZH.gbm.forTuning%>%select(-c(CholesterolTotal,CholesterolLDL,CholesterolTriglycerides)
Boosting_alzh_grid.final<-gbm(Diagnosis~.,data=for.final.gbm,distribution="bernoulli",n.trees=1000,inte
yhat.boost.final<-predict(Boosting_alzh_grid.final,newdata = ALZH.gbm.realTest,n.trees = 1000,interacti
pred_gbm_class_final <- ifelse(yhat.boost.final > 0.5, 1, 0)
table(pred_gbm_class_final,ALZH.gbm.realTest$Diagnosis)
```

```
##
## pred_gbm_class_final   0   1
##                    0 126   3
##                    1   4  82
```

```
Recall.grid.gbm<-sum(pred_gbm_class_final == 1 & ALZH.gbm.realTest$Diagnosis == 1)/sum(ALZH.gbm.realTes
Precision.grid.gbm<-sum(pred_gbm_class_final == 1 & ALZH.gbm.realTest$Diagnosis == 1)/sum(pred_gbm_clas
F1_Score.grid.gbm<-2*Precision.grid.gbm*Recall.grid.gbm/(Precision.grid.gbm+Recall.grid.gbm)
Accuracy.grid.gbm<-sum(pred_gbm_class_final == ALZH.gbm.realTest$Diagnosis)/length(ALZH.gbm.realTest$Di
```

```
Recall.grid.gbm
```

```
## [1] 0.9647059
```

```
Accuracy.grid.gbm
```

[1] 0.9674419

```
Precision.grid.gbm
```

[1] 0.9534884

```
F1_Score.grid.gbm
```

[1] 0.9590643