

# Practical Machine Learning

tldc01

May 8, 2017

## Executive Summary

For this assignment, we were required to analyze exercise data to evaluate an appropriate predictive model to "grade" an individual's activity based on several variables. To complete this, we first had to load necessary libraries and then read in both the training and testing data (we are not showing code for this project for security purposes).

The next step involved creating a sample from the training data to fit various models. 70% of our data was selected to fit models, while the remaining 30% of our data was used to validate the models. It was important to be aware of what columns contained data in the testing set so that we did not construct a model based on attributes for which we did not have values. Therefore, we only kept columns from our training set that were also valid for our testing set (which we refer to as our "revised training set").

After "cleaning" our training data, we fit several different types of models including random forest (rf), gradient boost and adaboost (gba), SVM, KNN, and K-means. Based on the accuracy of these models, some were selected as "good fits" while others were discarded based on poor outcome predictions when run through the validation data set.

Lastly, we took an ensemble/blended models approach to see if we could find an optimal weighting of our good models to further reduce the mean squared error without overfitting. To blend models it was necessary to convert factors to numeric format so that we could generate a quantitative output/score. We found through doing this additional step that we slightly improved our predicted values, but not significantly.

Based on our selected "best" model, we could then predict the grade for each record using the data provided in the testing file.

```
## Loading required package: randomForest
## Warning: package 'randomForest' was built under R version 3.3.3
## randomForest 4.6-12
## Type rfNews() to see new features/changes/bug fixes.
##
## Attaching package: 'randomForest'
##
## The following object is masked from 'package:ggplot2':
##
##     margin
```

```

## Loading required package: gbm
## Warning: package 'gbm' was built under R version 3.3.3
## Loading required package: survival
## Warning: package 'survival' was built under R version 3.3.2
##
## Attaching package: 'survival'
## The following object is masked from 'package:caret':
##
##     cluster
## Loading required package: parallel
## Loaded gbm 2.1.3
## Loading required package: plyr
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094           nan      0.1000    0.1060
##      2         1.5136           nan      0.1000    0.0926
##      3         1.4345           nan      0.1000    0.0652
##      4         1.3740           nan      0.1000    0.0779
##      5         1.3104           nan      0.1000    0.0474
##      6         1.2560           nan      0.1000    0.0462
##      7         1.2082           nan      0.1000    0.0377
##      8         1.1714           nan      0.1000    0.0274
##      9         1.1389           nan      0.1000    0.0153
##     10         1.1078           nan      0.1000    0.0211
##     20         0.8505           nan      0.1000    0.0138
##     40         0.5617           nan      0.1000   -0.0016
##     60         0.3917           nan      0.1000   -0.0040
##     80         0.2837           nan      0.1000   -0.0023
##    100         0.2105           nan      0.1000   -0.0047
##    120         0.1609           nan      0.1000   -0.0011
##    140         0.1246           nan      0.1000   -0.0018
##    150         0.1079           nan      0.1000   -0.0017

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1713
## 2	1.4592	nan	0.1000	0.1151
## 3	1.3431	nan	0.1000	0.1030
## 4	1.2418	nan	0.1000	0.0879
## 5	1.1495	nan	0.1000	0.0724
## 6	1.0716	nan	0.1000	0.0343
## 7	1.0186	nan	0.1000	0.0576
## 8	0.9614	nan	0.1000	0.0442
## 9	0.9077	nan	0.1000	0.0334
## 10	0.8667	nan	0.1000	0.0369
## 20	0.5442	nan	0.1000	0.0143
## 40	0.2724	nan	0.1000	-0.0035
## 60	0.1381	nan	0.1000	0.0003
## 80	0.0775	nan	0.1000	-0.0028
## 100	0.0456	nan	0.1000	-0.0012
## 120	0.0272	nan	0.1000	-0.0009
## 140	0.0163	nan	0.1000	0.0001
## 150	0.0122	nan	0.1000	-0.0004

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2256
## 2	1.4185	nan	0.1000	0.1259
## 3	1.2719	nan	0.1000	0.1602
## 4	1.1489	nan	0.1000	0.1183
## 5	1.0460	nan	0.1000	0.0657
## 6	0.9648	nan	0.1000	0.0503
## 7	0.9010	nan	0.1000	0.0778
## 8	0.8272	nan	0.1000	0.0501
## 9	0.7688	nan	0.1000	0.0225
## 10	0.7256	nan	0.1000	0.0521
## 20	0.3750	nan	0.1000	0.0103
## 40	0.1363	nan	0.1000	-0.0044
## 60	0.0545	nan	0.1000	-0.0026
## 80	0.0240	nan	0.1000	-0.0002
## 100	0.0108	nan	0.1000	-0.0002
## 120	0.0048	nan	0.1000	-0.0001
## 140	0.0023	nan	0.1000	-0.0001
## 150	0.0016	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.0992
## 2	1.5094	nan	0.1000	0.0473
## 3	1.4470	nan	0.1000	0.0644
## 4	1.3916	nan	0.1000	0.0491
## 5	1.3391	nan	0.1000	0.0290
## 6	1.2951	nan	0.1000	0.0436
## 7	1.2522	nan	0.1000	0.0275
## 8	1.2112	nan	0.1000	0.0197
## 9	1.1806	nan	0.1000	0.0334
## 10	1.1500	nan	0.1000	0.0222
## 20	0.9020	nan	0.1000	0.0139
## 40	0.6166	nan	0.1000	-0.0009
## 60	0.4477	nan	0.1000	-0.0008
## 80	0.3362	nan	0.1000	0.0005
## 100	0.2570	nan	0.1000	-0.0032
## 120	0.2013	nan	0.1000	-0.0042
## 140	0.1579	nan	0.1000	-0.0040
## 150	0.1392	nan	0.1000	-0.0040

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1483
## 2	1.4673	nan	0.1000	0.1296
## 3	1.3534	nan	0.1000	0.1076
## 4	1.2527	nan	0.1000	0.0754
## 5	1.1777	nan	0.1000	0.0557
## 6	1.1103	nan	0.1000	0.0434
## 7	1.0482	nan	0.1000	0.0644
## 8	0.9791	nan	0.1000	0.0447
## 9	0.9273	nan	0.1000	0.0071
## 10	0.8856	nan	0.1000	0.0272
## 20	0.5679	nan	0.1000	0.0066
## 40	0.3065	nan	0.1000	0.0023
## 60	0.1661	nan	0.1000	-0.0036
## 80	0.0971	nan	0.1000	-0.0012

```
##      100      0.0595      nan      0.1000     -0.0003
##      120      0.0362      nan      0.1000     -0.0006
##      140      0.0224      nan      0.1000     -0.0007
##      150      0.0177      nan      0.1000     -0.0008
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1830
##      2	1.4512	nan	0.1000	0.1256
##      3	1.3142	nan	0.1000	0.1441
##      4	1.1859	nan	0.1000	0.1285
##      5	1.0835	nan	0.1000	0.1045
##      6	0.9893	nan	0.1000	0.0770
##      7	0.9211	nan	0.1000	0.0608
##      8	0.8622	nan	0.1000	0.0477
##      9	0.8091	nan	0.1000	0.0331
##     10	0.7617	nan	0.1000	0.0440
##     20	0.4304	nan	0.1000	0.0146
##     40	0.1703	nan	0.1000	0.0004
##     60	0.0761	nan	0.1000	-0.0025
##     80	0.0368	nan	0.1000	-0.0002
##    100	0.0180	nan	0.1000	-0.0005
##    120	0.0092	nan	0.1000	-0.0002
##    140	0.0047	nan	0.1000	-0.0001
##    150	0.0033	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1425
##      2	1.4970	nan	0.1000	0.1083
##      3	1.4046	nan	0.1000	0.0772
##      4	1.3431	nan	0.1000	0.0507
##      5	1.2954	nan	0.1000	0.0427
##      6	1.2504	nan	0.1000	0.0492
##      7	1.2034	nan	0.1000	0.0250
##      8	1.1684	nan	0.1000	0.0264
##      9	1.1291	nan	0.1000	0.0222
##     10	1.0972	nan	0.1000	0.0401
##     20	0.8393	nan	0.1000	-0.0092
##     40	0.5383	nan	0.1000	0.0010
##     60	0.3734	nan	0.1000	0.0014

```
##      80      0.2673      nan      0.1000     -0.0036
##     100      0.1920      nan      0.1000     -0.0033
##     120      0.1411      nan      0.1000      0.0014
##     140      0.1053      nan      0.1000     -0.0015
##     150      0.0907      nan      0.1000     -0.0007
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2222
##      2	1.4400	nan	0.1000	0.1402
##      3	1.3225	nan	0.1000	0.1005
##      4	1.2238	nan	0.1000	0.1055
##      5	1.1236	nan	0.1000	0.0764
##      6	1.0485	nan	0.1000	0.0688
##      7	0.9828	nan	0.1000	0.0608
##      8	0.9239	nan	0.1000	0.0208
##      9	0.8799	nan	0.1000	0.0151
##     10	0.8404	nan	0.1000	0.0281
##     20	0.5155	nan	0.1000	0.0014
##     40	0.2460	nan	0.1000	-0.0003
##     60	0.1241	nan	0.1000	-0.0025
##     80	0.0668	nan	0.1000	0.0001
##    100	0.0366	nan	0.1000	0.0001
##    120	0.0201	nan	0.1000	-0.0003
##    140	0.0109	nan	0.1000	-0.0001
##    150	0.0081	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2567
##      2	1.4079	nan	0.1000	0.2004
##      3	1.2544	nan	0.1000	0.1168
##      4	1.1353	nan	0.1000	0.0894
##      5	1.0391	nan	0.1000	0.1027
##      6	0.9500	nan	0.1000	0.0926
##      7	0.8682	nan	0.1000	0.0673
##      8	0.8078	nan	0.1000	0.0671
##      9	0.7476	nan	0.1000	0.0496
##     10	0.6966	nan	0.1000	0.0337
##     20	0.3763	nan	0.1000	0.0159
##     40	0.1244	nan	0.1000	0.0035
##     60	0.0481	nan	0.1000	0.0002
##     80	0.0216	nan	0.1000	-0.0003
##    100	0.0100	nan	0.1000	-0.0002
##    120	0.0044	nan	0.1000	-0.0000

```

##      140      0.0020      nan      0.1000      0.0000
##      150      0.0013      nan      0.1000      0.0000

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000      0.1074
##      2         1.5070         nan         0.1000      0.0788
##      3         1.4325         nan         0.1000      0.0444
##      4         1.3758         nan         0.1000      0.0482
##      5         1.3242         nan         0.1000      0.0423
##      6         1.2860         nan         0.1000      0.0271
##      7         1.2462         nan         0.1000      0.0351
##      8         1.1966         nan         0.1000      0.0305
##      9         1.1607         nan         0.1000      0.0199
##     10         1.1356         nan         0.1000      0.0451
##     20         0.8777         nan         0.1000      0.0089
##     40         0.5841         nan         0.1000      0.0041
##     60         0.4180         nan         0.1000      0.0026
##     80         0.3089         nan         0.1000     -0.0043
##    100         0.2320         nan         0.1000     -0.0030
##    120         0.1738         nan         0.1000     -0.0024
##    140         0.1339         nan         0.1000     -0.0016
##    150         0.1177         nan         0.1000     -0.0016

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000      0.1428
##      2         1.4562         nan         0.1000      0.1093
##      3         1.3518         nan         0.1000      0.1194
##      4         1.2545         nan         0.1000      0.1008
##      5         1.1775         nan         0.1000      0.0514
##      6         1.1091         nan         0.1000      0.0588
##      7         1.0479         nan         0.1000      0.0684
##      8         0.9872         nan         0.1000      0.0452
##      9         0.9318         nan         0.1000      0.0320
##     10         0.8880         nan         0.1000      0.0456
##     20         0.5701         nan         0.1000      0.0004

```

```
##      40      0.2893      nan      0.1000     -0.0001
##      60      0.1568      nan      0.1000     -0.0036
##      80      0.0871      nan      0.1000     -0.0008
##     100      0.0500      nan      0.1000      0.0007
##     120      0.0299      nan      0.1000     -0.0005
##     140      0.0176      nan      0.1000     -0.0001
##     150      0.0135      nan      0.1000     -0.0000
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2167
##      2	1.4142	nan	0.1000	0.1517
##      3	1.2607	nan	0.1000	0.1304
##      4	1.1503	nan	0.1000	0.0996
##      5	1.0560	nan	0.1000	0.0999
##      6	0.9716	nan	0.1000	0.0618
##      7	0.9068	nan	0.1000	0.0534
##      8	0.8391	nan	0.1000	0.0568
##      9	0.7823	nan	0.1000	0.0443
##     10	0.7328	nan	0.1000	0.0221
##     20	0.4150	nan	0.1000	0.0055
##     40	0.1573	nan	0.1000	0.0021
##     60	0.0644	nan	0.1000	0.0001
##     80	0.0283	nan	0.1000	-0.0000
##    100	0.0129	nan	0.1000	-0.0002
##    120	0.0059	nan	0.1000	0.0001
##    140	0.0027	nan	0.1000	0.0000
##    150	0.0018	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1148
##      2	1.4958	nan	0.1000	0.1198
##      3	1.4121	nan	0.1000	0.0746
##      4	1.3466	nan	0.1000	0.0652
##      5	1.2921	nan	0.1000	0.0196
##      6	1.2506	nan	0.1000	0.0591



```
##      7      1.1996      nan      0.1000      0.0471
##      8      1.1608      nan      0.1000      0.0457
##      9      1.1252      nan      0.1000      0.0185
##     10      1.0973      nan      0.1000      0.0228
##     20      0.8450      nan      0.1000      0.0155
##     40      0.5670      nan      0.1000     -0.0042
##     60      0.4039      nan      0.1000      0.0038
##     80      0.2961      nan      0.1000     -0.0045
##    100      0.2222      nan      0.1000     -0.0047
##    120      0.1701      nan      0.1000     -0.0013
##    140      0.1322      nan      0.1000     -0.0011
##    150      0.1163      nan      0.1000     -0.0012
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1      1.6094      nan      0.1000      0.1791
##      2      1.4412      nan      0.1000      0.1356
##      3      1.3215      nan      0.1000      0.1205
##      4      1.2276      nan      0.1000      0.0989
##      5      1.1368      nan      0.1000      0.0829
##      6      1.0710      nan      0.1000      0.0685
##      7      0.9955      nan      0.1000      0.0817
##      8      0.9369      nan      0.1000      0.0554
##      9      0.8831      nan      0.1000      0.0349
##     10      0.8450      nan      0.1000      0.0312
##     20      0.5565      nan      0.1000      0.0100
##     40      0.2765      nan      0.1000      0.0033
##     60      0.1462      nan      0.1000     -0.0038
##     80      0.0812      nan      0.1000     -0.0022
##    100      0.0446      nan      0.1000      0.0007
##    120      0.0258      nan      0.1000     -0.0006
##    140      0.0153      nan      0.1000     -0.0004
##    150      0.0119      nan      0.1000     -0.0002
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1      1.6094      nan      0.1000      0.3083
```

```
##      2      1.3970      nan      0.1000      0.1741
##      3      1.2558      nan      0.1000      0.1023
##      4      1.1544      nan      0.1000      0.1076
##      5      1.0487      nan      0.1000      0.0634
##      6      0.9708      nan      0.1000      0.0740
##      7      0.8995      nan      0.1000      0.0765
##      8      0.8376      nan      0.1000      0.0665
##      9      0.7749      nan      0.1000      0.0468
##     10      0.7198      nan      0.1000      0.0452
##     20      0.3976      nan      0.1000      0.0032
##     40      0.1472      nan      0.1000      0.0002
##     60      0.0599      nan      0.1000     -0.0004
##     80      0.0268      nan      0.1000      0.0002
##    100      0.0126      nan      0.1000      0.0002
##    120      0.0058      nan      0.1000     -0.0001
##    140      0.0026      nan      0.1000     -0.0000
##    150      0.0017      nan      0.1000     -0.0000
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1      1.6094      nan      0.1000      0.1191
##      2      1.5031      nan      0.1000      0.0978
##      3      1.4232      nan      0.1000      0.0835
##      4      1.3608      nan      0.1000      0.0720
##      5      1.2983      nan      0.1000      0.0485
##      6      1.2437      nan      0.1000      0.0352
##      7      1.2030      nan      0.1000      0.0221
##      8      1.1692      nan      0.1000      0.0450
##      9      1.1321      nan      0.1000      0.0290
##     10      1.0984      nan      0.1000      0.0079
##     20      0.8528      nan      0.1000      0.0126
##     40      0.5769      nan      0.1000      0.0039
##     60      0.4190      nan      0.1000     -0.0015
##     80      0.3051      nan      0.1000      0.0000
##    100      0.2284      nan      0.1000     -0.0005
##    120      0.1733      nan      0.1000      0.0013
##    140      0.1323      nan      0.1000     -0.0013
##    150      0.1159      nan      0.1000     -0.0010
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1854
##	2	1.4510	nan	0.1000	0.1443
##	3	1.3341	nan	0.1000	0.1205
##	4	1.2357	nan	0.1000	0.0706
##	5	1.1576	nan	0.1000	0.0879
##	6	1.0785	nan	0.1000	0.0599
##	7	1.0126	nan	0.1000	0.0623
##	8	0.9588	nan	0.1000	0.0477
##	9	0.9094	nan	0.1000	0.0094
##	10	0.8715	nan	0.1000	0.0422
##	20	0.5636	nan	0.1000	0.0101
##	40	0.2706	nan	0.1000	-0.0022
##	60	0.1501	nan	0.1000	-0.0031
##	80	0.0885	nan	0.1000	-0.0023
##	100	0.0533	nan	0.1000	-0.0013
##	120	0.0318	nan	0.1000	-0.0008
##	140	0.0190	nan	0.1000	-0.0005
##	150	0.0148	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2510
##	2	1.4253	nan	0.1000	0.1709
##	3	1.2795	nan	0.1000	0.1253
##	4	1.1573	nan	0.1000	0.1237
##	5	1.0515	nan	0.1000	0.0987
##	6	0.9642	nan	0.1000	0.0703
##	7	0.8926	nan	0.1000	0.0601
##	8	0.8277	nan	0.1000	0.0488
##	9	0.7690	nan	0.1000	0.0465
##	10	0.7166	nan	0.1000	0.0350
##	20	0.3966	nan	0.1000	0.0065
##	40	0.1482	nan	0.1000	0.0027
##	60	0.0670	nan	0.1000	0.0003
##	80	0.0302	nan	0.1000	0.0001
##	100	0.0142	nan	0.1000	0.0001
##	120	0.0065	nan	0.1000	-0.0001
##	140	0.0031	nan	0.1000	-0.0000
##	150	0.0022	nan	0.1000	-0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1054
## 2	1.5125	nan	0.1000	0.0807
## 3	1.4310	nan	0.1000	0.0417
## 4	1.3747	nan	0.1000	0.0714
## 5	1.3136	nan	0.1000	0.0473
## 6	1.2661	nan	0.1000	0.0341
## 7	1.2235	nan	0.1000	0.0043
## 8	1.1823	nan	0.1000	0.0418
## 9	1.1464	nan	0.1000	0.0114
## 10	1.1183	nan	0.1000	-0.0025
## 20	0.8645	nan	0.1000	0.0116
## 40	0.5707	nan	0.1000	-0.0092
## 60	0.4065	nan	0.1000	-0.0041
## 80	0.2983	nan	0.1000	-0.0000
## 100	0.2280	nan	0.1000	-0.0044
## 120	0.1747	nan	0.1000	-0.0012
## 140	0.1356	nan	0.1000	-0.0022
## 150	0.1192	nan	0.1000	-0.0015

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1823
## 2	1.4571	nan	0.1000	0.1472
## 3	1.3363	nan	0.1000	0.0886
## 4	1.2440	nan	0.1000	0.0853
## 5	1.1587	nan	0.1000	0.0637
## 6	1.0914	nan	0.1000	0.0540

##	7	1.0305	nan	0.1000	0.0674
##	8	0.9651	nan	0.1000	0.0306
##	9	0.9202	nan	0.1000	0.0352
##	10	0.8760	nan	0.1000	0.0280
##	20	0.5706	nan	0.1000	0.0101
##	40	0.2660	nan	0.1000	0.0027
##	60	0.1390	nan	0.1000	-0.0017
##	80	0.0765	nan	0.1000	0.0000
##	100	0.0440	nan	0.1000	0.0002
##	120	0.0259	nan	0.1000	-0.0007
##	140	0.0151	nan	0.1000	-0.0004
##	150	0.0115	nan	0.1000	-0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2277
##	2	1.4218	nan	0.1000	0.1897
##	3	1.2709	nan	0.1000	0.1380
##	4	1.1600	nan	0.1000	0.1021
##	5	1.0576	nan	0.1000	0.0868
##	6	0.9732	nan	0.1000	0.0902
##	7	0.8963	nan	0.1000	0.0563
##	8	0.8373	nan	0.1000	0.0324
##	9	0.7917	nan	0.1000	0.0446
##	10	0.7479	nan	0.1000	0.0386
##	20	0.3982	nan	0.1000	0.0109
##	40	0.1488	nan	0.1000	0.0025
##	60	0.0627	nan	0.1000	-0.0028
##	80	0.0282	nan	0.1000	-0.0006
##	100	0.0128	nan	0.1000	0.0003
##	120	0.0058	nan	0.1000	-0.0001
##	140	0.0026	nan	0.1000	0.0000
##	150	0.0018	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1670
##	2	1.4852	nan	0.1000	0.1450
##	3	1.3932	nan	0.1000	0.0851
##	4	1.3245	nan	0.1000	0.0619
##	5	1.2660	nan	0.1000	0.0424
##	6	1.2208	nan	0.1000	0.0293
##	7	1.1733	nan	0.1000	0.0446
##	8	1.1275	nan	0.1000	0.0367
##	9	1.0917	nan	0.1000	0.0231
##	10	1.0591	nan	0.1000	0.0189
##	20	0.8099	nan	0.1000	0.0032
##	40	0.5215	nan	0.1000	0.0033
##	60	0.3608	nan	0.1000	-0.0128
##	80	0.2601	nan	0.1000	-0.0019
##	100	0.1880	nan	0.1000	-0.0048
##	120	0.1415	nan	0.1000	-0.0016
##	140	0.1059	nan	0.1000	-0.0021
##	150	0.0922	nan	0.1000	-0.0014

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2853
##	2	1.4103	nan	0.1000	0.1584
##	3	1.2874	nan	0.1000	0.1007
##	4	1.1885	nan	0.1000	0.0954
##	5	1.1038	nan	0.1000	0.0809
##	6	1.0283	nan	0.1000	0.0682
##	7	0.9653	nan	0.1000	0.0654
##	8	0.9045	nan	0.1000	0.0402
##	9	0.8552	nan	0.1000	0.0411
##	10	0.8079	nan	0.1000	0.0352
##	20	0.5024	nan	0.1000	0.0108
##	40	0.2339	nan	0.1000	0.0002
##	60	0.1163	nan	0.1000	0.0001
##	80	0.0646	nan	0.1000	-0.0003
##	100	0.0365	nan	0.1000	-0.0007
##	120	0.0211	nan	0.1000	-0.0001
##	140	0.0120	nan	0.1000	-0.0003
##	150	0.0090	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2800
## 2	1.3941	nan	0.1000	0.2215
## 3	1.2259	nan	0.1000	0.1543
## 4	1.0952	nan	0.1000	0.1210
## 5	0.9939	nan	0.1000	0.0706
## 6	0.9187	nan	0.1000	0.0949
## 7	0.8355	nan	0.1000	0.0695
## 8	0.7704	nan	0.1000	0.0514
## 9	0.7111	nan	0.1000	0.0387
## 10	0.6611	nan	0.1000	0.0278
## 20	0.3624	nan	0.1000	0.0124
## 40	0.1236	nan	0.1000	0.0004
## 60	0.0496	nan	0.1000	0.0002
## 80	0.0211	nan	0.1000	-0.0002
## 100	0.0094	nan	0.1000	-0.0001
## 120	0.0043	nan	0.1000	-0.0000
## 140	0.0019	nan	0.1000	-0.0001
## 150	0.0013	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.0686
## 2	1.5271	nan	0.1000	0.1130
## 3	1.4451	nan	0.1000	0.0583
## 4	1.3842	nan	0.1000	0.0690
## 5	1.3244	nan	0.1000	0.0586
## 6	1.2712	nan	0.1000	0.0479
## 7	1.2254	nan	0.1000	0.0437
## 8	1.1859	nan	0.1000	0.0311
## 9	1.1519	nan	0.1000	0.0333
## 10	1.1192	nan	0.1000	0.0172
## 20	0.8680	nan	0.1000	0.0103
## 40	0.5953	nan	0.1000	0.0032
## 60	0.4255	nan	0.1000	0.0007
## 80	0.3069	nan	0.1000	-0.0037
## 100	0.2264	nan	0.1000	-0.0018
## 120	0.1756	nan	0.1000	-0.0026
## 140	0.1345	nan	0.1000	-0.0029
## 150	0.1175	nan	0.1000	-0.0017

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1208
##	2	1.4688	nan	0.1000	0.1495
##	3	1.3511	nan	0.1000	0.0996
##	4	1.2642	nan	0.1000	0.0764
##	5	1.1849	nan	0.1000	0.0891
##	6	1.1104	nan	0.1000	0.0574
##	7	1.0416	nan	0.1000	0.0447
##	8	0.9885	nan	0.1000	0.0399
##	9	0.9349	nan	0.1000	0.0368
##	10	0.8934	nan	0.1000	0.0505
##	20	0.5764	nan	0.1000	0.0074
##	40	0.2810	nan	0.1000	-0.0015
##	60	0.1488	nan	0.1000	0.0001
##	80	0.0825	nan	0.1000	0.0004
##	100	0.0464	nan	0.1000	-0.0012
##	120	0.0271	nan	0.1000	-0.0004
##	140	0.0159	nan	0.1000	-0.0003
##	150	0.0122	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2383
##	2	1.4137	nan	0.1000	0.1453
##	3	1.2796	nan	0.1000	0.1515
##	4	1.1514	nan	0.1000	0.0800
##	5	1.0634	nan	0.1000	0.0755
##	6	0.9831	nan	0.1000	0.0588
##	7	0.9170	nan	0.1000	0.0491
##	8	0.8576	nan	0.1000	0.0586
##	9	0.7944	nan	0.1000	0.0435
##	10	0.7463	nan	0.1000	0.0284
##	20	0.4063	nan	0.1000	0.0189
##	40	0.1496	nan	0.1000	0.0003
##	60	0.0577	nan	0.1000	-0.0001
##	80	0.0246	nan	0.1000	0.0001
##	100	0.0112	nan	0.1000	0.0001
##	120	0.0051	nan	0.1000	-0.0001
##	140	0.0023	nan	0.1000	-0.0001
##	150	0.0016	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd timestamp5/12/2011 11:23 has no variation.
```



```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1192
## 2	1.5159	nan	0.1000	0.0848
## 3	1.4308	nan	0.1000	0.0706
## 4	1.3614	nan	0.1000	0.0453
## 5	1.3112	nan	0.1000	0.0506
## 6	1.2634	nan	0.1000	0.0474
## 7	1.2197	nan	0.1000	0.0318
## 8	1.1778	nan	0.1000	0.0249
## 9	1.1406	nan	0.1000	0.0350
## 10	1.1068	nan	0.1000	0.0276
## 20	0.8500	nan	0.1000	0.0153
## 40	0.5624	nan	0.1000	-0.0104
## 60	0.4042	nan	0.1000	-0.0035
## 80	0.3011	nan	0.1000	-0.0008
## 100	0.2204	nan	0.1000	-0.0041
## 120	0.1685	nan	0.1000	-0.0010
## 140	0.1272	nan	0.1000	-0.0018
## 150	0.1107	nan	0.1000	-0.0031

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1525
## 2	1.4744	nan	0.1000	0.1400
## 3	1.3499	nan	0.1000	0.0778
## 4	1.2635	nan	0.1000	0.0870
## 5	1.1841	nan	0.1000	0.1128
## 6	1.1007	nan	0.1000	0.0612
## 7	1.0401	nan	0.1000	0.0458
## 8	0.9904	nan	0.1000	0.0178
## 9	0.9416	nan	0.1000	0.0446
## 10	0.8935	nan	0.1000	0.0265
## 20	0.5614	nan	0.1000	0.0088
## 40	0.2728	nan	0.1000	0.0014
## 60	0.1414	nan	0.1000	-0.0024
## 80	0.0777	nan	0.1000	-0.0016
## 100	0.0442	nan	0.1000	-0.0005
## 120	0.0262	nan	0.1000	-0.0002
## 140	0.0155	nan	0.1000	-0.0002
## 150	0.0120	nan	0.1000	-0.0003

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2187
## 2	1.4326	nan	0.1000	0.1812
## 3	1.2851	nan	0.1000	0.1684
## 4	1.1646	nan	0.1000	0.0983
## 5	1.0640	nan	0.1000	0.1110
## 6	0.9705	nan	0.1000	0.0584
## 7	0.9050	nan	0.1000	0.0369
## 8	0.8503	nan	0.1000	0.0471
## 9	0.7935	nan	0.1000	0.0509
## 10	0.7423	nan	0.1000	0.0563
## 20	0.4078	nan	0.1000	0.0123
## 40	0.1543	nan	0.1000	0.0010
## 60	0.0648	nan	0.1000	-0.0005
## 80	0.0279	nan	0.1000	-0.0004
## 100	0.0126	nan	0.1000	-0.0000
## 120	0.0057	nan	0.1000	-0.0000
## 140	0.0026	nan	0.1000	-0.0000
## 150	0.0018	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 11: cvtd_timestamp2/12/2011 14:56 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1307
## 2	1.4967	nan	0.1000	0.0824
## 3	1.4159	nan	0.1000	0.0592
## 4	1.3551	nan	0.1000	0.0529
## 5	1.3062	nan	0.1000	0.0547
## 6	1.2606	nan	0.1000	0.0124
## 7	1.2285	nan	0.1000	0.0307
## 8	1.1945	nan	0.1000	0.0201
## 9	1.1607	nan	0.1000	0.0388
## 10	1.1244	nan	0.1000	0.0224
## 20	0.8681	nan	0.1000	0.0085
## 40	0.5795	nan	0.1000	0.0023
## 60	0.4142	nan	0.1000	-0.0021
## 80	0.3035	nan	0.1000	-0.0065

```
##      100      0.2290      nan      0.1000     -0.0005
##      120      0.1737      nan      0.1000     -0.0020
##      140      0.1337      nan      0.1000     -0.0015
##      150      0.1170      nan      0.1000     -0.0031
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 11: cvtd_timestamp2/12/2011 14:56 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1855
##      2	1.4414	nan	0.1000	0.1275
##      3	1.3263	nan	0.1000	0.0892
##      4	1.2296	nan	0.1000	0.0897
##      5	1.1507	nan	0.1000	0.0801
##      6	1.0832	nan	0.1000	0.0586
##      7	1.0213	nan	0.1000	0.0654
##      8	0.9650	nan	0.1000	0.0546
##      9	0.9073	nan	0.1000	0.0226
##     10	0.8695	nan	0.1000	0.0218
##     20	0.5633	nan	0.1000	0.0066
##     40	0.2643	nan	0.1000	-0.0028
##     60	0.1417	nan	0.1000	0.0014
##     80	0.0802	nan	0.1000	-0.0001
##    100	0.0456	nan	0.1000	-0.0010
##    120	0.0264	nan	0.1000	-0.0001
##    140	0.0163	nan	0.1000	0.0000
##    150	0.0126	nan	0.1000	-0.0006

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 11: cvtd_timestamp2/12/2011 14:56 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1995
##      2	1.4217	nan	0.1000	0.1354
##      3	1.2952	nan	0.1000	0.1330
##      4	1.1849	nan	0.1000	0.1160
##      5	1.0786	nan	0.1000	0.0838
##      6	0.9967	nan	0.1000	0.0710
##      7	0.9227	nan	0.1000	0.0775
##      8	0.8563	nan	0.1000	0.0273
##      9	0.7991	nan	0.1000	0.0448

```

##      10      0.7428      nan      0.1000      0.0389
##      20      0.4010      nan      0.1000      0.0163
##      40      0.1516      nan      0.1000      0.0012
##      60      0.0629      nan      0.1000     -0.0001
##      80      0.0278      nan      0.1000     -0.0009
##     100      0.0127      nan      0.1000     -0.0004
##     120      0.0060      nan      0.1000     -0.0001
##     140      0.0028      nan      0.1000     -0.0001
##     150      0.0020      nan      0.1000     -0.0000

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094           nan      0.1000     0.1180
##      2         1.5041           nan      0.1000     0.0989
##      3         1.4225           nan      0.1000     0.0564
##      4         1.3578           nan      0.1000     0.0757
##      5         1.3001           nan      0.1000     0.0512
##      6         1.2489           nan      0.1000     0.0395
##      7         1.2069           nan      0.1000     0.0357
##      8         1.1697           nan      0.1000     0.0301
##      9         1.1315           nan      0.1000     0.0210
##     10         1.0896           nan      0.1000     0.0362
##     20         0.8345           nan      0.1000     0.0146
##     40         0.5459           nan      0.1000     0.0066
##     60         0.3834           nan      0.1000    -0.0020
##     80         0.2803           nan      0.1000    -0.0048
##    100         0.2065           nan      0.1000    -0.0026
##    120         0.1544           nan      0.1000    -0.0014
##    140         0.1175           nan      0.1000    -0.0017
##    150         0.1032           nan      0.1000    -0.0006

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2023
## 2	1.4414	nan	0.1000	0.1100
## 3	1.3214	nan	0.1000	0.1377
## 4	1.2152	nan	0.1000	0.1142
## 5	1.1296	nan	0.1000	0.0729
## 6	1.0481	nan	0.1000	0.0562
## 7	0.9817	nan	0.1000	0.0636
## 8	0.9239	nan	0.1000	0.0370
## 9	0.8701	nan	0.1000	0.0129
## 10	0.8328	nan	0.1000	0.0415
## 20	0.5340	nan	0.1000	0.0054
## 40	0.2615	nan	0.1000	-0.0019
## 60	0.1377	nan	0.1000	-0.0020
## 80	0.0756	nan	0.1000	-0.0031
## 100	0.0437	nan	0.1000	-0.0016
## 120	0.0256	nan	0.1000	-0.0005
## 140	0.0146	nan	0.1000	-0.0002
## 150	0.0116	nan	0.1000	0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2486
## 2	1.4033	nan	0.1000	0.1742
## 3	1.2631	nan	0.1000	0.1192
## 4	1.1337	nan	0.1000	0.1256
## 5	1.0249	nan	0.1000	0.0941
## 6	0.9372	nan	0.1000	0.0748
## 7	0.8590	nan	0.1000	0.0717
## 8	0.7939	nan	0.1000	0.0556
## 9	0.7345	nan	0.1000	0.0543
## 10	0.6815	nan	0.1000	0.0252
## 20	0.3653	nan	0.1000	0.0166
## 40	0.1329	nan	0.1000	-0.0040
## 60	0.0561	nan	0.1000	-0.0029
## 80	0.0245	nan	0.1000	-0.0005

```
##      100      0.0114      nan      0.1000     -0.0005
##      120      0.0052      nan      0.1000     -0.0001
##      140      0.0025      nan      0.1000     -0.0001
##      150      0.0017      nan      0.1000     -0.0000
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1135
##      2	1.5061	nan	0.1000	0.0959
##      3	1.4292	nan	0.1000	0.0664
##      4	1.3697	nan	0.1000	0.0471
##      5	1.3172	nan	0.1000	0.0453
##      6	1.2740	nan	0.1000	0.0440
##      7	1.2328	nan	0.1000	0.0382
##      8	1.1912	nan	0.1000	0.0359
##      9	1.1486	nan	0.1000	0.0251
##     10	1.1146	nan	0.1000	0.0135
##     20	0.8699	nan	0.1000	0.0097
##     40	0.5877	nan	0.1000	0.0020
##     60	0.4205	nan	0.1000	-0.0036
##     80	0.3092	nan	0.1000	-0.0033
##    100	0.2308	nan	0.1000	-0.0057
##    120	0.1775	nan	0.1000	-0.0019
##    140	0.1363	nan	0.1000	-0.0025
##    150	0.1211	nan	0.1000	-0.0016

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1645
##      2	1.4581	nan	0.1000	0.1307
##      3	1.3385	nan	0.1000	0.0890
##      4	1.2389	nan	0.1000	0.0709
##      5	1.1531	nan	0.1000	0.0593
##      6	1.0846	nan	0.1000	0.0716
##      7	1.0231	nan	0.1000	0.0536
##      8	0.9661	nan	0.1000	0.0535
##      9	0.9154	nan	0.1000	0.0313
##     10	0.8739	nan	0.1000	0.0359
##     20	0.5504	nan	0.1000	0.0113
##     40	0.2764	nan	0.1000	-0.0004
##     60	0.1524	nan	0.1000	-0.0031
##     80	0.0880	nan	0.1000	-0.0005
##    100	0.0503	nan	0.1000	-0.0009
##    120	0.0297	nan	0.1000	-0.0010

```
##      140      0.0181      nan      0.1000     -0.0004
##      150      0.0142      nan      0.1000     -0.0004
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2395
##      2	1.4284	nan	0.1000	0.1789
##      3	1.2839	nan	0.1000	0.0963
##      4	1.1683	nan	0.1000	0.1232
##      5	1.0685	nan	0.1000	0.0779
##      6	0.9875	nan	0.1000	0.0881
##      7	0.9128	nan	0.1000	0.0841
##      8	0.8442	nan	0.1000	0.0305
##      9	0.7907	nan	0.1000	0.0508
##     10	0.7389	nan	0.1000	0.0384
##     20	0.4053	nan	0.1000	0.0204
##     40	0.1483	nan	0.1000	0.0000
##     60	0.0612	nan	0.1000	0.0007
##     80	0.0266	nan	0.1000	-0.0008
##    100	0.0130	nan	0.1000	-0.0002
##    120	0.0063	nan	0.1000	-0.0001
##    140	0.0030	nan	0.1000	-0.0000
##    150	0.0021	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1515
##      2	1.4931	nan	0.1000	0.0964
##      3	1.4109	nan	0.1000	0.0837
##      4	1.3432	nan	0.1000	0.0621
##      5	1.2858	nan	0.1000	0.0625
##      6	1.2347	nan	0.1000	0.0460
##      7	1.1948	nan	0.1000	0.0388
##      8	1.1471	nan	0.1000	0.0368
##      9	1.1049	nan	0.1000	0.0254
##     10	1.0684	nan	0.1000	0.0294
##     20	0.7995	nan	0.1000	0.0153
##     40	0.5210	nan	0.1000	0.0019
##     60	0.3628	nan	0.1000	-0.0016
##     80	0.2650	nan	0.1000	0.0023
##    100	0.1928	nan	0.1000	-0.0017
##    120	0.1413	nan	0.1000	-0.0026
##    140	0.1062	nan	0.1000	-0.0018
##    150	0.0913	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1769
##	2	1.4505	nan	0.1000	0.1520
##	3	1.3121	nan	0.1000	0.1362
##	4	1.2102	nan	0.1000	0.0963
##	5	1.1192	nan	0.1000	0.0767
##	6	1.0437	nan	0.1000	0.0839
##	7	0.9751	nan	0.1000	0.0745
##	8	0.9067	nan	0.1000	0.0437
##	9	0.8576	nan	0.1000	0.0493
##	10	0.8058	nan	0.1000	0.0403
##	20	0.5072	nan	0.1000	0.0049
##	40	0.2393	nan	0.1000	-0.0032
##	60	0.1209	nan	0.1000	-0.0024
##	80	0.0630	nan	0.1000	0.0001
##	100	0.0352	nan	0.1000	-0.0005
##	120	0.0197	nan	0.1000	-0.0003
##	140	0.0113	nan	0.1000	-0.0002
##	150	0.0085	nan	0.1000	-0.0003

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2198
##	2	1.4146	nan	0.1000	0.1574
##	3	1.2687	nan	0.1000	0.1582
##	4	1.1337	nan	0.1000	0.1558
##	5	1.0150	nan	0.1000	0.0918
##	6	0.9308	nan	0.1000	0.0806
##	7	0.8570	nan	0.1000	0.0763
##	8	0.7913	nan	0.1000	0.0613
##	9	0.7322	nan	0.1000	0.0481
##	10	0.6763	nan	0.1000	0.0561
##	20	0.3447	nan	0.1000	0.0212
##	40	0.1203	nan	0.1000	0.0015
##	60	0.0485	nan	0.1000	-0.0010
##	80	0.0200	nan	0.1000	-0.0005
##	100	0.0088	nan	0.1000	0.0000
##	120	0.0037	nan	0.1000	-0.0001
##	140	0.0017	nan	0.1000	-0.0000
##	150	0.0011	nan	0.1000	0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd timestamp5/12/2011 11:23 has no variation.
```



```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1223
## 2	1.4964	nan	0.1000	0.1151
## 3	1.4032	nan	0.1000	0.0979
## 4	1.3302	nan	0.1000	0.0480
## 5	1.2766	nan	0.1000	0.0598
## 6	1.2308	nan	0.1000	0.0498
## 7	1.1865	nan	0.1000	0.0402
## 8	1.1510	nan	0.1000	0.0266
## 9	1.1156	nan	0.1000	0.0262
## 10	1.0812	nan	0.1000	0.0196
## 20	0.8406	nan	0.1000	0.0205
## 40	0.5587	nan	0.1000	-0.0007
## 60	0.3965	nan	0.1000	-0.0036
## 80	0.2871	nan	0.1000	-0.0005
## 100	0.2123	nan	0.1000	-0.0010
## 120	0.1602	nan	0.1000	-0.0022
## 140	0.1219	nan	0.1000	-0.0016
## 150	0.1078	nan	0.1000	-0.0028

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2525
## 2	1.4370	nan	0.1000	0.1381
## 3	1.3071	nan	0.1000	0.1257
## 4	1.2037	nan	0.1000	0.0784
## 5	1.1210	nan	0.1000	0.0682
## 6	1.0441	nan	0.1000	0.0543
## 7	0.9858	nan	0.1000	0.0471
## 8	0.9346	nan	0.1000	0.0513
## 9	0.8858	nan	0.1000	0.0369
## 10	0.8427	nan	0.1000	0.0357
## 20	0.5306	nan	0.1000	0.0187
## 40	0.2546	nan	0.1000	0.0045
## 60	0.1336	nan	0.1000	0.0008
## 80	0.0747	nan	0.1000	-0.0013
## 100	0.0437	nan	0.1000	-0.0012
## 120	0.0253	nan	0.1000	-0.0004
## 140	0.0151	nan	0.1000	-0.0005
## 150	0.0116	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2304
## 2	1.4064	nan	0.1000	0.1918
## 3	1.2500	nan	0.1000	0.1510
## 4	1.1319	nan	0.1000	0.1149
## 5	1.0335	nan	0.1000	0.0811
## 6	0.9515	nan	0.1000	0.0822
## 7	0.8699	nan	0.1000	0.0707
## 8	0.8020	nan	0.1000	0.0485
## 9	0.7493	nan	0.1000	0.0456
## 10	0.6953	nan	0.1000	0.0316
## 20	0.3777	nan	0.1000	0.0025
## 40	0.1340	nan	0.1000	-0.0005
## 60	0.0583	nan	0.1000	0.0005
## 80	0.0256	nan	0.1000	-0.0005
## 100	0.0118	nan	0.1000	-0.0004
## 120	0.0054	nan	0.1000	0.0001
## 140	0.0026	nan	0.1000	-0.0000
## 150	0.0018	nan	0.1000	-0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1073
## 2	1.5140	nan	0.1000	0.1050
## 3	1.4266	nan	0.1000	0.0933
## 4	1.3576	nan	0.1000	0.0615
## 5	1.3040	nan	0.1000	0.0576
## 6	1.2590	nan	0.1000	0.0396
## 7	1.2198	nan	0.1000	0.0229
## 8	1.1810	nan	0.1000	0.0296
## 9	1.1417	nan	0.1000	0.0361
## 10	1.1036	nan	0.1000	0.0212
## 20	0.8523	nan	0.1000	0.0153
## 40	0.5771	nan	0.1000	-0.0009
## 60	0.4101	nan	0.1000	0.0005
## 80	0.3029	nan	0.1000	-0.0030

```

##      100      0.2279      nan      0.1000     -0.0033
##      120      0.1748      nan      0.1000     -0.0010
##      140      0.1334      nan      0.1000     -0.0019
##      150      0.1171      nan      0.1000     -0.0007

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.1822
##      2         1.4570         nan         0.1000     0.1285
##      3         1.3391         nan         0.1000     0.1172
##      4         1.2340         nan         0.1000     0.0692
##      5         1.1614         nan         0.1000     0.0826
##      6         1.0937         nan         0.1000     0.0787
##      7         1.0158         nan         0.1000     0.0407
##      8         0.9628         nan         0.1000     0.0621
##      9         0.9098         nan         0.1000     0.0430
##     10         0.8619         nan         0.1000     0.0324
##     20         0.5609         nan         0.1000     0.0167
##     40         0.2770         nan         0.1000    -0.0002
##     60         0.1508         nan         0.1000    -0.0033
##     80         0.0838         nan         0.1000    -0.0007
##    100         0.0477         nan         0.1000    -0.0014
##    120         0.0270         nan         0.1000    -0.0004
##    140         0.0159         nan         0.1000    -0.0000
##    150         0.0121         nan         0.1000    -0.0003

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.2178
##      2         1.4308         nan         0.1000     0.1816
##      3         1.2784         nan         0.1000     0.1071
##      4         1.1724         nan         0.1000     0.1063
##      5         1.0683         nan         0.1000     0.1046
##      6         0.9867         nan         0.1000     0.0916
##      7         0.9061         nan         0.1000     0.0616
##      8         0.8430         nan         0.1000     0.0425
##      9         0.7888         nan         0.1000     0.0296

```

##	10	0.7436	nan	0.1000	0.0204
##	20	0.4209	nan	0.1000	0.0147
##	40	0.1548	nan	0.1000	-0.0013
##	60	0.0671	nan	0.1000	-0.0008
##	80	0.0301	nan	0.1000	-0.0002
##	100	0.0133	nan	0.1000	0.0001
##	120	0.0063	nan	0.1000	0.0000
##	140	0.0028	nan	0.1000	-0.0000
##	150	0.0019	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve	
##	1	1.6094	nan	0.1000	0.1254
##	2	1.5012	nan	0.1000	0.0774
##	3	1.4278	nan	0.1000	0.0680
##	4	1.3613	nan	0.1000	0.0469
##	5	1.3036	nan	0.1000	0.0520
##	6	1.2556	nan	0.1000	0.0535
##	7	1.2097	nan	0.1000	0.0423
##	8	1.1688	nan	0.1000	0.0297
##	9	1.1332	nan	0.1000	0.0202
##	10	1.1013	nan	0.1000	0.0297
##	20	0.8403	nan	0.1000	0.0125
##	40	0.5604	nan	0.1000	-0.0061
##	60	0.4035	nan	0.1000	-0.0030
##	80	0.2973	nan	0.1000	0.0008
##	100	0.2224	nan	0.1000	-0.0022
##	120	0.1667	nan	0.1000	-0.0045
##	140	0.1266	nan	0.1000	-0.0028
##	150	0.1103	nan	0.1000	-0.0007

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve	
##	1	1.6094	nan	0.1000	0.1936
##	2	1.4558	nan	0.1000	0.1443
##	3	1.3322	nan	0.1000	0.0888
##	4	1.2290	nan	0.1000	0.1028
##	5	1.1437	nan	0.1000	0.0664
##	6	1.0682	nan	0.1000	0.0538
##	7	1.0073	nan	0.1000	0.0520
##	8	0.9524	nan	0.1000	0.0534
##	9	0.8990	nan	0.1000	0.0398
##	10	0.8560	nan	0.1000	0.0260
##	20	0.5413	nan	0.1000	0.0078
##	40	0.2657	nan	0.1000	-0.0009

```
##      60      0.1433      nan      0.1000     -0.0012
##      80      0.0803      nan      0.1000     -0.0005
##     100      0.0461      nan      0.1000      0.0002
##     120      0.0275      nan      0.1000     -0.0001
##     140      0.0161      nan      0.1000     -0.0002
##     150      0.0125      nan      0.1000     -0.0000
```

```
## Warning in gbm.fit(x = structure(c(1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2560
##      2	1.4158	nan	0.1000	0.1867
##      3	1.2629	nan	0.1000	0.1698
##      4	1.1344	nan	0.1000	0.0933
##      5	1.0373	nan	0.1000	0.0878
##      6	0.9556	nan	0.1000	0.0806
##      7	0.8809	nan	0.1000	0.0488
##      8	0.8183	nan	0.1000	0.0663
##      9	0.7583	nan	0.1000	0.0379
##     10	0.7078	nan	0.1000	0.0495
##     20	0.3797	nan	0.1000	0.0067
##     40	0.1428	nan	0.1000	-0.0038
##     60	0.0565	nan	0.1000	0.0006
##     80	0.0244	nan	0.1000	-0.0003
##    100	0.0108	nan	0.1000	-0.0001
##    120	0.0048	nan	0.1000	-0.0001
##    140	0.0023	nan	0.1000	-0.0000
##    150	0.0016	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1120
##      2	1.5060	nan	0.1000	0.1128
##      3	1.4273	nan	0.1000	0.0717
##      4	1.3682	nan	0.1000	0.0592
##      5	1.3147	nan	0.1000	0.0511
##      6	1.2646	nan	0.1000	0.0271
##      7	1.2216	nan	0.1000	0.0384
##      8	1.1840	nan	0.1000	0.0114
##      9	1.1527	nan	0.1000	0.0264
##     10	1.1206	nan	0.1000	0.0266
##     20	0.8491	nan	0.1000	0.0100
##     40	0.5650	nan	0.1000	0.0034
##     60	0.4061	nan	0.1000	0.0010
##     80	0.3055	nan	0.1000	-0.0054
##    100	0.2326	nan	0.1000	-0.0016

```
##      120      0.1775      nan      0.1000     -0.0040
##      140      0.1384      nan      0.1000     -0.0017
##      150      0.1210      nan      0.1000     -0.0015
```

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.1664
##      2	1.4742	nan	0.1000	0.1091
##      3	1.3575	nan	0.1000	0.1336
##      4	1.2562	nan	0.1000	0.0875
##      5	1.1709	nan	0.1000	0.0595
##      6	1.1078	nan	0.1000	0.0352
##      7	1.0393	nan	0.1000	0.0565
##      8	0.9827	nan	0.1000	0.0558
##      9	0.9273	nan	0.1000	0.0465
##     10	0.8793	nan	0.1000	0.0347
##     20	0.5600	nan	0.1000	-0.0003
##     40	0.2782	nan	0.1000	0.0022
##     60	0.1561	nan	0.1000	-0.0011
##     80	0.0892	nan	0.1000	-0.0035
##    100	0.0531	nan	0.1000	-0.0008
##    120	0.0326	nan	0.1000	-0.0007
##    140	0.0197	nan	0.1000	-0.0004
##    150	0.0155	nan	0.1000	-0.0005

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##      1	1.6094	nan	0.1000	0.2398
##      2	1.4068	nan	0.1000	0.1498
##      3	1.2644	nan	0.1000	0.1451
##      4	1.1470	nan	0.1000	0.0980
##      5	1.0489	nan	0.1000	0.1108
##      6	0.9539	nan	0.1000	0.0743
##      7	0.8795	nan	0.1000	0.0556
##      8	0.8167	nan	0.1000	0.0496
##      9	0.7592	nan	0.1000	0.0512
##     10	0.7058	nan	0.1000	0.0340
##     20	0.3891	nan	0.1000	0.0059
##     40	0.1578	nan	0.1000	-0.0030
##     60	0.0661	nan	0.1000	-0.0007
##     80	0.0312	nan	0.1000	-0.0007
##    100	0.0146	nan	0.1000	-0.0000
##    120	0.0069	nan	0.1000	-0.0003
##    140	0.0033	nan	0.1000	-0.0001
##    150	0.0024	nan	0.1000	-0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1479
## 2	1.4923	nan	0.1000	0.1260
## 3	1.4022	nan	0.1000	0.1004
## 4	1.3201	nan	0.1000	0.0775
## 5	1.2603	nan	0.1000	0.0542
## 6	1.2132	nan	0.1000	0.0295
## 7	1.1744	nan	0.1000	0.0464
## 8	1.1244	nan	0.1000	0.0347
## 9	1.0879	nan	0.1000	0.0212
## 10	1.0584	nan	0.1000	0.0306
## 20	0.7932	nan	0.1000	-0.0019
## 40	0.5187	nan	0.1000	0.0086
## 60	0.3625	nan	0.1000	-0.0028
## 80	0.2574	nan	0.1000	-0.0035
## 100	0.1897	nan	0.1000	-0.0011
## 120	0.1397	nan	0.1000	-0.0026
## 140	0.1069	nan	0.1000	-0.0000
## 150	0.0919	nan	0.1000	-0.0025

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2090
## 2	1.4265	nan	0.1000	0.1659
## 3	1.2892	nan	0.1000	0.1078
## 4	1.1891	nan	0.1000	0.0966
## 5	1.0957	nan	0.1000	0.0788
## 6	1.0257	nan	0.1000	0.0807
## 7	0.9537	nan	0.1000	0.0468
## 8	0.8954	nan	0.1000	0.0332
## 9	0.8492	nan	0.1000	0.0490
## 10	0.8006	nan	0.1000	0.0294
## 20	0.4987	nan	0.1000	0.0077
## 40	0.2321	nan	0.1000	0.0009
## 60	0.1166	nan	0.1000	0.0011
## 80	0.0619	nan	0.1000	0.0000

```

##      100      0.0347      nan      0.1000     -0.0006
##      120      0.0196      nan      0.1000     -0.0003
##      140      0.0112      nan      0.1000     -0.0005
##      150      0.0086      nan      0.1000     -0.0002

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.2860
##      2         1.3937         nan         0.1000     0.1979
##      3         1.2334         nan         0.1000     0.1373
##      4         1.1182         nan         0.1000     0.1124
##      5         1.0199         nan         0.1000     0.1025
##      6         0.9236         nan         0.1000     0.0913
##      7         0.8414         nan         0.1000     0.0681
##      8         0.7736         nan         0.1000     0.0678
##      9         0.7169         nan         0.1000     0.0501
##     10         0.6648         nan         0.1000     0.0323
##     20         0.3532         nan         0.1000     0.0117
##     40         0.1201         nan         0.1000     0.0033
##     60         0.0469         nan         0.1000     0.0013
##     80         0.0194         nan         0.1000    -0.0000
##    100         0.0086         nan         0.1000    -0.0003
##    120         0.0038         nan         0.1000    -0.0000
##    140         0.0017         nan         0.1000    -0.0000
##    150         0.0012         nan         0.1000    -0.0000

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.1295
##      2         1.5006         nan         0.1000     0.1164
##      3         1.4227         nan         0.1000     0.0688
##      4         1.3582         nan         0.1000     0.0623
##      5         1.3017         nan         0.1000     0.0103

```



```

##      6      1.2615      nan      0.1000      0.0316
##      7      1.2205      nan      0.1000      0.0418
##      8      1.1773      nan      0.1000      0.0428
##      9      1.1424      nan      0.1000      0.0333
##     10      1.1061      nan      0.1000      0.0172
##     20      0.8694      nan      0.1000      0.0132
##     40      0.5789      nan      0.1000      0.0015
##     60      0.4146      nan      0.1000     -0.0036
##     80      0.3070      nan      0.1000     -0.0039
##    100      0.2289      nan      0.1000     -0.0001
##    120      0.1739      nan      0.1000     -0.0007
##    140      0.1348      nan      0.1000     -0.0017
##    150      0.1179      nan      0.1000      0.0001

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1      1.6094      nan      0.1000      0.2135
##      2      1.4411      nan      0.1000      0.0826
##      3      1.3422      nan      0.1000      0.1159
##      4      1.2449      nan      0.1000      0.0927
##      5      1.1622      nan      0.1000      0.0917
##      6      1.0909      nan      0.1000      0.0492
##      7      1.0331      nan      0.1000      0.0628
##      8      0.9720      nan      0.1000      0.0561
##      9      0.9199      nan      0.1000      0.0507
##     10      0.8724      nan      0.1000      0.0314
##     20      0.5685      nan      0.1000      0.0056
##     40      0.2821      nan      0.1000      0.0036
##     60      0.1523      nan      0.1000     -0.0003
##     80      0.0823      nan      0.1000     -0.0010
##    100      0.0478      nan      0.1000     -0.0010
##    120      0.0280      nan      0.1000     -0.0006
##    140      0.0172      nan      0.1000     -0.0001
##    150      0.0132      nan      0.1000     -0.0000

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 24: cvtd_timestamp5/12/2011 14:22 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1737
## 2	1.4270	nan	0.1000	0.1412
## 3	1.2839	nan	0.1000	0.1636
## 4	1.1514	nan	0.1000	0.0888
## 5	1.0524	nan	0.1000	0.0625
## 6	0.9779	nan	0.1000	0.0490
## 7	0.9095	nan	0.1000	0.0562
## 8	0.8459	nan	0.1000	0.0420
## 9	0.7930	nan	0.1000	0.0640
## 10	0.7320	nan	0.1000	0.0477
## 20	0.3846	nan	0.1000	0.0053
## 40	0.1470	nan	0.1000	0.0030
## 60	0.0609	nan	0.1000	-0.0000
## 80	0.0277	nan	0.1000	-0.0001
## 100	0.0123	nan	0.1000	-0.0001
## 120	0.0057	nan	0.1000	-0.0000
## 140	0.0026	nan	0.1000	-0.0000
## 150	0.0017	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.0981
## 2	1.5096	nan	0.1000	0.1001
## 3	1.4225	nan	0.1000	0.0739
## 4	1.3562	nan	0.1000	0.0473
## 5	1.3050	nan	0.1000	0.0594
## 6	1.2549	nan	0.1000	0.0404
## 7	1.2127	nan	0.1000	0.0213
## 8	1.1693	nan	0.1000	0.0382
## 9	1.1314	nan	0.1000	0.0230
## 10	1.1018	nan	0.1000	0.0217
## 20	0.8517	nan	0.1000	0.0099
## 40	0.5627	nan	0.1000	0.0012
## 60	0.4016	nan	0.1000	0.0025
## 80	0.2926	nan	0.1000	-0.0065
## 100	0.2175	nan	0.1000	-0.0041
## 120	0.1660	nan	0.1000	-0.0019
## 140	0.1258	nan	0.1000	-0.0037
## 150	0.1097	nan	0.1000	-0.0004

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1788
##	2	1.4562	nan	0.1000	0.1705
##	3	1.3352	nan	0.1000	0.1059
##	4	1.2403	nan	0.1000	0.0895
##	5	1.1523	nan	0.1000	0.0753
##	6	1.0816	nan	0.1000	0.0704
##	7	1.0072	nan	0.1000	0.0542
##	8	0.9478	nan	0.1000	0.0508
##	9	0.8926	nan	0.1000	0.0311
##	10	0.8499	nan	0.1000	0.0417
##	20	0.5425	nan	0.1000	0.0155
##	40	0.2616	nan	0.1000	-0.0040
##	60	0.1393	nan	0.1000	0.0002
##	80	0.0786	nan	0.1000	-0.0007
##	100	0.0447	nan	0.1000	-0.0001
##	120	0.0258	nan	0.1000	-0.0001
##	140	0.0152	nan	0.1000	-0.0002
##	150	0.0117	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2398
##	2	1.4219	nan	0.1000	0.1387
##	3	1.2852	nan	0.1000	0.1107
##	4	1.1781	nan	0.1000	0.1118
##	5	1.0799	nan	0.1000	0.0665
##	6	1.0034	nan	0.1000	0.0957
##	7	0.9226	nan	0.1000	0.0769
##	8	0.8459	nan	0.1000	0.0484
##	9	0.7862	nan	0.1000	0.0619
##	10	0.7265	nan	0.1000	0.0438
##	20	0.3918	nan	0.1000	0.0094
##	40	0.1412	nan	0.1000	0.0043
##	60	0.0592	nan	0.1000	-0.0010
##	80	0.0260	nan	0.1000	-0.0001
##	100	0.0117	nan	0.1000	-0.0001
##	120	0.0054	nan	0.1000	-0.0001
##	140	0.0025	nan	0.1000	-0.0000
##	150	0.0017	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.0800
## 2	1.5114	nan	0.1000	0.0985
## 3	1.4279	nan	0.1000	0.0604
## 4	1.3674	nan	0.1000	0.0602
## 5	1.3128	nan	0.1000	0.0212
## 6	1.2694	nan	0.1000	0.0120
## 7	1.2323	nan	0.1000	0.0447
## 8	1.1872	nan	0.1000	0.0387
## 9	1.1538	nan	0.1000	0.0239
## 10	1.1138	nan	0.1000	0.0112
## 20	0.8795	nan	0.1000	0.0129
## 40	0.6041	nan	0.1000	0.0047
## 60	0.4396	nan	0.1000	-0.0015
## 80	0.3258	nan	0.1000	-0.0040
## 100	0.2512	nan	0.1000	-0.0051
## 120	0.1931	nan	0.1000	-0.0010
## 140	0.1496	nan	0.1000	-0.0020
## 150	0.1307	nan	0.1000	-0.0026

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1334
## 2	1.4645	nan	0.1000	0.1328
## 3	1.3485	nan	0.1000	0.1034
## 4	1.2538	nan	0.1000	0.0905
## 5	1.1691	nan	0.1000	0.0807
## 6	1.0951	nan	0.1000	0.0711
## 7	1.0324	nan	0.1000	0.0520
## 8	0.9749	nan	0.1000	0.0230
## 9	0.9292	nan	0.1000	0.0458
## 10	0.8783	nan	0.1000	0.0352
## 20	0.5696	nan	0.1000	0.0127
## 40	0.2868	nan	0.1000	-0.0014
## 60	0.1576	nan	0.1000	-0.0024
## 80	0.0894	nan	0.1000	-0.0006
## 100	0.0523	nan	0.1000	-0.0002
## 120	0.0303	nan	0.1000	-0.0005
## 140	0.0184	nan	0.1000	-0.0002
## 150	0.0147	nan	0.1000	-0.0002

```
## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.2182
## 2	1.4245	nan	0.1000	0.1524

##	3	1.2954	nan	0.1000	0.1506
##	4	1.1746	nan	0.1000	0.0800
##	5	1.0858	nan	0.1000	0.1016
##	6	0.9948	nan	0.1000	0.0838
##	7	0.9210	nan	0.1000	0.0744
##	8	0.8500	nan	0.1000	0.0396
##	9	0.7984	nan	0.1000	0.0473
##	10	0.7458	nan	0.1000	0.0207
##	20	0.4153	nan	0.1000	0.0122
##	40	0.1551	nan	0.1000	-0.0014
##	60	0.0692	nan	0.1000	-0.0002
##	80	0.0306	nan	0.1000	-0.0006
##	100	0.0146	nan	0.1000	-0.0003
##	120	0.0069	nan	0.1000	-0.0001
##	140	0.0034	nan	0.1000	-0.0001
##	150	0.0023	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1305
##	2	1.5001	nan	0.1000	0.0825
##	3	1.4151	nan	0.1000	0.0869
##	4	1.3487	nan	0.1000	0.0732
##	5	1.2879	nan	0.1000	0.0581
##	6	1.2369	nan	0.1000	0.0326
##	7	1.1991	nan	0.1000	0.0272
##	8	1.1645	nan	0.1000	0.0130
##	9	1.1298	nan	0.1000	0.0295
##	10	1.0899	nan	0.1000	0.0366
##	20	0.8235	nan	0.1000	0.0077
##	40	0.5450	nan	0.1000	0.0041
##	60	0.3801	nan	0.1000	-0.0029
##	80	0.2736	nan	0.1000	-0.0003
##	100	0.1986	nan	0.1000	0.0003
##	120	0.1492	nan	0.1000	-0.0029
##	140	0.1126	nan	0.1000	-0.0018
##	150	0.0971	nan	0.1000	-0.0006

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.1640
##	2	1.4512	nan	0.1000	0.1538
##	3	1.3262	nan	0.1000	0.1155
##	4	1.2304	nan	0.1000	0.0931
##	5	1.1454	nan	0.1000	0.0837
##	6	1.0738	nan	0.1000	0.0511
##	7	1.0141	nan	0.1000	0.0617
##	8	0.9528	nan	0.1000	0.0467
##	9	0.9004	nan	0.1000	0.0309
##	10	0.8543	nan	0.1000	0.0338
##	20	0.5377	nan	0.1000	0.0135
##	40	0.2519	nan	0.1000	0.0006
##	60	0.1330	nan	0.1000	-0.0021
##	80	0.0727	nan	0.1000	0.0002
##	100	0.0416	nan	0.1000	-0.0007
##	120	0.0237	nan	0.1000	0.0002
##	140	0.0140	nan	0.1000	0.0001
##	150	0.0105	nan	0.1000	-0.0001

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new windowyes has no variation.
```

##	Iter	TrainDeviance	ValidDeviance	StepSize	Improve
##	1	1.6094	nan	0.1000	0.2570
##	2	1.4105	nan	0.1000	0.1654
##	3	1.2670	nan	0.1000	0.1416
##	4	1.1424	nan	0.1000	0.1176
##	5	1.0358	nan	0.1000	0.0814
##	6	0.9585	nan	0.1000	0.0706
##	7	0.8855	nan	0.1000	0.0515
##	8	0.8268	nan	0.1000	0.0461
##	9	0.7698	nan	0.1000	0.0557
##	10	0.7117	nan	0.1000	0.0420
##	20	0.3706	nan	0.1000	0.0139
##	40	0.1253	nan	0.1000	0.0020
##	60	0.0518	nan	0.1000	0.0004
##	80	0.0222	nan	0.1000	0.0001
##	100	0.0091	nan	0.1000	-0.0003
##	120	0.0041	nan	0.1000	-0.0000
##	140	0.0019	nan	0.1000	0.0000
##	150	0.0012	nan	0.1000	-0.0000

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1107
## 2	1.5105	nan	0.1000	0.1091
## 3	1.4301	nan	0.1000	0.0406
## 4	1.3716	nan	0.1000	0.0449
## 5	1.3248	nan	0.1000	0.0589
## 6	1.2749	nan	0.1000	0.0535
## 7	1.2252	nan	0.1000	0.0207
## 8	1.1875	nan	0.1000	0.0392
## 9	1.1507	nan	0.1000	0.0344
## 10	1.1146	nan	0.1000	0.0266
## 20	0.8697	nan	0.1000	0.0005
## 40	0.5852	nan	0.1000	0.0025
## 60	0.4262	nan	0.1000	-0.0014
## 80	0.3158	nan	0.1000	-0.0020
## 100	0.2433	nan	0.1000	-0.0039
## 120	0.1874	nan	0.1000	-0.0014
## 140	0.1434	nan	0.1000	-0.0013
## 150	0.1263	nan	0.1000	0.0005

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

## Iter	TrainDeviance	ValidDeviance	StepSize	Improve
## 1	1.6094	nan	0.1000	0.1938
## 2	1.4512	nan	0.1000	0.1257
## 3	1.3468	nan	0.1000	0.0972
## 4	1.2555	nan	0.1000	0.0867
## 5	1.1702	nan	0.1000	0.0617
## 6	1.1075	nan	0.1000	0.0738
## 7	1.0438	nan	0.1000	0.0469
## 8	0.9900	nan	0.1000	0.0568
## 9	0.9326	nan	0.1000	0.0325
## 10	0.8860	nan	0.1000	0.0377
## 20	0.5640	nan	0.1000	0.0205
## 40	0.2797	nan	0.1000	0.0030
## 60	0.1519	nan	0.1000	-0.0006
## 80	0.0855	nan	0.1000	-0.0011

```

##      100      0.0522      nan      0.1000     -0.0008
##      120      0.0309      nan      0.1000     -0.0007
##      140      0.0183      nan      0.1000      0.0000
##      150      0.0141      nan      0.1000     -0.0002

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.2074
##      2         1.4264         nan         0.1000     0.1181
##      3         1.3072         nan         0.1000     0.1304
##      4         1.1906         nan         0.1000     0.1013
##      5         1.0827         nan         0.1000     0.1069
##      6         0.9937         nan         0.1000     0.0934
##      7         0.9138         nan         0.1000     0.0660
##      8         0.8514         nan         0.1000     0.0430
##      9         0.7901         nan         0.1000     0.0351
##     10         0.7415         nan         0.1000     0.0454
##     20         0.4156         nan         0.1000     0.0059
##     40         0.1587         nan         0.1000    -0.0022
##     60         0.0647         nan         0.1000    -0.0000
##     80         0.0294         nan         0.1000    -0.0003
##    100         0.0135         nan         0.1000     0.0004
##    120         0.0064         nan         0.1000    -0.0000
##    140         0.0031         nan         0.1000    -0.0000
##    150         0.0020         nan         0.1000    -0.0000

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.

## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094         nan         0.1000     0.1323
##      2         1.4870         nan         0.1000     0.1095
##      3         1.4008         nan         0.1000     0.0564
##      4         1.3435         nan         0.1000     0.0714
##      5         1.2872         nan         0.1000     0.0654
##      6         1.2370         nan         0.1000     0.0316
##      7         1.1957         nan         0.1000     0.0221
##      8         1.1619         nan         0.1000     0.0274
##      9         1.1254         nan         0.1000     0.0173

```



```
##      10      1.0867      nan      0.1000      0.0409
##      20      0.8470      nan      0.1000      0.0125
##      40      0.5623      nan      0.1000      0.0063
##      60      0.4076      nan      0.1000     -0.0066
##      80      0.3047      nan      0.1000     -0.0006
##     100      0.2264      nan      0.1000     -0.0041
##     120      0.1720      nan      0.1000     -0.0054
##     140      0.1325      nan      0.1000     -0.0022
##     150      0.1168      nan      0.1000     -0.0023
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094           nan      0.1000     0.1234
##      2         1.4686           nan      0.1000     0.1687
##      3         1.3384           nan      0.1000     0.1483
##      4         1.2292           nan      0.1000     0.0868
##      5         1.1502           nan      0.1000     0.1048
##      6         1.0658           nan      0.1000     0.0529
##      7         1.0040           nan      0.1000     0.0611
##      8         0.9452           nan      0.1000     0.0485
##      9         0.8939           nan      0.1000     0.0425
##     10         0.8457           nan      0.1000     0.0218
##     20         0.5408           nan      0.1000     0.0138
##     40         0.2575           nan      0.1000     0.0003
##     60         0.1357           nan      0.1000    -0.0014
##     80         0.0762           nan      0.1000    -0.0006
##    100         0.0449           nan      0.1000    -0.0011
##    120         0.0264           nan      0.1000    -0.0009
##    140         0.0155           nan      0.1000    -0.0003
##    150         0.0123           nan      0.1000    -0.0001
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 21: cvtd_timestamp5/12/2011 11:23 has no variation.
```

```
## Warning in gbm.fit(x = structure(c(0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.
```

```
## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094           nan      0.1000     0.2348
##      2         1.4113           nan      0.1000     0.1934
##      3         1.2599           nan      0.1000     0.1580
##      4         1.1328           nan      0.1000     0.1281
```

```
##      5      1.0343      nan      0.1000      0.0549
##      6      0.9552      nan      0.1000      0.0539
##      7      0.8916      nan      0.1000      0.0588
##      8      0.8268      nan      0.1000      0.0540
##      9      0.7674      nan      0.1000      0.0483
##     10      0.7158      nan      0.1000      0.0373
##     20      0.3960      nan      0.1000     -0.0028
##     40      0.1499      nan      0.1000      0.0019
##     60      0.0628      nan      0.1000     -0.0006
##     80      0.0290      nan      0.1000     -0.0008
##    100      0.0139      nan      0.1000     -0.0003
##    120      0.0071      nan      0.1000     -0.0004
##    140      0.0034      nan      0.1000     -0.0001
##    150      0.0024      nan      0.1000     -0.0001

## Warning in gbm.fit(x = structure(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
:
## variable 27: new_windowyes has no variation.

## Iter   TrainDeviance   ValidDeviance   StepSize   Improve
##      1         1.6094           nan      0.1000     0.1570
##      2         1.4563           nan      0.1000     0.1192
##      3         1.3328           nan      0.1000     0.0894
##      4         1.2334           nan      0.1000     0.0977
##      5         1.1422           nan      0.1000     0.0652
##      6         1.0675           nan      0.1000     0.0473
##      7         1.0008           nan      0.1000     0.0388
##      8         0.9406           nan      0.1000     0.0070
##      9         0.8904           nan      0.1000     0.0259
##     10         0.8463           nan      0.1000     0.0237
##     20         0.5131           nan      0.1000     0.0026
##     40         0.2251           nan      0.1000     0.0020
##     60         0.1105           nan      0.1000     0.0003
##     80         0.0555           nan      0.1000    -0.0011
##    100         0.0294           nan      0.1000    -0.0019
##    120         0.0162           nan      0.1000    -0.0005
##    140         0.0087           nan      0.1000    -0.0005
##    150         0.0065           nan      0.1000    -0.0002
```

## Metrics

Below is an example of the output from one of the better models. We see the accuracy is fairly high.

##		Reference				
##	Prediction	A	B	C	D	E
##	A	28	1	0	0	0
##	B	4	20	0	3	1
##	C	0	2	18	0	0

```
##           D  0  0  2 15  1
##           E  0  0  1  2 21

##           Accuracy           Kappa  AccuracyLower  AccuracyUpper  AccuracyNull
## 8.571429e-01 8.202896e-01 7.811516e-01 9.145232e-01 2.689076e-01
## AccuracyPValue  McNemarPValue
## 5.576130e-41           NaN

##
## Call:
## lm(formula = actual ~ ., data = predDF)
##
## Coefficients:
## (Intercept)           x1           x2
## 0.05226      0.68972      0.29233
```

The following list summarizes the squared error of various models--Random Forest, GBM, and Blended, respectfully:

```
## [1] 37
## [1] 63
## [1] 87
```

The following plots show output for our three models (rf, gbm, and blended). We based our final selection on that model producing the lowest mean squared error.





