Predicting NBA Shot Success Probability Using Logistic Regression

Ted Henson

Preview of Data

```
##   made shooter_velocity_ft_sec shooter_velocity_angle dribbles_before
## 1    0                1.870883              23.618326               1
## 2    0                1.001283             133.975882               0
## 3    0               10.471914               4.918328               1
## 4    0                2.230983             -96.206905               1
##   defender_distance defender_angle defender_velocity_ft_sec
## 1         10.004074       33.03691                 4.906114
## 2          7.655019      -13.40452                 2.358548
## 3          3.610886      167.80277                 2.075523
## 4          1.113495      -17.56011                 3.045782
##   defender_velocity_angle shooter.distance
## 1               -59.10059        18.193530
## 2                10.36283        23.098668
## 3               -22.95902         4.476016
## 4                82.61824        21.089940
```

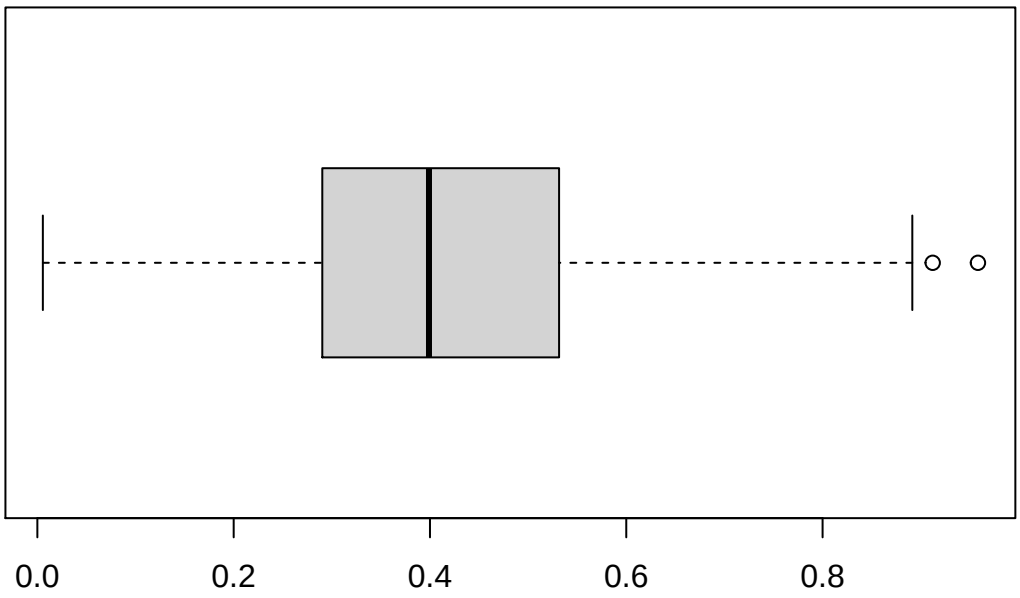
Model Coefficients and Confidence Intervals

```
##       (Intercept)   dribbles_before defender_distance    defender_angle
##      0.3415800416     -0.0360874458      0.0995241823     -0.0006202298
##  shooter.distance
##     -0.0704847083
```

```
##                          2.5 %        97.5 %
## (Intercept)        0.235858681  0.4476661066
## dribbles_before   -0.049443356 -0.0229850948
## defender_distance  0.079854896  0.1194714607
## defender_angle    -0.001348288  0.0001071902
## shooter.distance  -0.076357850 -0.0647191937
```

Preview of predicted probabilities for shots

```
##         6         8        20        24        28        29
## 0.5604403 0.4567623 0.2567748 0.5784136 0.6553261 0.6592018
```




```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 0.005575 0.290297 0.399002 0.403340 0.531457 0.958300
```

Evaluating model on test set

```
## [1] "number of shots evaluated: 3000"
```

Shots deemed low percentage (prediction fit below .4)

```
## [1] "number of 'bad shots':  1505"
```

```
## [1] "percent of evaluated shots deemed 'bad': 50%"
```

```
## [1] "field goal percentage of 'bad shots': 29%"
```

Shots deemed high percentage (prediction fit above .6)

```
## [1] "number of 'good shots':  278"
```

```
## [1] "percent of evaluated shots deemed 'good': 9%"
```

```
## [1] "field goal percentage of 'good shots': 69%"
```

Shots deemed above average (prediction fit below .6 and above .5)

```
## [1] "number of 'above average shots':  684"
```

```
## [1] "percent of evaluated shots deemed 'above average': 23%"
```

```
## [1] "field goal percentage of 'above average shots': 52%"
```

Shots deemed below average (prediction fit below .5 and above .4)

```
## [1] "number of 'below average shots':  533"
## [1] "percent of evaluated shots deemed 'below average': 18%"
## [1] "field goal percentage of 'below average shots': 40%"
```

Shots deemed average (prediction fit between .4 and .6)

```
## [1] "number of 'average shots':  1217"
## [1] "percent of evaluated shots deemed 'average': 41%"
## [1] "field goal percentage of 'average shots': 47%"
```