

Lesson 25 NFL Field Goals Example with categorical variables (with # categories > 2)

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```
# Load packages
library(tidyverse)

field_goal <- read.csv("https://raw.githubusercontent.com/jkstarling/MA376/main/fg_2021.csv",header=T, )

fg <- field_goal %>% select(c(field_goal_result, surface))

ind <- fg$field_goal_result == "blocked"
fg$field_goal_result[ind] <- "missed"

fg <- droplevels(fg)

levels(fg$surface)

## [1] "astroturf" "fieldturf" "fieldturf " "grass"      "matrixturf"
## [6] "sportturf"

fg.glm <- glm(field_goal_result ~ surface, data=fg, family = "binomial")
summary(fg.glm)

##
## Call:
## glm(formula = field_goal_result ~ surface, family = "binomial",
##      data = fg)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -0.5844  -0.5844  -0.5780  -0.4890   2.3096
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -1.735e+00  2.801e-01  -6.194 5.87e-10 ***
## surfacefieldturf  2.985e-02  3.573e-01   0.084   0.933
## surfacefieldturf -3.291e-01  4.683e-01  -0.703   0.482
## surfacegrass     5.377e-02  3.005e-01   0.179   0.858
## surfacematrixturf -8.607e-01  5.416e-01  -1.589   0.112
## surfacesportturf  9.307e-16  5.239e-01   0.000   1.000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 897.79  on 1075  degrees of freedom
## Residual deviance: 892.35  on 1070  degrees of freedom
## AIC: 904.35
##
## Number of Fisher Scoring iterations: 5
```

```
contrasts(fg$surface)
```

```
##           fieldturf fieldturf  grass matrixturf sportturf
## astroturf           0           0      0           0           0
## fieldturf           1           0      0           0           0
## fieldturf           0           1      0           0           0
## grass               0           0      1           0           0
## matrixturf          0           0      0           1           0
## sportturf           0           0      0           0           1
```