project preprocessing

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Including Plots

You can also embed plots, for example:

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.4.4     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
salary_data = read.csv("salary_Proj.csv")
nflverse_data = read.csv("nflverse.csv")

names(salary_data)[1] <- "player_display_name"
total <- merge(salary_data,nflverse_data,by="player_display_name")
total$Base.Salary
```

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## [1873]  1870000  1870000  1870000  1870000  1870000  5500000  5500000  5500000
## [1881]  5500000  5500000  5500000  5500000  5500000  5500000  5500000  5500000
## [1889]  5500000  5500000  1125000  1180000  1180000  1180000  1180000  1180000
## [1897]  1180000  1180000  1180000  1180000  1180000  1180000  1180000  1180000
## [1905]  1180000  1180000  2530842  2530842  2530842  2530842  2530842  2530842
## [1913]  2530842  2530842  2530842  2530842  2530842  2530842  2530842  1400000
## [1921]  1400000  1400000  1400000  1400000  1400000  1400000  1400000  1400000
## [1929]  1400000  1400000  1400000  1400000  1400000  1400000  1400000  1400000
## [1937]  1125000  1125000  1125000  1125000  1125000 18100000 18100000 18100000
## [1945] 18100000 18100000 18100000 18100000 18100000 18100000 18100000 18100000
## [1953] 18100000 18100000  1125000  1300000  1300000  1300000  1300000  1300000
## [1961]  1300000  1300000  1300000  1472416  1472416  1472416  1472416  1472416
## [1969]  1472416  1472416  1472416  1472416  1472416  1472416  1472416  1472416
## [1977]  1472416  1472416  1550000  1550000  1550000  1550000  1550000  1550000
## [1985]  1550000 12500000 12500000 12500000 12500000 12500000 12500000 12500000
## [1993] 12500000  1125000  1125000  1125000  1125000  1125000  1125000  1210000
## [2001]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2009]  1210000  1210000  1210000  1414819  1414819  3116000  3116000  3116000
## [2017]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2025]  3116000  3116000  3116000  3116000 37000000 37000000 37000000 37000000
## [2033] 37000000 37000000 37000000 37000000 14250000 14250000 14250000 14250000
## [2041] 14250000 14250000 14250000 14250000 14250000 14250000 14250000 14250000
## [2049] 14250000 14250000 14250000 14250000 14250000 14250000  1950000  1135261
## [2057]  1135261  1135261  1135261  1135261  1135261  1135261  1135261  1135261
## [2065]  1135261  1135261  1135261  1135261  2785412  2785412  2785412  2785412
## [2073]  2785412  2785412  2785412  2785412  2785412  2785412  2785412  1540000
## [2081]  1540000  1540000  1540000  1540000  1540000  1540000  1540000  1540000
## [2089]  1174100  1174100  2390000  2390000  7000000  7000000  7000000  7000000
## [2097]  7000000  7000000  7000000  7000000  7000000  7000000  7000000  3500000
## [2105]  3500000  3500000  3500000  3500000  3500000  3500000  3500000  3500000
## [2113]  3500000  3500000  3500000  3500000  1350000  1350000  1350000  1350000
## [2121]  1350000 31000000 31000000 31000000 31000000 31000000 31000000 31000000
## [2129] 31000000 31000000 31000000 31000000 31000000 31000000 31000000 31000000
## [2137] 31000000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2145]  1210000  3366000  3366000  3366000  3366000  3366000  3366000  3366000
## [2153]  3366000  3366000  3366000  3366000  3366000  3366000  3366000  3366000
## [2161]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2169]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  1173348
## [2177]  1173348  1173348  1173348  1173348  1173348  1173348  1173348  1173348
## [2185]  1173348  1173348  1173348  1125000  1125000  1125000  1125000  1125000
## [2193]  1125000  1125000  1210000  1210000  1210000  1210000  1210000  1210000
## [2201]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2209]  1210000  1210000  1210000  1210000  1210000  1500000  1500000  1500000
## [2217]  1500000  1500000  1500000  1500000  1500000  1500000  1500000  1500000
## [2225]  1500000  1500000  1500000  1500000  3500000  3500000  3500000  3500000
## [2233]  3500000  3500000  1255000  1255000  1255000  4020000  4020000  4020000
## [2241]  4020000  4020000  4020000  4020000  4020000  4020000  4020000  4020000
## [2249]  4020000  4020000  4020000  4020000  4020000  1210000  1210000  1210000
## [2257]  1210000  1210000  5410000  5410000  5410000  5410000  5410000  5410000
## [2265]  5410000  5410000  5410000  5410000  5410000  5410000  5410000  1210000
## [2273]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2281]  2439197  2439197  2439197  2439197  2439197  2439197  2439197  2439197
```

```
## [2289]  2439197  2439197  2439197  2439197  2439197  2439197  2439197  2439197
## [2297]  2439197  2439197  1210000  1210000  1210000  1210000  1210000  1210000
## [2305]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2313]  1210000  1210000  1210000  1210000 11775000 11775000  1722500  1722500
## [2321]  1722500  1722500  1722500  3116000  3116000  3116000  3116000  3116000
## [2329]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2337]  3116000  3116000  3116000  3116000  2000000  2000000  2000000  2000000
## [2345]  2000000  2000000  2000000  2000000  2000000  2000000  2000000  2490000
## [2353]  2490000  2490000  2490000  2490000  2490000  2490000  2490000  2490000
## [2361]  2490000  2490000  2490000  2490000  2490000  3116000  3116000  3116000
## [2369]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2377]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2385]  3116000  1482025  1482025  1482025  1482025  1482025  1482025  1482025
## [2393]  1482025  1482025  1482025  1482025  1482025  9850000  9850000  9850000
## [2401]  9850000  9850000  9850000  9850000  9850000  9850000  9850000  9850000
## [2409]  9850000  9850000  9850000  9850000  9850000  9850000  9850000  9850000
## [2417]  9850000  4000000  4000000  4000000  4000000  4000000  4000000  1440000
## [2425]  1440000  1440000  1440000  1440000  1440000  1440000  1440000  1440000
## [2433]  1210000  1210000  1125000  1125000  1125000  1125000  1125000  1125000
## [2441]  1171364  1171364  1171364  1171364  1171364  1171364  1171364  1171364
## [2449]  1171364  1171364  1171364  1171364  1171364  1171364  1171364  1171364
## [2457]  1171364  1171364  1171364  2355000  2355000  2355000  2355000  2355000
## [2465]  2355000  2355000  2355000  2355000  2355000  2355000  2355000  2355000
## [2473]  2355000  2355000  2355000  2378102  2378102  2378102  2378102  2378102
## [2481]  2378102  2378102  2378102  2378102  2378102  2378102  2378102  2378102
## [2489]  2378102  2378102  2378102  2378102  1125000  1125000  1125000  1125000
## [2497]  1125000  1125000  1125000  1125000  1125000  1698000  3116000  3116000
## [2505]  3116000  3116000  3116000  3116000  3116000  3116000  3116000  3116000
## [2513]  3116000  3116000  6250000  6250000  6250000  6250000  6250000  6250000
## [2521]  6250000  6250000  6250000  6250000  6250000  6250000  6250000  6250000
## [2529]  6250000  1604215  1604215  1604215  1604215  1604215  1604215  1604215
## [2537]  1604215  1604215  1604215  1604215  1604215  1604215  1604215  1604215
## [2545]  1604215  1604215  1210000  1210000  1210000  1210000  1210000  1210000
## [2553]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2561]  1210000  2500000  2500000  2500000  2500000  2500000  2500000  2500000
## [2569]  2500000  2500000  2500000  1180272  1180272  1180272  1180272  1180272
## [2577]  1180272  1180272  1180272  1180272  1180272  1180272  1180272  1180272
## [2585]  1180272  1180272  1180272  1180272  1180272  1180272  1180272  2830000
## [2593]  2830000  2830000  2830000  2830000  2830000  2830000  2830000  2830000
## [2601]  2830000  2830000  2830000  2830000  2830000  2830000  2830000  2830000
## [2609]  1375000  1375000  1375000  1375000  1375000  1375000  1375000  1375000
## [2617]  1375000  1375000  1375000  1375000  1375000  1375000  1291409  1291409
## [2625]  1291409  1291409  1291409  1291409  1291409  1291409  1291409  1291409
## [2633]  1291409  1291409  1291409  1210000  1210000  1210000  1210000  1210000
## [2641]  1210000  1210000  1210000  1210000  1210000  1210000  1210000  1210000
## [2649]  1210000  1210000  1210000  1210000  1210000  1210000  9900000  9900000
## [2657]  9900000  9900000  9900000  9900000  9900000  9900000  9900000  9900000
## [2665]  9900000  9900000  9900000  9900000  9900000  1125000  1125000  1125000
## [2673]  1125000  1125000  1125000  1125000  1125000  1125000  1125000  1125000
## [2681]  1125000  1210000  1210000  1210000  1210000  1210000 10000000 10000000
## [2689] 10000000 10000000 10000000 10000000 10000000 10000000 10000000 10000000
## [2697] 10000000 10000000 10000000 10000000 10000000 10000000 21816000 21816000
## [2705] 21816000 21816000 21816000 21816000 21816000 21816000 21816000 21816000
## [2713] 21816000 21816000  1441294  1441294  1441294  1441294  1441294  1441294
```

```
## [2721]  1441294  1441294 15150000 15150000 15150000 15150000 15150000 15150000
## [2729] 15150000 15150000 15150000 15150000 15150000 15150000 15150000 15150000
## [2737] 15150000 15150000 15150000  1210000  1125000  1125000  1125000  1125000
## [2745]  2839213  2839213  2839213  2839213  2839213  2839213  2839213  2839213
## [2753]  2839213  2839213  2839213  2839213  2839213  1490000  1490000  1490000
## [2761]  1490000  1490000  1490000  1490000  1490000  1490000  1490000  1490000
## [2769]  1490000  1490000  1490000  1490000  1490000  1490000  1490000  2418833
## [2777]  2418833  2418833  2418833  2418833  2418833  2418833  2418833  2418833
## [2785]  2418833  2418833  2418833  2418833  2418833  2418833  2418833  2418833
## [2793]  1550000 12000000 12000000 12000000 12000000 12000000 12000000 12000000
## [2801] 12000000 12000000 12000000 12000000 12000000 12000000 12000000 12000000
## [2809] 12000000 12000000 12000000 12000000  1125000  1125000  1125000  1125000
## [2817]  1125000  1125000  1125000  1125000  1125000  1125000  1125000  1125000
## [2825]  1125000  1125000  1340000  1340000  1340000  1340000  1340000  1340000
## [2833]  1340000  1340000  1340000  1340000  3000000  1277697  1277697  1277697
## [2841]  1277697  1277697  1277697  1277697  1277697  1277697  1277697  1277697
## [2849]  1277697  1277697  1277697  1277697  1277697  1277697  6250000  1567576
## [2857]  1567576  1567576  1567576  1567576  1567576  1567576  1567576  1567576
## [2865] 23171000 23171000 23171000 23171000 23171000 23171000 23171000 23171000
## [2873] 23171000 23171000 23171000 23171000 23171000 23171000 23171000 23171000
## [2881] 23171000 23171000  1125000  1125000  1125000  1125000  1125000  1125000
## [2889]  1125000  1125000  1125000  6100000  6100000  6100000  6100000  6100000
## [2897]  6100000  6100000  6100000  6100000  6100000  6100000  6100000  6100000
## [2905]  6100000  6100000  6100000  6100000  3000000  3000000  3000000  3000000
## [2913]  3000000  3000000  3000000  3000000  3000000  3000000  3000000  3000000
## [2921]  3000000  3000000  3000000  3000000  1125000  1125000  1125000  1125000
## [2929]  1125000  4660000  4660000  4660000  4660000  4660000  4660000  4660000
## [2937]  4660000  4660000  4660000  4660000  4660000  4660000  4660000  4660000
## [2945]  4660000  4660000  1346260  1346260  1346260  1346260  1346260  1346260
## [2953]  1346260  1346260  1346260 19665000 19665000 19665000 19665000 19665000
## [2961] 19665000 19665000 19665000 19665000 19665000 19665000 19665000 19665000
## [2969] 19665000 19665000 19665000 19665000  2000000  2000000  2000000  2000000
## [2977]  2000000  2000000  2000000  2000000  2000000  2000000  1125000  1125000
## [2985]  1125000  1125000  1125000  1125000  1125000  1125000  1125000  1125000
## [2993]  1125000  1125000  1125000  1125000  1196448  1196448  1196448  1196448
## [3001]  1196448  1196448  1196448  1196448  1196448  1196448  1125000  1125000
## [3009]  1125000  1125000  1125000  1125000  1125000  1125000  1125000  1125000
## [3017]  1125000  1125000  1210000  1210000  1210000  1210000  1210000  1210000
## [3025]  1210000  1920000  1920000  1920000  1920000  1920000  1920000  1920000
## [3033]  1920000  1920000  1125000  1125000  1125000  1125000  1125000  1125000
## [3041]  1125000  1125000  1125000  1125000  1125000  1125000  1125000  1125000
## [3049]  7000000  7000000  7000000  7000000  7000000  7000000  7000000  7000000
## [3057]  7000000
```

```r
#For each player, select all instances. Averaege all stats. Return avg.
total = subset(total, select = -c(player_name,player_id,X,Position,season_type,headshot_url,recent_team

library(dplyr)
total <- total %>%
  group_by(player_display_name,position,position_group) %>%
  summarise_all(mean)

#Combine position back
table(total$position_group)
```

```
##
##   DB   DL   LB   OL   QB   RB SPEC   TE   WR
##    2    2    2    3   53   55    9   51   87
```

```
df_wr = subset(total, position_group == "WR")
df_te = subset(total, position_group == "TE")
df_rb = subset(total, position_group == "RB")
df_qb = subset(total, position_group == "QB")

df_wr = subset(df_wr, select = -c(position, position_group))
df_te = subset(df_te, select = -c(position, position_group))
df_hb = subset(df_rb, select = -c(position, position_group))
df_qb = subset(df_qb, select = -c(position, position_group))

#colnames(df_wr)
#colnames(df_te)
#colnames(df_rb)
#colnames(df_qb)

#
#Now that data has been seperated into different dataframes, we can now do different demos.

#Between 7-7:30. Filter out what demos are going to be applicable and viable for the given scenario.
#Basically a complex regression using demo.
#Between 7-9, make a demo work. Your goal, is to fit regression models, and then a score model.

#Model to predict salary
#Feed it all of the training data
#After training data, predict confidence intervals
#Present confidence intervals in a plot.
library(scales)
```

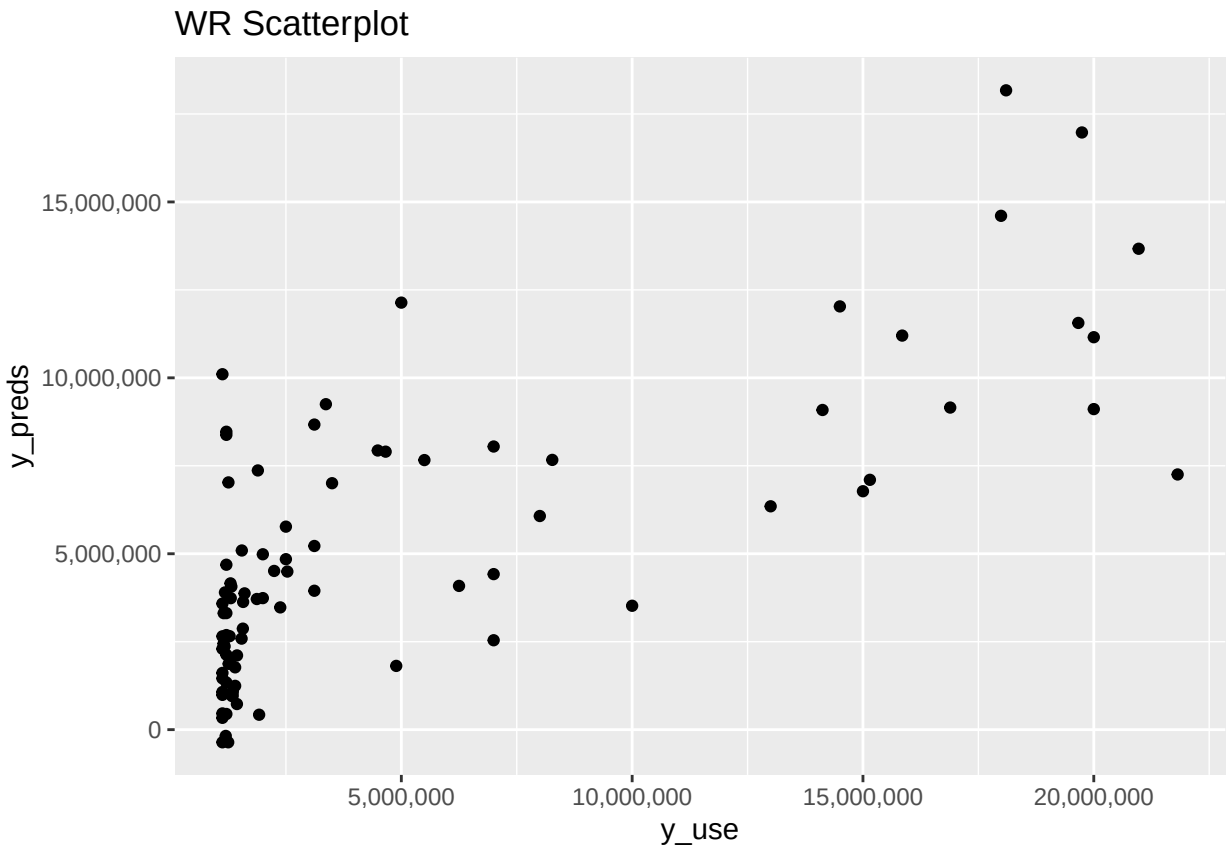
```
##
## Attaching package: 'scales'

## The following object is masked from 'package:purrr':
##
##     discard

## The following object is masked from 'package:readr':
##
##     col_factor
```

```
#WR
x = subset(df_wr, select = -c(Base.Salary))
y = df_wr$Base.Salary
x[is.na(x)] <- 0
y[is.na(y)] <- 0
library(glmnet)
```

```
## Warning: package 'glmnet' was built under R version 4.3.3

## Loading required package: Matrix
```

```
##
## Attaching package: 'Matrix'

## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack

## Loaded glmnet 4.1-8
```

```
x_use = subset(x, select = -c(player_display_name))

x_use <- as.matrix(x_use)
y_use <- as.numeric(y)

fit <- cv.glmnet(x_use, y_use, family = "gaussian")
y_preds <- predict(fit, x_use, type = "response", s = fit$lambda.min)

y_use <- as.vector(y_use)
y_preds <- as.vector(y_preds)

names = x$player_display_name

library(ggplot2)
# Basic scatter plot
ggplot(mapping = aes(x=y_use, y=y_preds)) + geom_point() +
  scale_x_continuous(labels = comma) +
  scale_y_continuous(labels = comma) +
  ggtitle("WR Scatterplot")
```



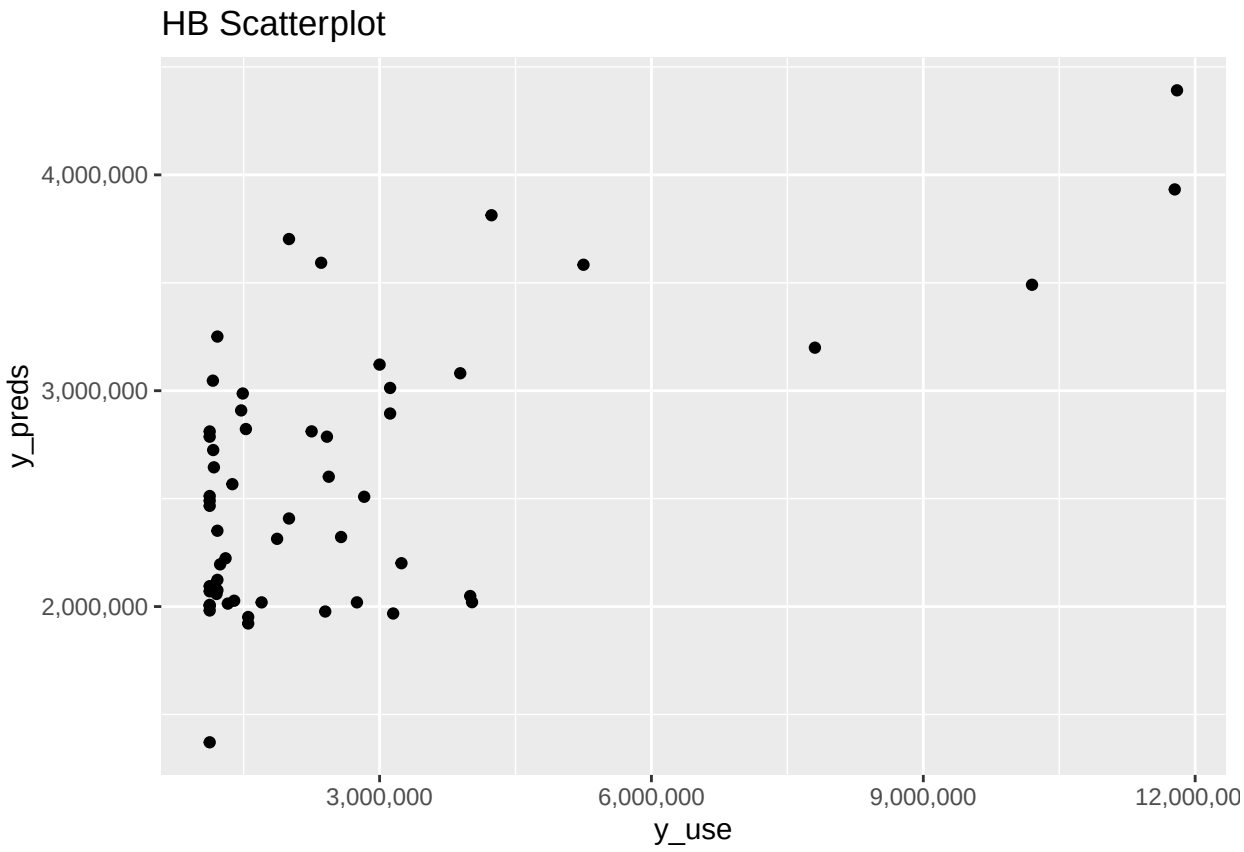

```
pay_disparity = y_preds - y_use

perc_pay_disparity = (pay_disparity / y_preds) * 100

ppcs <- sort(perc_pay_disparity, index.return=TRUE, decreasing=TRUE)

top_10 = ppcs$ix[1:10]
bot_10 = tail(ppcs$ix, n = 10)

overpaid_wr <- names[top_10]

underpaid_wr <- names[bot_10]

coef <- coef(fit,s = fit$lambda.min, complete = TRUE)

coef[coef[,1]!=0, ]
```

```
##               (Intercept)               sack_yards         passing_air_yards
##                 -359526.1                -3364183.8                 2585295.0
##               rushing_tds     receiving_first_downs receiving_2pt_conversions
##                30329953.5                 1810802.2                 7248111.4
##                      racr           air_yards_share
##                 -478996.6                 8105929.9
```

```r
sem_y_preds_wr <- sd(y_preds) / sqrt(length(y_preds))

sem_y_preds_wr
```

```
## [1] 428779.4
```

```r
#HB
x = subset(df_hb, select = -c(Base.Salary))
y = df_hb$Base.Salary
x[is.na(x)] <- 0
y[is.na(y)] <- 0



x_use = subset(x, select = -c(player_display_name))

x_use <- as.matrix(x_use)
y_use <- as.numeric(y)

fit <- cv.glmnet(x_use, y_use, family = "gaussian")
y_preds <- predict(fit, x_use, type = "response", s = fit$lambda.min)

y_use <- as.vector(y_use)
y_preds <- as.vector(y_preds)

names = x$player_display_name

# Basic scatter plot
ggplot(mapping = aes(x=y_use, y=y_preds)) + geom_point() +
  scale_x_continuous(labels = comma) +
  scale_y_continuous(labels = comma) +
  ggtitle("HB Scatterplot")
```




```
pay_disparity = y_preds - y_use

perc_pay_disparity = (pay_disparity / y_preds) * 100

ppcs <- sort(perc_pay_disparity, index.return=TRUE, decreasing=TRUE)

top_10 = ppcs$ix[1:10]
bot_10 = tail(ppcs$ix, n = 10)

overpaid_hb <- names[top_10]

underpaid_hb <- names[bot_10]
coef <- coef(fit,s = fit$lambda.min, complete = TRUE)

coef[coef[,1]!=0, ]
```

```
##         (Intercept) rushing_first_downs         rushing_epa          receptions
##          1936672.99           347877.40           260127.48            34677.63
##                wopr
##          1048404.68
```

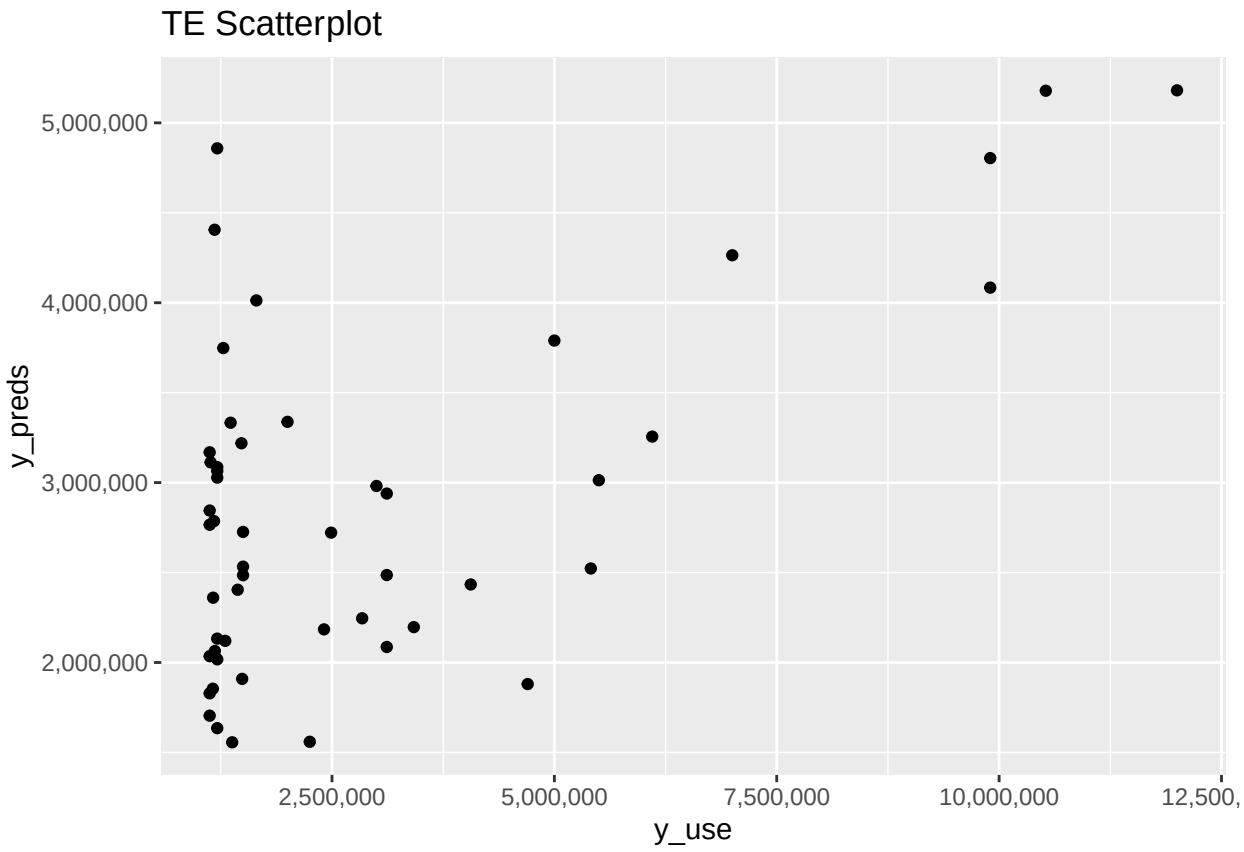
```
sem_y_preds_hb <- sd(y_preds) / sqrt(length(y_preds))

sem_y_preds_hb
```

```
## [1] 84041.56
```

```r
#TE
x = subset(df_te, select = -c(Base.Salary))
y = df_te$Base.Salary
x[is.na(x)] <- 0
y[is.na(y)] <- 0


x_use = subset(x, select = -c(player_display_name))

x_use <- as.matrix(x_use)
y_use <- as.numeric(y)

fit <- cv.glmnet(x_use, y_use, family = "gaussian")
y_preds <- predict(fit, x_use, type = "response", s = fit$lambda.min)

y_use <- as.vector(y_use)
y_preds <- as.vector(y_preds)

names = x$player_display_name

sem_y_preds_te <- sd(y_preds) / sqrt(length(y_preds))

sem_y_preds_te
```

```
## [1] 132501.3
```

```r
# Basic scatter plot
ggplot(mapping = aes(x=y_use, y=y_preds)) + geom_point() +
  scale_x_continuous(labels = comma) +
  scale_y_continuous(labels = comma) +
  ggtitle("TE Scatterplot")
```

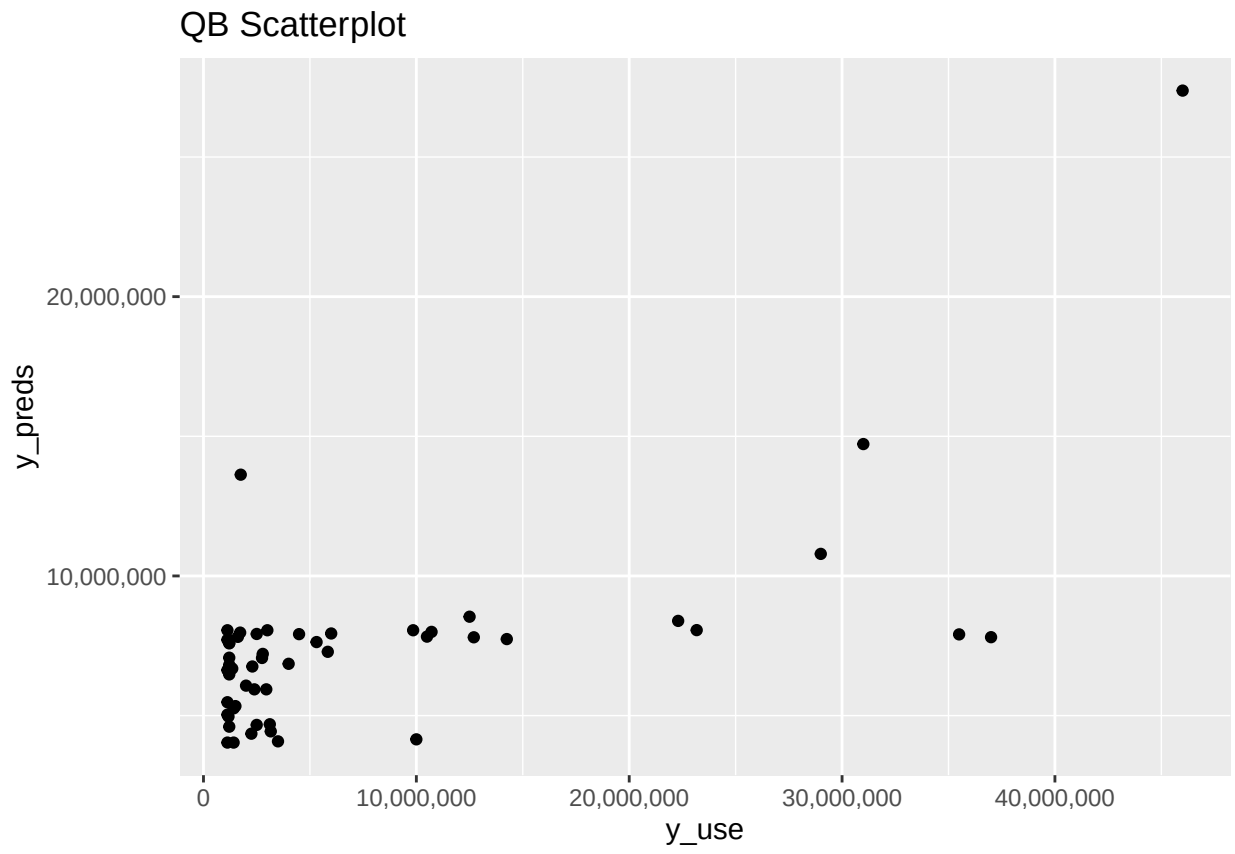



```
pay_disparity = y_preds - y_use

perc_pay_disparity = (pay_disparity / y_preds) * 100

ppcs <- sort(perc_pay_disparity, index.return=TRUE, decreasing=TRUE)

top_10 = ppcs$ix[1:10]
bot_10 = tail(ppcs$ix, n = 10)

overpaid_te <- names[top_10]

underpaid_te <- names[bot_10]
coef <- coef(fit,s = fit$lambda.min, complete = TRUE)

coef[coef[,1]!=0, ]
```

```
##     (Intercept)   receiving_epa air_yards_share
##       1556385.5        229525.5      11053218.5
```

```
#QB
x = subset(df_qb, select = -c(Base.Salary))
y = df_qb$Base.Salary
x[is.na(x)] <- 0
y[is.na(y)] <- 0
```

```r
x_use = subset(x, select = -c(player_display_name))

x_use <- as.matrix(x_use)
y_use <- as.numeric(y)

fit <- cv.glmnet(x_use, y_use, family = "gaussian")
y_preds <- predict(fit, x_use, type = "response", s = fit$lambda.min)

y_use <- as.vector(y_use)
y_preds <- as.vector(y_preds)

names = x$player_display_name

# Basic scatter plot
ggplot(mapping = aes(x=y_use, y=y_preds)) + geom_point() +
  scale_x_continuous(labels = comma) +
  scale_y_continuous(labels = comma) +
  ggtitle("QB Scatterplot")
```




```r
pay_disparity = y_preds - y_use

perc_pay_disparity = (pay_disparity / y_preds) * 100

ppcs <- sort(perc_pay_disparity, index.return=TRUE, decreasing=TRUE)
```

```
top_10 = ppcs$ix[1:10]
bot_10 = tail(ppcs$ix, n = 10)

overpaid_qb <- names[top_10]

underpaid_qb <- names[bot_10]
coef <- coef(fit,s = fit$lambda.min, complete = TRUE)

coef[coef[,1]!=0, ]
```

```
##               (Intercept)                     sacks       passing_first_downs
##                 4034212.5                 400503.1                  261083.5
##   rushing_2pt_conversions receiving_2pt_conversions
##                39891006.8               105443661.3
```

```
sem_y_preds_qb <- sd(y_preds) / sqrt(length(y_preds))

sem_y_preds_qb
```

```
## [1] 477423.3
```

```
wr_table <- data.frame(rank=seq(1, 10, length.out = 10),
                Overpaid_WR = overpaid_wr,
                Underpaid_WR = underpaid_wr)

hb_table <- data.frame(rank=seq(1, 10, length.out = 10),
                Overpaid_HB = overpaid_hb,
                Underpaid_HB = underpaid_hb)
qb_table <- data.frame(rank=seq(1, 10, length.out = 10),
                Overpaid_QB = overpaid_qb,
                Underpaid_QB = underpaid_qb)
te_table <- data.frame(rank=seq(1, 10, length.out = 10),
                Overpaid_TE = overpaid_te,
                Underpaid_TE = underpaid_te)
wr_table
```

```
##    rank      Overpaid_WR        Underpaid_WR
## 1     1      Velus Jones        Amari Cooper
## 2     2   Devin Duvernay         Cooper Kupp
## 3     3 Gunner Olszewski         David Moore
## 4     4       A.J. Brown      Jauan Jennings
## 5     5       Mike Evans     Isaiah McKenzie
## 6     6     Stefon Diggs JuJu Smith-Schuster
## 7     7    Mike Williams        Allen Lazard
## 8     8 Jameson Williams         Tee Higgins
## 9     9    Curtis Samuel      Juwann Winfree
## 10   10      K.J. Osborn         Zach Pascal
```

```
hb_table
```

```
##    rank    Overpaid_HB        Underpaid_HB
```

```
## 1     1  Derrick Henry         Andrew Beck
## 2     2     James Cook    David Montgomery
## 3     3      Zack Moss      Michael Carter
## 4     4 D'Onta Foreman     Jamaal Williams
## 5     5 Brian Robinson      Patrick Ricard
## 6     6  Rachaad White       Miles Sanders
## 7     7     Ty Johnson     Jonathan Taylor
## 8     8 Antonio Gibson Christian McCaffrey
## 9     9 Craig Reynolds        Alvin Kamara
## 10   10   Tony Pollard          Nick Chubb
```

```
qb_table
```

```
##    rank       Overpaid_QB     Underpaid_QB
## 1     1      Joshua Dobbs       Geno Smith
## 2     2    Baker Mayfield   Deshaun Watson
## 3     3       Jalen Hurts    Lamar Jackson
## 4     4      Carson Wentz Matthew Stafford
## 5     5        Derek Carr      Taysom Hill
## 6     6    Russell Wilson       Jared Goff
## 7     7         Tim Boyle     Dak Prescott
## 8     8   Jimmy Garoppolo   Tua Tagovailoa
## 9     9   Taylor Heinicke     Daniel Jones
## 10   10 Mitchell Trubisky     Kyler Murray
```

```
te_table
```

```
##    rank    Overpaid_TE   Underpaid_TE
## 1     1  George Kittle   Mark Andrews
## 2     2    Sam LaPorta Gerald Everett
## 3     3   Trey McBride  Juwan Johnson
## 4     4 Dallas Goedert  Tyler Conklin
## 5     5  Luke Musgrave  Darren Waller
## 6     6      Zach Ertz T.J. Hockenson
## 7     7    David Njoku    Mo Alie-Cox
## 8     8  Tanner Hudson   Travis Kelce
## 9     9    Jonnu Smith      Cole Kmet
## 10   10  Durham Smythe    Josh Oliver
```

```
data = data.frame(Position = character(), SEM = double())
data[nrow(data) + 1,] = c("SEM WR",sem_y_preds_wr)
data[nrow(data) + 1,] = c("SEM HB",sem_y_preds_hb)
data[nrow(data) + 1,] = c("SEM TE",sem_y_preds_te)
data[nrow(data) + 1,] = c("SEM QB",sem_y_preds_qb)

data
```

```
##   Position              SEM
## 1   SEM WR 428779.364104501
## 2   SEM HB 84041.5602433971
## 3   SEM TE 132501.282233124
## 4   SEM QB 477423.310856845
```