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library(tidyverse)
library(ggplot2)
library(janitor)
library(psych)
library(knitr)
library(markdown)
library(hrbrthemes)
library(viridis)

red_sox_hitters_all <- read.csv("Red_Sox_Hitters.csv")
str(red_sox_hitters_all)
summary(red_sox_hitters_all)

red_sox_hitters_wk <- red_sox_hitters_all

red_sox_hitters_wk <- clean_names(red_sox_hitters_wk)

colnames(red_sox_hitters_wk)[colnames(red_sox_hitters_wk) == "x2b"] <- "2b"
colnames(red_sox_hitters_wk)[colnames(red_sox_hitters_wk) == "x3b"] <- "3b"

red_sox_hitters_wk <- red_sox_hitters_wk %>%
  select(-rk, -awards, -player_additional)

red_sox_hitters_wk <- red_sox_hitters_wk %>%
  mutate(player = str_remove_all(player, "[*#]"))
red_sox_hitters_all$Player
red_sox_hitters_wk$player

hitter_stats <- describe(data.frame(
  OBP = red_sox_hitters_wk$obp,
  SLG = red_sox_hitters_wk$slg
))
hitter_stats <- round(hitter_stats, 3)

kable(hitter_stats, caption = "Descriptive Statistics for OBP and SLG")

ggplot(red_sox_hitters_wk, aes(x = obp, y = slg)) +
  geom_point(color = "red", size = 3, alpha = 0.7) +
  geom_smooth() +
  labs(
    title = "OBP vs. SLG for Red Sox Hitters",
    x = "On-Base Percentage (OBP)",
    y = "Slugging Percentage (SLG)"
  ) +
  theme_minimal() +
  theme(
    panel.grid.major = element_blank(),
    panel.grid.minor = element_blank(),
    panel.background = element_rect(fill = "white", color = NA),

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plot.background = element_rect(fill = "white", color = NA)
)

obp_slg_boxplot <- pivot_longer(red_sox_hitters_wk, cols = c(obp, slg),
names_to = "Metric", values_to = "Value")

ggplot(obp_slg_boxplot, aes(x = Metric, y = Value, fill = Metric)) +
geom_boxplot(width = 0.5, alpha = 0.7, outlier.shape = NA) +
geom_jitter(width = 0.1, size = 2, alpha = 0.6) +
scale_fill_viridis_d() +
labs(
title = "Boxplot for OBP and SLG for Red Sox Hitters",
x = "Metric",
y = "Value"
) +
theme_minimal() +
theme(
panel.grid.major = element_blank(),
panel.grid.minor = element_blank(),
panel.background = element_rect(fill = "white", color = NA),
plot.background = element_rect(fill = "white", color = NA),
legend.position = "none"
)

top_slg_hitters <- red_sox_hitters_wk %>%
arrange(desc(slg)) %>%
slice_head(n = 5)

top_slg_bar <- pivot_longer(top_slg_hitters, cols = c(obp, slg),
names_to = "Metric", values_to = "Value")

ggplot(top_slg_bar, aes(x = reorder(player, Value), y = Value, fill = Metric)) +
geom_bar(stat = "identity", position = position_dodge(width = 0.9)) +
geom_text(aes(label = round(Value, 3)),
position = position_dodge(width = 0.9),
hjust = -0.1, size = 3.5) +
coord_flip() +
scale_fill_viridis_d() +
labs(
title = "OBP and SLG by Player",
x = "Player",
y = "Value",
fill = "Metric"
) +
theme_minimal() +
theme(
panel.grid.major.y = element_blank(),
panel.background = element_rect(fill = "white", color = NA),
plot.background = element_rect(fill = "white", color = NA)

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