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#load in the data, and view the structure
call_center_data <- read.csv(file.choose())
str(call_center_data)
summary(call_center_data)

# Check for missing values
sum(is.na(call_center_data))

# 1. CUSTOMER SATISFACTION ANALYSIS BY CHANNEL

# Perform ANOVA
anova_model <- aov(Csat.Score ~ Channel, data = call_center_data)
summary(anova_model)

# Boxplot for Csat.Score by Channel
boxplot(Csat.Score ~ Channel,
        data = call_center_data,
        main = "Customer Satisfaction Scores by Channel",
        xlab = "Channel",
        ylab = "Customer Satisfaction Score",
        col = "lightblue",
        border = "black")

# 2. SENTIMENT ANALYSIS BY REASON, RESPONSE TIME, AND CALL DURATION

# Fit the Multiple Linear Regression Model
multiple_linear_model <- lm(Sentiment_scored ~ Reason + response_time_scored +
Call_Duration_In_Minutes, data = call_center_data)

# Summary of the model
print(summary(multiple_linear_model))

# Visualize the relationships

# a) Sentiment vs. Response Time (Scatter plot with regression line)
plot(call_center_data$response_time_scored, call_center_data$Sentiment_scored,
     main = "Sentiment vs Response Time",
     xlab = "Response Time",
     ylab = "Sentiment Score",
     col = "blue", pch = 19)
abline(lm(Sentiment_scored ~ response_time_scored, data = call_center_data), col = "red",
      lwd = 2)

# b) Sentiment vs. Call Duration (Scatter plot with regression line)
plot(call_center_data$Call_Duration_In_Minutes, call_center_data$Sentiment_scored,
     main = "Sentiment vs Call Duration",
     xlab = "Call Duration",
     ylab = "Sentiment Score",
     col = "purple", pch = 19)
abline(lm(Sentiment_scored ~ Call_Duration_In_Minutes, data = call_center_data), col =
"red", lwd = 2)

# c) Boxplot for Sentiment grouped by Reason
boxplot(Sentiment_scored ~ Reason, data = call_center_data,
        main = "Sentiment by Reason",
        xlab = "Reason",
        ylab = "Sentiment Score",
        col = "coral",
        border = "hotpink")

# 3. CHANNEL BY REASON

# Create a contingency table for Channel and Reason
contingency_table <- table(call_center_data$Channel, call_center_data$Reason)

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# Perform the Chi-Square Test of Independence
chi_square_result <- chisq.test(contingency_table)

# Print the contingency table and test result
print("Contingency Table:")
print(contingency_table)

print("Chi-Square Test Result:")
print(chi_square_result)

# Plot a grouped bar chart
barplot(contingency_table,
        beside = TRUE,                # Creates a grouped bar chart
        col = rainbow(nrow(contingency_table)), # Different colors for each channel
        legend = rownames(contingency_table),  # Legend for the chart
        main = "Comparison of Channel and Reason",
        xlab = "Reason",
        ylab = "Count")
```