VishwasP_231057008_CodingProblemSet3

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R Markdown

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When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
# Load libraries
library(ggplot2)
```

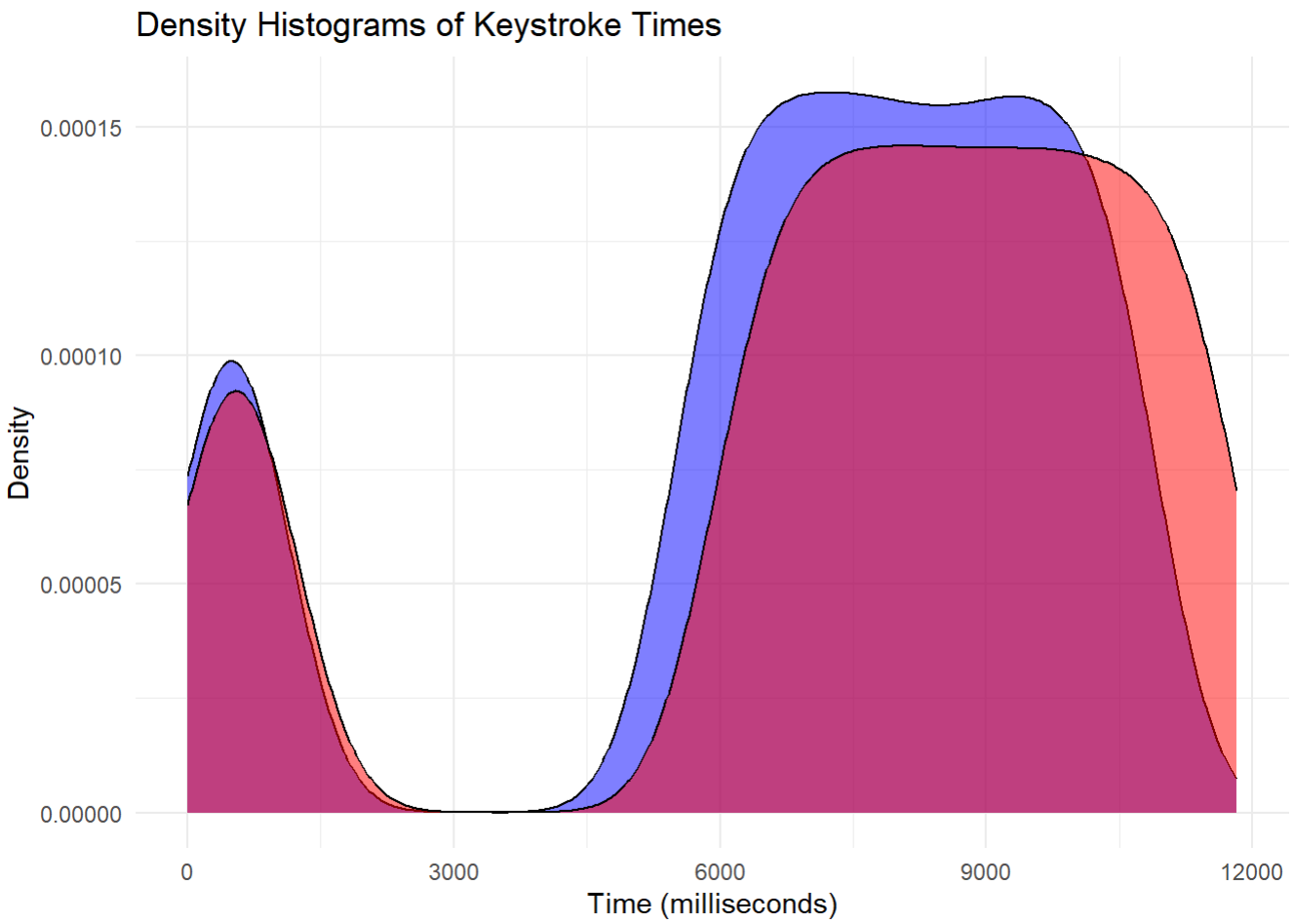
```
## Warning: package 'ggplot2' was built under R version 4.3.2
```

```
# Load keystroke timing data for users A and B
data_A <- read.table("personKeyTimingA.txt", header = FALSE, sep = ",")
data_B <- read.table("personKeyTimingB.txt", header = FALSE, sep = ",")

# Plot density histograms
ggplot() +
  geom_density(aes(x = data_A$V1), fill = "blue", alpha = 0.5, label = "User A") +
  geom_density(aes(x = data_B$V1), fill = "red", alpha = 0.5, label = "User B") +
  labs(title = "Density Histograms of Keystroke Times",
       x = "Time (milliseconds)",
       y = "Density") +
  scale_fill_manual(values = c("blue", "red")) +
  theme_minimal()
```

```
## Warning in geom_density(aes(x = data_A$V1), fill = "blue", alpha = 0.5, :
## Ignoring unknown parameters: `label`
```

```
## Warning in geom_density(aes(x = data_B$V1), fill = "red", alpha = 0.5, label =
## "User B"): Ignoring unknown parameters: `label`
```



```
mu_A <- mean(data_A$V1)
sigma_A <- sd(data_A$V1)

mu_B <- mean(data_B$V1)
sigma_B <- sd(data_B$V1)


time_email <- as.numeric(read.table("email.txt", header = FALSE, sep = ",")$V1)

# Calculate likelihood ratios
likelihood_ratio_A <- dnorm(time_email, mean = mu_A, sd = sigma_A)
likelihood_ratio_B <- dnorm(time_email, mean = mu_B, sd = sigma_B)

# Calculate the final likelihood ratio
final_likelihood_ratio <- likelihood_ratio_A / likelihood_ratio_B

# Print the result
cat("Likelihood Ratio (A:B) =", mean(final_likelihood_ratio), "\n")
```

```
## Likelihood Ratio (A:B) = 1.116914
```