Baysian theory

2023-11-24

```r
#install.packages("bayesm")

library(bayesm)
set.seed(123)
# Actual dataset (replace this with your data)
heights <- c(165, 168, 172, 160, 175, 170, 155, 168, 180, 162)

# Bayesian analysis
n <- length(heights)
prior_mean <- 160
prior_std <- 10

# Prior distribution
prior <- rnorm(10000, mean = prior_mean, sd = prior_std)

# Clip values to be between 100 and 200
prior <- pmax(pmin(prior, 200), 100)

# Likelihood parameters
likelihood_mean <- mean(heights)
likelihood_std <- sd(heights)

# Posterior calculation
posterior_mean <- (prior_mean / prior_std^2 + sum(heights) /
likelihood_std^2) / (1 / prior_std^2 + n / likelihood_std^2)
posterior_std <- 1 / sqrt(1 / prior_std^2 + n / likelihood_std^2)

# Generate posterior samples
posterior <- rnorm(10000, mean = posterior_mean, sd = posterior_std)
posterior <- pmax(pmin(posterior, 200), 100)

# Generate some example data for three distributions
data1 <- heights
data2 <- prior
data3 <- posterior

# Determine the range of values for x-axis
x_range <- range(c(data1, data2, data3))

# Create a line plot for the three distributions
plot(density(data1), col = "blue", main = "Line Plot of Three Distributions",
xlab = "Values", ylab = "Density", xlim = x_range)
lines(density(data2), col = "red")
```
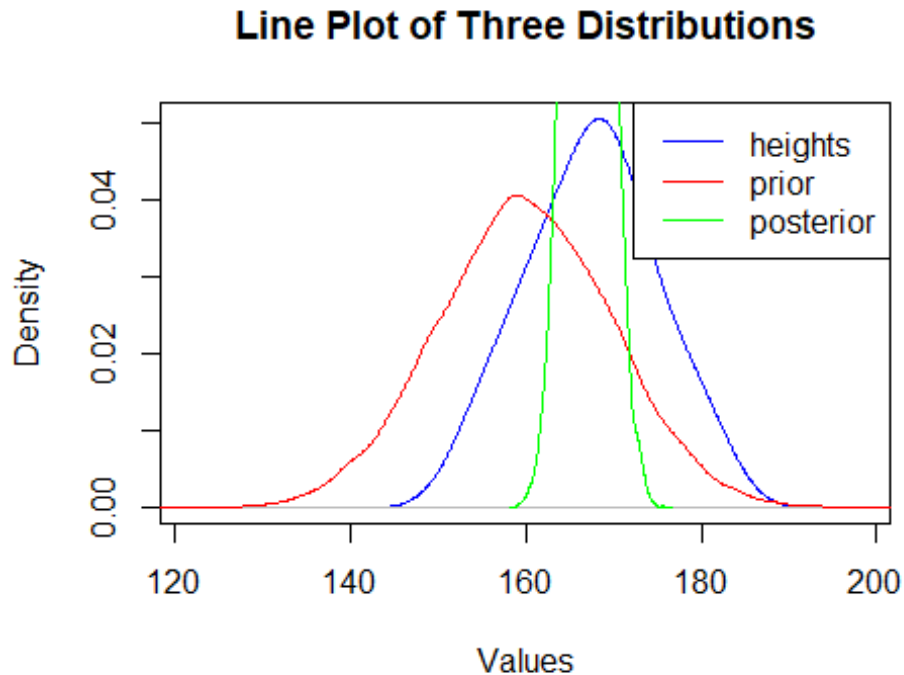
```r
lines(density(data3), col = "green")

# Add a legend
legend("topright", legend = c("heights", "prior", "posterior"), col =
c("blue", "red", "green"), lty = 1)
```

Line Plot of Three Distributions


```r
# Generate some example data for three distributions
data1 <- heights
data2 <- prior
data3 <- posterior

# Determine the range of values for x-axis
x_range <- range(c(data1, data2, data3))

# Create a line plot for the three distributions
plot(density(data1), col = "blue", main = "Line Plot of Three Distributions",
xlab = "Values", ylab = "Density", xlim = x_range, ylim = c(0, 0.2))
lines(density(data2), col = "red")
lines(density(data3), col = "green")

# Add a legend
legend("topright", legend = c("heights", "prior", "posterior"), col =
c("blue", "red", "green"), lty = 1)
```

Line Plot of Three Distributions