

README

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Instructions for App

This app uses the trees dataset in R to estimate the height and volume of a black cherry tree if you can determine the diameter of the tree 4 ft 6 in above the ground.

The trees dataset contains 31 observations of felled black cherry trees with 3 variables: Girth, Height, and Volume. Girth is mislabeled and is actually the tree's diameter in inches. Height is the height of the tree in feet. Volume is the timber's volume in cubic feet. A summary and first 5 observations of the data is below.

```
summary(trees)
```

```
##      Girth      Height      Volume
##  Min.   : 8.30   Min.   :63   Min.   :10.20
## 1st Qu.:11.05   1st Qu.:72   1st Qu.:19.40
##  Median :12.90   Median :76   Median :24.20
##  Mean   :13.25   Mean   :76   Mean   :30.17
## 3rd Qu.:15.25   3rd Qu.:80   3rd Qu.:37.30
##  Max.   :20.60   Max.   :87   Max.   :77.00
```

```
head(trees)
```

```
##   Girth Height Volume
## 1   8.3     70   10.3
## 2   8.6     65   10.3
## 3   8.8     63   10.2
## 4  10.5     72   16.4
## 5  10.7     81   18.8
## 6  10.8     83   19.7
```

To use the app, simply slide the slider to the diameter of the tree you want. The app will give you two plots: volume vs diameter and height vs diameter. Both of these plots include a simple linear model to estimate the volume and height based off of the diameter and lines that show where on that model the slider value would be. Below the charts are the predicted volume and predicted height of the tree.

ui.R code

```
library(shiny)
shinyUI(fluidPage(
  titlePanel("Predicting Black Cherry Tree Volume and Height"),
  sidebarLayout(
    sidebarPanel(
      h1("What is the diameter of the tree?"),
      sliderInput(
        "slider", "Diameter in Inches",
        value = mean(trees$Girth), min = 8, max = 21, step = 0.1
      ),
      h4("Measure tree diameter in inches at 4 ft 6 in above the ground."),
    ),
    mainPanel(
```

```

        plotOutput("plotV"),
        h3("Predicted Volume (cubic feet):"),
        textOutput("predV"),
        plotOutput("plotH"),
        h3("Predicted Height (feet):"),
        textOutput("predH")
      )
    )
  })
})

```

server.R code

```

library(shiny)
shinyServer(function(input, output) {
  modelH <- lm(Height ~ Girth, data = trees)
  modelV <- lm(Volume ~ Girth, data = trees)
  predH <- reactive({
    predict(modelH, newdata = data.frame(Girth = input$slider))
  })
  predV <- reactive({
    predict(modelV, newdata = data.frame(Girth = input$slider))
  })
  output$plotH <- renderPlot({
    plot(trees$Girth, trees$Height, pch = 19, col = "green",
         cex = 1.5, xlab = "Diameter (inches)",
         ylab = "Height (feet)",
         main = "Black Cherry Tree Height vs Diameter",
         xlim = c(8, 21))
    abline(modelH, col = "orange", lwd = 3)
    abline(v = input$slider, lwd = 2, lty = 2, col = "red")
    abline(h = predH(), lwd = 2, lty = 2, col = "red")
  })
  output$predH <- renderText({
    round(predH(), 2)
  })
  output$plotV <- renderPlot({
    plot(trees$Girth, trees$Volume, pch = 19, col = "blue",
         cex = 1.5, xlab = "Diameter (inches)",
         ylab = "Volume (cubic feet)",
         main = "Black Cherry Tree Volume vs Diameter",
         xlim = c(8, 21), ylim = c(0, 80))
    abline(modelV, col = "orange", lwd = 3)
    abline(v = input$slider, lwd = 2, lty = 2, col = "red")
    abline(h = predV(), lwd = 2, lty = 2, col = "red")
  })
  output$predV <- renderText({
    round(predV(), 2)
  })
})

```