

Web App & Data Visualization

Vishal P

2025-04-05

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.4.3
```

```
##  
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':  
##  
##   filter, lag
```

```
## The following objects are masked from 'package:base':  
##  
##   intersect, setdiff, setequal, union
```

```
library(stringr)  
library(lubridate)
```

```
## Warning: package 'lubridate' was built under R version 4.4.3
```

```
##  
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:base':  
##  
##   date, intersect, setdiff, union
```

```
library(shiny)  
library(shinydashboard)
```

```
## Warning: package 'shinydashboard' was built under R version 4.4.3
```

```
##  
## Attaching package: 'shinydashboard'
```

```
## The following object is masked from 'package:graphics':  
##  
##   box
```

```
library(DT)
```

```
## Warning: package 'DT' was built under R version 4.4.3
```

```
##  
## Attaching package: 'DT'
```

```
## The following objects are masked from 'package:shiny':  
##  
##   dataTableOutput, renderDataTable
```

```
library(DBI)  
library(RSQLite)  
library(plotly)
```

```
## Warning: package 'plotly' was built under R version 4.4.3
```

```
## Loading required package: ggplot2
```

```
##  
## Attaching package: 'plotly'
```

```
## The following object is masked from 'package:ggplot2':  
##  
##   last_plot
```

```
## The following object is masked from 'package:stats':  
##  
##   filter
```

```
## The following object is masked from 'package:graphics':  
##  
##   layout
```

```
library(syuzhet)
```

```
df <- read.csv("FINALVIT_Reviews_Students_Data.csv", stringsAsFactors = FALSE)  
  
head(df)
```

```
##      ID      Name Rating      Degree
## 1  1 Mukesh Yashvanth  3.4      B.Sc
## 2  2   Saamy Kunhibi  3.6      B.Sc
## 3  3   Punya Oswal  4.0      B.Tech
## 4  4 Soumyajit Ghosal  5.0      B.Tech
## 5  5      GDivya  3.3 B.Tech + M.Tech
## 6  6   Review guru  3.9      B.Tech
##
##      Specialization Review_Date
## 1      Animation & Multimedia 2025-02-13
## 2      Animation & Multimedia 2025-02-13
## 3 Electrical And Electronics Engineering 2025-02-12
## 4      Computer Science and Engineering 2025-02-12
## 5      Software Engineering 2025-02-12
## 6      Computer Science and Engineering 2025-02-11
##
```

Review_Text

```
## 1 One of my senior got placed in Couch Base for 34LPA CTC another got placed in Unilever f
or 42LPA but this was for CSE and related branches while few of my seniors got decent package
from mechanical branch too 8-12L in companies like Mercedes a Euler ~ Anonymous, B.Tech FFC
S. A study who is facing difficulty to study more, can take less number of credits and it wil
l reduce the burden of the students. And the student can also Complete the entire course in 4
years instead of 5years by taking maximum no of credits. ~ Supriya R Patil, B.Sc + M.Sc Cam
pus Life in Vit is simply magnificent.All types of facilities are provided inside the campus
including sport complex and restaurants.The girls to boys ratio in Mechanical engineering is
surprisinly high of about 1:7. ~ Mithilesh Angal, B.Tech
```

```
## 2
```

```
I don't like how the student and faculty ratio is 60-40 ~ Praveen Kumar, BCA Lot of exams ye
arly 3 exams in a semester 2-3 quiz and 1-2 DA ~ Kartik Navnath Narare, B.Tech Water is real
ly bad. 750+ TDS. It makes you go bald. Really. ~ Piyush Prajapati, B.Des
```

```
## 3
```

```
The university is vast to have best experience Best faculty crew providing best source of ed
ucation Security guards of universities are bad.
```

```
## 4
```

```
Transportation is very bad making it difficult for students The infrastructure of the univer
sity gives you a perfect learning environment The faculties are highly qualified to train th
e students
```

```
## 5
```

```
The library is the best part out of the university Too many rules and regulations to be foll
owed Arrear fees is 6000 per subject which is too much
```

```
## 6
```

```
Attendance minimum criteria is seventify percentage The College has many hostel buildings an
d enough space The nature of college and greenery is the best part
```

```
##      Word_Count Sentiment_Label Sentiment_Score
## 1      139      Neutral      1.3
## 2      50      Neutral      1.3
## 3      22      Neutral      1.3
## 4      29      Neutral      1.3
## 5      28      Positive      1.7
## 6      25      Positive      2.0
```

```
# Check for missing values
colSums(is.na(df))
```

##	ID	Name	Rating	Degree	Specialization
##	0	0	0	0	0
##	Review_Date	Review_Text	Word_Count	Sentiment_Label	Sentiment_Score
##	0	0	0	0	0

```
# Extract ID from Name and clean Name
df <- df %>%
  mutate(
    extracted_id = as.numeric(str_extract(Name, "^\\d+")),
    ID = ifelse(!is.na(extracted_id), extracted_id, row_number()),
    Name = str_trim(str_remove(Name, "^\\d+"))
  ) %>%
  select(-extracted_id) %>%
  relocate(ID, .before = Name)
```

```
# Check column names
colnames(df)
```

```
## [1] "ID"          "Name"        "Rating"      "Degree"
## [5] "Specialization" "Review_Date" "Review_Text" "Word_Count"
## [9] "Sentiment_Label" "Sentiment_Score"
```

```
# Connect to SQLite database
conn <- dbConnect(SQLite(), "reviews.db")

# Drop table if it exists (to start fresh)
dbExecute(conn, "DROP TABLE IF EXISTS reviews")
```

```
## [1] 0
```

```
# Create table with correct columns
dbExecute(conn, "CREATE TABLE reviews (
  id INTEGER PRIMARY KEY AUTOINCREMENT,
  Name TEXT,
  Rating REAL,
  Degree TEXT,
  Specialization TEXT,
  Review_Date TEXT,
  Review_Text TEXT,
  Word_Count INTEGER,
  Sentiment_Label TEXT,
  Sentiment_Score REAL
)")
```

```
## [1] 0
```

```
# Insert dataset into SQLite
dbWriteTable(conn, "reviews", df, append = TRUE, row.names = FALSE)
```

```
## Warning: Column names will be matched ignoring character case
```

```
# Close connection  
dbDisconnect(conn)
```

```
conn <- dbConnect(SQLite(), "reviews.db")  
  
# Check column names  
dbListFields(conn, "reviews")
```

```
## [1] "id"           "Name"         "Rating"       "Degree"  
## [5] "Specialization" "Review_Date"  "Review_Text"  "Word_Count"  
## [9] "Sentiment_Label" "Sentiment_Score"
```

```
# Preview data  
dbGetQuery(conn, "SELECT * FROM reviews LIMIT 5")
```

```
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## 2  2   Saamya Kunhibi   3.6        B.Sc
## 3  3    Punya Oswal   4.0        B.Tech
## 4  4 Soumyajit Ghosal   5.0        B.Tech
## 5  5      GDivya   3.3 B.Tech + M.Tech
##
##      Specialization Review_Date
## 1      Animation & Multimedia 2025-02-13
## 2      Animation & Multimedia 2025-02-13
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## 5      Software Engineering 2025-02-12
##
```

Review_Text

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2

I don't like how the student and faculty ratio is 60-40 ~ Praveen Kumar, BCA Lot of exams yearly 3 exams in a semester 2-3 quiz and 1-2 DA ~ Kartik Navnath Narare, B.Tech Water is really bad. 750+ TDS. It makes you go bald. Really. ~ Piyush Prajapati, B.Des

3

The university is vast to have best experience Best faculty crew providing best source of education Security guards of universities are bad.

4

Transportation is very bad making it difficult for students The infrastructure of the university gives you a perfect learning environment The faculties are highly qualified to train the students

5

The library is the best part out of the university Too many rules and regulations to be followed Arrear fees is 6000 per subject which is too much

```
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## 4           29      Neutral          1.3
## 5           28      Positive          1.7
```

```
dbDisconnect(conn)
```

```

# UI
ui <- dashboardPage(
  dashboardHeader(title = "VIT Reviews Dashboard"),

  dashboardSidebar(
    sidebarMenu(
      menuItem("Home", tabName = "home", icon = icon("home")),
      menuItem("Add Review", tabName = "add", icon = icon("plus")),
      menuItem("Update Review", tabName = "update", icon = icon("edit")),
      menuItem("Delete Review", tabName = "delete", icon = icon("trash")),
      menuItem("Visualizations", tabName = "viz", icon = icon("chart-bar"))
    )
  ),

  dashboardBody(
    tabItems(
      tabItem(tabName = "home",
        fluidRow(
          box(title = "Student Reviews", width = 12, status = "primary",
            checkboxInput("show_id", "Show ID Column", value = FALSE),
            DTOutput("reviews_table"))
        )
      ),

      tabItem(tabName = "add",
        fluidRow(
          column(width = 3),
          column(width = 6,
            box(title = "Add Review", status = "primary", solidHeader = TRUE, width = 12,
              textInput("new_name", "Name"),
              numericInput("new_rating", "Rating", value = 0, min = 0, max = 5),
              textInput("new_degree", "Degree"),
              textInput("new_spec", "Specialization"),
              dateInput("new_date", "Review Date"),
              textAreaInput("new_text", "Review Text"),
              actionButton("add_btn", "Submit Review", class = "btn-primary")
            )
          ),
          column(width = 3)
        )
      ),

      tabItem(tabName = "update",
        fluidRow(
          box(title = "Update Review", width = 6, status = "warning",
            numericInput("update_id", "Enter Review ID to Update", value = NA, min = 1),
            verbatimTextOutput("existing_review_info"),
            textAreaInput("update_text", "New Review Text", "", width = "100%"),
            actionButton("update_btn", "Update Review", class = "btn-warning")
          )
        )
      ),
    )
  )

```

```

    tabItem(tabName = "delete",
      fluidRow(
        box(title = "Delete Review", width = 6, status = "danger",
          numericInput("delete_id", "Enter Review ID to Delete", value = NA, min =
1),
          actionButton("delete_btn", "Delete Review", class = "btn-danger")
        )
      ),
    ),

    tabItem(tabName = "viz",
      fluidRow(
        box(title = "Filter Options", width = 12, status = "warning",
          selectInput("year_filter", "Select Year:", choices = NULL, selected = "AL
L")
        )
      ),
      fluidRow(
        box(title = "Monthly Rating Scatter Plot", width = 12, status = "info",
          plotlyOutput("scatter_plot", height = "500px"))
      ),
      fluidRow(
        box(title = "Average Rating per Degree (Scrollable)", width = 12, status = "s
uccess",
          selectInput("degree_sort", "Sort by:",
            choices = c("Random", "Lowest to Highest", "Highest to Lowes
t"), selected = "Random"),
          plotlyOutput("barplot_degree_scrollable", height = "500px"))
      ),
      fluidRow(
        box(title = "Trend Over Time by B.Tech Top Specialization", width = 12, statu
s = "primary",
          selectInput("time_period", "Time Period:",
            choices = c("Past 1 Year", "Past 2 Years", "Past 3 Years", "A
ll Time"),
            selected = "Past 1 Year"),
          plotlyOutput("trend_line_chart", height = "500px"))
      )
    )
  )
)
)
)
)

```



```

# Server
server <- function(input, output, session) {
  rv <- reactiveValues(data = df)

  analyze_sentiment <- function(text) {
    score <- get_sentiment(text, method = "syuzhet")
    label <- ifelse(score > 0, "Positive", ifelse(score < 0, "Negative", "Neutral"))
    return(list(label = label, score = score))
  }

  output$reviews_table <- renderDT({
    data <- rv$data
    if (!input$show_id) {
      data <- data[, !names(data) %in% "ID"]
    }
    datatable(data, options = list(scrollX = TRUE), selection = list(mode = "none"))
  })

  observeEvent(input$add_btn, {
    new_id <- ifelse(nrow(rv$data) == 0, 1, max(rv$data$ID, na.rm = TRUE) + 1)
    sentiment <- analyze_sentiment(input$new_text)
    new_row <- data.frame(
      ID = new_id,
      Name = input$new_name,
      Rating = input$new_rating,
      Degree = input$new_degree,
      Specialization = input$new_spec,
      Review_Date = as.character(input$new_date),
      Review_Text = input$new_text,
      Word_Count = str_count(input$new_text, "\\S+"),
      Sentiment_Label = sentiment$label,
      Sentiment_Score = sentiment$score
    )
    rv$data <- bind_rows(rv$data, new_row)
    df <- rv$data
    write.csv(rv$data, "FINALVIT_Reviews_Students_Data.csv", row.names = FALSE)
    showNotification("Review added successfully!", type = "message")
  })

  observeEvent(input$delete_btn, {
    if (!is.na(input$delete_id) && input$delete_id %in% rv$data$ID) {
      rv$data <- rv$data[rv$data$ID != input$delete_id, ]
      df <- rv$data
      write.csv(rv$data, "FINALVIT_Reviews_Students_Data.csv", row.names = FALSE)
      showNotification("Review deleted successfully.", type = "message")
    } else {
      showNotification("ID not found.", type = "error")
    }
  })

  observeEvent(input$update_btn, {
    if (!is.na(input$update_id) && input$update_id %in% rv$data$ID) {
      rv$data$Review_Text[rv$data$ID == input$update_id] <- input$update_text
      sentiment <- analyze_sentiment(input$update_text)
      rv$data$Sentiment_Label[rv$data$ID == input$update_id] <- sentiment$label
    }
  })
}

```

```

rv$data$Sentiment_Score[rv$data$ID == input$update_id] <- sentiment$score
rv$data$Word_Count[rv$data$ID == input$update_id] <- str_count(input$update_text, "\\S
+")
df <- rv$data
write.csv(rv$data, "FINALVIT_Reviews_Students_Data.csv", row.names = FALSE)
showNotification("Review updated successfully.", type = "message")
} else {
  showNotification("ID not found.", type = "error")
}
})

observeEvent(input$update_id, {
  req(input$update_id)
  if (input$update_id %in% rv$data$ID) {
    selected_review <- rv$data[rv$data$ID == input$update_id, ]
    updateTextInput(session, "update_text", value = selected_review$Review_Text)
    output$existing_review_info <- renderText({
      paste0(
        "Name: ", selected_review$Name, "\n",
        "Rating: ", selected_review$Rating, "\n",
        "Degree: ", selected_review$Degree, "\n",
        "Specialization: ", selected_review$Specialization, "\n",
        "Date: ", selected_review$Review_Date, "\n",
        "Sentiment: ", selected_review$Sentiment_Label, " (", round(selected_review$Sentime
nt_Score, 2), ")"
      )
    })
  } else {
    output$existing_review_info <- renderText({ "ID not found." })
    updateTextInput(session, "update_text", value = "")
  }
})

observe({
  all_years <- sort(unique(format(as.Date(rv$data$Review_Date), "%Y")))
  updateSelectInput(session, "year_filter",
    choices = c("ALL", all_years),
    selected = "ALL")
})

output$scatter_plot <- renderPlotly({
  df_filtered <- rv$data
  if (input$year_filter != "ALL") {
    df_filtered <- df_filtered[format(as.Date(df_filtered$Review_Date), "%Y") == input$year
_filter, ]
  }
  df_filtered$Month <- month(as.Date(df_filtered$Review_Date), label = TRUE, abbr = TRUE)
  df_filtered$Color <- ifelse(df_filtered$Rating > 4, "green",
    ifelse(df_filtered$Rating >= 3, "yellow", "red"))

  p <- ggplot(df_filtered, aes(x = Month, y = Rating, color = Color)) +
    geom_point(size = 3, alpha = 0.7) +
    scale_color_identity() +
    labs(title = "Monthly Rating Scatter Plot", x = "Month", y = "Rating") +
    theme_minimal()

```

```

    ggplotly(p)
  })

output$barplot_degree_scrollable <- renderPlotly({
  df_bar <- rv$data %>%
    group_by(Degree) %>%
    summarise(Average_Rating = mean(Rating),
              Count = n(),
              Avg_Sentiment = mean(Sentiment_Score, na.rm = TRUE))

  if (input$degree_sort == "Lowest to Highest") {
    df_bar <- df_bar %>% arrange(Average_Rating)
    df_bar$Degree <- factor(df_bar$Degree, levels = df_bar$Degree)
  } else if (input$degree_sort == "Highest to Lowest") {
    df_bar <- df_bar %>% arrange(desc(Average_Rating))
    df_bar$Degree <- factor(df_bar$Degree, levels = df_bar$Degree)
  } else {
    random_order <- sample(df_bar$Degree)
    df_bar$Degree <- factor(df_bar$Degree, levels = random_order)
  }

  p <- ggplot(df_bar, aes(x = Degree, y = Average_Rating, fill = Count)) +
    geom_bar(stat = "identity") +
    scale_fill_gradient(low = "lightblue", high = "blue") +
    labs(title = "Average Rating per Degree", x = "Degree", y = "Average Rating", fill = "Review Count") +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))

  ggplotly(p)
})

output$trend_line_chart <- renderPlotly({
  time_limit <- switch(input$time_period,
                      "Past 1 Year" = Sys.Date() - 365,
                      "Past 2 Years" = Sys.Date() - 365 * 2,
                      "Past 3 Years" = Sys.Date() - 365 * 3,
                      "All Time" = as.Date("1900-01-01"))

  # List of only the first 3 specializations we want to show
  target_specializations <- c(
    "Computer Science and Engineering",
    "Electronics & Communication Engineering",
    "Mechanical Engineering"
  )

  df_trend <- rv$data %>%
    filter(as.Date(Review_Date) >= time_limit) %>%
    # Filter to only include our target specializations
    filter(Specialization %in% target_specializations) %>%
    group_by(Specialization, Month = floor_date(as.Date(Review_Date), "month")) %>%
    summarise(Count = n(), Avg_Rating = mean(Rating))

  p <- ggplot(df_trend, aes(x = Month, y = Avg_Rating, color = Specialization)) +
    geom_line(size = 1) +
    geom_point(size = 3, alpha = 0.7) +

```

```
labs(title = "Engineering Specialization Trends Over Time",
      x = "Month",
      y = "Average Rating") +
theme_minimal() +
scale_color_manual(values = c(
  "Computer Science and Engineering" = "darkblue", # blue
  "Electronics & Communication Engineering" = "orange", # pink/red
  "Mechanical Engineering" = "yellow" # amber/yellow
))

ggplotly(p)
})

}
```

```
# Run App
shinyApp(ui, server)
```

Student Reviews

☐ Show ID Column

Show entries

Search:

Name	Rating	Degree	Specialization	Review_Date	Review_
------	--------	--------	----------------	-------------	---------

One of my senior got placed in Co Base for 34L CTC another got placed in Unilever for 42LPA but th was for CSE related