CREATING PIE CHARTS AND HISTOGRAMS FOR SURVEY DATA

A PROJECT REPORT

Submitted by

ABINESH R (2303811724321007)

in partial fulfillment of requirements for the award of the course

AGI1252-Fundamentals of Data Science Using R

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

JUNE- 2025

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **"CREATING PIE CHARTS AND HISTOGRAMS FOR SURVEY DATA"** is the bonafide work of **ABINESH R(2303811724321007)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

SIGNATURE	**SIGNATURE**
Dr.T.AVUDAIAPPAN, M.E.,Ph.D.,	Mrs. GANGA NAIDU, M.E.,
HEAD OF THE DEPARTMENT	**SUPERVISOR**
ASSOCIATE PROFESSOR	ASSISTANT PROFESSOR
Department of Artificial Intelligence	Department of Artificial Intelligence
K.Ramakrishnan College of Technology (Autonomous)	K.Ramakrishnan College of Technology (Autonomous)
Samayapuram–621112.	Samayapuram–621112.

Submitted for the viva-voce examination held on **02.06.2025.**

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

I declare that the project report on **"CREATING PIE CHARTS AND HISTOGRAMS FOR SURVEY DATA"** is the result of original work done by me and best of my knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfilment of the requirement of the completion of the course **AGI1252-Fundamentals of Data Science Using R.**

Signature

ABINESH R

Place: Samayapuram

Date: 02.06.2025

ACKNOWLEDGEMENT

It is with great pride that I express our gratitude and indebtedness to our institution, **"K.Ramakrishnan College of Technology (Autonomous)",** for providing us with the opportunity to do this project.

I extend our sincere acknowledgement and appreciation to the esteemed and honorable Chairman, **Dr. K. RAMAKRISHNAN, B.E.,** for having provided the facilities during the course of our study in college.

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I wish to convey our profound and heartfelt gratitude to our esteemed project guide **Mrs. GANGA NAIDU M.E.,** Department of **ARTIFICIAL INTELLIGENCE AND DATA SCIENCE,** for her incalculable suggestions, creativity, assistance and patience, which motivated us to carry out this project.

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I wish to express our special thanks to the officials and Lab Technicians of our departments who rendered their help during the period of the work progress.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfill industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of ---- mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

✧ This project explores the use of R programming in processing and visualizing survey data. Surveys, commonly used in research and decision-making, often result in datasets that are rich in both categorical and numerical variables. Manual processing of these datasets is not only time-consuming but also prone to error.

✧ The goal of this project is to use R to automatically generate pie charts for categorical variables such as gender or education level, and histograms for numerical variables like age, satisfaction score, or number of purchases. These visualizations provide a clearer understanding of the underlying data trends.

✧ Libraries like ggplot2 and dplyr were used for data visualization and manipulation, making the workflow efficient and reproducible. The final result is a dynamic and user-friendly tool that can analyze new datasets by simply changing the input CSV file.

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ABSTRACT WITH POs AND PSOs MAPPING

ABSTRACT	POs MAPPED	PSOs MAPPED
This project uses **R programming** to create a Shiny web app for visualizing and analyzing survey data, aimed at small businesses to gain customer insights. It processes categorical (e.g., Gender, Education Level) and numerical (e.g., Age, Satisfaction Score, Purchases) variables via four modules: **Data Processing**, **Visualization**, **Statistical Analysis**, and **Export**. The **Data Processing** module cleans data with dplyr and applies reactive filtering. The **Visualization** module, using ggplot2 and Shiny, creates dynamic pie charts and histograms with customization. The **Statistical Analysis** module displays descriptive statistics, correlations, and grouped metrics in the Shiny UI. The **Export** module allows downloading visualizations, filtered data, and summaries as PNG and CSV files. Using ggplot2, dplyr, scales, and shiny, this tool automates analysis, reduces effort, and supports data-driven decisions in marketing.	**PO 1** **PO 2** **PO 3** **PO 4** **PO 5** **PO 6** **PO 10** **PO 11** **PO 12**	**PSO 1** **PSO 2**

Note: 1- Low, 2-Medium, 3- High

SUPERVISOR **HEAD OF THE DEPARTME**

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CHAPTER 1

INTRODUCTION

1.1 Objective

The main objective of this project is to create a comprehensive system in R that reads survey data and produces meaningful visual summaries using pie charts and histograms. This helps in simplifying data interpretation and aids in quicker decision-making. It also eliminates the need for repetitive manual plotting.

1.2 Overview

Survey data is a key source of insights in various domains including academia, healthcare, marketing, and governance. However, the traditional approach to analyzing this data—using spreadsheets or manual charting—has its limitations. This project automates this process, leveraging the power of R's data manipulation and visualization capabilities.

The system uses structured CSV files as input, processes the data to identify which columns are categorical and which are numerical, and generates appropriate plots. It ensures scalability, reusability, and minimal human intervention once set up.

1.3 R Concepts

- **dplyr** :–
  A powerful R package used to manipulate and clean the survey dataset by applying functions like `count()`, `mutate()`, and `filter()` for grouping and transforming data effectively.

- **ggplot2:** –
  A widely used visualization package that allows the creation of pie charts and histograms with high-quality, customizable graphics for representing both categorical and numerical survey data.

- **read.csv():** –
  A built-in R function used to import external survey data files in CSV format, allowing flexible and dynamic data input for analysis.

- **scales** :–
  A supporting package used to refine visuals by formatting numeric labels into readable percentages and controlling axis scaling in charts for better interpretation.

CHAPTER 2

PROJECT METHODOLOGY

2.1 Proposed Work

The proposed system is an R-based Survey Data Visualization Tool designed to automate the graphical analysis of survey responses. The application focuses on generating meaningful insights from both categorical and numerical data by producing pie charts and histograms. This reduces the need for manual chart creation and speeds up the decision-making process for researchers, students, or analysts.

The system enables users to:

- Upload survey data from structured CSV files
- Automatically identify and process categorical and numerical fields
- Generate pie charts for categorical data such as Gender and Education Level
- Create histograms for numerical data like Age, Satisfaction Score, and Number of Purchases

The project is developed using base R and advanced packages such as **dplyr**, **ggplot2**, and **scales**, ensuring clean code, flexibility, and high-quality visuals. It eliminates repetitive tasks involved in chart creation and offers a reusable template that can be applied to any compatible dataset.

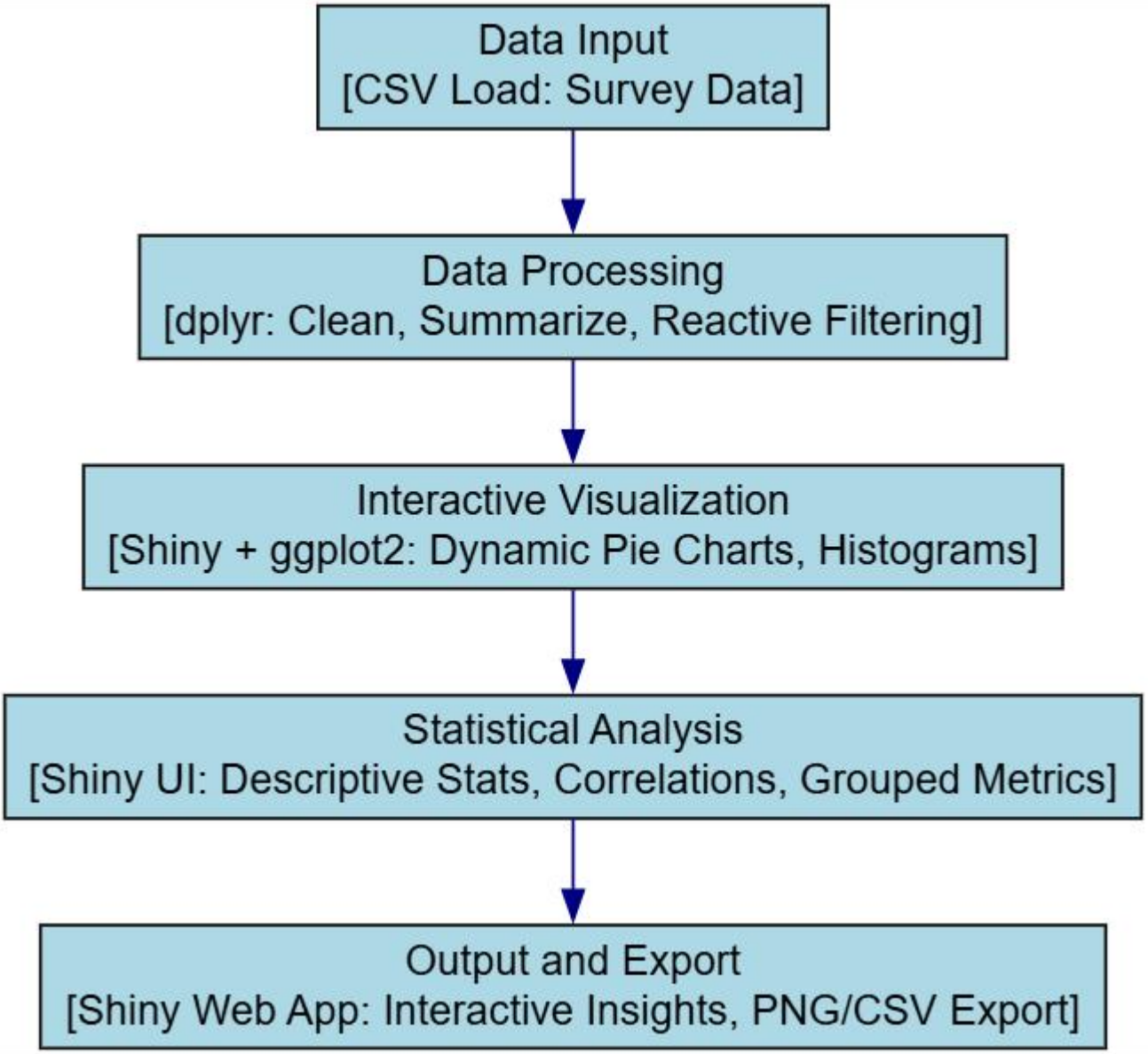
Key Functionalities:

- Data Upload and Structure Preview
- Automatic Data Cleaning and Type Detection
- Pie Chart Generation for Categorical Fields
- Histogram Plotting for Numerical Fields

Exportable Charts for Reports and Presentations

This system significantly improves accuracy, reduces analysis time, and enables clear communication of survey results. It is a valuable tool for academic research, market studies, feedback analysis, and any domain where survey data plays a key role.

2.2 Block Diagram



CHAPTER 3

R PROGRAMMING CONCEPTS

3.1 TIDYVERSE AND DATA MANIPULATION

The tidyverse collection of R packages is used for data manipulation, transformation, and visualization in the Survey Data Visualization Dashboard. These packages enable efficient operations on survey datasets, including categorical and numerical variables. Key tidyverse functions used include:

- **Data Import:** read.csv() loads user-uploaded datasets or sample data into the app.
- **Data Cleaning:** tibble() structures data for usability, and mutate() transforms columns (e.g., scaling Satisfaction Scores).
- **Data Filtering:** filter() and select() extract specific respondent groups or variables.
- **Grouping and Aggregation:** group_by() and summarise() calculate grouped metrics (e.g., average Purchases by Gender).
- **Pipelining:** The %>% operator streamlines multi-step operations into readable workflows.

These functions enable the app to dynamically process and filter survey data based on user interactions, ensuring real-time analysis.

3.2 REACTIVE PROGRAMMING AND UI UPDATES

User interactions in the Shiny dashboard—such as applying filters, adjusting visualization settings, or uploading new data—are managed using reactive programming principles in R. These principles ensure:

- **Atomicity:** Each input change (e.g., selecting a filter) triggers a full update of relevant UI components, avoiding partial updates.
- **Consistency:** The UI reflects a valid state of the dataset, ensuring consistency across visualizations and tables.
- **Isolation:** Each user session is independent, preventing interference between sessions.
- **Durability:** Computed results (e.g., charts, statistics) remain stable until inputs change, re-triggering only when necessary.

Powered by reactive(), eventReactive(), observe(), and render*() functions, these concepts make the dashboard responsive and reliable, enhancing the user experience.

CHAPTER 3

MODULE DESCRIPTION (Explanation)

3.1 Data Processing Module:

Purpose:
Reads and prepares customer survey data for interactive visualization.

Functionality:

- **Data Import:** Loads CSV file with survey data (Gender, Education Level, Age, Satisfaction Score, Purchases) using **read.csv()**.
- **Data Cleaning:** Removes missing values with **dplyr**'s **na.omit()**.
- **Data Validation:** Ensures required columns are present and converts data types using **as.factor()** for Gender and Education Level, and **as.numeric()** for Age, Satisfaction Score, and Purchases.
- **Reactive Filtering:** Filters data dynamically based on user inputs (e.g., Gender, Education Level) using **filter()**.

Role in System:
Ensures clean, structured data for accurate and interactive visualizations.

3.2 Visualization Module:

Purpose:
Creates interactive visualizations to display survey data distributions.

Functionality:

- **Pie Charts:** Uses **ggplot2**'s **geom_col()** and **coord_polar()** for Gender and Education Level, with percentage labels via **scales**.
- **Histograms:** Generates histograms for Age, Satisfaction Score, and Purchases using **geom_histogram()** with user-defined bin widths via a **Shiny** slider, and **steelblue** fill color.
- **Interactivity:** Implements a **Shiny** web app for dynamic plot type selection (Pie Chart or Histogram), variable selection, bin width adjustment, and data filtering.
- **Customization:** Applies **theme_void()** for pie charts and dynamic labels for readability.

Role in System:
Transforms data into interactive graphical outputs for easy interpretation of customer demographics and behaviors.

3.3 Statistical Analysis Module:

Purpose:
Integrates statistical insights into the Shiny app to enhance data interpretation.

Functionality:

- **Descriptive Statistics Display:** Displays key statistics (e.g., **mean**, **median**, **standard deviation**) for Age, Satisfaction Score, and Purchases in the Shiny UI using **dplyr**'s **summarise()**, rendered as a table.
- **Correlation Insights:** Shows correlations (e.g., Satisfaction Score vs. Purchases) as a text output in the Shiny app using **cor()**.
- **Grouped Metrics:** Presents aggregated metrics (e.g., **mean** Satisfaction Score by Gender or Education Level) in a table within the Shiny interface using **group_by()** and **summarise()**.

Role in System:
Enriches the Shiny app by providing numerical insights alongside visualizations, supporting deeper analysis of survey data.

3.4 Export Module:

Purpose:
Enables users to export visualizations and filtered data from the Shiny app.

Functionality:

- **Visualization Export:** Adds a download button in the Shiny app to export the current pie chart or histogram as a PNG file using **downloadHandler()** and **ggsave()**.
- **Filtered Data Export:** Allows users to download the filtered dataset (e.g., after selecting Gender or Education Level) as a CSV file via **downloadHandler()** and **write.csv()**.
- **Summary Export:** Provides an option to export a summary table (e.g., descriptive statistics or grouped metrics) as a CSV file from the Shiny interface.

Role in System:
Extends the Shiny app's utility by allowing users to save and share visualizations and data for external use, such as presentations or reports.

CHAPTER 5
CONCLUSION

The Customer Survey Data Visualization System effectively analyzes and visualizes customer survey data, providing small businesses with clear insights into demographic and behavioral patterns. Built using R packages (ggplot2, dplyr, scales), the system offers a lightweight and user-friendly solution for data-driven decision-making. The generated pie charts and histograms enable businesses to understand customer distributions and behaviors, supporting targeted marketing and customer engagement strategies. Future enhancements could include integrating interactive Shiny dashboards, real-time data processing, and predictive analytics to forecast customer trends.

REFERENCES:

1. R Core Team (2025). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria.

2. Wickham, H., et al. (2025). *ggplot2: Elegant Graphics for Data Analysis*. Springer, New York.

3. Wickham, H., et al. (2025). *dplyr: A Grammar of Data Manipulation*. RStudio, PBC.

4. Wickham, H. (2025). *scales: Scale Functions for Visualization*. RStudio, PBC.

APPENDICES

APPENDIX A-SOURCE CODE

R Code:

```
# Load required packages
library(shiny)
library(ggplot2)
library(dplyr)
library(scales)


# --- Data Processing Module ---
# Read and clean data
tryCatch({
  data <- read.csv("D:/Downloads/survey_data.csv")
  # Validate required columns
  required_cols <- c("Gender", "EducationLevel", "Age", "SatisfactionScore", "Purchases")
  if (!all(required_cols %in% names(data))) {
    stop("CSV file must contain columns: ", paste(required_cols, collapse = ", "))
  }
  # Clean data
  data <- data %>%
    na.omit() %>%
    mutate(Gender = as.factor(Gender),
           EducationLevel = as.factor(EducationLevel),
           Age = as.numeric(Age),
           SatisfactionScore = as.numeric(SatisfactionScore),
           Purchases = as.numeric(Purchases))
}, error = function(e) {
```

```
  stop("Error reading CSV file: ", e$message)
})

# --- Shiny App (Visualization, Statistical Analysis, and Export Modules) ---
# UI
ui <- fluidPage(
  titlePanel("Interactive Survey Data Visualization"),
  sidebarLayout(
    sidebarPanel(
      selectInput("plot_type", "Select Plot Type:",
                  choices = c("Pie Chart", "Histogram")),
      conditionalPanel(
        condition = "input.plot_type == 'Pie Chart'",
        selectInput("pie_var", "Select Variable for Pie Chart:",
                    choices = c("Gender", "EducationLevel"))
      ),
      conditionalPanel(
        condition = "input.plot_type == 'Histogram'",
        selectInput("hist_var", "Select Variable for Histogram:",
                    choices = c("Age", "SatisfactionScore", "Purchases")),
        sliderInput("binwidth", "Histogram Bin Width:",
                    min = 1, max = 10, value = 5, step = 1)
      ),
      selectInput("filter_var", "Filter by Gender (Optional):",
                  choices = c("All", levels(data$Gender))),
      selectInput("filter_edu", "Filter by Education Level (Optional):",
                  choices = c("All", levels(data$EducationLevel))),
      downloadButton("download_plot", "Download Plot as PNG"),
```

```
            downloadButton("download_data", "Download Filtered Data as CSV"),
            downloadButton("download_summary", "Download Summary as CSV")
        ),
        mainPanel(
            plotOutput("survey_plot"),
            h3("Statistical Insights"),
            tableOutput("descriptive_stats"),
            textOutput("correlation_info"),
            tableOutput("grouped_stats")
        )
    )
)

# Server
server <- function(input, output) {
    # Reactive data filtering
    filtered_data <- reactive({
        df <- data
        if (input$filter_var != "All") {
            df <- df %>% filter(Gender == input$filter_var)
        }
        if (input$filter_edu != "All") {
            df <- df %>% filter(EducationLevel == input$filter_edu)
        }
        df
    })

    # Render plot (Visualization Module)
```

```
output$survey_plot <- renderPlot({
  df <- filtered_data()

  if (input$plot_type == "Pie Chart") {
    var <- input$pie_var
    pie_data <- df %>%
      count(!!sym(var)) %>%
      mutate(percentage = n / sum(n) * 100,
             label = paste0(!!sym(var), ": ", round(percentage, 1), "%"))

    ggplot(pie_data, aes(x = "", y = percentage, fill = !!sym(var))) +
      geom_col() +
      coord_polar(theta = "y") +
      geom_text(aes(label = label), position = position_stack(vjust = 0.5)) +
      labs(title = paste(var, "Distribution")) +
      theme_void()
  } else {
    var <- input$hist_var
    ggplot(df, aes(x = !!sym(var))) +
      geom_histogram(binwidth = input$binwidth, fill = "steelblue", color = "black") +
      labs(title = paste(var, "Distribution"),
           x = var, y = "Count")
  }
})

# Statistical Analysis Module
# Descriptive statistics
output$descriptive_stats <- renderTable({
```

```
  df <- filtered_data()
  df %>%
    summarise(
      Mean_Age = mean(Age, na.rm = TRUE),
      Median_Age = median(Age, na.rm = TRUE),
      SD_Age = sd(Age, na.rm = TRUE),
      Mean_Satisfaction = mean(SatisfactionScore, na.rm = TRUE),
      Median_Satisfaction = median(SatisfactionScore, na.rm = TRUE),
      SD_Satisfaction = sd(SatisfactionScore, na.rm = TRUE),
      Mean_Purchases = mean(Purchases, na.rm = TRUE),
      Median_Purchases = median(Purchases, na.rm = TRUE),
      SD_Purchases = sd(Purchases, na.rm = TRUE)
    )
})

# Correlation insights
output$correlation_info <- renderText({
  df <- filtered_data()
  corr <- cor(df$SatisfactionScore, df$Purchases, use = "complete.obs")
  paste("Correlation between Satisfaction Score and Purchases:", round(corr, 2))
})

# Grouped metrics
output$grouped_stats <- renderTable({
  df <- filtered_data()
  df %>%
    group_by(Gender, EducationLevel) %>%
    summarise(
```

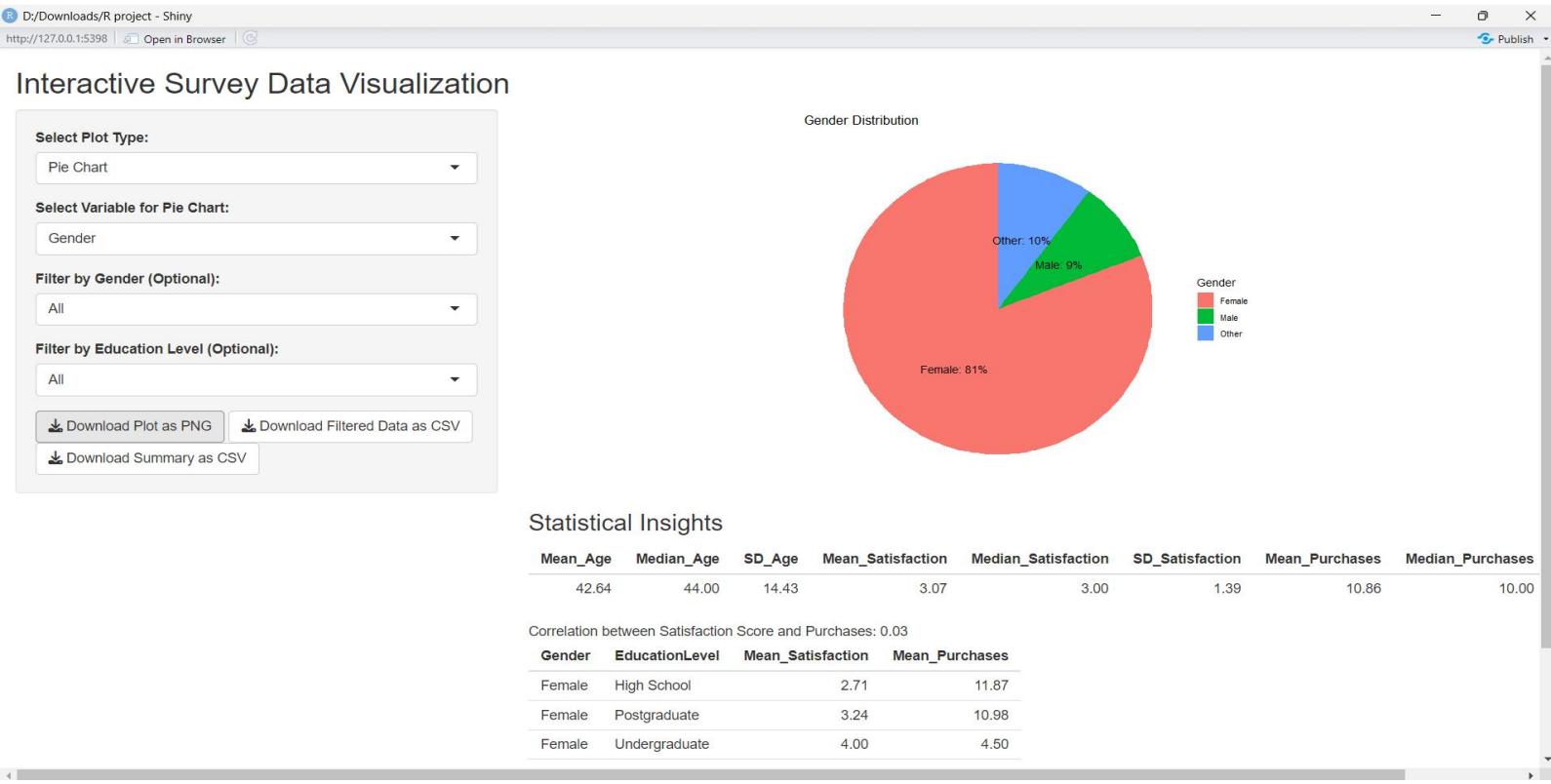
```
        Mean_Satisfaction = mean(SatisfactionScore, na.rm = TRUE),
        Mean_Purchases = mean(Purchases, na.rm = TRUE),
        .groups = "drop"
      )
})

# Export Module
# Download plot as PNG
output$download_plot <- downloadHandler(
  filename = function() {
    paste(input$plot_type, "_",
          ifelse(input$plot_type == "Pie Chart", input$pie_var, input$hist_var),
          "_", Sys.Date(), ".png", sep = "")
  },
  content = function(file) {
    df <- filtered_data()
    if (input$plot_type == "Pie Chart") {
      var <- input$pie_var
      pie_data <- df %>%
        count(!!sym(var)) %>%
        mutate(percentage = n / sum(n) * 100,
               label = paste0(!!sym(var), ": ", round(percentage, 1), "%"))
      plot <- ggplot(pie_data, aes(x = "", y = percentage, fill = !!sym(var))) +
        geom_col() +
        coord_polar(theta = "y") +
        geom_text(aes(label = label), position = position_stack(vjust = 0.5)) +
        labs(title = paste(var, "Distribution")) +
        theme_void()
```

```
        } else {
            var <- input$hist_var
            plot <- ggplot(df, aes(x = !!sym(var))) +
                geom_histogram(binwidth = input$binwidth, fill = "steelblue", color = "black") +
                labs(title = paste(var, "Distribution"),
                        x = var, y = "Count")
        }
        ggsave(file, plot = plot, device = "png", width = 6, height = 4)
    }
)

# Download filtered data as CSV
output$download_data <- downloadHandler(
    filename = function() {
        paste("filtered_data_", Sys.Date(), ".csv", sep = "")
    },
    content = function(file) {
        write.csv(filtered_data(), file, row.names = FALSE)
    }
)

# Download summary as CSV
output$download_summary <- downloadHandler(
    filename = function() {
        paste("summary_stats_", Sys.Date(), ".csv", sep = "")
    },
    content = function(file) {
        df <- filtered_data()
```

```
        summary_stats <- df %>%
          summarise(
            Mean_Age = mean(Age, na.rm = TRUE),
            Median_Age = median(Age, na.rm = TRUE),
            SD_Age = sd(Age, na.rm = TRUE),
            Mean_Satisfaction = mean(SatisfactionScore, na.rm = TRUE),
            Median_Satisfaction = median(SatisfactionScore, na.rm = TRUE),
            SD_Satisfaction = sd(SatisfactionScore, na.rm = TRUE),
            Mean_Purchases = mean(Purchases, na.rm = TRUE),
            Median_Purchases = median(Purchases, na.rm = TRUE),
            SD_Purchases = sd(Purchases, na.rm = TRUE)
          )
        write.csv(summary_stats, file, row.names = FALSE)
      }
    )
}

# Run the Shiny app
      shinyApp(ui = ui, server = server)
```

APPENDIX B-SCREEN SHOTS

PIE CHART:



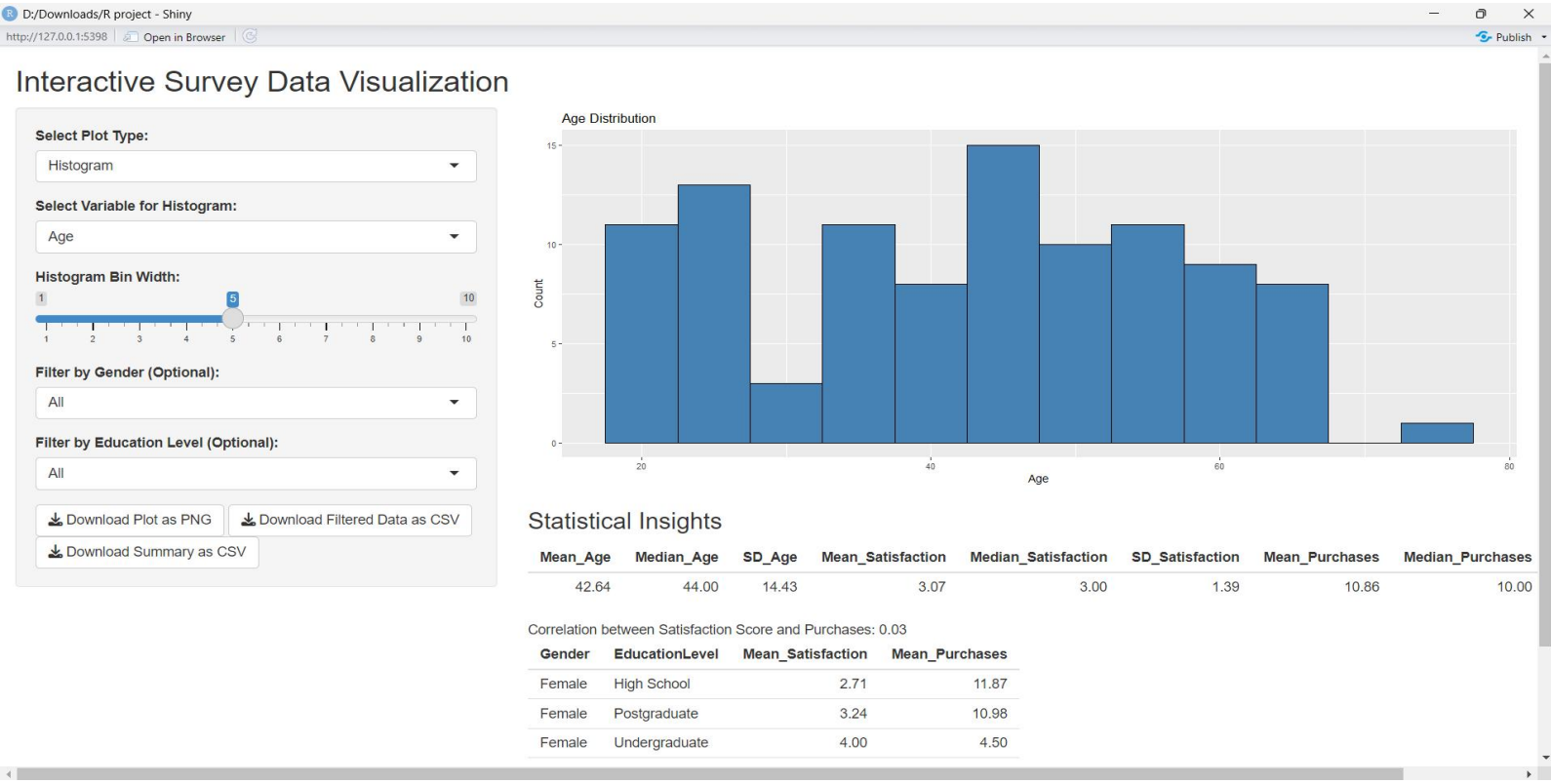
Statistical Insights

Mean_Age	Median_Age	SD_Age	Mean_Satisfaction	Median_Satisfaction	SD_Satisfaction	Mean_Purchases	Median_Purchases
42.64	44.00	14.43	3.07	3.00	1.39	10.86	10.00

Correlation between Satisfaction Score and Purchases: 0.03

Gender	EducationLevel	Mean_Satisfaction	Mean_Purchases
Female	High School	2.71	11.87
Female	Postgraduate	3.24	10.98
Female	Undergraduate	4.00	4.50

HISTOGRAM:



Statistical Insights

Mean_Age	Median_Age	SD_Age	Mean_Satisfaction	Median_Satisfaction	SD_Satisfaction	Mean_Purchases	Median_Purchases
42.64	44.00	14.43	3.07	3.00	1.39	10.86	10.00

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Gender	EducationLevel	Mean_Satisfaction	Mean_Purchases
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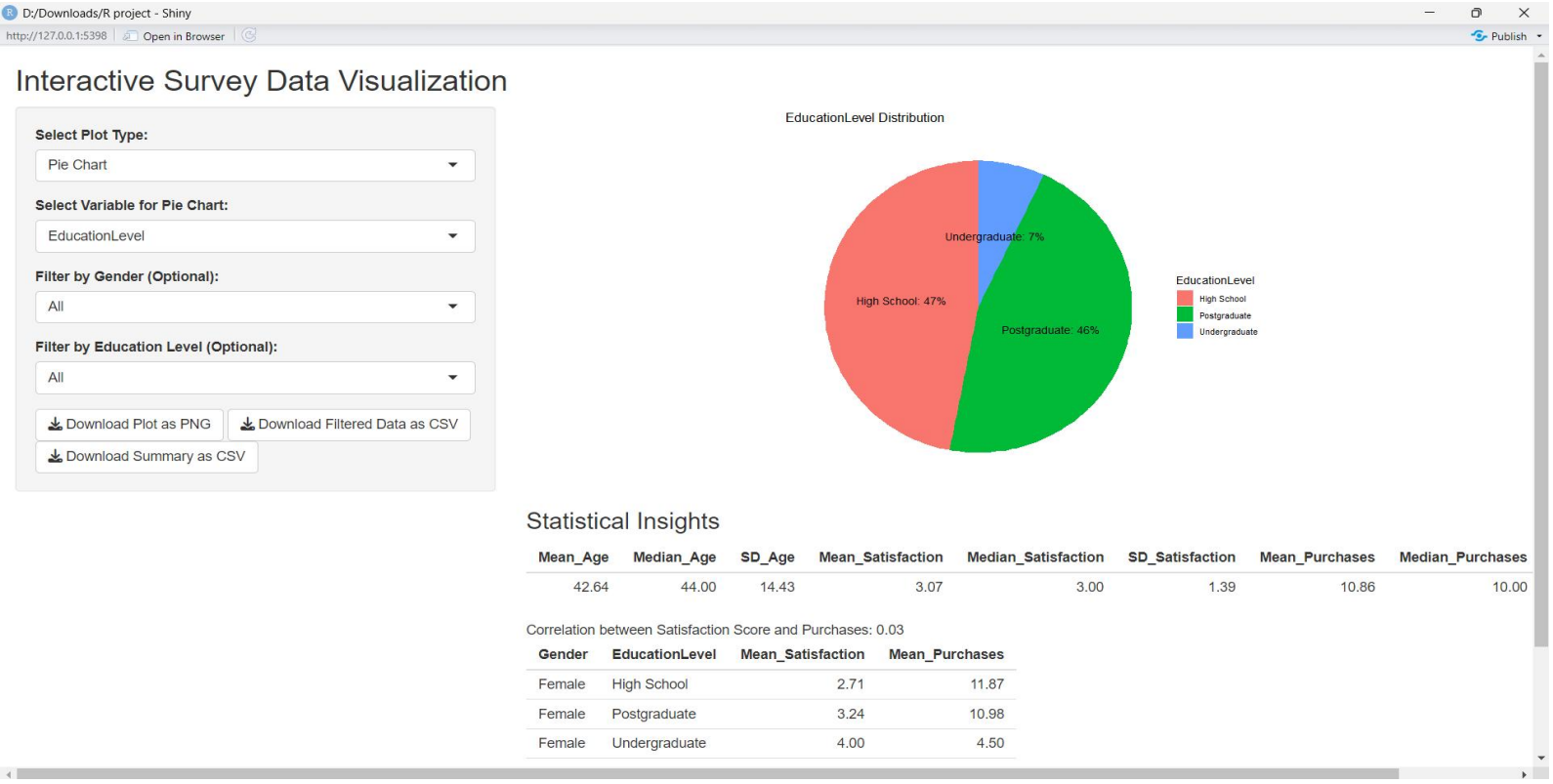
STATISTICAL VALUES:



Statistical Insights

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42.64	44.00	14.43	3.07	3.00	1.39	10.86	10.00

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Gender	EducationLevel	Mean_Satisfaction	Mean_Purchases
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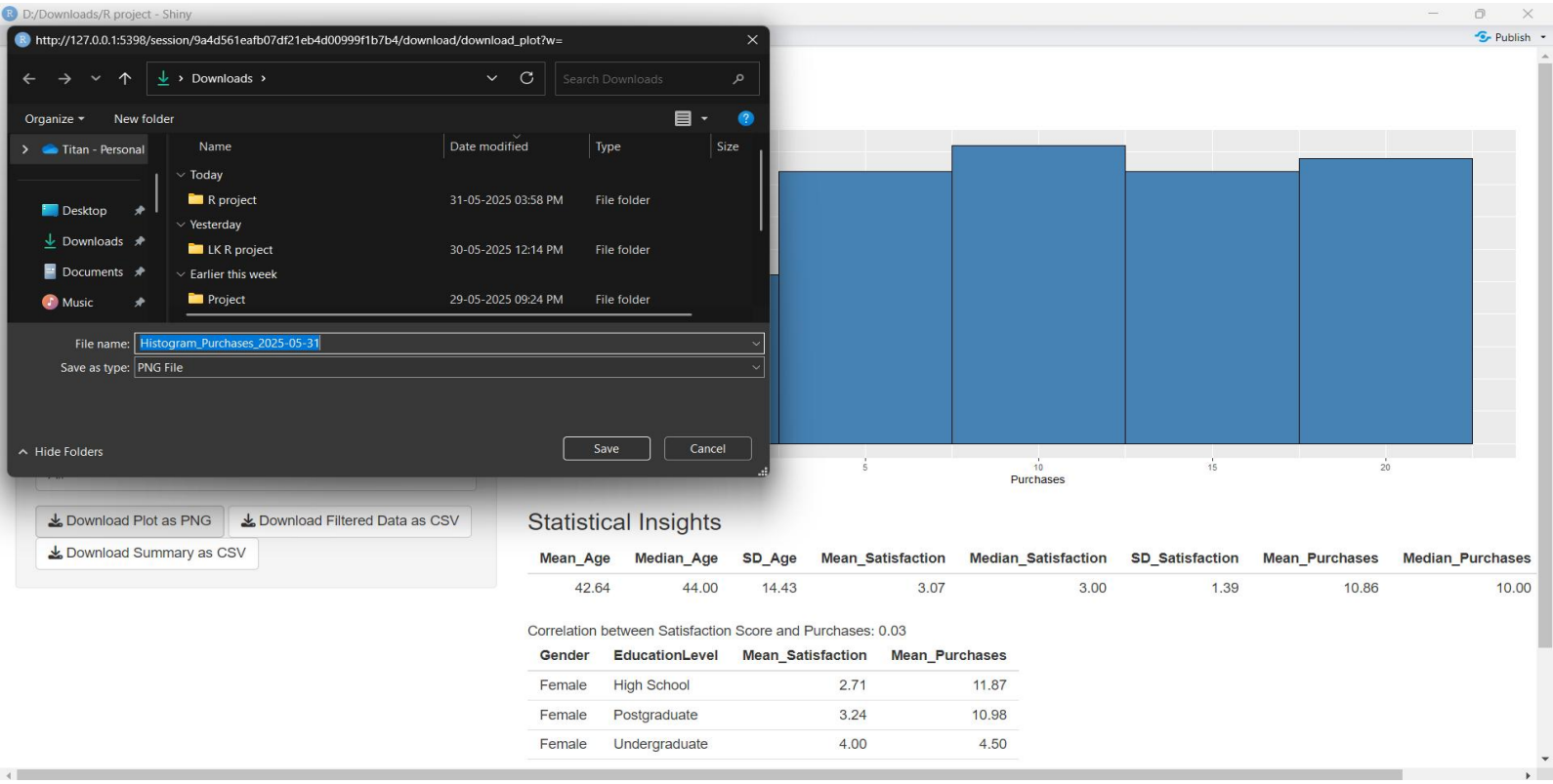
Female	Undergraduate	4.00	4.50

EXPORT:



Statistical Insights

Mean_Age	Median_Age	SD_Age	Mean_Satisfaction	Median_Satisfaction	SD_Satisfaction	Mean_Purchases	Median_Purchases
42.64	44.00	14.43	3.07	3.00	1.39	10.86	10.00

Correlation between Satisfaction Score and Purchases: 0.03

Gender	EducationLevel	Mean_Satisfaction	Mean_Purchases
Female	High School	2.71	11.87
Female	Postgraduate	3.24	10.98
Female	Undergraduate	4.00	4.50