Descriptive Analysis

2023-12-04

Descriptive Analysis Plan:

Objective: Conduct a descriptive analysis of the dataset, focusing on categorical variables and providing summary statistics for the GPA variable.

Load and Inspect Data:

- Load the dataset.
- Inspect the structure of the dataset, checking for the data types and missing values.

Data Cleaning:

- Ensure that the 'gpa' column is treated as a numeric variable.

Descriptive Statistics for GPA:

Compute and present the following summary statistics for the 'gpa' column:

- Mean
- Median
- etc.

Distribution of GPA:

- Create a histogram to visualize the distribution of GPA.

Descriptive Statistics for Categorical Variables:

- Identify and list all categorical variables in the dataset.

For each categorical variable, compute and present the following summary statistics:

- Number of levels (unique values)
- Frequency distribution of each level

Data Cleaning

```
data <- read_csv("data_tidy.csv")
```

```
## Rows: 95 Columns: 59
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (20): timestamp, gender, age, academic_level, field_of_study, university...
## dbl (39): id, study_env_Campus Common Spaces, study_env_Classroom, study_env...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
head(data)
```

```
## # A tibble: 6 x 59
##      id study_~1 study~2 study~3 study~4 study~5 study~6 study~7 backg~8 backg~9
##   <dbl>    <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
## 1     1        0       0       0       1       1       0       0       1       0
## 2     2        1       0       0       0       1       0       0       1       0
## 3     3        0       0       0       1       1       0       0       1       0
## 4     4        0       1       1       0       1       0       0       1       1
## 5     5        0       0       0       1       1       1       0       1       1
## 6     6        0       0       0       1       0       0       0       0       0
## # ... with 49 more variables:
## #   `background_noise_Prefer a bustling environment` <dbl>,
## #   `background_noise_Prefer complete silence` <dbl>,
## #   study_time_Afternoon <dbl>, `study_time_Early morning` <dbl>,
## #   study_time_Evening <dbl>, `study_time_Late morning` <dbl>,
## #   study_time_Night <dbl>, `study_time_No specific preference` <dbl>,
## #   `resources_Interactive simulations or applications` <dbl>, ...
```

```
# List of columns to exclude from conversion
columns_to_exclude <- c("id", "timestamp", "field_of_study", "university", "gpa")

# List of columns to convert to categorical
columns_to_convert <- setdiff(names(data), columns_to_exclude)

# Convert selected columns to categorical
data[columns_to_convert] <- lapply(data[columns_to_convert], as.factor)
```

Descriptive Statistics for GPA

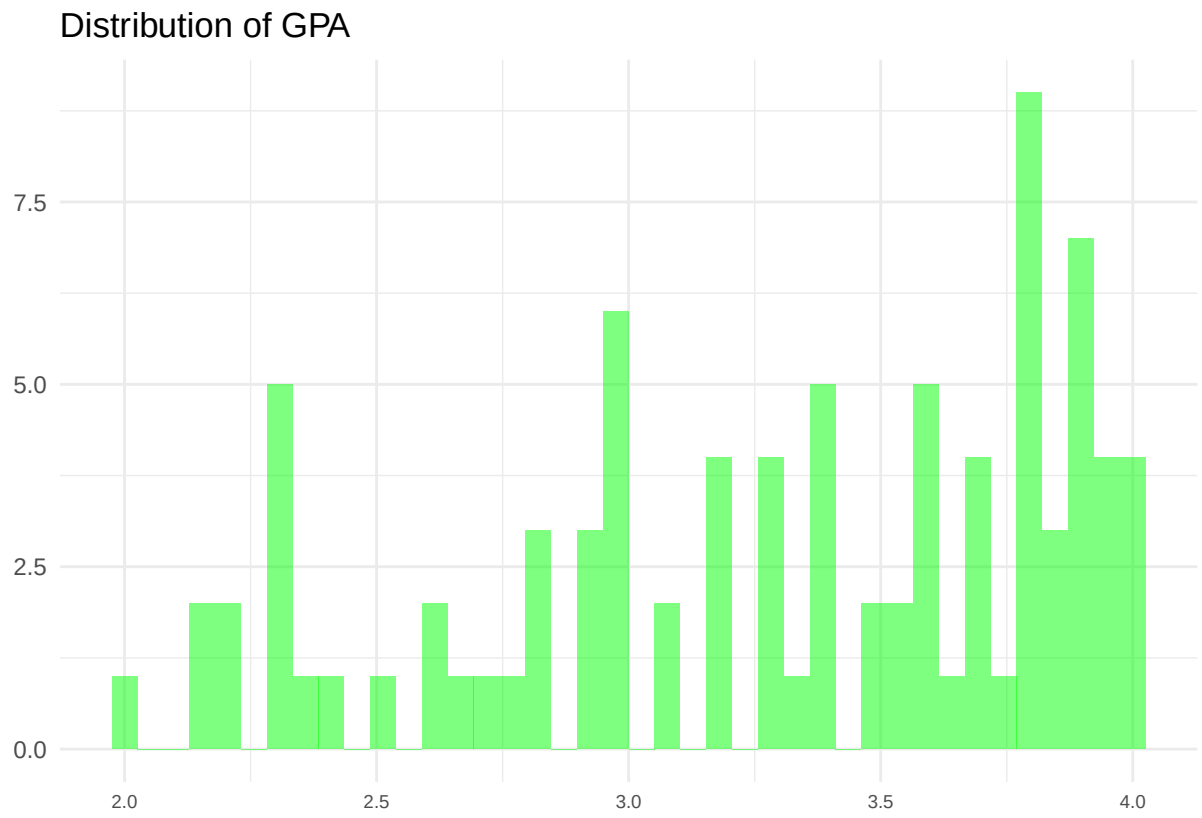
```r
# Select only numeric variables for summary statistics
numeric_data <- data %>%
  select_if(is.numeric)

# Summary statistics for numeric variables
summary(numeric_data)
```

```
##        id              gpa       
##  Min.   : 1.0   Min.   :2.000  
##  1st Qu.:24.5   1st Qu.:2.900  
##  Median :48.0   Median :3.400  
##  Mean   :48.0   Mean   :3.288  
##  3rd Qu.:71.5   3rd Qu.:3.800  
##  Max.   :95.0   Max.   :4.000  
##                 NA's   :7
```

Distribution of GPA

```
ggplot(data, aes(x = gpa)) +
  geom_histogram(fill = "green", alpha = 0.5, bins = 40) +
  labs(title = "Distribution of GPA", x = "", y = "")+
  theme_minimal() +
  theme(axis.text.x = element_text(size = 7))
```



Descriptive Statistics for Categorical Variables

```r
# Select only categorical variables for frequency table
categorical_data <- data %>%
  select_if(is.factor)

# Frequency table for categorical variables
for (col in colnames(categorical_data)) {
  print(table(categorical_data[[col]], dnn = col))
}
```

```
## study_env_Campus Common Spaces
##  0  1
## 62 33
## study_env_Classroom
##  0  1
## 80 15
## study_env_Coffee shop
##  0  1
## 83 12
## study_env_Home
##  0  1
## 19 76
## study_env_Library
##  0  1
## 45 50
## study_env_Other
##  0  1
## 87  8
## study_env_Park or outdoor space
##  0  1
## 90  5
## background_noise_Comfortable with some ambient noise
##  0  1
## 46 49
## background_noise_Like listening to music
##  0  1
## 51 44
## background_noise_Prefer a bustling environment
##  0  1
## 90  5
## background_noise_Prefer complete silence
##  0  1
## 49 46
## study_time_Afternoon
##  0  1
## 66 29
## study_time_Early morning
##  0  1
## 74 21
## study_time_Evening
##  0  1
## 31 64
```

```
## study_time_Late morning
##  0  1
## 74 21
## study_time_Night
##  0  1
## 49 46
## study_time_No specific preference
##  0  1
## 85 10
## resources_Interactive simulations or applications
##  0  1
## 77 18
## resources_Lecture notes
##  0  1
## 23 72
## resources_Online articles and resources
##  0  1
## 17 78
## resources_Other
##  0  1
## 93  2
## resources_Textbooks
##  0  1
## 46 49
## resources_Videos and multimedia
##  0  1
## 32 63
## consumed_beverages_Coffee
##  0  1
## 34 61
## consumed_beverages_Energy drinks
##  0  1
## 90  5
## consumed_beverages_Soft drinks/sodas
##  0  1
## 78 17
## consumed_beverages_Tea
##  0  1
## 46 49
## consumed_beverages_Water
##  0  1
## 20 75
## manage_stress_Engaging in a hobby or creative activity
##  0  1
## 62 33
## manage_stress_Exercise
##  0  1
## 80 15
## manage_stress_Hanging out with friends/family
##  0  1
## 30 65
## manage_stress_Listening to music
##  0  1
## 32 63
```

```
## manage_stress_Meditation
##  0  1
## 82 13
## manage_stress_Other
##  0  1
## 85 10
## manage_stress_Spending time in nature
##  0  1
## 70 25
## manage_stress_Taking short breaks between study sessions
##  0  1
## 51 44
## manage_stress_Watching movies or TV shows
##  0  1
## 42 53
## gender
## Female   Male
##     65     30
## age
##    18-24    25-30    31-40 Under 18
##       92        1        1        1
## academic_level
##         Freshman Graduate student           Junior           Senior
##               12               14               17               33
##        Sophomore
##               19
## employment_status
## Employed full-time Employed part-time         Unemployed
##                 17                 24                 54
## hours_spend_studying
##     11 to 20 hours     21 to 30 hours     31 to 40 hours     41 to 50 hours
##                 31                 30                 14                  5
## Less than 10 hours more than 51 hours
##                 14                  1
## attendance
##          Occasionally                Rarely           Yes, always
##                     9                     2                    49
## Yes, most of the time
##                    35
## help_from_professors
##       Always   Frequently        Never Occasionally       Rarely
##            4           11            6           40           34
## extracurricular_activities
##  No Yes
##  51  44
## studying_in_groups
## Enjoy occasional group study sessions                Prefer studying alone
##                                    38                                   52
##  Prefer studying in a group regularly
##                                     5
## breaks
##     10 to 20 minutes     21 to 40 minutes       41 to one hour
##                   40                   34                   11
## Less than 10 minutes    More than an hour
```

```
##                   4                   6
## avg_sleep
##      5 to 6 hours      7 to 8 hours Less than 5 hours More than 8 hours
##                53                33                 5                 4
## eating_habits
##            Healthy            Neutral   Somewhat healthy Somewhat unhealthy
##                  5                 33                 27                 21
##          Unhealthy
##                  9
## eat_freq
##                     Four or more times        I don't have regular meal times
##                                      4                                     20
##                                One time Three times (breakfast, lunch, dinner)
##                                      1                                     30
##                               Two times
##                                      40
## caffeine_freq
##                                  Daily I don't consume caffeinated beverages
##                                     30                                     4
##                  Multiple times a day                           Occasionally
##                                     37                                    14
##                       Rarely or never
##                                     10
## physical_activity_freq
##                Daily                Never          Once a week
##                    9                   11                   12
##               Rarely Several times a week
##                   31                  32
## academic_goals
##               Explore new academic interests
##                                           19
##          Improve grades in specific subjects
##                                           30
##           Maintain current academic standing
##                                           24
##                                        Other
##                                            6
## Pursue advanced coursework or certifications
##                                           16
## future_plans
## No, I do not plan to pursue further education
##                                            8
##                                    Undecided
##                                           22
##        Yes, but after gaining work experience
##                                           35
##             Yes, immediately after graduation
##                                           30
```

Some Insights

Preferred Study Environments:

- Home and Library Dominance: A significant number of respondents prefer studying at home or in the library, suggesting a preference for quiet and controlled environments.
- Campus Spaces: While some students opt for on-campus common spaces, the preference for classrooms, coffee shops, parks, or other outdoor spaces is relatively lower.

Background Noise Preferences:

- Diverse Noise Tolerance: Students exhibit diverse preferences for background noise, with a sizable proportion comfortable with some ambient noise. This suggests that designing flexible study spaces catering to various noise preferences could enhance the overall learning environment.
- Varied Study Times: Students have diverse preferences for study times, indicating that institutions should provide flexible scheduling for classes, study sessions, and resources.

Resource Preferences:

- Interactive and Multimedia Resources: A notable preference for interactive simulations, videos, and multimedia resources implies that integrating technology and multimedia into teaching methods could be well-received.
- Varied Resource Usage: Preferences for lecture notes, textbooks, and online articles vary, indicating a need for diverse resource availability.

Consumed Beverages:

- Caffeine Dominance: Coffee is the most consumed beverage. Consideration of caffeine-friendly spaces and resources may enhance student satisfaction.

Managing Stress:

- Diverse Stress Coping Mechanisms: Students employ various stress management methods, including engaging in hobbies, exercising, meditation, and spending time in nature. Institutions could provide resources and support for a variety of stress-relief activities.

Demographics and Study Patterns:

- Unemployment and Study Hours: A majority of respondents are unemployed, suggesting that institutions could provide additional support or resources for job placement. Understanding varied study hour patterns can aid in scheduling and resource allocation.

Attendance and Academic Support:

- Regular Attendance: The majority attend classes regularly. This signals an engaged student body, but institutions should continue to provide academic support and resources for those who might need additional assistance.

Academic Goals and Future Plans:

- Diverse Academic Aspirations: With diverse academic goals and future plans, institutions can tailor support services to cater to students pursuing different paths, whether it be further education, immediate employment, or exploring new interests.