

Sheth L.U.J. & Sir M.V. College

1. Generating descriptive statistics using summary() or describe() (R)

The screenshot shows an RStudio interface. The main area displays a data frame titled 'data' with 27 rows and 10 columns. The columns are: college_id, iq, prev_sem_result, cgpa, academic_performance, internship_experience, extra_curricular_score, communication_skills, projects_completed, and placement. The data includes various numerical values and categorical entries like 'Yes' and 'No'. To the right of the data frame, a 'values' pane shows summary statistics: avg., Cur., max., and min. Below the data frame, a 'Console' tab is visible, and at the bottom, a Windows taskbar shows various open applications.

college_id	iq	prev_sem_result	cpga	academic_performance	internship_experience	extra_curricular_score	communication_skills	projects_completed	placement
1 CLG0030	107	6.61	6.28	8 No		8	8	4	No
2 CLG0061	97	5.52	5.37	8 No		7	8	0	No
3 CLG0036	109	5.36	5.83	9 No		3	1	1	No
4 CLG0055	122	5.47	5.75	6 Yes		1	6	1	No
5 CLG0004	96	7.91	7.69	7 No		8	10	2	No
6 CLG0015	96	5.26	5.32	7 No		5	8	0	No
7 CLG0071	123	6.68	6.58	5 No		7	8	2	Yes
8 CLG0096	111	8.77	8.76	7 No		3	1	2	Yes
9 CLG0097	92	6.47	6.33	9 No		7	8	5	No
10 CLG0057	108	8.82	8.60	4 No		5	9	1	No
11 CLG0063	93	8.73	8.90	2 Yes		5	6	0	No
12 CLG0077	93	6.23	6.51	8 No		5	7	4	No
13 CLG0064	103	8.64	9.01	7 Yes		8	6	1	No
14 CLG0017	71	8.74	8.40	6 No		0	5	2	No
15 CLG0053	74	6.99	7.31	7 No		0	1	2	No
16 CLG0040	91	6.05	5.80	3 No		4	2	3	No
17 CLG0070	84	7.61	7.54	6 No		0	10	0	No
18 CLG0050	104	9.61	10.01	10 Yes		9	2	4	No
19 CLG0068	86	8.20	8.15	7 No		8	9	4	Yes
20 CLG0015	78	5.66	5.56	7 Yes		3	6	2	No
21 CLG0072	121	8.41	8.07	5 Yes		1	3	3	Yes
22 CLG0034	96	7.14	7.11	3 Yes		2	3	3	No
23 CLG0030	101	7.96	8.22	2 Yes		8	10	0	No
24 CLG0087	78	8.67	9.17	7 Yes		10	10	2	Yes
25 CLG0073	91	7.57	7.86	4 Yes		7	2	2	No
26 CLG0024	101	9.07	9.45	2 No		2	7	2	No

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RStudio interface showing an R script named S081_R_Practical1_M2.R:

```

1 # summary() gives basic descriptive statistics
2 # For numeric data: Min, Q1Quartiles, Median, Mean, Q3, Max
3 # For categorical data: count and most frequent values
4
5 # describe() gives detailed descriptive statistics
6 # Includes mean, median, SD, min, max, range, skewness, kurtosis
7
8
9 # Load data set
10 data <- read.csv("C:\\Users\\itlab\\OneDrive\\Desktop\\S081_Adv.Python\\Practical1\\cleaned_CollegePlacement.csv")
11
12 # Generate descriptive statistics
13 summary(data)
14
15 # Install and load psych package
16 #install.packages("psych")
17 library(psych)
18
19 # Descriptive statistics
20 describe(data)
21
22
23
24

```

Environment pane showing various data frames and their dimensions:

- combined_data: 10150 obs. of 2 variables
- data: 10000 obs. of 10 variables
- df: 200 obs. of 10 variables
- df_clean: 200 obs. of 11 variables
- df_no_duplicates: 200 obs. of 10 variables
- df_small: 200 obs. of 4 variables
- duplicate_Foo.: 205 obs. of 10 variables
- duplicate_rows: 10 obs. of 10 variables
- flower_clean: 10000 obs. of 2 variables
- flower_df: 10000 obs. of 4 variables
- Food_delivery: 200 obs. of 10 variables
- iris: 150 obs. of 5 variables
- iris_clean: 150 obs. of 2 variables
- long_df: 600 obs. of 3 variables
- processed_data: 200 obs. of 21 variables
- traffic_pivot: 200 obs. of 4 variables
- unique_orders: 200 obs. of 10 variables
- unique_routes: 200 obs. of 10 variables
- wide_df: 200 obs. of 4 variables

Values pane showing summary statistics:

avg_delivery_	44.7445
current_time	2023-12-08 14:15:16 IST
max_distance	12
min_route_len_	0.58

RStudio interface showing the output of the `describe(data)` command:

```

Console | Background Jobs X
[R: R4.52 - ~]
> # Load data set
> data <- read.csv("C:\\Users\\itlab\\OneDrive\\Desktop\\S081_Adv.Python\\Practical1\\Cleaned_CollegePlacement.csv")
>
> # Generate descriptive statistics
> summary(data)
college_id iq prev_sem_result cgpa academic_performance internship_experience extra_curricular_score
Length:10000 Min. :41.00 Max. :5.000 Min. :4.540 Min. :1.000 Length:10000 Min. :0.000
Class :character 1st Qu.:89.00 1st Qu.:6.290 1st Qu.:6.290 1st Qu.:3.000 Class :character 1st Qu.:2.000
Mode :character Median :99.00 Median :7.560 Median :7.550 Median :6.000 Mode :character Median :5.000
Mean :99.47 Mean :7.536 Mean :7.532 Mean :5.546 Mean :4.971
3rd Qu.:110.00 3rd Qu.:8.790 3rd Qu.:8.770 3rd Qu.:8.000 3rd Qu.:8.000
Max. :158.00 Max. :10.000 Max. :10.460 Max. :10.000 Max. :10.000

communication_skills projects_completed placement
Min. :0.0000000000000000 Length:10000
1st Qu.:3.0000000000000000 1st Qu.:13.000000000000000 Class :character
Median :6.000000000000000 3rd Qu.:13.000000000000000 Mode :character
Mean :5.562 Mean :12.513
3rd Qu.:8.000 3rd Qu.:4.000
Max. :10.000 Max. :5.000

> # Install and load psych package
> #install.packages("psych")
> library(psych)
>
> # Descriptive statistics
> describe(data)
> describe(data)

vars n mean sd median trimmed mad min max range skew kurtosis se
college_id* 1 10000 50.71 28.80 51.00 50.74 37.06 1.00 100.00 99.00 -0.01 -1.21 0.29
iq 2 10000 99.47 15.05 99.00 99.47 14.83 41.00 158.00 117.00 0.00 0.03 0.15
prev_sem_result 3 10000 7.54 1.45 7.56 7.54 1.85 5.00 10.00 5.00 -0.03 -1.19 0.01
cgpa 4 10000 7.53 1.47 7.55 7.54 1.84 4.54 10.46 5.92 -0.03 -1.11 0.00
academic_performance 5 10000 5.54 0.87 6.00 5.54 2.57 3.00 9.00 -0.01 -1.22 0.03
internship_experience* 6 10000 4.40 0.49 4.00 4.47 4.45 1.00 10.00 10.00 0.01 -1.22 0.03
extra_curricular_score 7 10000 4.97 3.16 5.00 4.97 4.45 0.00 10.00 10.00 0.01 -1.22 0.03
communication_skills 8 10000 5.56 2.90 6.00 5.57 4.45 1.00 10.00 9.00 -0.01 -1.24 0.03
projects_completed 9 10000 2.51 1.72 3.00 2.52 1.48 0.00 5.00 5.00 -0.01 -1.28 0.02
placement* 10 10000 1.17 0.37 1.00 1.08 0.00 1.00 2.00 1.00 1.80 1.23 0.00

```

Environment pane showing various data frames and their dimensions (repeated from the top screenshot):

- combined_data: 10150 obs. of 2 variables
- data: 10000 obs. of 10 variables
- df: 200 obs. of 10 variables
- df_clean: 200 obs. of 11 variables
- df_no_duplicates: 200 obs. of 10 variables
- df_small: 200 obs. of 4 variables
- duplicate_Foo.: 205 obs. of 10 variables
- duplicate_rows: 10 obs. of 10 variables
- flower_clean: 10000 obs. of 2 variables
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- long_df: 600 obs. of 3 variables
- processed_data: 200 obs. of 21 variables
- traffic_pivot: 200 obs. of 4 variables
- unique_orders: 200 obs. of 10 variables
- unique_routes: 200 obs. of 10 variables
- wide_df: 200 obs. of 4 variables

Values pane showing summary statistics (repeated from the top screenshot):

avg_delivery_	44.7445
cur...	2025-12-
max...	12
min...	0.58

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2. Generating frequency tables using table() or count() (R)

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

5081_R_Practical2_M2.R data

Project: (None)

Environment

Data

Values

Files Plots Pa

Console

1 70 1 3 130 322 0 2 109 0 2.4 1 3 1 1
2 67 0 2 115 564 0 2 160 0 1.6 1 0 3 0
3 57 1 1 124 261 0 0 141 0 0.3 0 0 3 1
4 64 1 3 128 263 0 0 105 1 0.2 1 1 3 0
5 74 0 1 120 269 0 2 121 1 0.2 0 1 1 0
6 65 1 3 120 177 0 0 140 0 0.4 0 0 3 0
7 56 1 2 130 256 1 2 142 1 0.6 1 1 2 1
8 59 1 3 110 239 0 2 142 1 1.2 1 1 3 1
9 60 1 3 140 293 0 2 170 0 1.2 1 2 3 1
10 63 0 3 150 407 0 2 154 0 4.0 1 3 3 1
11 59 1 3 135 234 0 0 161 0 0.5 1 0 3 0
12 53 1 3 142 226 0 2 111 1 0.0 0 0 3 0
13 44 1 2 140 235 0 2 180 0 0.0 0 0 1 0
14 61 1 0 134 234 0 0 145 0 2.6 1 2 1 1
15 57 0 3 128 303 0 2 159 0 0.0 0 1 1 0
16 71 0 3 112 149 0 0 125 0 1.6 1 0 1 0
17 46 1 3 140 311 0 0 120 1 1.8 1 2 3 1
18 53 1 3 140 203 1 2 155 1 3.1 2 0 3 1
19 64 1 0 110 211 0 2 144 1 1.8 1 0 1 0
20 40 1 0 140 199 0 0 178 1 1.4 0 0 3 0
21 67 1 3 120 229 0 2 129 1 2.6 1 2 3 1
22 48 1 1 130 245 0 2 180 0 0.2 1 0 1 0
23 43 1 3 115 303 0 0 181 0 1.2 1 0 1 0
24 47 1 3 112 204 0 0 143 0 0.1 0 0 1 0
25 54 0 1 132 288 1 2 159 1 0.0 0 1 1 0
26 48 0 2 130 275 0 0 139 0 0.2 0 0 1 0
-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
Showing 1 to 27 of 270 entries, 14 total columns

11.10.17 AM
15-12-2025
ENG IN

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Roll No :- S081

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RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Source

Project: (None)

Environment

Data

com... 10150...
data 270 o...
df 200 o...
df... 200 o...
df... 200 o...
dup... 205 o...
dup... 10 ob...
flo... 10000...
flo... 10000...
Foo... 200 o...
iris 150 o...
iris... 150 o...
ion... 600 o...
pro... 200 o...
tra... 200 o...
uni... 200 o...
uni... 200 o...
wid... 200 o...

Values

avg... 44.7445
cp... 'table'
cur... 2025-12-
max... 12
min... 0.58
sex... 'table'
tar... 'table'

Files Plots Pa... Zoom E

25:1 (Top Level) R Script

Console

27°C Sunny

Search

11.10.00 AM 15-12-2025

```
1 #R Code (Using table())
2 # Load dataset
3 data <- read.csv("C:\\\\Users\\\\itlab\\\\Downloads\\\\Heart_disease_statlog.csv")
4
5 # Frequency table for target variable
6 table(data$target)
7
8 # Frequency table for gender
9 table(data$sex)
10
11 # Frequency table for chest pain type
12 table(data$cp)
13
14 #
15
16 #R Code (Using count() from dplyr)
17 # Install and load dplyr package
18 #install.packages("dplyr")
19 library(dplyr)
20
21 # Frequency count using count()
22 count(data, target)
23 count(data, sex)
24 count(data, cp)
25
```

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Source

Project: (None)

Environment

Data

com... 10150...
data 270 o...
df 200 o...
df... 200 o...
df... 200 o...
dup... 205 o...
dup... 10 ob...
flo... 10000...
flo... 10000...
Foo... 200 o...
iris 150 o...
iris... 150 o...
ion... 600 o...
pro... 200 o...
tra... 200 o...
uni... 200 o...
uni... 200 o...
wid... 200 o...

Values

avg... 44.7445
cp... 'table'
cur... 2025-12-
max... 12
min... 0.58
sex... 'table'
tar... 'table'

Files Plots Pa... Zoom E

Console Background Jobs

R 4.5.2 - ~/

```
>
> # Frequency table for target variable
> table(data$target)
0 1
150 120
>
> # Frequency table for gender
> table(data$sex)
0 1
87 183
>
> # Frequency table for chest pain type
> table(data$cp)
0 1 2 3
20 42 79 129
>
> #
>
> #R Code (Using count() from dplyr)
> # Install and load dplyr package
> #install.packages("dplyr")
> library(dplyr)
>
> # Frequency count using count()
> count(data, target)
target n
1 0 150
2 1 120
> count(data, sex)
Sex n
1 0 87
2 1 183
> count(data, cp)
CP n
1 0 20
2 1 42
3 2 79
4 3 129
>
```

27°C Sunny

Search

11.08.19 AM 15-12-2025

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3. Creating cross-tabulations and two-way tables using **table()** (R).

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
1	70	1	3	130	322	0	2	109	0	2.4	1	3	1	1
2	67	0	2	115	564	0	2	160	0	1.6	1	0	3	0
3	57	1	1	124	261	0	0	141	0	0.3	0	0	3	1
4	64	1	3	128	263	0	0	105	1	0.2	1	1	3	0
5	74	0	1	120	269	0	2	121	1	0.2	0	1	1	0
6	65	1	3	120	177	0	0	140	0	0.4	0	0	3	0
7	56	1	2	130	256	1	2	142	1	0.6	1	1	2	1
8	59	1	3	110	239	0	2	142	1	1.2	1	1	3	1
9	60	1	3	140	293	0	2	170	0	1.2	1	2	3	1
10	63	0	3	150	407	0	2	154	0	4.0	1	3	3	1
11	59	1	3	135	234	0	0	161	0	0.5	1	0	3	0
12	53	1	3	142	226	0	2	111	1	0.0	0	0	3	0
13	44	1	2	140	235	0	2	180	0	0.0	0	0	1	0
14	61	1	0	134	234	0	0	145	0	2.6	1	2	1	1
15	57	0	3	128	303	0	2	159	0	0.0	0	1	1	0
16	71	0	3	112	149	0	0	125	0	1.6	1	0	1	0
17	46	1	3	140	311	0	0	120	1	1.8	1	2	3	1
18	53	1	3	140	203	1	2	155	1	3.1	2	0	3	1
19	64	1	0	110	211	0	2	144	1	1.8	1	0	1	0
20	40	1	0	140	199	0	0	178	1	1.4	0	0	3	0
21	67	1	3	120	229	0	2	129	1	2.6	1	2	3	1
22	48	1	1	130	245	0	2	180	0	0.2	1	0	1	0
23	43	1	3	115	303	0	0	181	0	1.2	1	0	1	0
24	47	1	3	112	204	0	0	143	0	0.1	0	0	1	0
25	54	0	1	132	288	1	2	159	1	0.0	0	1	1	0
26	48	0	2	130	275	0	0	199	0	0.2	0	0	1	0

Showing 1 to 27 of 270 entries, 14 total columns

Name :- Priya Gupta
Roll No :- S081

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The screenshot shows the RStudio interface with the following details:

- File menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project: (None)
- Code Editor:** Shows R script code for creating a cross-tabulation table from a CSV dataset.
- Console:** Displays the R session history, including the command to read the CSV file and the resulting cross-tabulation table.
- Environment:** Shows the global environment with various objects and their values.
- Plots:** Shows a small preview of a scatter plot.
- System Status:** Shows system status at the bottom right, including battery level, signal strength, and system time (11:37:43 AM 15-12-2025).

```
1 # cross-tabulation (two-way table)
2 # used to compare two categorical variables together
3 # Shows how many times each combination of values occurs
4 # Example: Male/Female vs Heart Disease (Yes/No)
5
6
7
8
9 # Load dataset
10 data <- read.csv("C:\\\\Users\\\\itlab\\\\Downloads\\\\Heart_disease_statlog.csv")
11
12 # Create two-way table (cross-tabulation)
13 cross_tab <- table(data$sex, data$target)
14
15 # Display table
16 cross_tab
```

```
R> # Load dataset
R> data <- read.csv("C:\\\\Users\\\\itlab\\\\Downloads\\\\Heart_disease_statlog.csv")
R>
R> # Create two-way table (cross-tabulation)
R> cross_tab <- table(data$sex, data$target)
R>
R> # Display table
R> cross_tab
     0   1 
0 67  20 
1 83 100
```

A large watermark "S081 Priya" is diagonally across the page.

Name :- Priya Gupta

Roll No :- S081

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4. Performing one-sample t-tests using t.test() (R).



A screenshot of the RStudio interface showing a data frame titled "data". The data frame contains 30 rows of data with 18 columns. The columns are: Job_Title, Average_Salary, Years_Experience, Education_Level, AI_Exposure_Index, Tech_Growth_Factor, Automation_Probability_2030, Risk_Category, Skill_1, Skill_2, Skill_3, Skill_4, Skill_5, Skill_6, Skill_7, Skill_8, and Skill_9. The data includes various job titles like Security Guard, Research Scientist, Construction Worker, Software Engineer, Financial Analyst, AI Engineer, Mechanic, Teacher, HR Specialist, Customer Support, UX Researcher, Financial Analyst, Lawyer, Data Scientist, Research Scientist, Graphic Designer, Teacher, Teacher, Retail Worker, Doctor, AI Engineer, HR Specialist, Teacher, Financial Analyst, AI Engineer, and Software Engineer. Each row provides specific details such as salary, years of experience, education level, and various skill scores.

	Job_Title	Average_Salary	Years_Experience	Education_Level	AI_Exposure_Index	Tech_Growth_Factor	Automation_Probability_2030	Risk_Category	Skill_1	Skill_2	Skill_3	Skill_4	Skill_5	Skill_6	Skill_7	Skill_8	Skill_9
1	Security Guard	45795	28	Master's	0.18	1.28	0.85	High	0.45	0.10	0.46	0.33	0.14	0.65	0.06	0.72	
2	Research Scientist	133355	20	PhD	0.62	1.11	0.05	Low	0.02	0.52	0.40	0.05	0.97	0.23	0.09	0.62	
3	Construction Worker	146216	2	High School	0.86	1.18	0.81	High	0.01	0.94	0.56	0.39	0.02	0.23	0.24	0.68	
4	Software Engineer	136530	13	PhD	0.39	0.68	0.60	Medium	0.43	0.21	0.57	0.03	0.84	0.45	0.40	0.93	
5	Financial Analyst	70397	22	High School	0.52	1.46	0.64	Medium	0.75	0.54	0.59	0.97	0.61	0.28	0.30	0.17	
6	AI Engineer	92592	11	Master's	0.29	0.51	0.10	Low	0.71	0.79	0.61	0.93	0.65	0.91	0.85	0.45	
7	Mechanic	107373	23	PhD	0.67	1.09	0.41	Medium	0.56	0.38	0.97	0.85	0.72	0.24	0.26	0.04	
8	Teacher	53419	12	High School	0.20	1.40	0.17	Low	0.56	0.70	0.14	0.60	0.54	0.20	0.94	0.60	
9	HR Specialist	139225	12	Master's	0.30	0.61	0.48	Medium	0.22	0.42	0.88	0.32	0.12	0.36	0.91	0.27	
10	Customer Support	85016	2	High School	0.01	1.01	0.80	High	0.22	0.12	0.34	0.94	0.32	0.52	0.70	0.36	
11	UX Researcher	82733	6	High School	0.50	0.80	0.41	Medium	0.04	0.61	0.50	0.05	0.28	0.91	0.24	0.14	
12	Financial Analyst	117455	22	High School	0.67	1.26	0.40	Medium	0.73	0.37	0.63	0.63	0.54	0.09	0.84	0.32	
13	Lawyer	79811	27	High School	0.68	0.52	0.50	Medium	0.23	0.65	0.17	0.69	0.39	0.94	0.14	0.34	
14	Data Scientist	115981	9	High School	0.26	1.16	0.63	Medium	0.56	0.53	0.24	0.09	0.90	0.90	0.63	0.34	
15	Research Scientist	96690	19	Master's	0.89	1.28	0.21	Low	0.08	0.16	0.90	0.61	0.01	0.10	0.66	0.01	
16	Graphic Designer	32869	2	High School	0.65	0.72	0.58	Medium	0.24	0.33	0.75	0.65	0.85	0.66	0.57	0.09	
17	Teacher	36893	29	Bachelor's	0.97	0.89	0.27	Low	0.63	0.79	0.50	0.58	0.49	0.20	0.72	0.28	
18	Teacher	103744	11	Bachelor's	0.94	1.45	0.28	Low	0.37	0.02	0.93	0.43	0.97	0.96	0.85	0.29	
19	Retail Worker	148015	2	PhD	0.17	1.06	0.93	High	0.70	0.57	0.10	0.62	0.99	0.14	0.52	0.68	
20	Doctor	108069	15	Master's	0.55	0.80	0.15	Low	0.26	0.61	0.08	0.01	0.63	0.19	0.07	0.40	
21	AI Engineer	43403	1	High School	0.09	1.08	0.06	Low	0.47	0.54	0.29	0.59	0.03	0.04	0.82	0.36	
22	HR Specialist	49508	27	Bachelor's	0.22	1.12	0.33	Medium	0.05	0.53	0.54	0.64	0.73	0.88	0.52	0.32	
23	Teacher	58251	25	PhD	0.08	0.53	0.29	Low	0.84	0.70	0.41	0.17	0.16	0.25	0.55	0.71	
24	Financial Analyst	33343	28	High School	0.74	1.05	0.54	Medium	0.42	0.25	0.36	0.76	0.01	0.12	0.05	0.04	
25	AI Engineer	125455	15	PhD	0.10	0.99	0.17	Low	0.17	0.43	0.40	0.62	0.64	0.05	0.37	0.63	
26	Software Engineer	39540	12	High School	0.16	0.57	0.56	Medium	0.03	0.59	0.94	0.58	0.39	0.64	0.46	0.55	

Name :- Priya Gupta

Roll No :- S081

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The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project (None).
- Source Editor:** Shows R code for a one-sample t-test. The code reads a CSV file, checks its structure, and performs a t-test to determine if the mean of a sample is significantly different from a given value (hypothesized mean). It also includes an interpretation section based on the p-value.
- Environment View:** Displays global environment variables and their values.
- Console View:** Shows the command history and output of the R session.
- System Status Bar:** Shows the date (15-12-2025), time (11:35:07 AM), battery level (200%), and system temperature (27°C).

The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project (None).
- Source Editor:** Shows the same R code for a one-sample t-test as the first screenshot.
- Environment View:** Displays global environment variables and their values.
- Console View:** Shows the command history and output of the R session, including the t-test results and summary statistics.
- System Status Bar:** Shows the date (15-12-2025), time (11:35:34 AM), battery level (200%), and system temperature (27°C).

Name :- Priya Gupta
 Roll No :- S081

5. Performing independent two-sample t-tests using `t.test()` with grouping (R).



The screenshot shows an RStudio interface with a data frame loaded. The data frame contains 3,000 entries and 18 columns. The columns are: Job_Title, Average_Salary, Years_Experience, Education_Level, AI_Exposure_Index, Tech_Growth_Factor, Automation_Probability_2030, Risk_Category, Skill_1, Skill_2, Skill_3, Skill_4, Skill_5, Skill_6, Skill_7, Skill_8, and Skill_9. The data includes various job titles like Security Guard, Research Scientist, Construction Worker, etc., along with their respective salary, experience, education level, and various skill scores.

	Job_Title	Average_Salary	Years_Experience	Education_Level	AI_Exposure_Index	Tech_Growth_Factor	Automation_Probability_2030	Risk_Category	Skill_1	Skill_2	Skill_3	Skill_4	Skill_5	Skill_6	Skill_7	Skill_8	Skill_9
1	Security Guard	45795	28	Master's	0.18	1.28	0.85	High	0.45	0.10	0.46	0.33	0.14	0.65	0.06	0.72	
2	Research Scientist	133355	20	PhD	0.62	1.11	0.05	Low	0.02	0.52	0.40	0.05	0.97	0.23	0.09	0.62	
3	Construction Worker	146216	2	High School	0.86	1.18	0.81	High	0.01	0.94	0.56	0.39	0.02	0.23	0.24	0.68	
4	Software Engineer	136530	13	PhD	0.39	0.68	0.60	Medium	0.43	0.21	0.57	0.03	0.64	0.45	0.40	0.93	
5	Financial Analyst	70397	22	High School	0.52	1.46	0.64	Medium	0.75	0.54	0.59	0.97	0.61	0.28	0.30	0.17	
6	AI Engineer	92592	11	Master's	0.29	0.51	0.10	Low	0.71	0.79	0.61	0.93	0.65	0.91	0.85	0.45	
7	Mechanic	107373	23	PhD	0.67	1.09	0.41	Medium	0.56	0.38	0.97	0.85	0.72	0.24	0.26	0.04	
8	Teacher	53419	12	High School	0.20	1.40	0.17	Low	0.56	0.70	0.14	0.60	0.54	0.20	0.94	0.60	
9	HR Specialist	139225	12	Master's	0.30	0.61	0.48	Medium	0.22	0.42	0.88	0.32	0.12	0.36	0.91	0.27	
10	Customer Support	85016	2	High School	0.01	1.01	0.80	High	0.22	0.12	0.34	0.94	0.32	0.52	0.70	0.36	
11	UX Researcher	82733	6	High School	0.50	0.80	0.41	Medium	0.04	0.61	0.50	0.05	0.28	0.91	0.24	0.14	
12	Financial Analyst	117455	22	High School	0.67	1.26	0.40	Medium	0.73	0.37	0.63	0.63	0.54	0.09	0.84	0.32	
13	Lawyer	79811	27	High School	0.68	0.52	0.50	Medium	0.23	0.65	0.17	0.69	0.39	0.94	0.14	0.34	
14	Data Scientist	115981	9	High School	0.26	1.16	0.63	Medium	0.56	0.53	0.24	0.09	0.90	0.90	0.63	0.34	
15	Research Scientist	96690	19	Master's	0.89	1.28	0.21	Low	0.08	0.16	0.90	0.61	0.01	0.10	0.66	0.01	
16	Graphic Designer	32869	2	High School	0.65	0.72	0.58	Medium	0.24	0.33	0.75	0.65	0.65	0.66	0.57	0.09	
17	Teacher	36893	29	Bachelor's	0.97	0.89	0.27	Low	0.63	0.79	0.50	0.58	0.49	0.20	0.72	0.28	
18	Teacher	103744	11	Bachelor's	0.94	1.45	0.28	Low	0.37	0.02	0.93	0.43	0.97	0.96	0.85	0.29	
19	Retail Worker	148015	2	PhD	0.17	1.06	0.93	High	0.70	0.57	0.10	0.62	0.99	0.14	0.52	0.68	
20	Doctor	108069	15	Master's	0.55	0.60	0.15	Low	0.26	0.61	0.08	0.01	0.63	0.19	0.07	0.40	
21	AI Engineer	43403	1	High School	0.09	1.08	0.06	Low	0.47	0.54	0.29	0.59	0.03	0.04	0.82	0.36	
22	HR Specialist	49508	27	Bachelor's	0.22	1.12	0.33	Medium	0.05	0.53	0.54	0.64	0.73	0.98	0.52	0.32	
23	Teacher	58251	25	PhD	0.08	0.53	0.29	Low	0.84	0.70	0.41	0.17	0.16	0.25	0.59	0.71	
24	Financial Analyst	33343	28	High School	0.74	1.05	0.54	Medium	0.42	0.25	0.36	0.76	0.01	0.12	0.05	0.04	
25	AI Engineer	125435	15	PhD	0.10	0.99	0.17	Low	0.17	0.43	0.40	0.62	0.64	0.05	0.37	0.63	
26	Software Engineer	39540	12	High School	0.16	0.57	0.56	Medium	0.03	0.59	0.94	0.58	0.39	0.64	0.46	0.55	

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Roll No :- S081

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The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project: (None).
- Code Editor:** The code is written in R and performs the following steps:
 - Imports the dataset from a CSV file.
 - Checks the structure of the dataset.
 - Ensures the Average_Salary column is numeric.
 - Creates a frequency table for the Risk_Catagory.
 - Performs an independent two-sample t-test comparing Average_Salary between "High" and "Low" risk categories.
 - Displays the t-test result.
 - Interprets the results based on the p-value.
- Console:** Shows the R session output, including the command history and the resulting t-test summary.
- System Status Bar:** Shows the date (15-12-2025), time (11:39:12 AM), battery level (27°C), and network status (Sunny).

The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project:** Project: (None).
- Code Editor:** The code is identical to the one in the first screenshot, performing the same statistical analysis on the AI_Impact_on_Jobs_2030 dataset.
- Console:** Shows the R session output, including the command history and the resulting t-test summary.
- System Status Bar:** Shows the date (15-12-2025), time (11:40:21 AM), battery level (27°C), and network status (Sunny).

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RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins ▾ Project: (None) ▾

Console Background Jobs

```
R - R 4.5.2 - ~/
```

```
$ sk111_3 : num 0.46 0.4 0.56 0.57 0.59 0.61 0.97 0.14 0.88 0.34 ...
$ sk111_4 : num 0.33 0.05 0.39 0.03 0.29 0.93 0.85 0.6 0.32 0.94 ...
$ sk111_5 : num 0.14 0.97 0.05 0.86 0.61 0.65 0.77 0.34 0.12 0.32 ...
$ sk111_6 : num 0.2 0.09 0.43 0.45 0.39 0.84 0.64 0.1 0.2 0.27 ...
$ sk111_7 : num 0.06 0.09 0.24 0.4 0.3 0.85 0.26 0.94 0.91 0.7 ...
$ sk111_8 : num 0.72 0.62 0.68 0.93 0.17 0.45 0.04 0.6 0.27 0.36 ...
$ sk111_9 : num 0.94 0.38 0.61 0.73 0.02 0.1 0.71 0.69 0.65 0.97 ...
$ sk111_10 : num 0 0.98 0.83 0.33 0.42 0.37 0.11 0.88 0 0.96 ...

> # Ensure numeric column is numeric
> data$Average_Salary <- as.numeric(data$Average_Salary)
>
> # Check the groups
> table(data$Risk_Category)

High Low Medium
740 739 1521

> # Example: compare Average_Salary between "High" vs "Low" risk categories
> # Subset data for only these two groups
> subset_data <- data[data$Risk_Category %in% c("High", "Low"), ]

> # Perform independent two-sample t-test
> t_test_result <- t.test(Average_Salary ~ Risk_Category,
+                         data = subset_data,
+                         var.equal = FALSE) # Welch t-test (does not assume equal variance)
>
> # Display the result
> t_test_result
```

Welch Two Sample t-test

```
data: Average_Salary by Risk.Category
t = -1.0111, df = 1475.2, p-value = 0.3121
alternative hypothesis: true difference in means between group High and group Low is not equal to 0
95 percent confidence interval:
-5313.624 1698.955
sample estimates:
mean in group High mean in group Low
87359.44 89166.78
```

|

27°C Sunny

Search

Dell

11:40:36 AM 15-12-2025

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6. Performing paired t-tests using t.test(paired=TRUE) (R).



RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Job_Title Average_Salary Years_Experience Education_Level AI_Exposure_Index Tech_Growth_Factor Automation_Probability_2030 Risk_Category Skill_1 Skill_2 Skill_3 Skill_4 Skill_5 Skill_6 Skill_7 Skill_8 Skill_9

Job_Title	Average_Salary	Years_Experience	Education_Level	AI_Exposure_Index	Tech_Growth_Factor	Automation_Probability_2030	Risk_Category	Skill_1	Skill_2	Skill_3	Skill_4	Skill_5	Skill_6	Skill_7	Skill_8	Skill_9
1 Security Guard	45795	28	Master's	0.18	1.28	0.85	High	0.45	0.10	0.46	0.33	0.14	0.65	0.06	0.72	
2 Research Scientist	133355	20	PhD	0.62	1.11	0.05	Low	0.02	0.52	0.40	0.05	0.97	0.23	0.09	0.62	
3 Construction Worker	146216	2	High School	0.86	1.18	0.81	High	0.01	0.94	0.56	0.39	0.02	0.23	0.24	0.68	
4 Software Engineer	136530	13	PhD	0.39	0.68	0.60	Medium	0.43	0.21	0.57	0.03	0.84	0.45	0.40	0.93	
5 Financial Analyst	70397	22	High School	0.52	1.46	0.64	Medium	0.75	0.54	0.59	0.97	0.61	0.28	0.30	0.17	
6 AI Engineer	92592	11	Master's	0.29	0.51	0.10	Low	0.71	0.79	0.61	0.93	0.65	0.91	0.85	0.45	
7 Mechanic	107373	23	PhD	0.67	1.09	0.41	Medium	0.56	0.38	0.97	0.85	0.72	0.24	0.26	0.04	
8 Teacher	53419	12	High School	0.20	1.40	0.17	Low	0.56	0.70	0.14	0.60	0.54	0.20	0.94	0.60	
9 HR Specialist	139225	12	Master's	0.30	0.61	0.48	Medium	0.22	0.42	0.88	0.32	0.12	0.36	0.91	0.27	
10 Customer Support	85016	2	High School	0.01	1.01	0.80	High	0.22	0.12	0.34	0.94	0.32	0.52	0.70	0.36	
11 UX Researcher	82733	6	High School	0.50	0.80	0.41	Medium	0.04	0.61	0.50	0.05	0.28	0.91	0.24	0.14	
12 Financial Analyst	117455	22	High School	0.67	1.26	0.40	Medium	0.73	0.37	0.63	0.63	0.54	0.09	0.84	0.32	
13 Lawyer	79811	27	High School	0.68	0.52	0.50	Medium	0.23	0.65	0.17	0.69	0.39	0.94	0.14	0.34	
14 Data Scientist	115981	9	High School	0.26	1.16	0.63	Medium	0.56	0.53	0.24	0.09	0.90	0.90	0.63	0.34	
15 Research Scientist	96690	19	Master's	0.89	1.28	0.21	Low	0.08	0.16	0.90	0.61	0.01	0.10	0.66	0.01	
16 Graphic Designer	32869	2	High School	0.65	0.72	0.58	Medium	0.24	0.33	0.75	0.65	0.65	0.66	0.57	0.09	
17 Teacher	36893	29	Bachelor's	0.97	0.89	0.27	Low	0.63	0.79	0.50	0.58	0.49	0.20	0.72	0.28	
18 Teacher	103744	11	Bachelor's	0.94	1.45	0.28	Low	0.37	0.02	0.93	0.43	0.97	0.96	0.85	0.29	
19 Retail Worker	148015	2	PhD	0.17	1.06	0.93	High	0.70	0.57	0.10	0.62	0.99	0.14	0.52	0.68	
20 Doctor	108069	15	Master's	0.55	0.80	0.15	Low	0.26	0.61	0.08	0.01	0.63	0.19	0.07	0.40	
21 AI Engineer	43403	1	High School	0.09	1.08	0.06	Low	0.47	0.54	0.29	0.59	0.03	0.04	0.82	0.36	
22 HR Specialist	49508	27	Bachelor's	0.22	1.12	0.33	Medium	0.05	0.53	0.54	0.64	0.73	0.88	0.52	0.32	
23 Teacher	58251	25	PhD	0.08	0.53	0.29	Low	0.84	0.70	0.41	0.17	0.16	0.25	0.55	0.71	
24 Financial Analyst	33343	28	High School	0.74	1.05	0.54	Medium	0.42	0.25	0.36	0.76	0.01	0.12	0.05	0.04	
25 AI Engineer	125455	15	PhD	0.10	0.99	0.17	Low	0.17	0.43	0.40	0.62	0.64	0.05	0.37	0.63	
26 Software Engineer	39540	12	High School	0.16	0.57	0.56	Medium	0.03	0.59	0.94	0.58	0.39	0.64	0.46	0.55	

Showing 1 to 26 of 3,000 entries, 18 total columns

Console

37°C Sunny

Search

DELL

11:42:45 AM
15-12-2025

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RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Project: (None)

Source

```
1 # -----
2 # AIM:
3 # Perform paired t-test to compare means of two paired numeric variables
4 #
5 #
6 # Load dataset
7 data <- read.csv("C:\\Users\\itlab\\Downloads\\AI_Impact_on_Jobs_2030.csv")
8 #
9 # Check structure
10 str(data)
11 #
12 # Ensure the numeric columns are numeric
13 data$AI_Exposure_Index <- as.numeric(data$AI_Exposure_Index)
14 data$Automation_Probability_2030 <- as.numeric(data$Automation_Probability_2030)
15 #
16 # Perform paired t-test
17 paired_test_result <- t.test(data$AI_Exposure_Index,
18                               data$Automation_Probability_2030,
19                               paired = TRUE)
20 #
21 # Display result
22 paired_test_result
23 #
24 # -----
25 # INTERPRETATION:
26 # If p-value < 0.05 -> Reject H0 (the means of the two variables are significantly different)
27 # If p-value >= 0.05 -> Fail to reject H0 (no significant difference between means)
28 #
29 |
```

291 (Untitled) R Script

Console

27°C Sunny 11:43:03 AM 15-12-2025

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Project: (None)

Source

Console Background Jobs

```
R: R4.5.2 - ~
> # Load dataset
> data <- read.csv("C:\\Users\\itlab\\Downloads\\AI_Impact_on_Jobs_2030.csv")
>
> # Check structure of dataset
> str(data)
'data.frame': 3000 obs. of 18 variables:
 $ Job_Title    : chr "Security Guard" "Research Scientist" "construction worker" "Software Engineer" ...
 $ Average_Salary: int 45795 133355 146216 136530 70397 92592 107373 53419 139225 85016 ...
 $ Years_Experience: int 28 20 2 13 22 11 23 12 12 2 ...
 $ Education_Level: chr "Master's" "PhD" "High school" "PhD" ...
 $ AI_Exposure_Index: num 0.18 0.62 0.89 0.39 0.52 0.29 0.67 0.2 0.3 0.01 ...
 $ Tech_Growth_Factor: num 1.28 1.11 1.18 0.68 1.46 0.51 1.09 1.4 0.61 1.01 ...
 $ Automation_Probability_2030: num 0.85 0.05 0.81 0.6 0.64 0.1 0.41 0.17 0.48 0.8 ...
 $ Risk_Category: chr "High" "Low" "High" "Low" ...
 $ Sk11_1: num 0.19 0.02 0.01 0.43 0.75 0.71 0.56 0.56 0.22 0.22 ...
 $ Sk11_2: num 0.1 0.52 0.94 0.21 0.54 0.79 0.38 0.7 0.42 0.12 ...
 $ Sk11_3: num 0.46 0.4 0.56 0.57 0.59 0.61 0.97 0.14 0.88 0.34 ...
 $ Sk11_4: num 0.33 0.05 0.39 0.03 0.97 0.93 0.85 0.6 0.32 0.94 ...
 $ Sk11_5: num 0.14 0.97 0.02 0.84 0.61 0.65 0.72 0.54 0.12 0.32 ...
 $ Sk11_6: num 0.65 0.23 0.23 0.45 0.28 0.91 0.24 0.2 0.36 0.52 ...
 $ Sk11_7: num 0.06 0.09 0.24 0.4 0.3 0.85 0.26 0.94 0.91 0.7 ...
 $ Sk11_8: num 0.72 0.62 0.68 0.93 0.17 0.45 0.04 0.6 0.27 0.36 ...
 $ Sk11_9: num 0.94 0.38 0.61 0.73 0.02 0.1 0.71 0.69 0.65 0.97 ...
 $ Sk11_10: num 0 0.98 0.83 0.33 0.42 0.37 0.11 0.88 0 0.96 ...
> # Ensure numeric column is numeric
> data$Average_Salary <- as.numeric(data$Average_Salary)
>
> # check the groups
> table(data$Risk_Category)
   High    Low Medium 
    740    739   1521 
> # Example: Compare Average_Salary between "High" vs "Low" risk categories
> # subset data for only these two groups
> subset_data <- data[data$Risk_Category %in% c("High", "Low"), ]
>
> # Perform independent two-sample t-test
> t_test_result <- t.test(Average_Salary ~ Risk_Category,
+                         data = subset_data,
+                         var.equal = FALSE) # Welch t-test (does not assume equal variance)
>
```

27°C Sunny 11:43:35 AM 15-12-2025

Name :- Priya Gupta

Roll No :- S081

Sheth L.U.J. & Sir M.V. College

The screenshot shows the RStudio interface with the following content:

```
R > t_test_result <- t.test(Average_Salary ~ Risk_Category,
+                             data = subset_data,
+                             var.equal = FALSE) # Welch t-test (does not assume equal variance)
>
> # display the result
> t_test_result
Welch Two Sample t-test

data: Average_Salary by Risk_category
t = -1.0111, df = 1475.2, p-value = 0.3121
alternative hypothesis: true difference in means between group High and group Low is not equal to 0
95 percent confidence interval:
-513.624 1698.955
sample estimates:
mean in group High mean in group Low
87359.44          89166.78

> # Load dataset
> data <- read.csv("C:\\users\\itlab\\downloads\\AI_Impact_on_Jobs_2030.csv")
>
> # check structure
> str(data)
'data.frame': 3000 obs. of 18 variables:
 $ Job_Title      : chr "Security Guard" "Research Scientist" "Construction Worker" "Software Engineer" ...
 $ Average_Salary : int 45795 133355 146216 136530 70397 92592 107373 53419 139225 85016 ...
 $ Years_Experience: int 28 20 2 13 22 11 23 12 12 2 ...
 $ Education_Level : chr "Master's" "PhD" "High school" "PhD" ...
 $ AI_Impact_Index : num 0.18 0.62 0.84 0.39 0.52 0.29 0.67 0.2 0.3 0.01 ...
 $ Attachment_Index : num 1.0 0.98 0.98 0.96 1.46 1.51 1.09 0.92 0.61 1.01 ...
 $ Tech_Growth_Factor: num 0.85 0.05 0.81 0.6 0.64 0.3 0.2 0.17 0.48 0.8 ...
 $ Automation_Probability_2030: num 0.85 0.05 0.81 0.6 0.64 0.3 0.2 0.17 0.48 0.8 ...
 $ Risk_Category    : chr "High" "Low" "High" "Medium" ...
 $ skill_1          : num 0.45 0.02 0.01 0.43 0.75 0.71 0.58 0.56 0.22 0.22 ...
 $ skill_2          : num 0.1 0.52 0.94 0.21 0.54 0.79 0.38 0.7 0.42 0.12 ...
 $ skill_3          : num 0.46 0.4 0.56 0.57 0.59 0.61 0.97 0.14 0.88 0.34 ...
 $ skill_4          : num 0.33 0.05 0.38 0.03 0.97 0.93 0.85 0.6 0.32 0.94 ...
 $ skill_5          : num 0.14 0.97 0.02 0.84 0.61 0.65 0.73 0.54 0.12 0.32 ...
 $ skill_6          : num 0.65 0.01 0.23 0.4 0.28 0.91 0.01 0.2 0.38 0.32 ...
 $ skill_7          : num 0.2 0.08 0.24 0.4 0.3 0.85 0.26 0.05 0.1 0.7 ...
 $ skill_8          : num 0.73 0.62 0.68 0.03 0.37 0.45 0.04 0.6 0.27 0.26 ...
 $ skill_9          : num 0.94 0.38 0.61 0.73 0.02 0.1 0.71 0.69 0.65 0.97 ...
 $ skill_10         : num 0 0.98 0.83 0.33 0.42 0.37 0.11 0.88 0 0.96 ...
```

The RStudio interface includes a menu bar (File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help), a toolbar with various icons, and a status bar at the bottom showing system information like temperature (27°C), battery level (Sunny), and system time (11:43:37 AM, 15-12-2025).

*Name :- Priya Gupta
Roll No :- S081*

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RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

```
R - R 4.52 - ~/r
Console Background Jobs x
$ Average_Salary : int 45795 133355 146216 136530 70397 92592 107373 53419 139225 85016 ...
$ Years_Experience : int 28 20 2 13 22 11 23 12 12 2 ...
$ Tech_Stack : chr "Java" "Python" "High" "Low" "PHP" ...
$ AI_Exposure_Index : num 0.18 0.62 0.88 0.28 0.52 0.39 0.67 0.24 0.3 0.01 ...
$ Tech_Growth_Factor : num 1.28 1.11 1.18 0.68 1.46 0.51 1.09 1.4 0.61 1.01 ...
$ Automation_Probability_2030: num 0.85 0.05 0.81 0.6 0.64 0.1 0.41 0.17 0.48 0.8 ...
$ Risk_Category : chr "High" "Low" "High" "Medium" ...
$ sk11_1 : num 0.45 0.02 0.01 0.43 0.75 0.71 0.58 0.56 0.22 0.22 ...
$ sk11_2 : num 0.1 0.52 0.94 0.21 0.5 0.79 0.38 0.7 0.42 0.12 ...
$ sk11_3 : num 0.46 0.4 0.56 0.57 0.59 0.61 0.97 0.14 0.88 0.34 ...
$ sk11_4 : num 0.33 0.2 0.38 0.6 0.62 0.93 0.85 0.6 0.38 0.94 ...
$ sk11_5 : num 0.65 0.29 0.57 0.84 0.61 0.72 0.72 0.12 0.32 ...
$ sk11_6 : num 0.65 0.23 0.23 0.45 0.28 0.91 0.24 0.2 0.36 0.52 ...
$ sk11_7 : num 0.06 0.09 0.24 0.4 0.3 0.85 0.26 0.94 0.91 0.7 ...
$ sk11_8 : num 0.72 0.62 0.68 0.93 0.17 0.45 0.04 0.6 0.27 0.36 ...
$ sk11_9 : num 0.94 0.38 0.61 0.73 0.02 0.1 0.71 0.69 0.65 0.97 ...
$ sk11_10 : num 0 0.98 0.83 0.33 0.42 0.37 0.11 0.88 0 0.96 ...
> # Ensure the numeric columns are numeric
> dataAI_Exposure_Index <- as.numeric(data$AI_Exposure_Index)
> dataAutomation_Probability_2030 <- as.numeric(data$Automation_Probability_2030)
>
> # Perform paired t-test
> paired_test_result <- t.test(data$AI_Exposure_Index,
+                                 data$Automation_Probability_2030,
+                                 paired = TRUE)
>
> # Display result
> paired_test_result
Paired t-test

data: data$AI_Exposure_Index and data$Automation_Probability_2030
t = -0.032195, df = 2999, p-value = 0.9743
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
-0.01361869 0.01317869
sample estimates:
mean difference
-0.00022
```

11:44:45 AM
15-12-2025

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Roll No :- S081