DATA ANALYTICS & REPORTING PROJECT

TOPIC-ANALYSIS ON WAVE OF ENGINEERING IN INDIA

SUBMITTED BY:

SUBMITTED TO:

AINA SRIVASTAVA-202410101150208
KIRTI-202410101150181

MRS.DEEPIKA TIWARI MA'AM

GROUP-(37,38)

INTRODUCTION:

Engineering in India has grown very fast in recent years. It plays an important role in the development of the country. The wave of engineering in India shows how new ideas, technologies, and innovations are changing different fields like civil, mechanical, electrical, and computer engineering. Many students are choosing engineering as a career, and new industries are using modern technology to solve real-life problems. This study explains the growth, importance, and impact of engineering in India and how it is helping the nation move towards progress and development.

OBJECTIVE:

- To study the growth and development of engineering in India.

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- To understand the role of engineering in the progress of technology and industry.

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- To analyze the impact of modern innovations and trends in different branches of engineering.

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- To highlight the contribution of engineers and educational institutions in nation-building.

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- To identify the challenges and future opportunities in the field of engineering in India.

DATASET OVERVIEW:

The dataset titled "engineering_dataset_2000.csv" contains information about engineering students across various branches in India. It includes details such as Student ID, Branch, Placement status, and Salary (in thousand INR per annum). The data has been cleaned by removing duplicate rows, filling missing values, and resetting the index to ensure consistency.

KEY FEATURES OF DATSET

StudentID – Unique identification number for each student.

Branch – The engineering specialization (e.g., Civil, Mechanical, Electrical, Computer Science, Electronics, etc.).

Placed – Indicates whether the student got placed
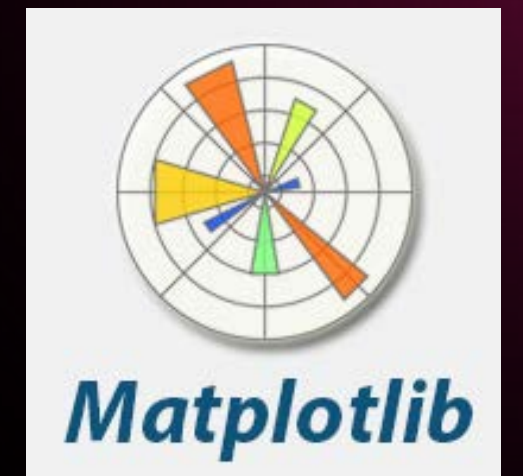
DATA CLEANING AND PREPARATION

Data cleaning and preparation are important steps before analyzing any dataset. In this project, the dataset "engineering_dataset_2000.csv" was cleaned to remove errors and make it ready for analysis.

THE MAIN STEPS USED

- Removing Duplicates:
- All duplicate rows were removed to make sure each student record appeared only once.
- Filling Missing Values:
- Some data entries were missing, so they were filled using simple methods like forward-fill and backward-fill to avoid empty cells.

TOOLS & LIBRARIES USED

- **PANDAS-** Data handling and preprocesing.

- **MATPLOTLIB-** Static data visualization.

- **SEABORN-** Enhanced statistical plots.

- **NUMPY-** Numerical operations.

DATA ANALYSIS-

Data Analysis is the process of inspecting, cleaning, and interpreting data to discover useful patterns, trends, and insights for informed decision-making.

1. Loading and Displaying the Dataset
2. Data Cleaning Verification
3. Branch-Wise Analysis

EXAMPLE- BRANCH-WISE ANALYSIS

```
# Branch-wise summary
pivot = df.groupby('Branch').agg({
        'StudentID': 'count',
'Salary_kINR_per_annum': 'mean',
        'Placed': 'mean'
        })
        print(pivot)
```
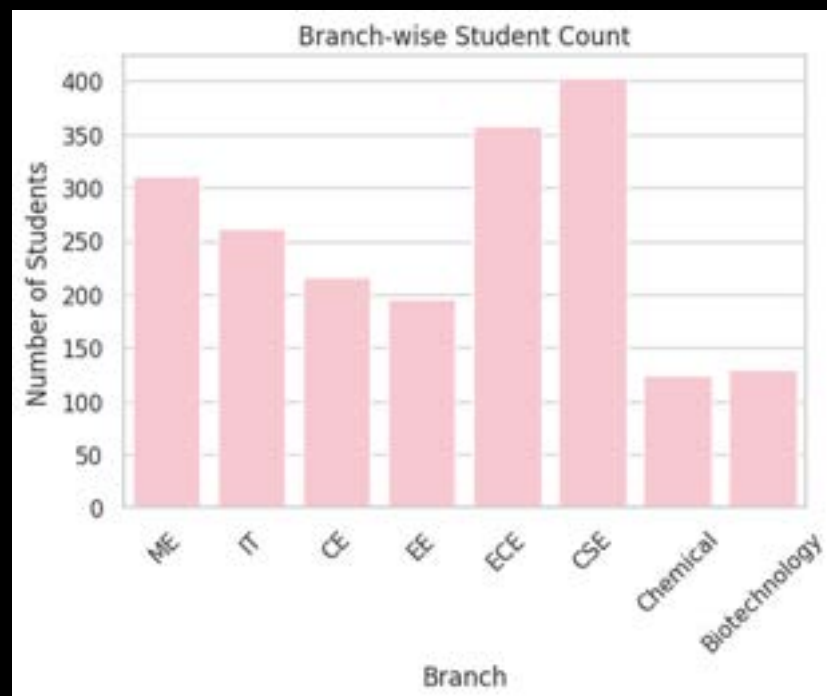
Branch	StudentID	Salary_kINR_per_annum	Placed
Biotechnology	130	312.823077	0.538462
CE	216	275.574074	0.481481
CSE	403	1030.076923	0.878412
Chemical	124	262.991935	0.483871
ECE	358	544.047486	0.659218
EE	196	428.505102	0.632653
IT	262	763.057252	0.854962
ME	311	346.356913	0.565916

DATA VISUALIZATION-

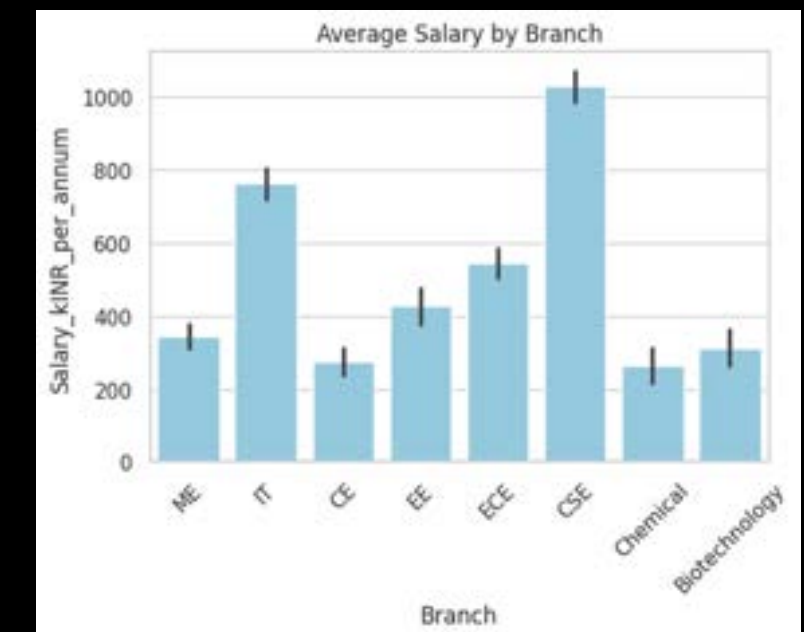Graphs and charts were plotted to visualize the findings more clearly.

(a) Branch-wise Placement Rate

```
plt.figure(figsize=(6,4))
sns.countplot(data=df, x='Branch',color='pink')
plt.title("Branch-wise Student Count")
plt.xlabel("Branch")
plt.ylabel("Number of Students")
plt.xticks(rotation=45)
plt.show()
```

(b) Salary Distribution

```
# lets look at average salary
plt.figure(figsize=(6,4))
sns.barplot(data=df, x='Branch',
y='Salary_kINR_per_annum',color='skyblue')
plt.title("Average Salary by Branch")
plt.xticks(rotation=45)
plt.show()
```
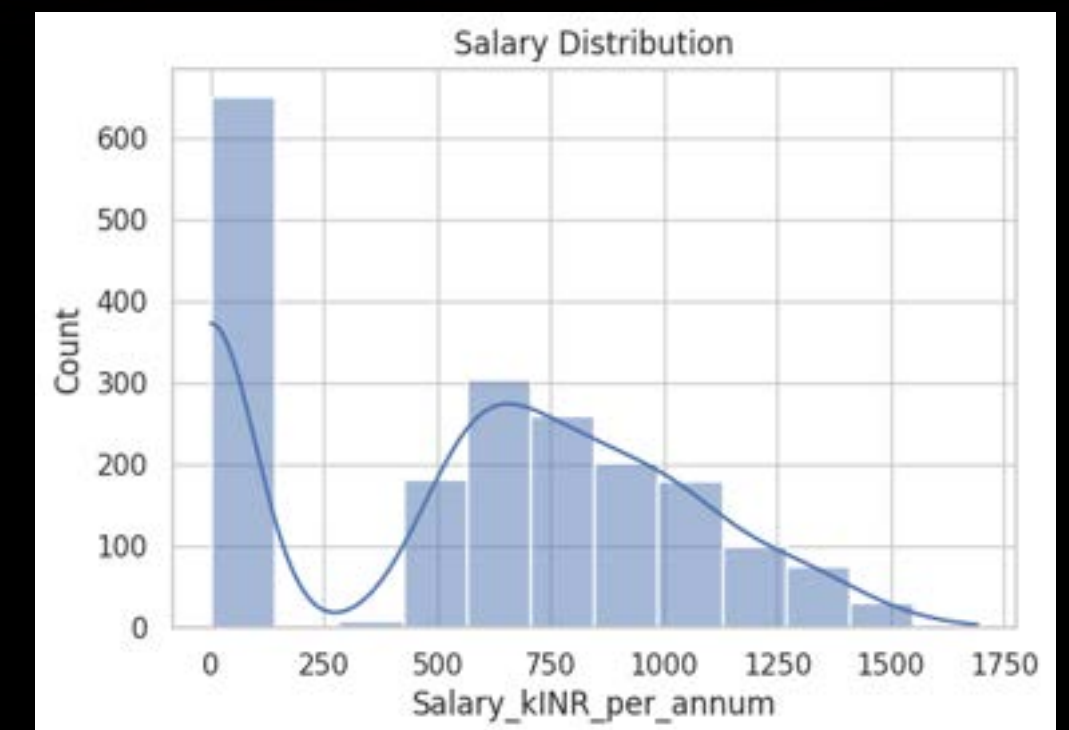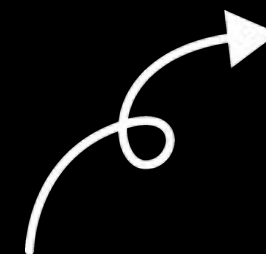
FINDINGS AND DISCUSSION-

From the analysis of the dataset "engineering_dataset_2000.csv", several key findings were observed:

- Computer Science Engineering showed the highest placement rate among all branches, followed closely by Electronics and Communication Engineering.
- The average salary offered to students from Computer Science and Electronics branches was significantly higher compared to other fields.
- Branches such as Civil and Mechanical Engineering had moderate placement rates and comparatively lower average salary packages.

Salary Distribution of Placed Students

```
# salary distribution
plt.figure(figsize=(6,4))
sns.histplot(df['Salary_kINR_per_annum'], kde=True)
plt.title("Salary Distribution")
plt.show()
```


Salary Distribution

FUTURE SCOPE-

RAPID TECHNOLOGY GROWTH

India's increasing focus on digital transformation, automation, and artificial intelligence is creating new opportunities in all branches of engineering.

EMERGENCE OF NEW DOMAINS:

Fields like Data Science, Robotics, Cybersecurity, IoT, Renewable Energy, and Biotechnology are becoming major areas of demand.

GOVERNMENT INITIATIVES:

Programs such as Make in India, Digital India, and Smart Cities Mission are driving innovation and industrial development.

IMPROEMENT IN EDUCATION &RESEARCH

Engineering education in India is continuously evolving with updated curricula, modern labs, and more emphasis on practical and project-based learning.

CONCLUSION

The analysis of the wave of engineering in India highlights the rapid growth and transformation of the engineering sector in recent years. From the study of the dataset, it is clear that branches like Computer Science and Electronics have the highest placement rates and salary packages, showing the growing demand for technology-driven skills in the job market. Traditional branches such as Civil and Mechanical Engineering still play a vital role but face moderate placement outcomes.

Overall, the findings show that India's engineering education system is adapting to global technological trends, and this wave of progress is shaping the nation's industrial and digital future. With continuous improvement in education, innovation, and skill development, engineering will remain a strong pillar of India's economic and technological growth.

THANKYOU