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PROJECT ON

Exploratory Data Analysis (EDA) On AMCAT Dataset

About Me

My name is **Rakesh Oza**, I was completed my computer engineering degree from Zeal College, holding a CGPA of 8.48. I was also completed internships in AI, ML, and Python development, gaining practical experience in creating models, scripting, and presenting technical projects. I was developed projects such as an AI desktop assistant named Eklavya, a movie recommendation system, and a cyber-attack detection model. Currently, I am working at Innomatics Research Lab as Data science intern and working on data analysis projects, including Domino's datasets and the AMCAT dataset, performing exploratory data analysis (EDA). Additionally, he is developing dynamic websites focused on tourism and photography. I am a volunteer at Bhumi and actively participates in college events. With skills in Python, AI frameworks.

1. Business Problem and Use Case Domain Understanding

The business problem for this project revolves around understanding and gaining insights from a dataset related to job applicants or employees. The dataset contains various attributes such as ID, salary, educational qualifications, performance metrics, and personality traits. The use case domain involves human resources management, recruitment, and talent acquisition. The objective is to explore the data, identify patterns, and derive meaningful insights to aid decision-making processes within the organization.

2. Objective of the project

The primary aim of this analysis is to extract insights from the provided dataset, focusing particularly on understanding the relationship between various features and the target variable, which is Salary.

Our specific goals include:

- Comprehensive description of the dataset and its features.
- Identification of patterns or trends within the data.
- Exploration of relationships between independent variables and Salary.
- Detection of outliers or anomalies in the dataset.

3. Summary of the Data

The dataset, titled Aspiring Mind Employment Outcome 2015 (AMEO), curated by Aspiring Minds, centres around employment outcomes for engineering graduates. It encompasses dependent variables such as Salary, Job Titles, and Job Locations, alongside standardized scores in cognitive, technical, and personality skills. With approximately 4000 data points and 40 independent variables, the dataset presents a mix of continuous and categorical data. Moreover, demographic features and unique candidate identifiers enrich the dataset.

Exploratory Data Analysis

1. Data Cleaning and Pre-processing

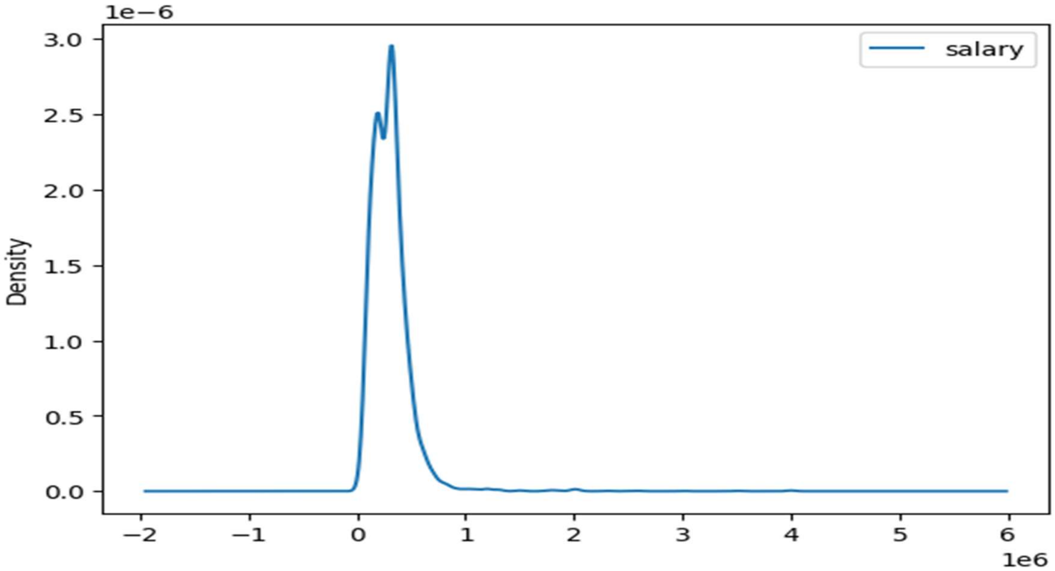
- **Datatype Conversion:** The 'Date of Joining' (DOJ) and 'Date of Leaving' (DOL) fields were converted to date time objects. 'Present' values in the DOL field were replaced with the end date of the survey (2024-02-17).

- **Aggregating Categories:** The dataset was streamlined to include only the top 10 most frequent categories within specific columns. Additional categories were grouped under 'Other' to simplify analysis.

2. Univariate Analysis

Univariate Analysis is a type of data visualization where we visualize only a single variable at a time. Univariate Analysis helps us to analyze the distribution of the variable present in the data so that we can perform further analysis.

2.1 Salary and Probability Distribution:

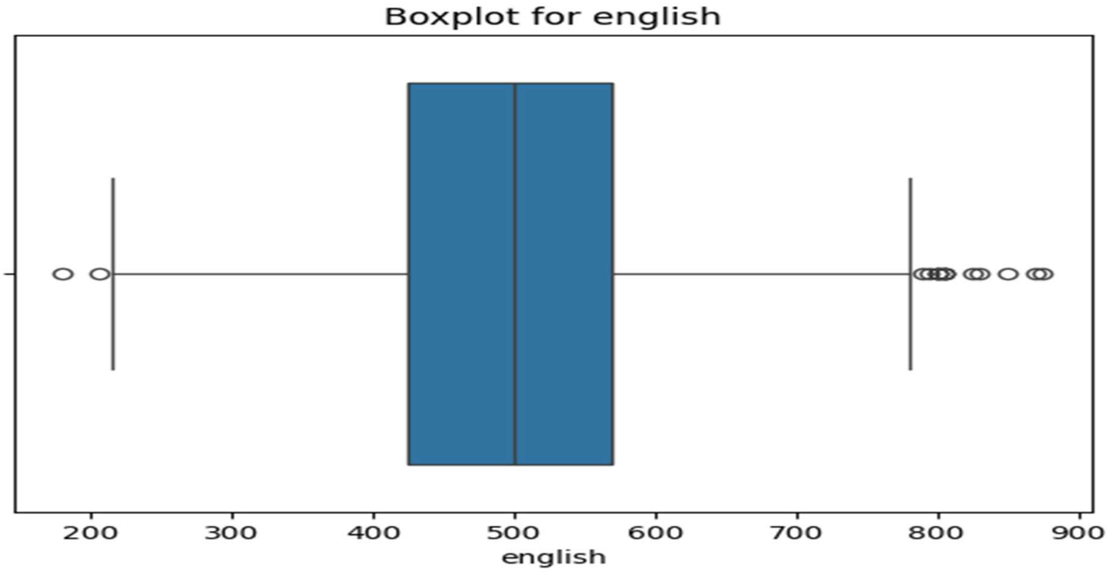


The plot shows the probability density function of salary values, allowing for a clear understanding of how salaries are distributed across different ranges. The x-axis represents salary values, while the y-axis indicates the density of observations at each salary level. This visualization aids in identifying patterns such as the central tendency and variability of salaries within the dataset, providing valuable insights for further analysis and decision-making.

2.2 Box plot for English

1. **Median and Interquartile Range**: The median score appears to be around 500, with the interquartile range (IQR) falling between approximately 400 and 600. This shows that the central 50% of the data lies within this range.
2. **Outliers**: There are several outliers on both the lower and upper ends of the distribution. These are the data points that fall outside the whiskers, which extend approximately 1.5 times the IQR from the first and third quartiles. Outliers suggest that some students have either very low or very high scores compared to the majority.
3. **Skewness**: The data appears slightly skewed towards higher scores, as indicated by the presence of more outliers on the upper side.

In summary, the box plot reveals that most students have "english" scores between 400 and 600, with a few outliers on both extremes.



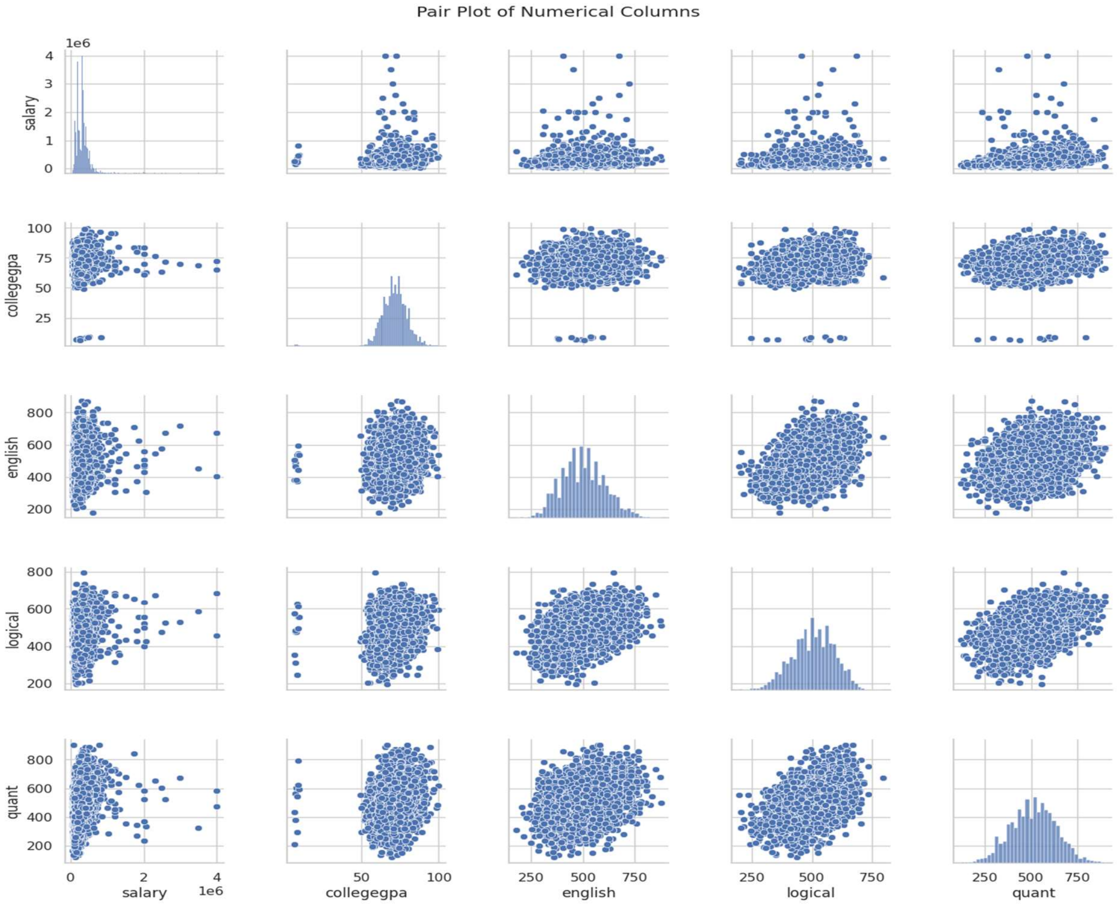
2.3 The pair plot

The pair plot shows the relationships between several numerical columns, such as **salary**, **college GPA**, **English**, **logical**, and **quant**. Here's a summary of insights:

1. **Salary**:
   - The salary distribution is right-skewed, with a few high outliers.
   - There doesn't appear to be a clear linear correlation between salary and other variables like GPA, English, logical, or quant scores.

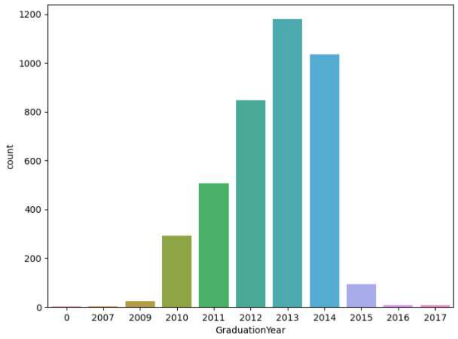
2. **College GPA**:
   - The GPA distribution seems to be fairly normal.
   - There is some moderate positive correlation between GPA and English, logical, and quant scores, as shown by the oval-shaped scatterplots.
3. **English, Logical, and Quant Scores**:
   - English, logical, and quant scores are positively correlated with each other. This is evident from the scatter plots between these variables, which show upward trends.
4. **Overall**:
   - The pair plot suggests a strong relationship between academic performance (GPA) and skills like English, logical, and quantitative reasoning.
   - However, the relationship between salary and these variables is less clear, indicating that other factors may play a larger role in determining salary.

In summary, the plot reveals strong inter-correlations among the skill-based variables (English, logical, quant) but less of a direct connection between these skills and salary.



2.3 College GPAs Distribution:

A count plot using Seaborn to visualize the distribution of graduation years within the dataset. By specifying the "Graduation Year" column from the DataFrame df, the count plot displays the frequency of each graduation year category.

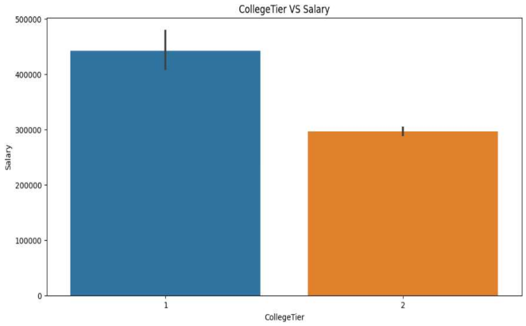


3. Bivariate Analysis

Bivariate analysis is the simultaneous analysis of two variables. It explores the concept of the relationship between two variable whether there exists an association and the strength of this association or whether there are differences between two variables and the significance of these differences.

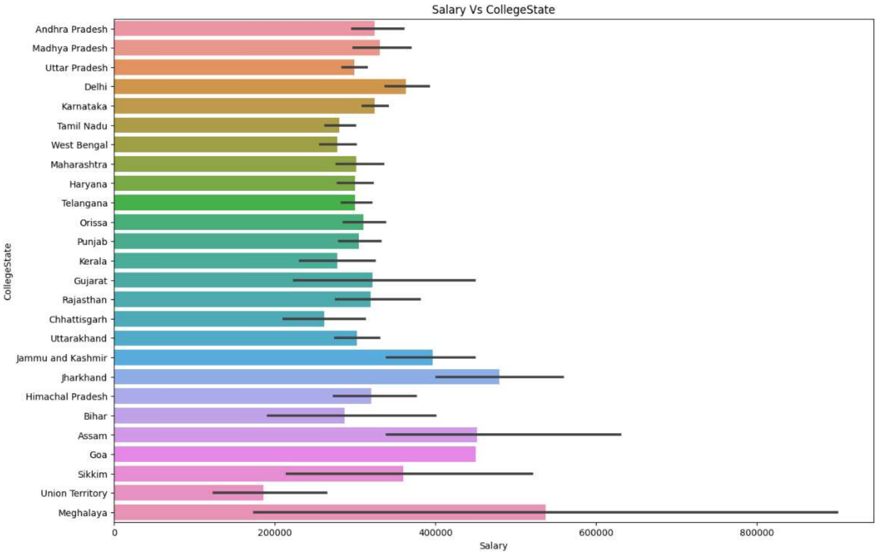
3.1 College Tier and Salary:

Higher Average Salary for Tier 1 Colleges: Graduates from Tier 1 colleges have a significantly higher average salary (around 450,000) compared to those from Tier 2 colleges (approximately 300,000).
Smaller Variability in Tier 2: The error bar (likely representing the confidence interval or standard deviation) for Tier 2 colleges is smaller, indicating less variability in the salary data for Tier 2 graduates.
Conclusion: Graduates from Tier 1 colleges tend to receive higher salaries than their counterparts from Tier 2, suggesting that the reputation or resources available at Tier 1 institutions could positively influence salary outcomes.



3.2 Salary and College State:

A bar plot using Seaborn to compare the average salary based on the college state where individuals graduated. The y-axis represents the different college states, while the x-axis indicates the corresponding average salary for each state category. The title "Salary Vs College State" summarizes the comparison being made. This visualization facilitates the exploration of potential variations in salary across different states, providing insights into regional disparities in earning potential among graduates.



Conclusion

The analysis offers valuable insights into the dataset, uncovering relationships, patterns, and trends. While certain factors like tenure and college tier influence salary, others such as gender and academic scores show minimal correlation. This suggests a complex interplay of factors affecting salaries in the given context. Additionally, the analysis sheds light on gender-based specialization preferences, providing actionable insights for recruitment strategies. This report serves as a foundation for further investigations and decision-making processes within the organization, guiding future analytical endeavors.