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Analyzing Stress Frequency Among University Students

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Research Paper:

Analyzing Stress Frequency Among University Students

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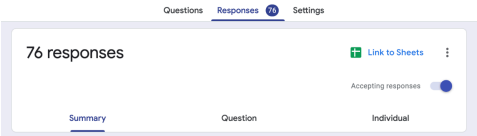
Introduction

As part of this project, data was analyzed to which artificial intelligence (AI) will be applied in the future, which shows good results not only in character recognition, but also finds successful application in other areas [1, 2, 3, 4, 5, 6] .

In this study, we examine the frequency of stress among university students and investigate how various factors such as age, gender, university, and academic performance influence students' stress levels. Understanding the sources and frequency of stress can provide valuable insights into student well-being and help educational institutions design better support systems. The data used for this analysis was gathered through an online survey involving 76 university students. This research aims to identify patterns in the frequency of stress among students and correlate it with other factors like academic performance and stress management techniques.



Data Collection and Methodology

The data for this study was collected through an online questionnaire, which included demographic information such as age, gender, university, and academic year, as well as questions related to the frequency and sources of stress. The survey also asked students about their academic performance and stress management strategies. The dataset was then preprocessed by renaming columns for clarity and ensuring that the data was clean for analysis. The dataset includes 12 variables, with the primary focus on the frequency of stress reported by students.

The data columns are as follows:

- **Timestamp**: The time when the survey was submitted.
- **Age**: The age group of the respondent.
- **Gender**: The gender of the respondent.
- **University**: The university attended by the respondent.
- **Course**: The academic course in which the respondent is enrolled.
- **Stress Frequency**: The reported frequency of stress experienced by the student.
- **Stress Sources**: The sources of stress reported by the student.
- **Academic Performance**: The student’s self-reported academic performance.
- **Stress Affect Grades**: How stress affects the student’s grades.
- **Stress Consequences**: The consequences of stress experienced by the student.
- **Stress Management**: The strategies used by the student to manage stress.
- **Exam Preparation**: How students prepare for exams and the role of stress in their preparation.

Exploratory Data Analysis (EDA)

We performed an exploratory analysis of the dataset to uncover patterns and relationships between different variables. Below, we present some of the key findings based on visualizations of the data.

Stress Frequency Among Students

One of the key aspects we explored was the frequency of stress experienced by students. The dataset indicates that most students experience stress "sometimes," followed by "often" and "rarely."

The distribution of responses is visualized through a bar plot, showing the number of students reporting each frequency of stress.

Age vs. Stress Frequency

Next, we analyzed how the frequency of stress varies with age. The results showed that students in certain age groups tend to experience stress more frequently than others. This relationship is displayed in a bar chart, illustrating the distribution of stress frequency across different age groups.

Sources of Stress

We also examined the sources of stress reported by students. The analysis revealed that academic workload and personal issues are the most common sources of stress among the respondents. A bar plot was used to visualize the most frequently mentioned stress sources.

Academic Performance and Stress

The correlation between academic performance and stress frequency was also explored. The dataset indicates a potential relationship between students' perceived academic performance and their reported stress levels. A bar plot illustrating the distribution of academic performance categories across different stress frequencies was used to analyze this relationship.

Statistical Analysis and Correlations

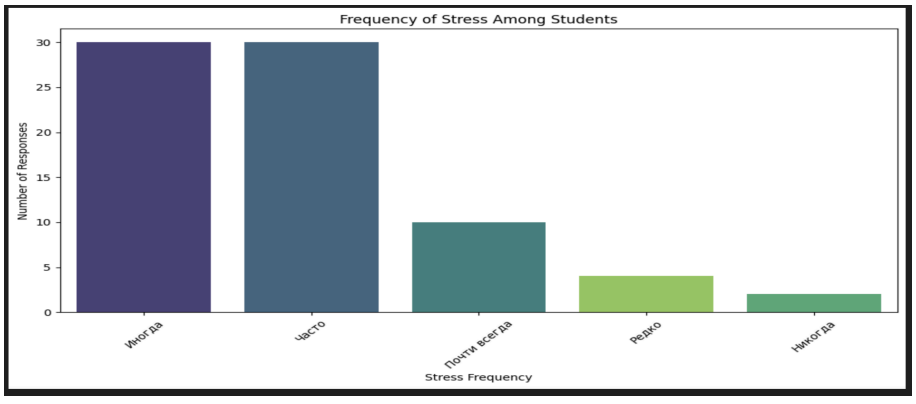
A correlation matrix was computed to examine the relationships between numeric variables in the dataset. The correlation between variables such as age and stress frequency was assessed to determine if there were any significant associations. The heatmap below highlights the strength and direction of these correlations, with darker colors indicating stronger correlations.

Code for Analysis and Visualization

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

data = pd.read_csv(r'C:\Users\ASUS\PycharmProjects\statistic\Untitled form.csv')

data.columns = [
    "Timestamp", "Age", "Gender", "University", "Course", "Stress Frequency",
    "Stress Sources", "Academic Performance", "Stress Affect Grades",
    "Stress Consequences", "Stress Management", "Exam Preparation"
]

# Create the plot
plt.figure(figsize=(10, 6))
sns.countplot(x="Stress Frequency", data=data, hue="Stress Frequency", palette="viridis", order=data["Stress Frequency"].value_counts().index)

# Title and labels
plt.title("Frequency of Stress Among Students")
plt.xlabel("Stress Frequency")
plt.ylabel("Number of Responses")
plt.xticks(rotation=45)
plt.tight_layout()

# Show the plot
plt.show()
```

1. **Libraries**:
    - `pandas` loads the data, `matplotlib.pyplot` and `seaborn` are used for creating the plot.
2. **Loading and Renaming Data**:
    - The dataset is loaded from a CSV file, and the columns are renamed for clarity.
3. **Creating the Plot**:
    - A count plot is generated to show how often students experience stress, with stress frequencies on the x-axis and the number of responses on the y-axis.
4. **Formatting**:
    - The plot is given a title, and labels for both axes are set. The x-axis labels are rotated for better readability.
5. **Displaying the Plot**:
    - The plot is displayed on the screen.

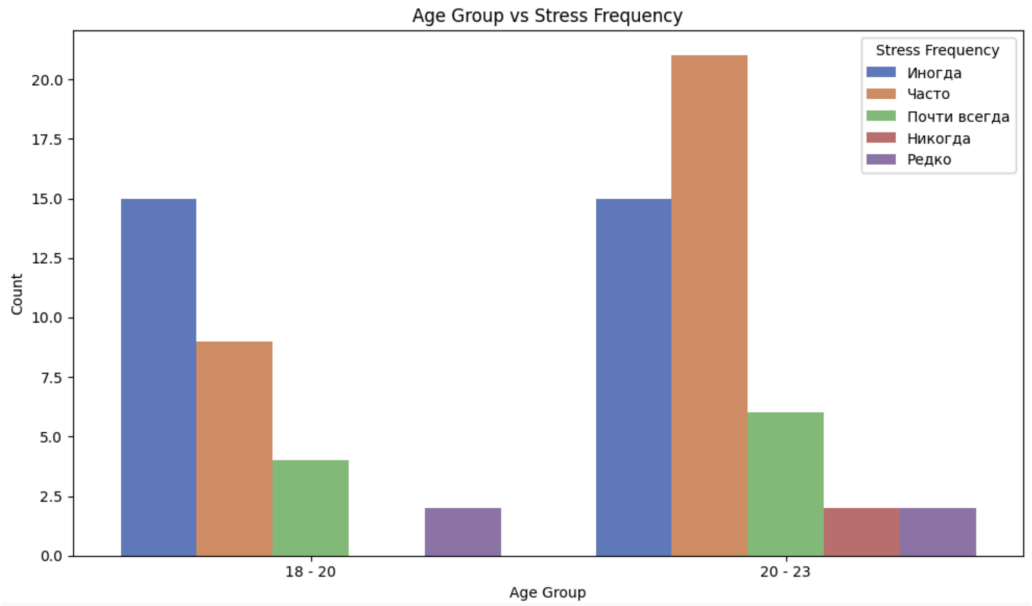
This is an overview of the code's purpose: it visualizes the distribution of stress frequency among students.



```
plt.figure(figsize=(10, 6))
sns.countplot(x="Age", hue="Stress Frequency", data=data, palette="muted")
plt.title("Age Group vs Stress Frequency")
plt.xlabel("Age Group")
plt.ylabel("Count")
plt.legend(title="Stress Frequency")
plt.tight_layout()
plt.show()
```

1. **Plot Setup**:
   - A figure of size 10x6 inches is created for the plot.
2. **Count Plot**:
   - A `countplot` is generated with `Age` on the x-axis and the number of responses (count) on the y-axis. The data is grouped by "Stress Frequency" (using `hue`), meaning it will show different colors for each stress frequency within each age group.
3. **Formatting**:
   - The plot is given a title "Age Group vs Stress Frequency".
   - The x-axis is labeled as "Age Group", and the y-axis is labeled as "Count".
   - A legend is added to indicate what each color represents (stress frequency).
4. **Displaying the Plot**:
   - The plot layout is adjusted for better visualization and then displayed.

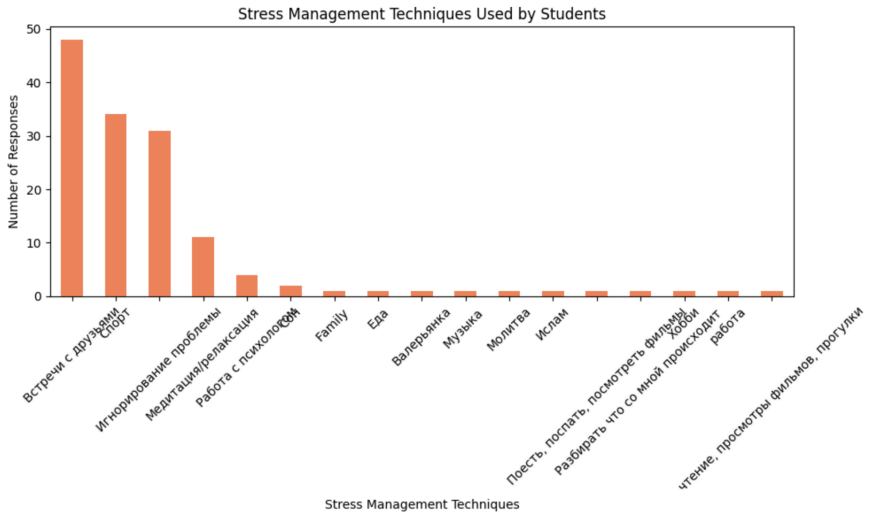
This visualization helps to understand how stress frequency varies across different age groups among the respondents.



```python
stress_management = data["Stress Management"].str.get_dummies(";").sum().sort_values(ascending=False)
plt.figure(figsize=(10, 6))
stress_management.plot(kind="bar", color="coral")
plt.title("Stress Management Techniques Used by Students")
plt.xlabel("Stress Management Techniques")
plt.ylabel("Number of Responses")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

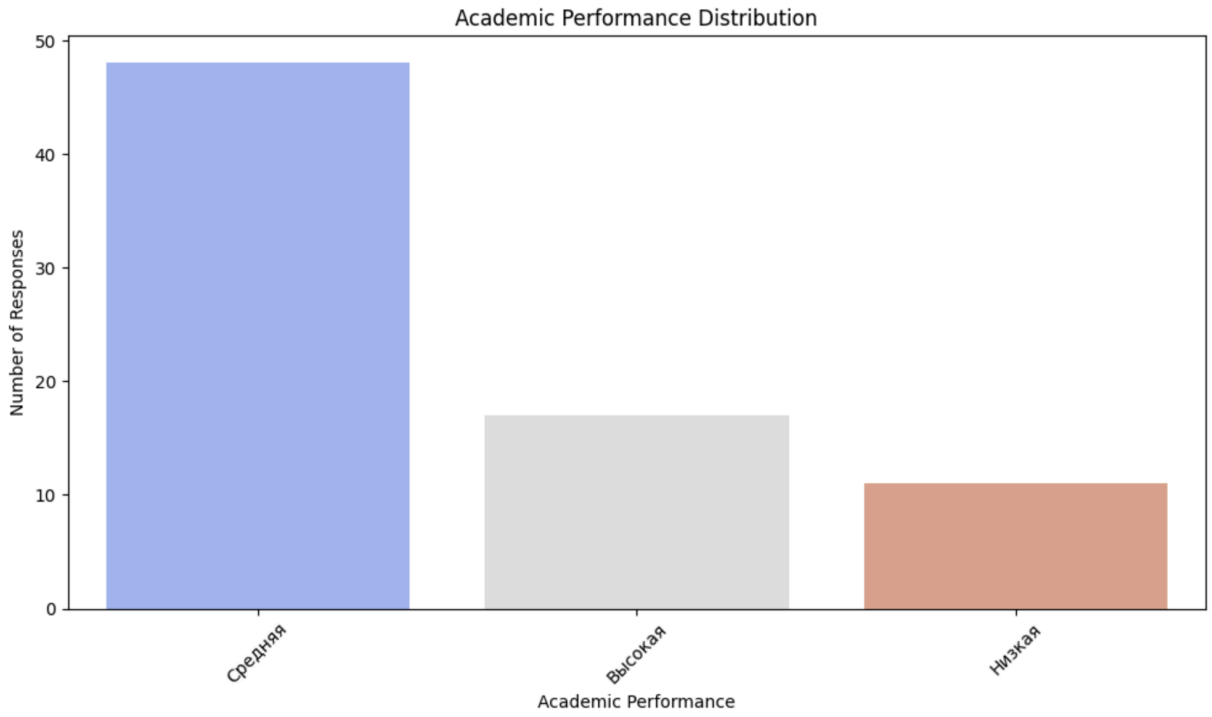
1. **Data Preparation**:
   - The "Stress Management" column contains multiple values separated by semicolons. The `str.get_dummies(";")` method splits these values into individual columns, creating a binary indicator for each stress management technique used by students.
   - `sum()` is used to count how many times each stress management technique was mentioned across all responses.
   - The resulting data is sorted in descending order to show the most commonly mentioned techniques first.
2. **Bar Plot Creation**:
   - A bar plot is generated where the x-axis represents different stress management techniques, and the y-axis shows the number of responses for each technique.
3. **Formatting**:
   - The plot is given a title "Stress Management Techniques Used by Students".
   - The x-axis is labeled as "Stress Management Techniques", and the y-axis is labeled as "Number of Responses".
   - The x-axis labels (technique names) are rotated by 45 degrees for better readability.
4. **Displaying the Plot**:
   - The plot layout is adjusted to ensure that everything fits well and is displayed.

This graph helps visualize the most common stress management techniques used by students based on survey responses.



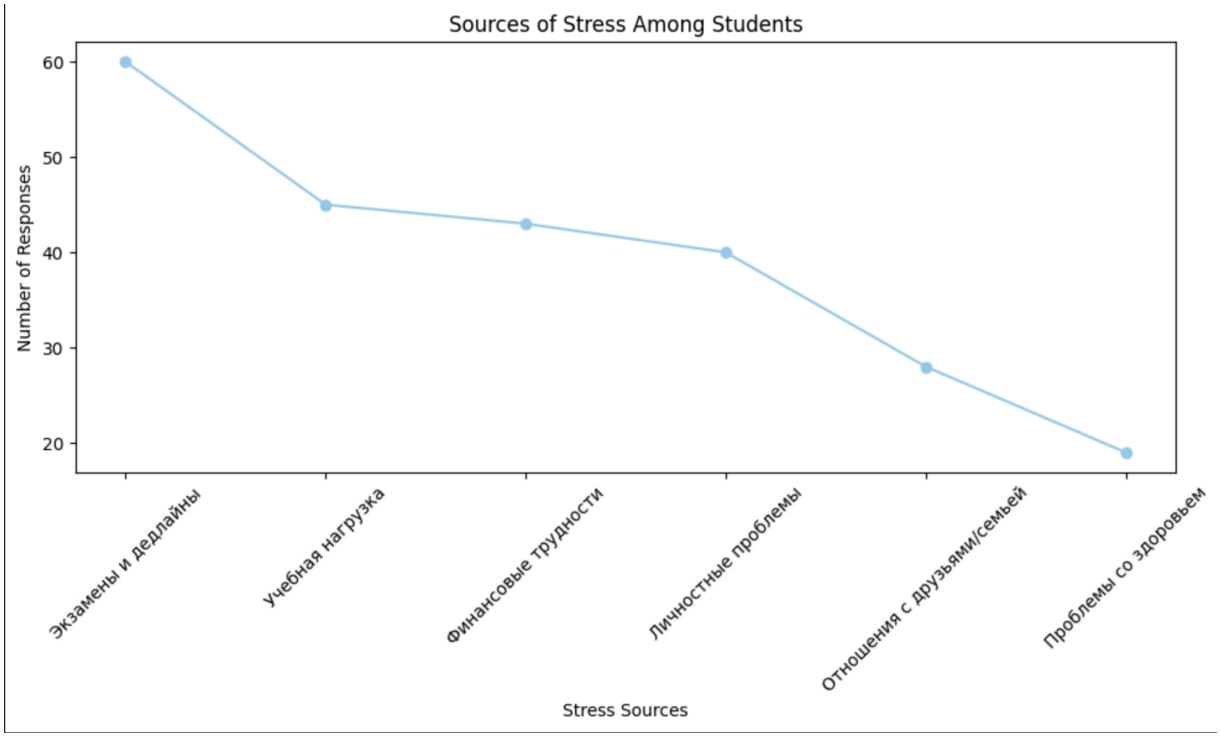
```
plt.figure(figsize=(10, 6))
sns.countplot(x="Academic Performance", data=data, hue="Academic Performance", palette="coolwarm", order=data["Academic Performance"].value_counts().index)
plt.title("Academic Performance Distribution")
plt.xlabel("Academic Performance")
plt.ylabel("Number of Responses")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

This plot shows the distribution of academic performance levels among students. The x-axis represents different performance categories, and the y-axis shows the number of responses for each category. The `hue` parameter adds a breakdown within each category, giving additional insights. The title is "Academic Performance Distribution," and labels indicate the axes for clarity. The `coolwarm` color palette is used for visual appeal, and the x-axis labels are rotated for better readability. This graph helps visualize how students' academic performance is distributed in the survey.



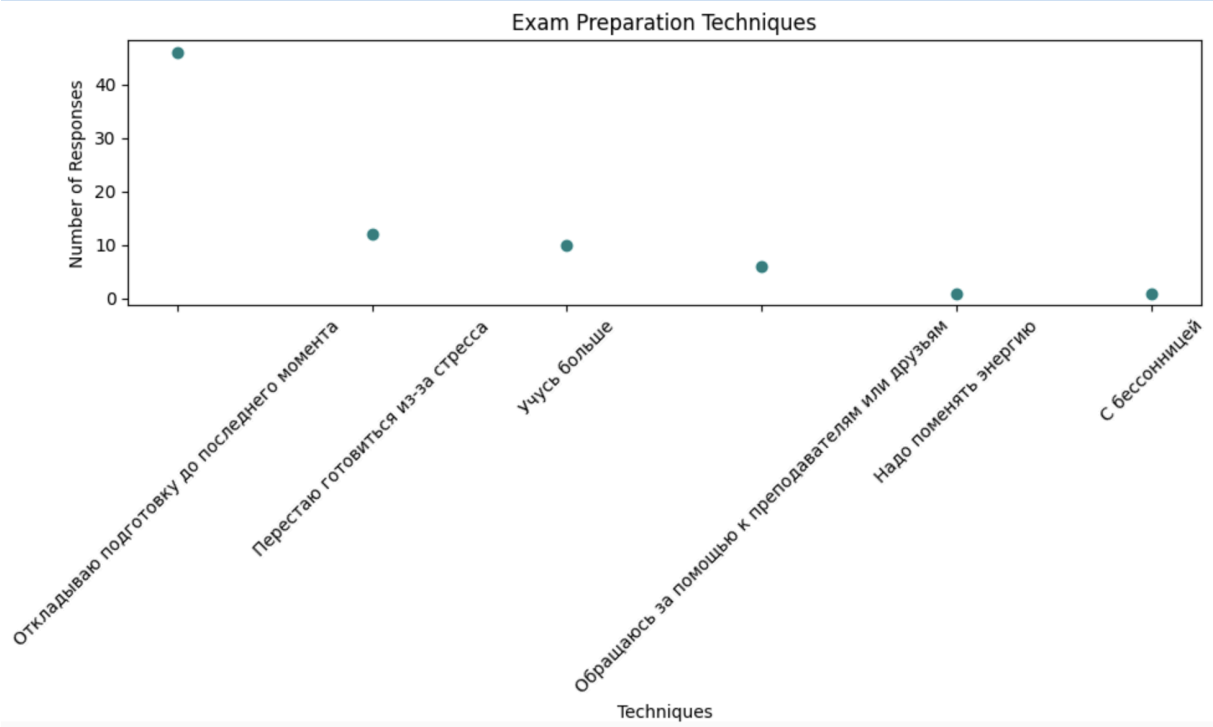
```python
stress_sources = data["Stress Sources"].str.get_dummies(";").sum().sort_values(ascending=False)
plt.figure(figsize=(10, 6))
stress_sources.plot(kind="line", color="skyblue", marker='o')  # marker='o' adds circular markers to the line
plt.title("Sources of Stress Among Students")
plt.xlabel("Stress Sources")
plt.ylabel("Number of Responses")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

This line plot displays the most common sources of stress among students. The x-axis represents different stress sources, while the y-axis shows the number of responses for each source. The data is visualized as a line with circular markers (`marker='o'`), making it easier to identify specific points along the line. The plot is titled "Sources of Stress Among Students," and the axes are labeled for clarity. The x-axis labels are rotated for better readability. This graph allows us to understand which stress sources are most prevalent among students based on survey responses.



```python
# Get the exam preparation techniques as dummies and sum them
exam_preparation = data["Exam Preparation"].str.get_dummies(";").sum().sort_values(ascending=False)

# Create the scatter plot
plt.figure(figsize=(10, 6))
plt.scatter(exam_preparation.index, exam_preparation.values, color="teal")  # Using index for x-axis and values for y-axis
plt.title("Exam Preparation Techniques")
plt.xlabel("Techniques")
plt.ylabel("Number of Responses")
plt.xticks(rotation=45)
plt.tight_layout()

# Show the plot
plt.show()
```

This scatter plot illustrates the various exam preparation techniques used by students and their frequency. Each point on the plot corresponds to a specific technique, with the x-axis representing the technique and the y-axis showing the number of responses. The points are colored in teal for better visibility. The plot is titled "Exam Preparation Techniques," and the axes are labeled accordingly. The x-axis labels are rotated for easier reading. This visualization helps identify the most commonly used techniques for exam preparation among students based on survey data.



Conclusion

The analysis revealed several interesting insights into stress among university students. Most students report experiencing stress "sometimes," with academic pressure and personal issues being the leading causes of stress. Additionally, academic performance appears to be linked to stress levels, with students who perceive their performance negatively reporting higher stress. The findings suggest that interventions aimed at managing academic workload and providing stress management resources could benefit students, particularly those who report frequent stress.

Further research could explore the effectiveness of stress management strategies and their impact on students' well-being. Moreover, a more extensive dataset could provide a clearer picture of the factors contributing to stress and help develop targeted support systems for students.

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6. Comparison and Selection of an Edge Detection Filters for ECG Applications
Dim Shaiakhmetov, Mohd. Tauheed Khan, Gulnaz Gimaletdinova
Alatoo Academic Studies 23 (1), 509 - 519