

1.02. univariate_analysis

October 14, 2024

1 EDA - Univariate Analysis

```
[1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

import httpimport

from pathlib import Path
```

```
[2]: # Import personal library
with httpimport.github_repo("junclemente", "jcds", ref="master"):
    import jcds.eda as jq
```

```
[3]: # Import clean dataset
datasets = Path("../datasets")
df = pd.read_csv(datasets / "school_clean.csv")
df.head()
```

```
[3]:
```

	Student_ID	Undergrad_Degree	Undergrad_Grade	MBA_Grade	Work_Experience	\
0	1	Business	68.4	90.2		No
1	2	Business	62.1	92.8		No
2	3	Computer Science	70.2	68.7		Yes
3	4	Engineering	75.1	80.7		No
4	5	Finance	60.9	74.9		No

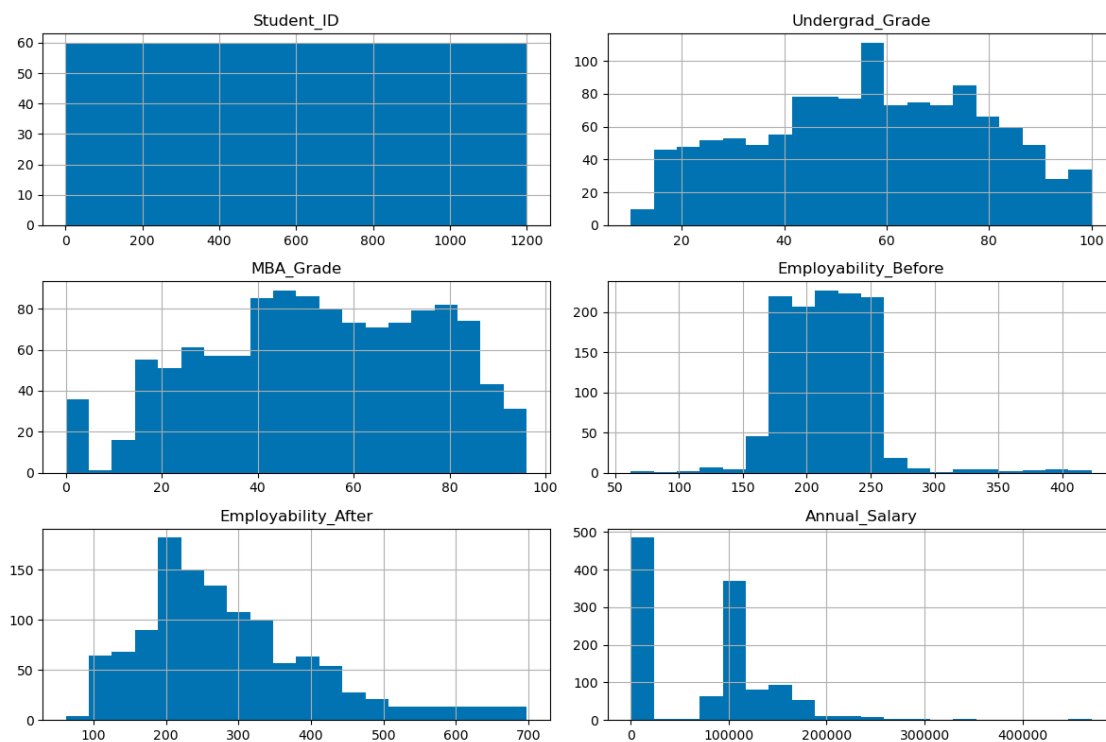
	Employability_Before	Employability_After	Status	Annual_Salary
0	252.0	276.0	Placed	111000.0
1	423.0	410.0	Not Placed	0.0
2	101.0	119.0	Placed	107000.0
3	288.0	334.0	Not Placed	0.0
4	248.0	252.0	Not Placed	0.0

1.1 Distributions

1.1.1 Continuous Features

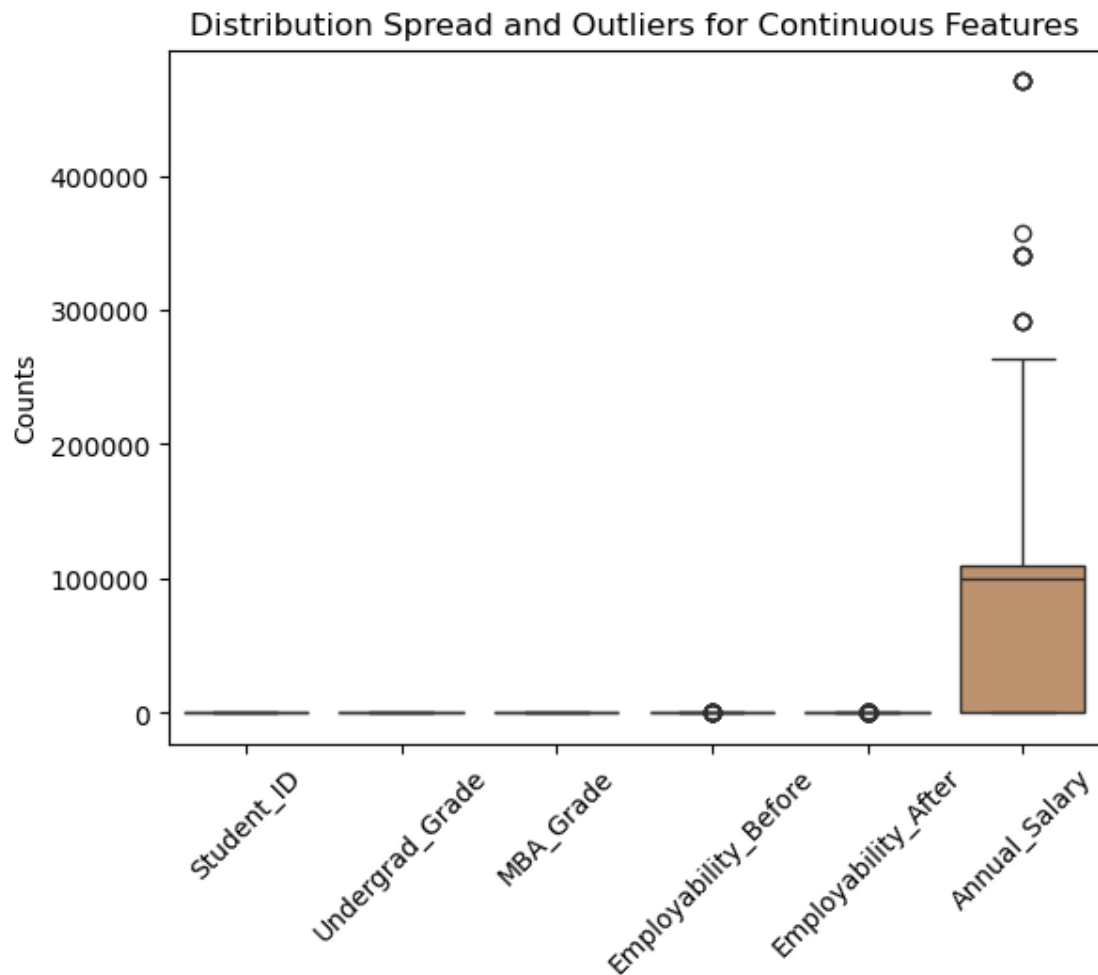
```
[4]: # Set global color palette
global_color = "colorblind"
# Set global color for Seaborn
sns.set_palette(global_color)
# Set global color palette for Matplotlib
colors = sns.color_palette(global_color)
plt.rcParams["axes.prop_cycle"] = plt.cycler(color=colors)
```

```
[5]: # Show histogram of each continuous variable
df.hist(bins=20, figsize=(12, 8))
plt.tight_layout()
plt.show()
```

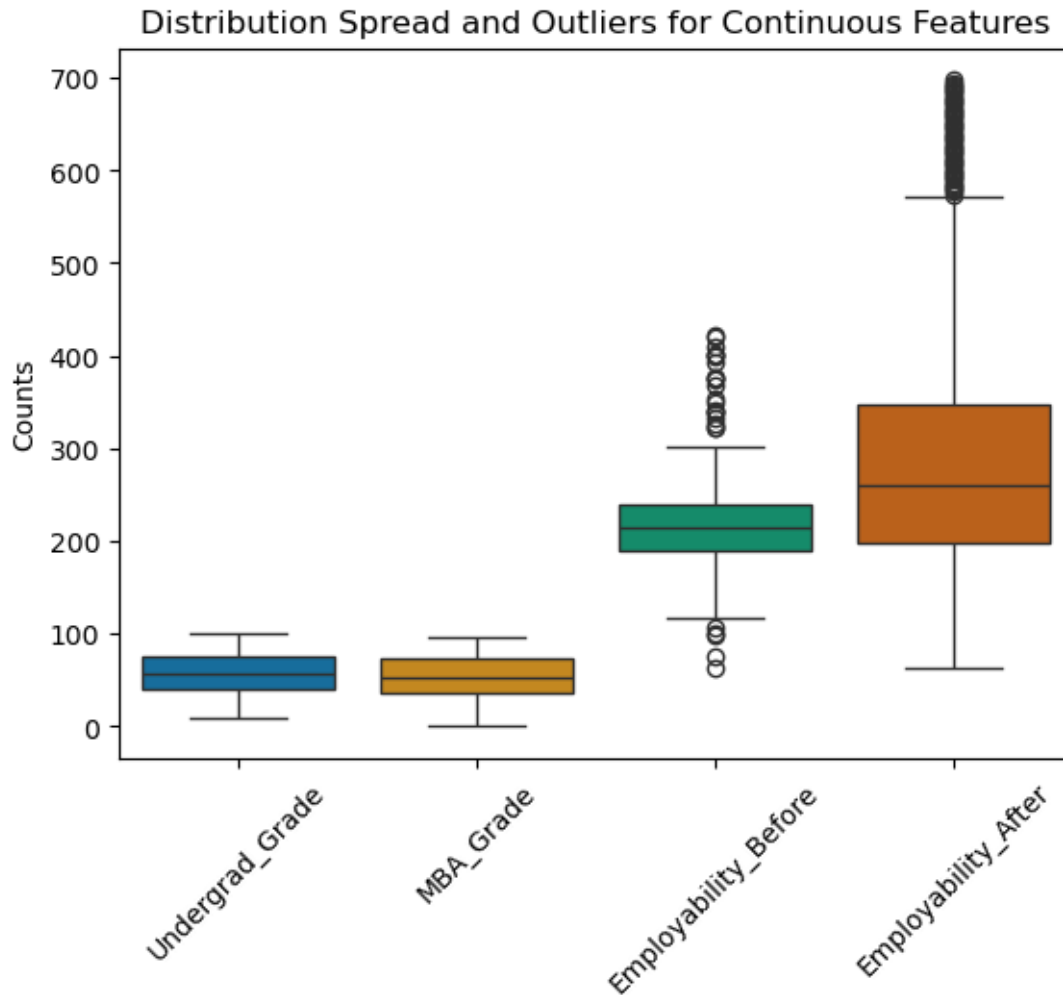


- Undergrad Grade shows a normal distribution.
- MBA Grade has a somewhat normal distribution but values at 0 may be outliers. This could also be related to students who dropped out or did not place after graduation.
- Employability variables are both skewed to the left but the range in “After” has increased.
- Annual Salary shows a left skew with most students that placed at around \$100K. The 0s are all graduates who did not place.

```
[6]: # Visualize outliers
sns.boxplot(data=df)
plt.title("Distribution Spread and Outliers for Continuous Features")
plt.ylabel("Counts")
plt.xticks(rotation=45)
plt.show()
```



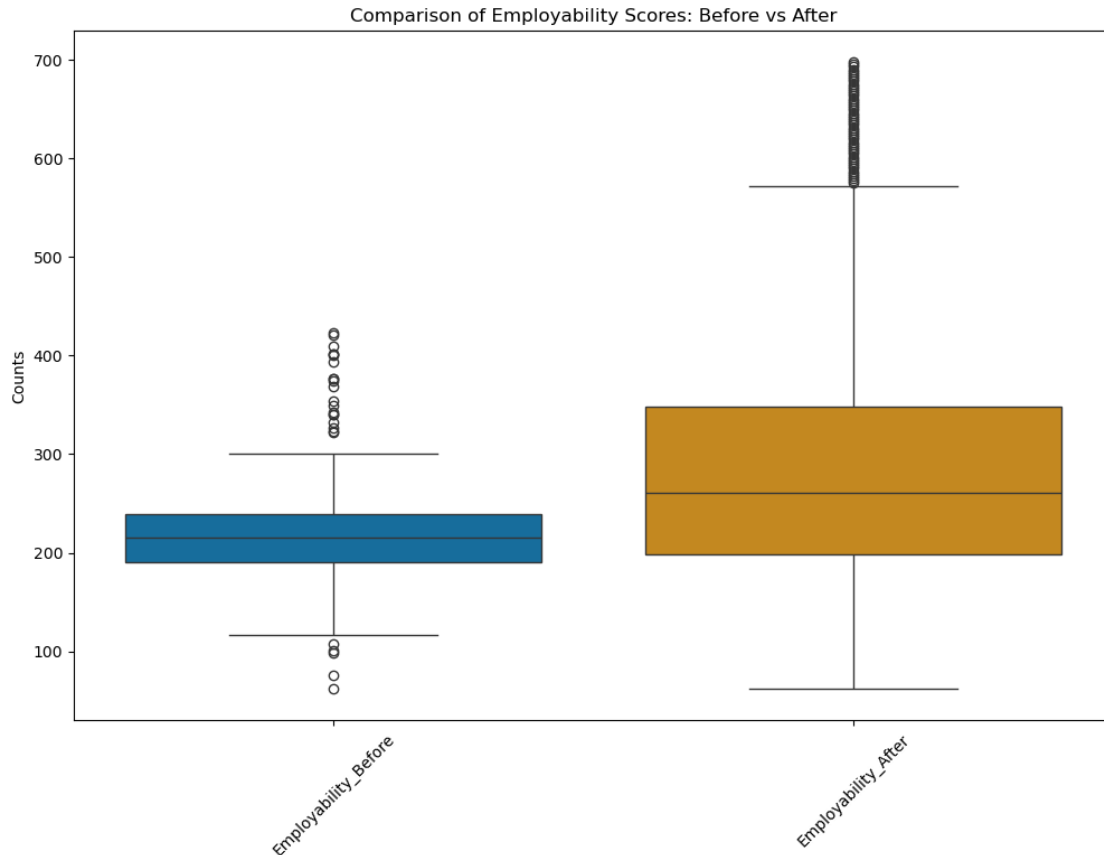
```
[7]: # Remove student ID and annual salary to show detail of other columns
sns.boxplot(data=df.drop(columns=["Student_ID", "Annual_Salary"]))
plt.title("Distribution Spread and Outliers for Continuous Features")
plt.ylabel("Counts")
plt.xticks(rotation=45)
plt.show()
```



The range increase in Employability After compared to Before is evident showing that the program has a positive impact on students' career.

There does not appear to be any significant differences between the Undergrad and MBA grade.

```
[12]: # Comparison of Employability before and after
plt.figure(figsize=(12, 8))
sns.boxplot(data=df[["Employability_Before", "Employability_After"]])
plt.title("Comparison of Employability Scores: Before vs After")
plt.ylabel("Counts")
plt.xticks(rotation=45)
plt.show()
```



A wider range of scores post-graduation shows an improvement in employability. The program has a positive impact on students' career.

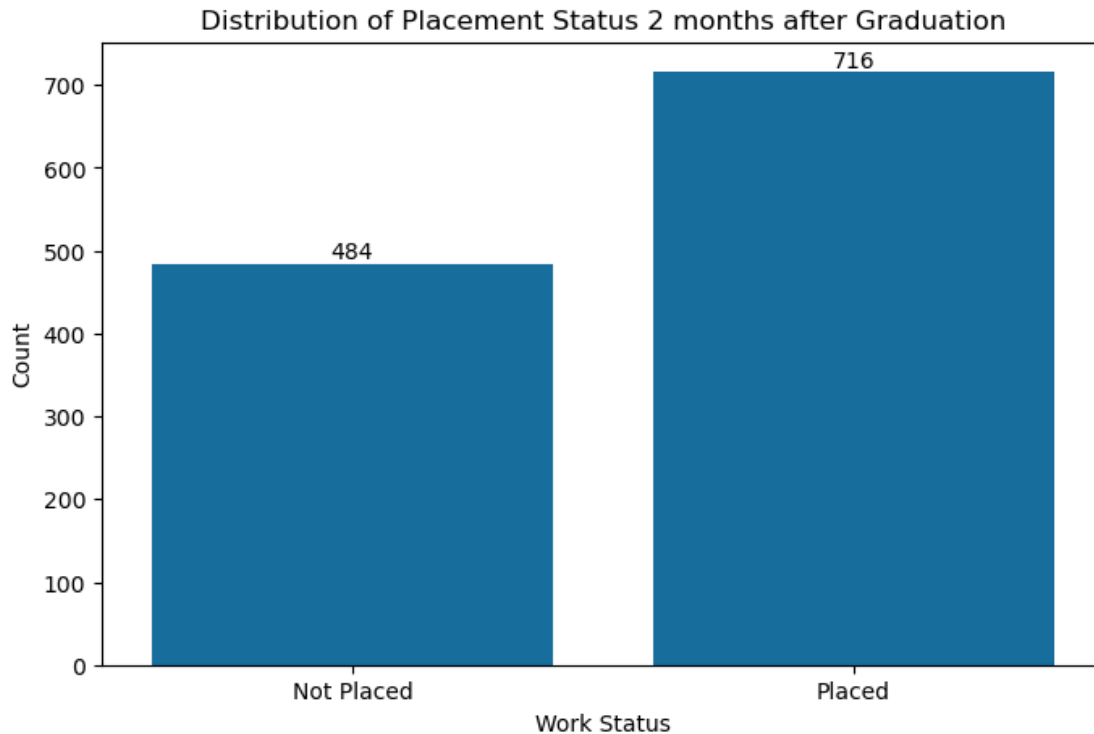
1.1.2 Categorical Features

Job Placement Status

```
[13]: # categorical_vars = ["Undergrad_Degree", "Work_Experience", "Status"]
# Status
plt.figure(figsize=(8, 5))
ax = sns.countplot(x="Status", data=df, order=["Not Placed", "Placed"])

for container in ax.containers:
    ax.bar_label(container)

plt.title("Distribution of Placement Status 2 months after Graduation")
plt.xlabel("Work Status")
plt.ylabel("Count")
plt.show()
```



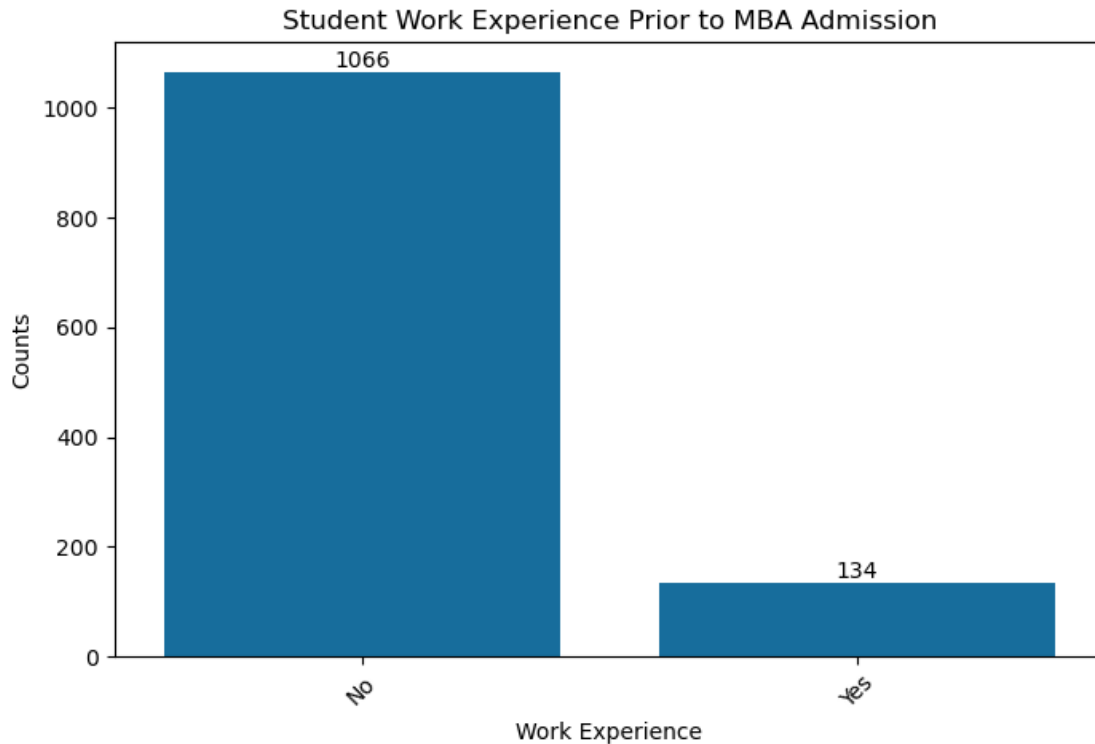
```
[17]: status_counts = df["Status"].value_counts()
percentages = (status_counts / len(df)) * 100

print(f"Total Placed: {status_counts['Placed']} ({percentages['Placed']:.1f}%)")
print(
    f"Total Not Placed: {status_counts['Not Placed']} ({percentages['Not Placed']:.1f}%)")
)
```

Total Placed: 716 (59.7%)
 Total Not Placed: 484 (40.3%)

Work Experience

```
[22]: # Work Experience
plt.figure(figsize=(8, 5))
ax = sns.countplot(x="Work_Experience", data=df)
for container in ax.containers:
    ax.bar_label(container)
plt.title(f"Student Work Experience Prior to MBA Admission")
plt.xlabel("Work Experience")
plt.ylabel("Counts")
plt.xticks(rotation=45)
plt.show()
```



```
[19]: status_counts = df["Work_Experience"].value_counts()
percentages = (status_counts / len(df)) * 100

print(f"Total Placed: {status_counts['Yes']} ({percentages['Yes']:.1f}%)")
print(f"Total Not Placed: {status_counts['No']} ({percentages['No']:.1f}%)")
```

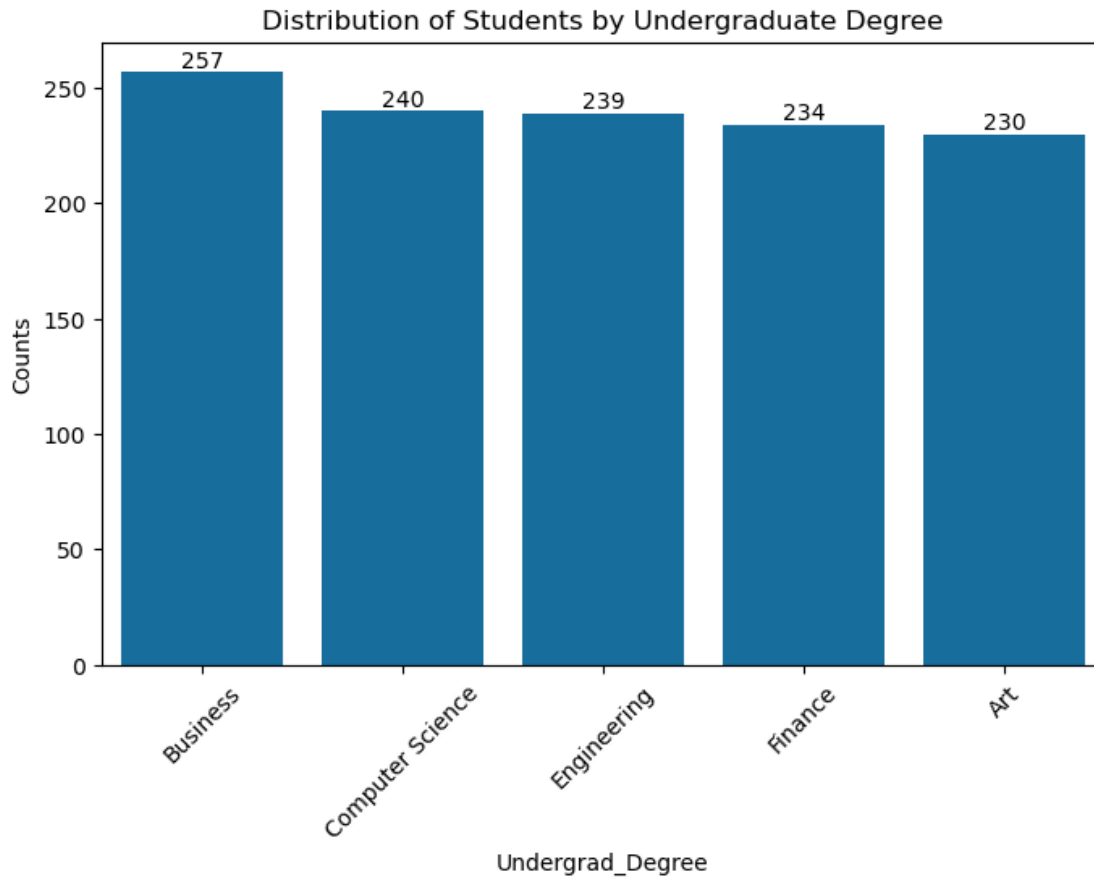
Total Placed: 134 (11.2%)

Total Not Placed: 1066 (88.8%)

Most MBA students did not have prior work experience before entering the program.

Undergraduate Degree

```
[23]: # Undergrad Degree
plt.figure(figsize=(8, 5))
ax = sns.countplot(x="Undergrad_Degree", data=df)
for container in ax.containers:
    ax.bar_label(container)
plt.title(f"Distribution of Students by Undergraduate Degree")
# plt.xlabel("Undergraduate Degree")
plt.ylabel("Counts")
plt.xticks(rotation=45)
plt.show()
```



```
[24]: crosstab = pd.crosstab(df["Status"], df["Work_Experience"])
      display(crosstab)
```

	No	Yes
Status		
Not Placed	478	6
Placed	588	128

```
[25]: plt.figure(figsize=(8, 5))

# Plot the bars manually for 'No' and 'Yes' work experience
bars1 = plt.bar(
    crosstab.index, crosstab["No"], label="No Work Experience", color="#1f77b4"
)
bars2 = plt.bar(
    crosstab.index,
    crosstab["Yes"],
    bottom=crosstab["No"],
    label="Yes Work Experience",
```



```

        color="#ff7f0e",
    )

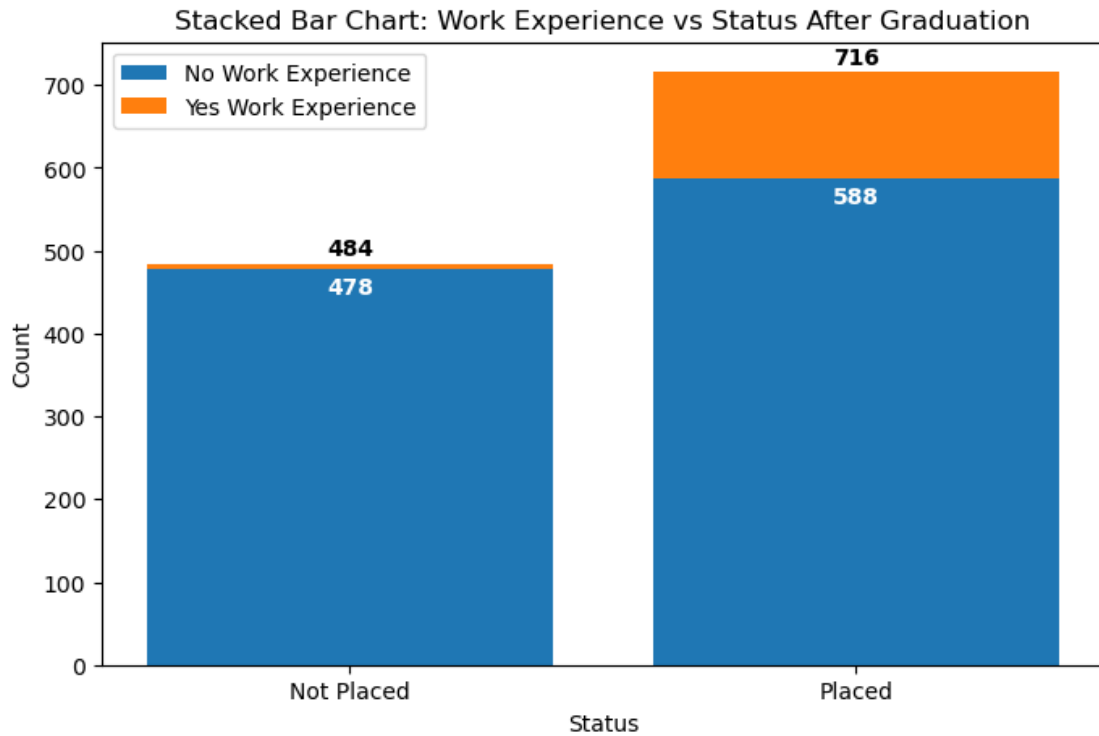
    # Add number counts on top of each bar for 'No Work Experience'
    for bar in bars1:
        height = bar.get_height()
        plt.text(
            bar.get_x() + bar.get_width() / 2.0,
            height - 30,
            "%d" % int(height),
            ha="center",
            color="white",
            fontweight="bold",
        )

    # Add number counts on top of each bar for 'Yes Work Experience'
    for bar in bars2:
        height = bar.get_height() + bar.get_y()
        plt.text(
            bar.get_x() + bar.get_width() / 2.0,
            height + 10,
            "%d" % int(height),
            ha="center",
            color="black",
            fontweight="bold",
        )

    # Add labels and title
    plt.xlabel("Status")
    plt.ylabel("Count")
    plt.title("Stacked Bar Chart: Work Experience vs Status After Graduation")
    plt.legend()

    # Show the plot
    plt.show()

```



Of all 716 students who found a job within 2 months of graduation, 588 students did not have work experience. Of the 484 students who did not find a job within 2 months of graduation, 478 did not have work experience. Six students who did not place had prior work experience.

[]: