Lab3

> Human-computer Interaction 2023 Spring

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1 Data Analysis Task

Among the three topics proposed by Pro.Shen, I have chosen the topic of **college salaries** for data visualization.

The dataset provides three CSV-formatted tables, each depicting the relationship between the salaries of college graduates and variables such as geographical regin, academic major, and type of institution.

It is essential that the dataset describes salaries in a multi-dimensional manner, including `Starting Median Salary`, `Mid-Career Median Salary`, `` `Mid-Career 10th Percentile Salary ``, `Mid-Career 25th Percentile Salary`, `Mid-Career 75th Percentile Salary`, `Mid-Career 90th Percentile Salary`. The dataset reflects salaries at different career stages and levels, enabling a more comprehensive understanding of the data.

The primary objective of our visualization is to illustrate the connection between college salaries and various factors. It is essential to capture the unique characteristics of the data for visualization. For example, as the salary is a numerical value, we are concerned about its specific magnitude. Regarding location data, we are interested in its geographical distribution. For the undergraduate major and school type, we need to provide users with different options for comparative analysis.
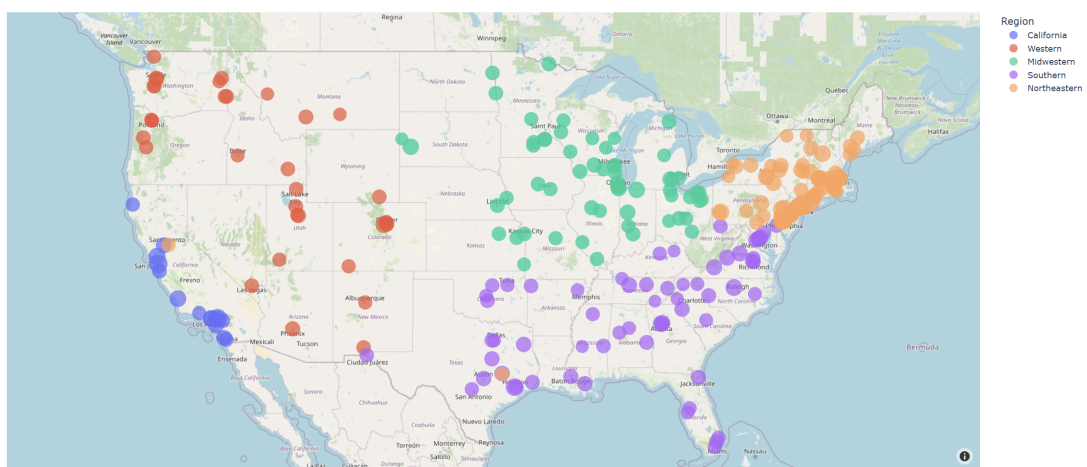
2 Dashboard Design
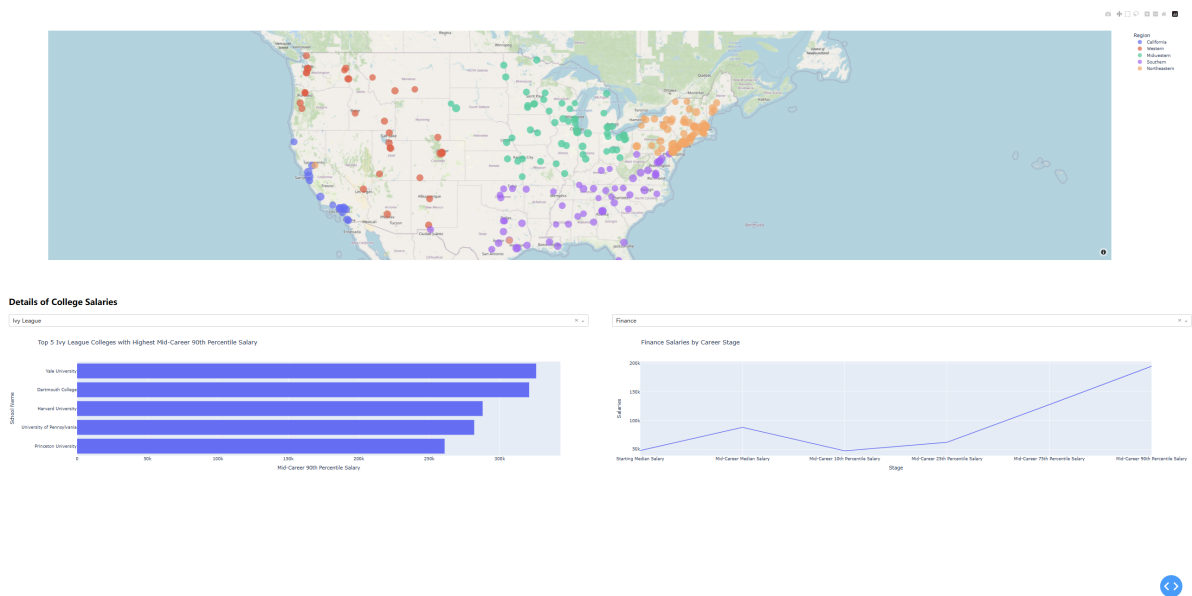
The dashboard primarily consists of three components: map of college salaries, the bar chart of top5 ranking salaries in the same type of schools, and the line graph of salaries by major.

Map of College Salaries

I have implemented a map of college salaries, where colored dots distributed across the map represent the locations of universities in corresponding region. The size of each dot is proportional to the `Starting Median Salary` of each university.

To implement this map, I processed the raw data from file `salaries-by-region.csv` first. To get obtain the precise coordinates of each university, I utilized the `geopy` library to query locations based on the name of the unibersities. The complete code is in file `data_prep.py`.

```
import geopy.geocoders
...
# Search for location
for index, row in df.iterrows():
    location = geolocator.geocode(row['School Name'])
    if location is not None:
        df.at[index, 'lat'] = location.latitude
        df.at[index, 'lon'] = location.longitude
...
```

When the cursor hovers over the colored dots on the map, detailed information of
the university located at that spot is displayed.
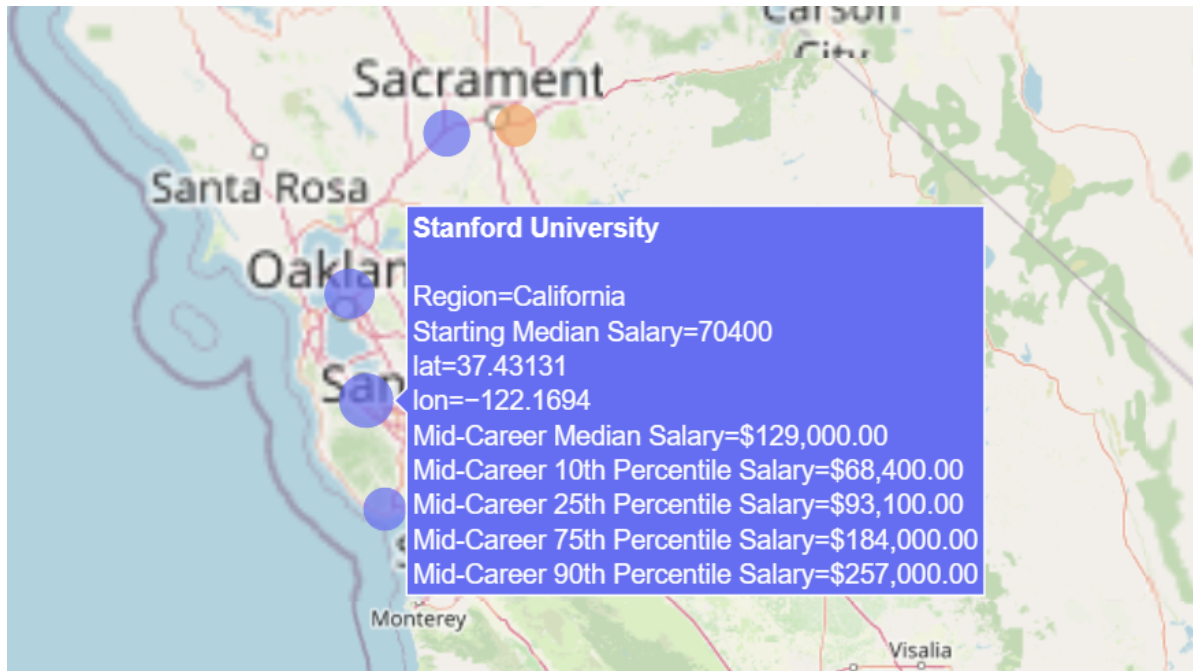
Patterns revealed in the figure

Universities close to the coastline and developed areas tend to have higher
salaries, particularly those located near California and New York State.

Bar Chart of Top5 Ranking Salaries Schools

Details of College Salaries

Ivy League   × ▾

Top 5 Ivy League Colleges with Highest Mid-Career 90th Percentile Salary
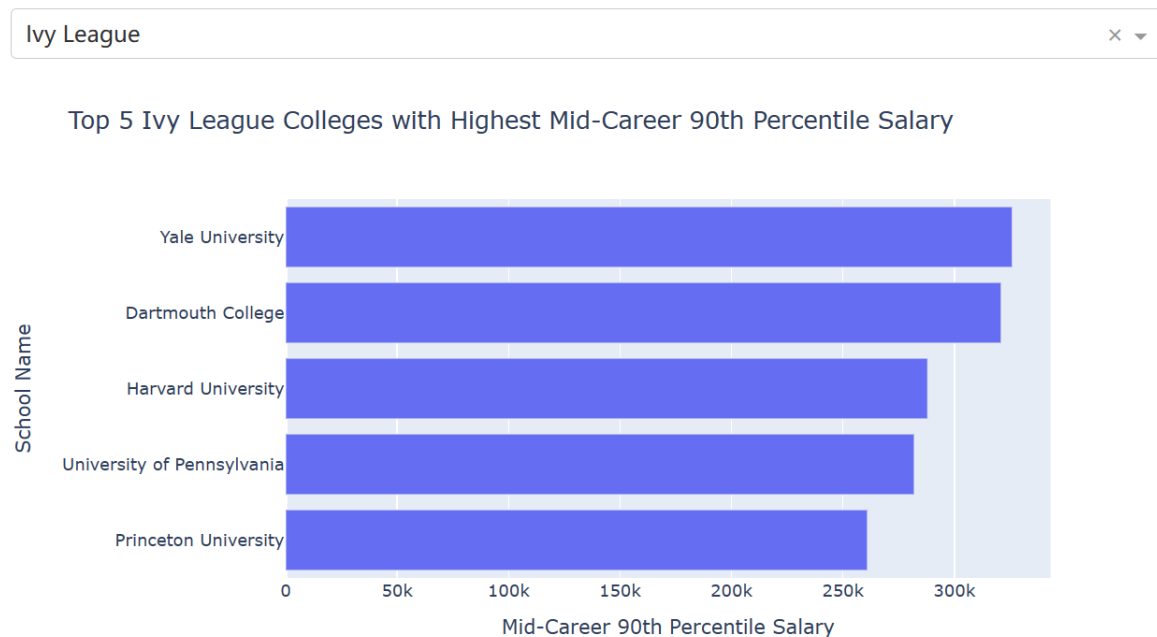
We use `Mid-Career 90th Percentile Salary` to represent the highest salaries level of each university. I have implemented a bar chart to visualize the top5 highest salary in the same type of schools. Users can change the school type by selecting in the dropdown box.

Details of College Salaries

Ivy League	× ▲
Engineering	
Party	
Liberal Arts	
Ivy League	
State	
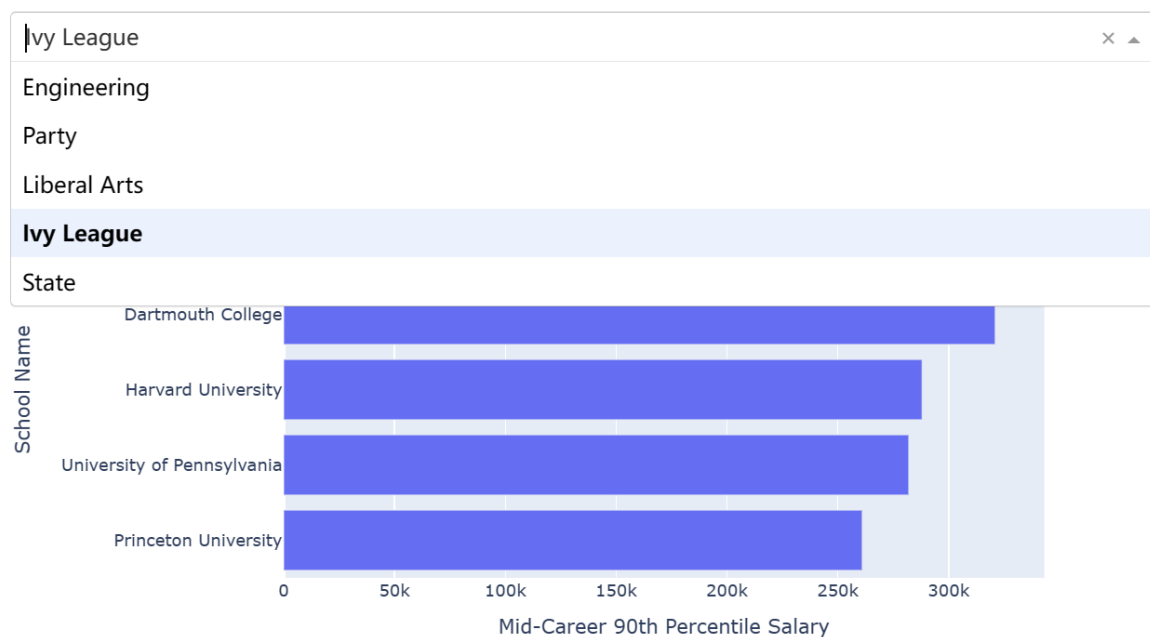
Patterns revealed in the figure

Ivy League universities hold a significant advantage in salary levels, followed closely by institutes of technology. Addtionally, graduates from Yale Uniersity exhibit the highest salary potential.

Line Chart of Salaries in Different Stage

Accounting	× ▼

Accounting Salaries by Career Stage

To illustrate the relationship between university salaries and majors, we employed a line graph to represent the salary changes of different majors at different stages. I utilized a dropdown selection box to alternate the input major.

Patterns revealed in the figure

Each major has a different career trajectory, and salary trends can vary accordingly. From the perspective of starting salaries, technical majors such as computer engineering and mechanical engineering are very competitive. However, when it comes to career income ceiling, business majors such as economics and finance show higher earning potential.