ASSIGNMENT 4: DATA VIZ FOR ADVOCACY

Khwaab Thareja *CS-GY 6313 B*

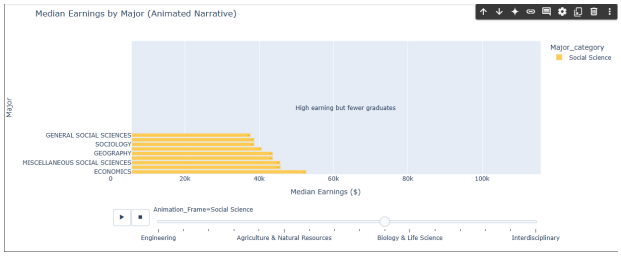
Introduction

In a small town, a group of parents keen to secure bright futures for their children struggles to decide which career paths to encourage. They meet a career counselor who introduces them to data-driven insights, emphasizing the importance of balancing financial prospects, personal interests, and societal contributions when selecting a major. Using interactive visualizations, the counselor answers critical questions: Which fields offer the highest median earnings? How do unemployment rates vary across majors? Which majors see significant gender disparities? These visualizations advocate for informed decision-making, helping parents and students navigate career choices based on real-world outcomes. Moreover, they address societal biases by promoting equal opportunities across disciplines and encouraging exploration beyond traditionally favored fields.

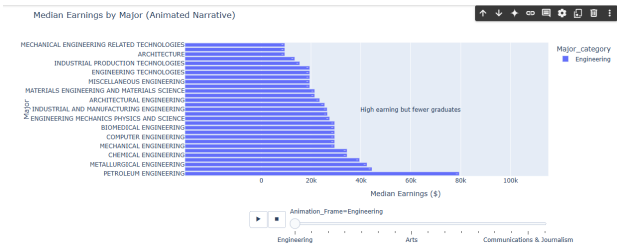
Questions and Visualizations

1. Bar Chart: Median Earnings by Major (Animated Narrative)

Question Addressed: Which majors within a category yield the highest and lowest median earnings?



(a) Earnings by major: Social Science



(b) Earnings by Major: Engineering

Figure 1: Animated Bar chart to depict Earnings by Major

How It Answers

- The bar chart compares median earnings of individual majors within each major category.
- Animation guides viewers to observe disparities across fields, such as:
  - **Petroleum Engineering**: High-paying major.
  - **Architectural Engineering**: Lower-paying major.
- Annotations highlight significant trends, including:
  - Fields with smaller graduate pools that offer strong financial returns.

Insights

- Engineering majors dominate high earnings across the dataset.
- Arts majors often exhibit lower financial returns.
- This chart encourages informed exploration of high-reward fields for better decision-making.

2. Scatter Plot: Median Earnings vs. Unemployment Rate by Major (Animated)

Questions Addressed:

- What are the trade-offs between potential earnings and job stability across fields?

- Which fields offer high earnings with low unemployment, and which present higher risks?

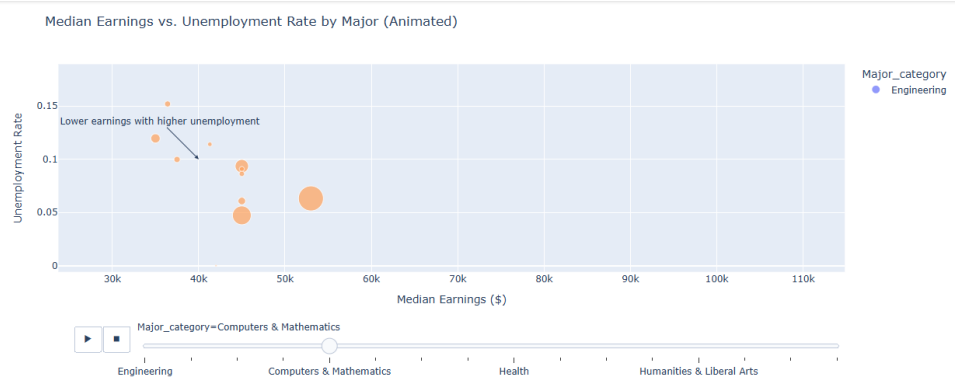


Figure 2: Scatter Plot for Median Earning vs Employement rate by Major

How It Answers

- The scatter plot illustrates the balance between:
  - **Earnings** (x-axis).
  - **Unemployment Rates** (y-axis).
- Bubble size indicates the total number of graduates in each field.
- Key observations:
  - **High-earning fields** like Mechanical Engineering have low unemployment rates.
  - **Fields like Fine Arts** exhibit higher unemployment and financial risks.
- Annotations highlight:
  - Outliers and trends, guiding parents and students to evaluate career risks and rewards effectively.

Insights

- High-earning, low-risk fields like Engineering stand out as desirable options.
- Some Humanities fields face economic challenges, urging careful consideration.

3. Sunburst Chart: Economic Outcomes of College Majors

Questions Addressed:

- How do majors within each category contribute to the overall economic landscape?
- Which broad categories include high-earning or low-earning majors?

How It Answers

- The hierarchical sunburst chart visualizes relationships between:
  - **Broad categories** (outer layers).
  - **Subfields** (inner layers).
- Colors represent **median earnings**, making trends easy to identify.
- On hover, the data represent economic contributions
- Key observations:
  - **Engineering** includes multiple high-earning subfields.

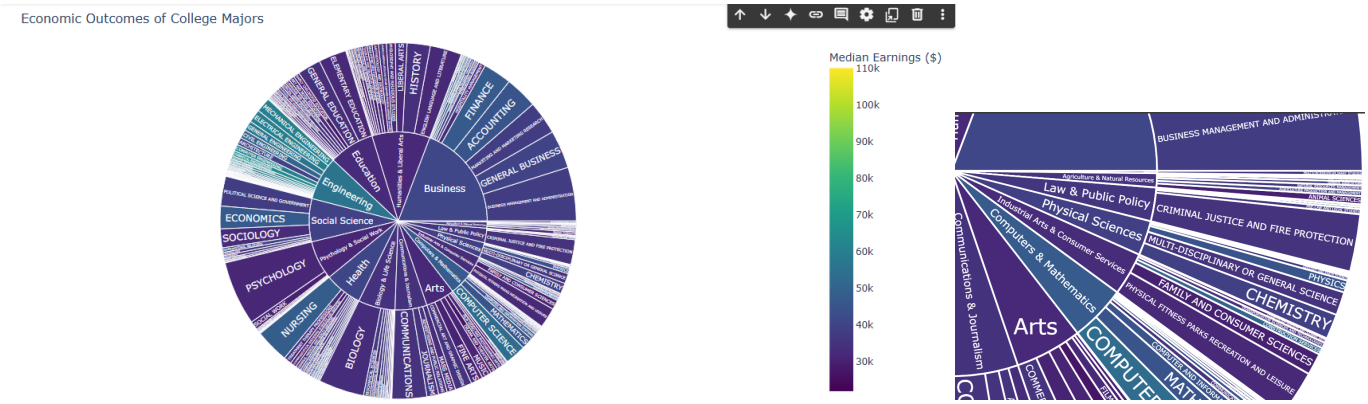


Figure 3: Sunburst chart for Economic contribution by College major

– **Arts majors** tend to have lower earnings.

Insights

- Helps parents and students understand how individual majors contribute to overall earnings within a category.
- Challenges stereotypes about underrepresented fields, promoting informed and unbiased decision-making.

4. Treemap: Total Graduates vs. Median Earnings by Major (Interactive)

Questions Addressed:

- How does the number of graduates in a field correlate with median earnings?
- Which fields dominate in terms of graduate volume and earnings potential?

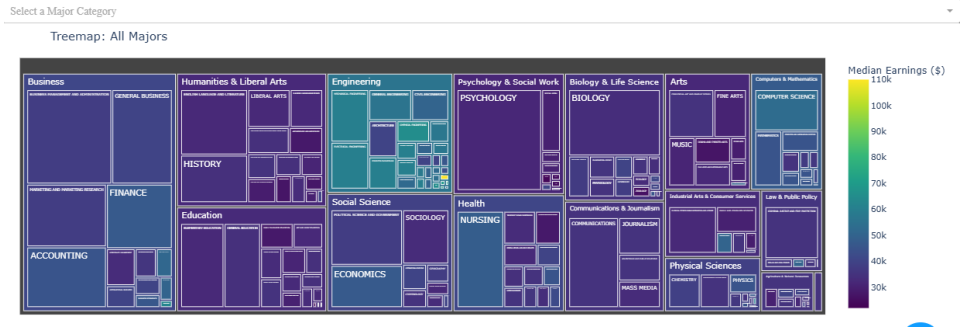


Figure 4: Treemap of college majors: Total graduates vs Median Earnings

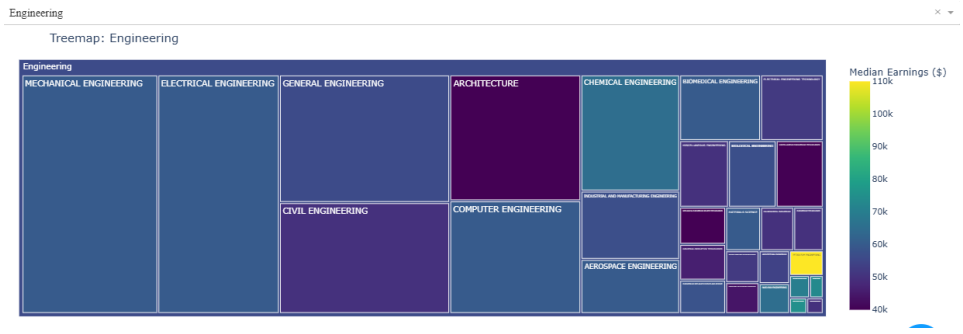


Figure 5: Treemap of Engineering majors: Total graduates vs Median Earnings

How It Answers

- The treemap provides a hierarchical representation of majors and their categories, allowing users to explore key trends interactively:
  - **Block sizes**: Represent the total number of graduates in each major, showing the relative popularity of fields.
  - **Color intensity**: Depicts the median earnings of graduates, highlighting xeconomic outcomes at a glance.
- Users can filter by major category to focus on specific areas of interest and uncover important patterns.
- Key observations:
  - **Business**: A popular category with large graduate numbers but varying earnings across its subfields, showcasing a mix of high and low-return majors.
  - **Actuarial Science**: A niche field with a smaller number of graduates but significantly high earnings, demonstrating strong financial potential for less saturated fields.

Insights

- The treemap emphasizes the economic opportunities available in smaller, less conventional fields like Actuarial Science and Metallurgical Engineering.
- Encourages students and parents to look beyond mainstream options, fostering diversity in career choices.
- Provides a balanced view of popularity and financial potential, helping to identify fields that combine high returns with manageable competition.

Strengths and Weaknesses

Strengths:

- **Dynamic Visualizations:** The use of animations and interactivity engages users and simplifies complex datasets.
- **Annotation Guidance:** Annotations help viewers quickly grasp key insights without requiring deep data expertise.
- **Diverse Chart Types:** Bar charts, scatter plots, treemaps, and sunbursts provide a comprehensive view from different analytical perspectives.

Weaknesses:

- **Sparse Data Representation:** Fields with limited data or small graduate numbers may not be fully represented, leaving gaps in the narrative.
- **Interactivity Barriers:** Users unfamiliar with interactive tools might struggle to fully explore all features without guidance.

Conclusion

These visualizations provide actionable insights for parents, students, and educators by answering critical questions about the economic outcomes of college majors. By presenting data in engaging, accessible formats, they foster informed decision-making that balances financial security with personal interests and societal contributions. Beyond individual guidance, the visualizations also challenge biases against underrepresented fields, advocating for a broader, more equitable perspective on career planning. Together, these tools empower communities to navigate the complexities of education and employment with clarity and confidence.