Parallel Judgments: A Visual Exploration of Similar Case Outcomes

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Github: https://github.com/dataviscourse2024/group-project-parallel-judgments-vis/tree/main

1. Background and Motivation

The legal system is built on precedents, where past cases influence future decisions. However, understanding how similar cases are decided across different jurisdictions or time periods can be complex. This project aims to provide an interactive visualization tool that enables legal scholars, students, and researchers to compare and contrast the outcomes of similar court judgments. My interest in legal informatics and data visualization has driven me to explore how visual tools can make legal research more accessible and insightful. This project will also help bridge the gap between law and technology, providing a modern solution for comparing case law effectively.

2. Project Objectives

- **Primary Goal:** To develop an interactive visualization tool that compares the outcomes of similar court judgments.
- **Key Questions to Answer:**
    - How do legal outcomes for similar cases vary across different courts or time periods?
    - What are the key factors (jurisdiction, legal principles, or precedent cases) that contribute to these variations?
- **Benefits:**
    - Provide insights into patterns and disparities in legal decisions.
    - Help legal professionals and researchers easily compare similar cases.

- Facilitate learning for law students through an interactive and engaging tool.

3. Data Source

Legal case data will be sourced from publicly available databases such as:

- **CourtListener**:
  - CourtListener provides access to millions of court cases from the United States. They offer an API and bulk data downloads.
  - **Link:** CourtListener
  - **API Documentation:** CourtListener API
- **Caselaw Access Project**:
  - The Caselaw Access Project (CAP) makes all U.S. court decisions freely available online. They offer an API for retrieving cases.
  - **Link:** Caselaw Access Project
  - **API Documentation:** CAP API
- **Justia**:
  - Justia provides free case law, codes, regulations, and legal information from the United States.
  - **Link:** Justia
- **FindLaw**:
  - FindLaw offers a vast collection of legal information, including case law, statutes, and regulations.
  - **Link:** FindLaw

The data will be collected via APIs where possible or manually downloaded from the websites. I will target cases related to a specific legal topic (e.g., intellectual property, civil rights) for better comparison.

4. Data Processing

- **Preprocessing Tasks:**
  - Clean the raw legal text to remove extraneous information such as footnotes or legal references.

- Extract key case metadata such as the outcome, cited precedents, and legal principles.
- Implement Natural Language Processing (NLP) to extract relevant legal terms and principles for comparison.

- **Quantities:** Plan to work with a dataset of 100–200 similar cases for this analysis.
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5. Visualization Design

- **Approach:** The visualization will enable users to compare multiple cases along key dimensions such as jurisdiction, time period, legal principles, and outcomes.

- **Three Prototype Designs:**

1. **Sketch 1**: It provides a visual analysis of legal case outcomes and similarities. It includes a table summarizing key case details such as duration, legal precedents cited, and jurisdiction complexity. A pie chart shows an equal split of 50% favorable and 50% unfavorable case outcomes. The flowchart visually represents potential legal outcomes like dismissal, appeal, final ruling, and settlement. Additionally, a bar chart compares the similarity scores between different cases, highlighting how closely they align based on specific criteria.

2. **Sketch 2**: It offers a detailed comparison of court cases using multiple visualizations. A table at the top left provides key case attributes such as duration, legal precedents, and jurisdiction complexity. The bar chart in the top right breaks down the progression stages (dismissed, settled, trial, appeal) for each case. A heatmap below shows the variation of key court case attributes like complexity, legal precedents cited, and case duration across all cases. Additionally, the similarity scores between cases are displayed in a bar chart, comparing Case 2, Case 3, and Case 4 to Case 1.

3. **Sketch 3** : It provides a multi-dimensional comparison of court cases. It includes a table detailing key attributes such as case duration, legal precedents cited, and jurisdiction complexity. A radar chart visualizes the comparison of cases (A-D) across five variables: legal precedents, case complexity, jurisdiction complexity, case duration, and sentiment analysis score. A timeline below illustrates key case milestones from January to October for cases A, B, and C. Additionally, a bar chart shows the similarity scores of Case 2, Case 3, and Case 4 compared to Case 1, highlighting differences in their attributes.

- **Final Design:** The final design offers a comprehensive analysis of case attributes and similarities using multiple visualizations. The table provides key details such as case duration, legal precedents cited, and jurisdiction complexity for Cases A-D. A radar chart compares the cases across dimensions like complexity, duration, and sentiment analysis. A parallel coordinates plot illustrates the variations in case outcomes, complexity, and other attributes across the cases. Lastly, a bar chart visualizes the similarity scores between Case 1 and the other cases (2, 3, and 4), highlighting their relative differences.

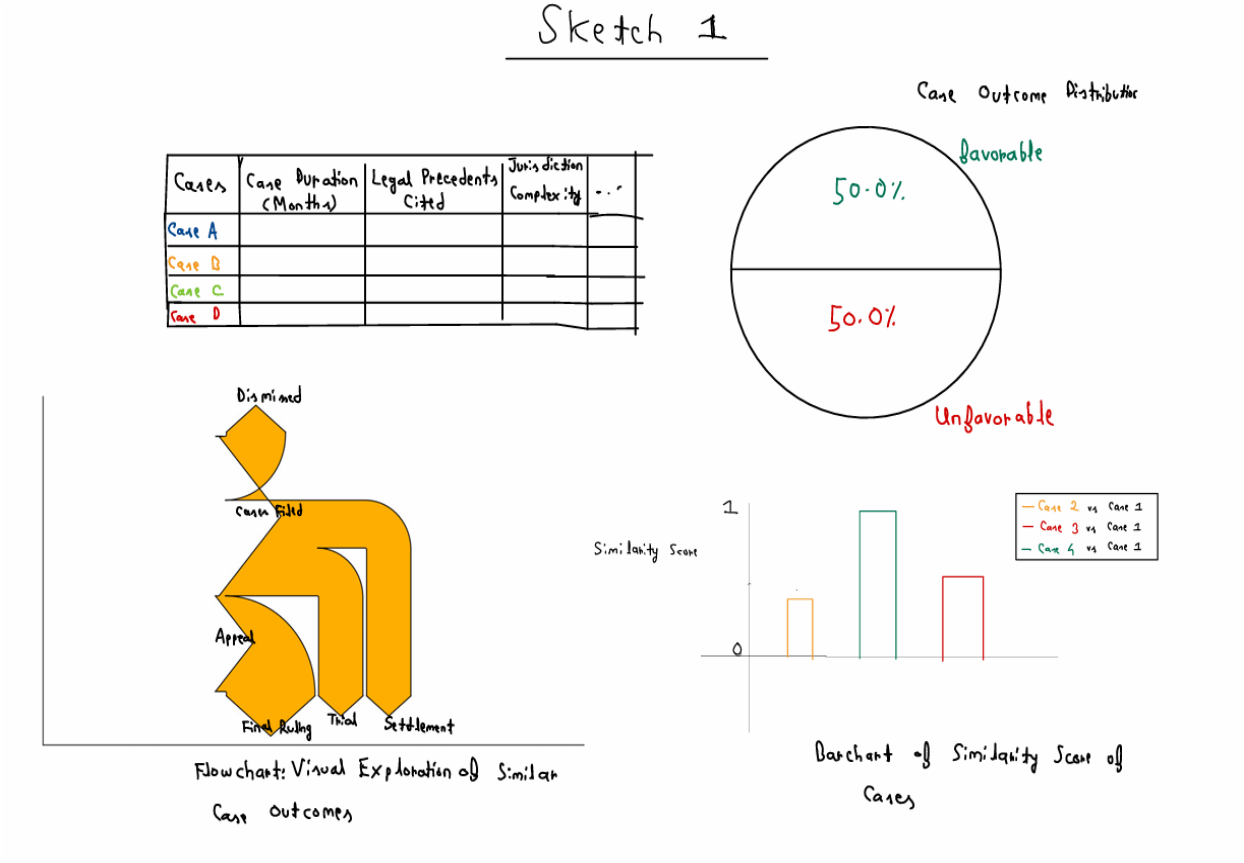

Fig01: A structured approach to exploring legal case outcomes and similarities across different cases.

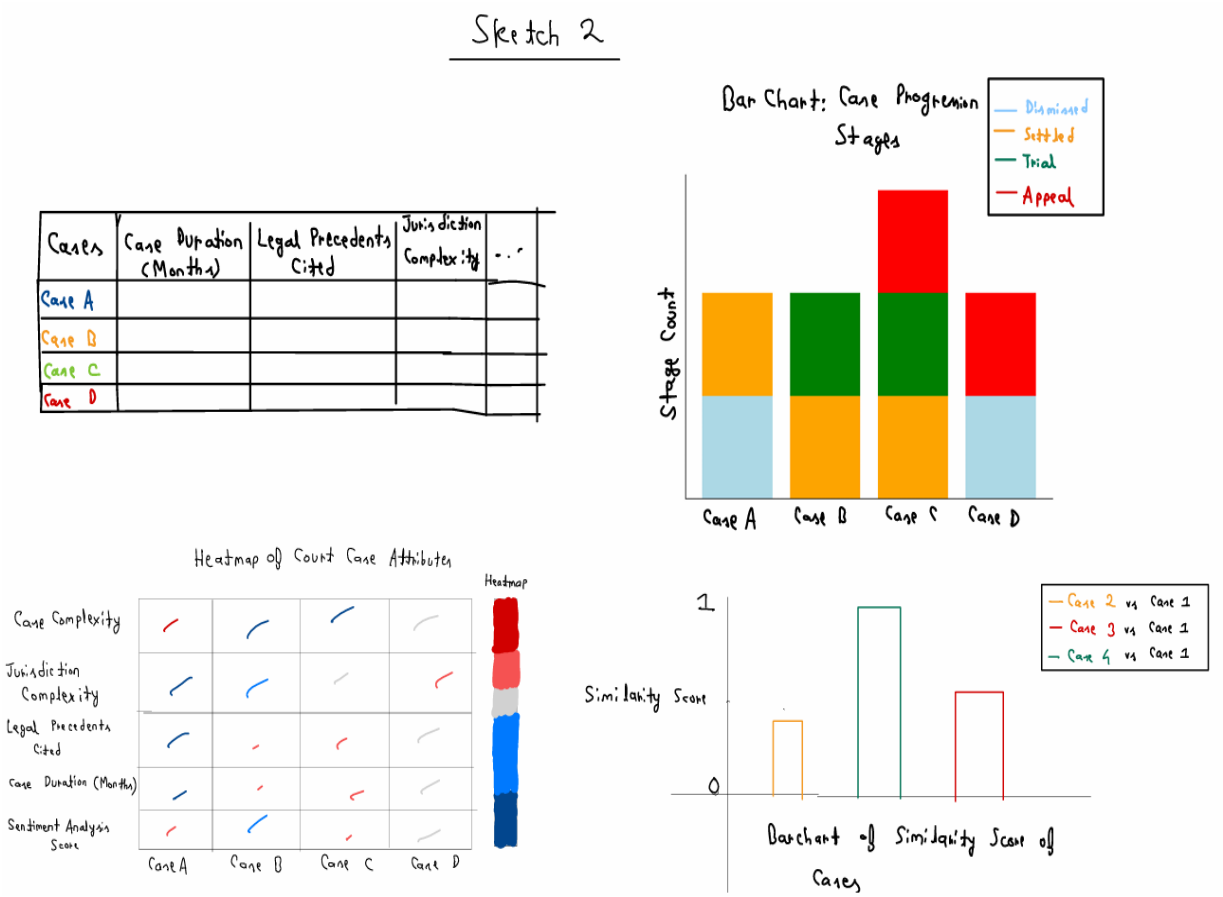

Fig02: A detailed visualization of case attributes, progression, and similarities for comparative legal analysis.

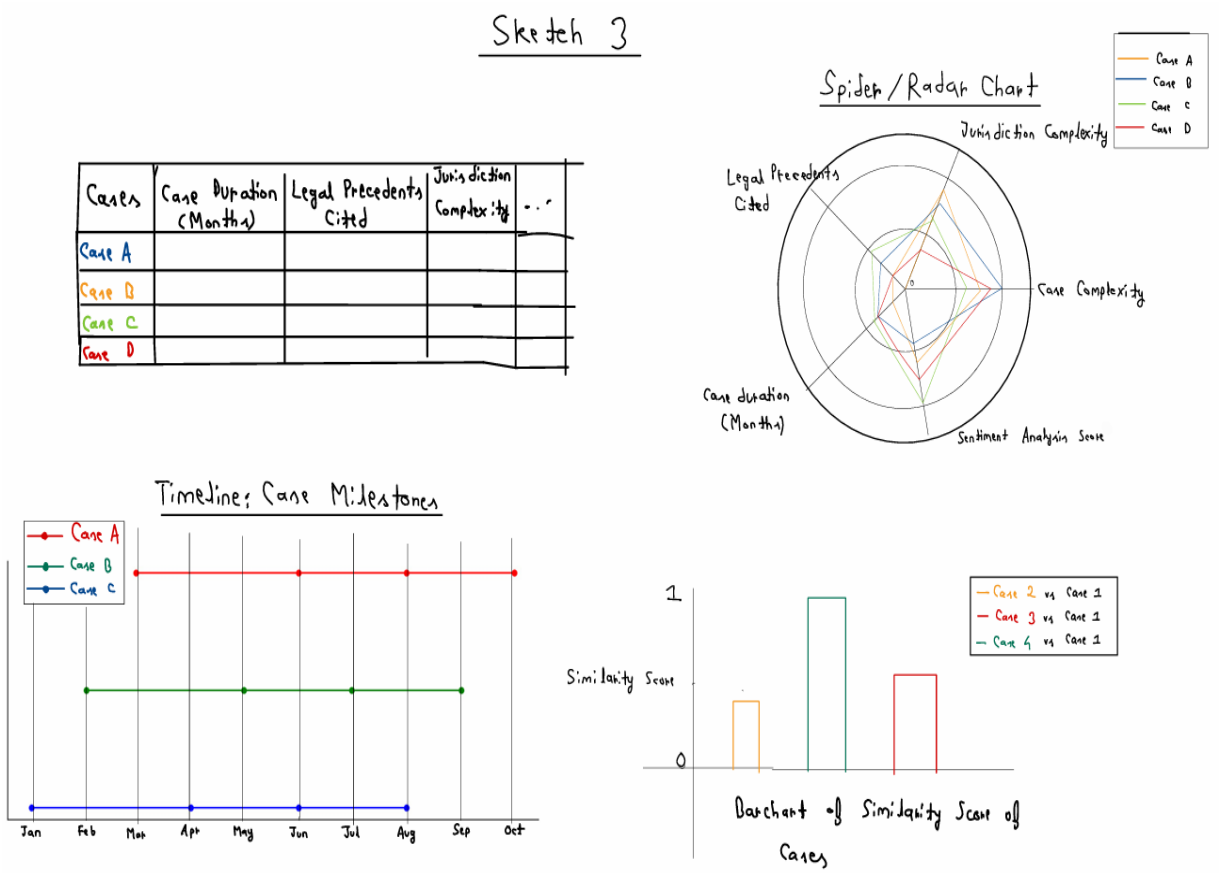

Fig03: A comparative analysis of legal cases using various visualization techniques.

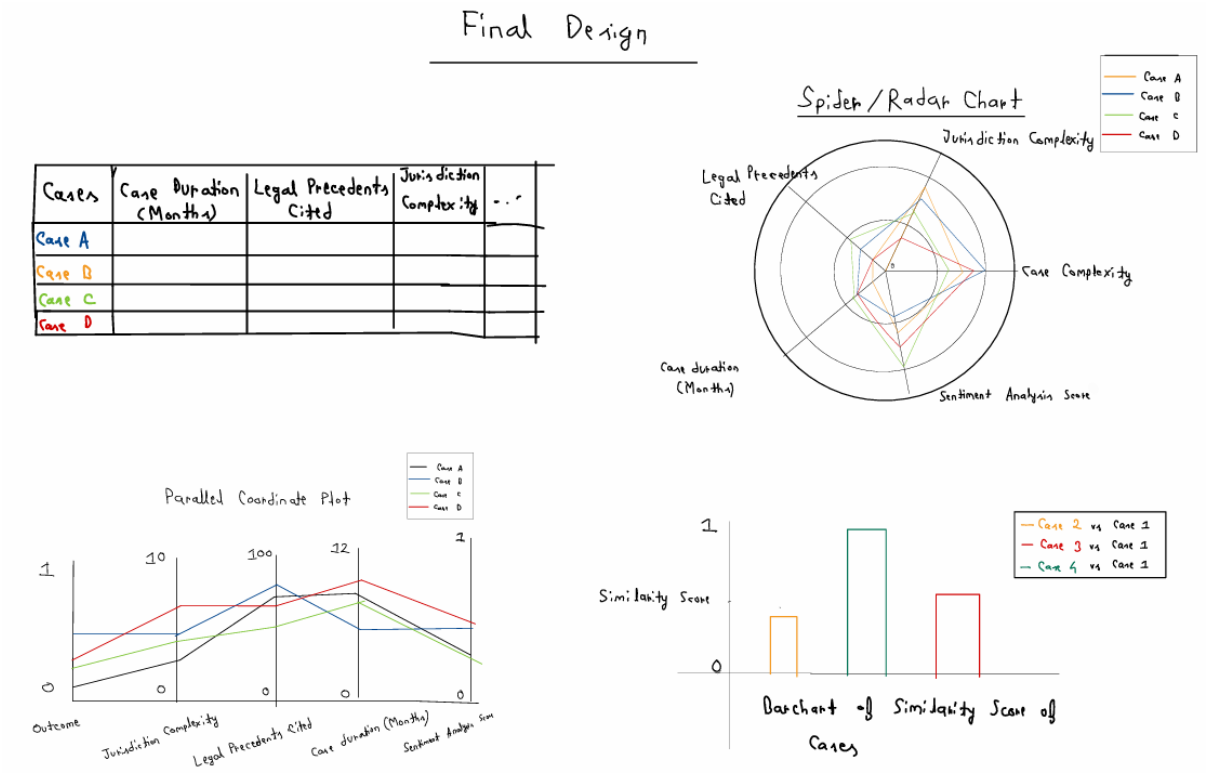

Fig04: An integrated approach to analyzing and comparing legal case attributes and outcomes.

6. Must-Have Features

- The ability to load and compare multiple similar cases.
- Clear visual representation of case outcomes and legal principles.
- Interactive filtering options (e.g., jurisdiction, time period) to refine the comparison.
- Display of case metadata (e.g., court, date, outcome) alongside the visualization.

7. Optional Features

- Integration of sentiment analysis to show how favorable or unfavorable certain sections of judgments are.
- Case summary tooltips when hovering over specific data points.
- The ability to export comparative visualizations for reports or further analysis.

8. Project Schedule

To ensure timely delivery, the following weekly milestones will be followed:

- **Week 1-2:** Finalize the topic and start data acquisition. Set up the web framework and backend for data handling.
- **Week 3-4:** Data preprocessing (cleaning, extraction of key information, and NLP tasks).
- **Week 5-6:** Develop three alternative prototype designs and get feedback.
- **Week 7:** Select and finalize the best design from the three prototypes.
- **Week 8-9:** Implement the final design and build the interactive features.
- **Week 10:** Testing and refinement based on user feedback and performance evaluation.
- **Week 11-12:** Final project documentation, evaluation, and preparation for presentation.