COM-480 Data Visualization Project

Milestone 2 Report

Group : PieChartMasters

1 Project Overview

We designed the structure of the website and selected datasets and visualizations to offer a broad overview of the 2008 financial crisis. The goal is to capture both the global and regional dimensions of the crisis through a variety of interactive visualizations, including animated world maps, regional heatmaps, bar charts, time-series plots of stock markets, and others.

The website is structured along two dimensions: a vertical scroll guides the user through major themes and events of the crisis — *e.g.* the evolution of mortgage defaults with key economic indicators, the global stock market crash, institutional failures, public sentiment, etc. — while horizontal scrolling reveals complementary insights and visualization.(A basic skeleton of the website is available on GitHub).

2 Visualization Sketches

2.1 First/introduction page

The idea here would be to have the title of the website with an image/map of the United State and, as the background, animated curves of crashing stocks.

2.2 Map of the mortgage default evolution in the United States

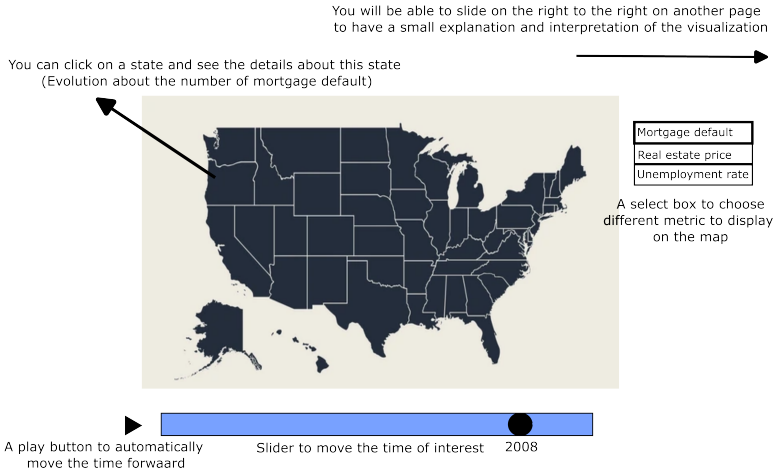


Figure 1: Draft map of the mortgage default evolution in the United States

This interactive visualization maps the propagation of mortgage defaults throughout the US during the financial crisis in 2008. By presenting spatial and temporal patterns of the spread in a interactive map, the intention is to achieve a better understanding of the progression of

the crisis and the relationship of the propagation to other indicators of the economy, including unemployment rate, real estate price, and other indicators.

The basic features of the visualization will be the interactive US Map, the time cursor, the play button, the color encoding and the ability to slide to the right on the description page (a common functionality to every section).

And **more complex and challenging features** would be : the indicator selector or the the possibility to click on a state revealing the specific time-serie of this state.

To perform this visualization, we will use the following : **JSON Data File** to load the data (Lecture 4), **D3.js** to draw the US map (Lectures 4 and 8), to bind data dynamically, to map elements and update visuals as the timeline progresses and to handle the color scales, tooltips, and transitions.- **User Interaction Tools** (Lecture 5) for the slider to control the date shown on the map, for the play/pause button for automatic timeline progression and for click events to explore individual state data in detail.

2.3 Words cloud on Google Trends

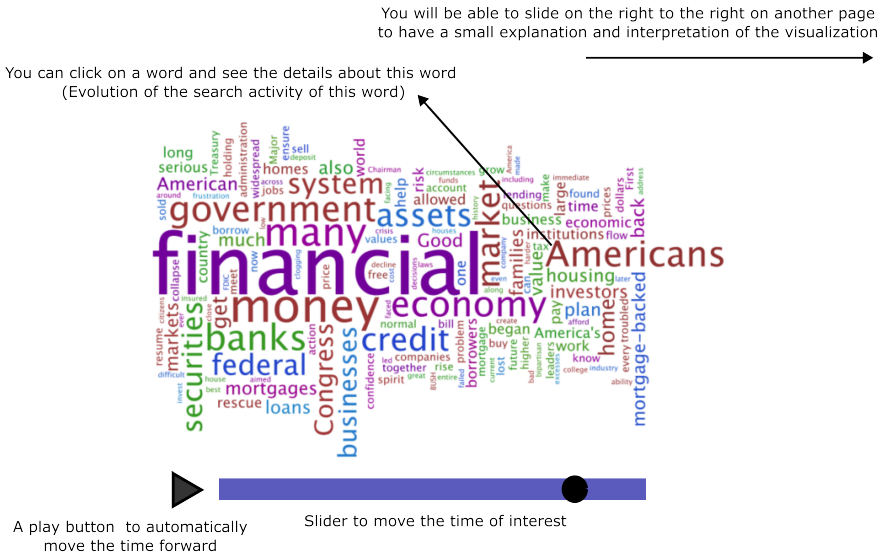


Figure 2: Words cloud draft on Google Trends

The interactive word cloud maps the Google search in the US during the 2008 financial crisis. The objective is to illustrate and project the public's concern, perplexity, and interest in the crisis displaying the most searched words over time.

The basic features of the visualization would be the dynamic word cloud, the time slide and the play button.

And **more complex and challenging features** would be to click on a word and display a time-series chart showing the search volume of that term over the entire crisis period. We could also perform a term frequency graph like the following figure :

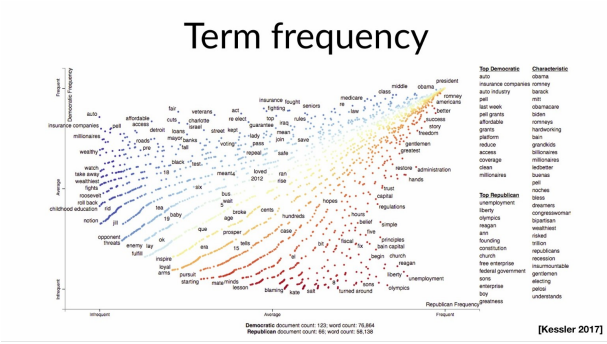


Figure 3: Term frequency graph example (from lecture 9)

To perform this visualization, we will use : **Google Trends API** to get the data and save it as a **JSON file** (Lecture 4),**D3.js** to create the word cloud (Lecture 4), and some **user interactions** (Lecture 5) like a slider to change the date of the data, or the ability to click on a word to see the evolution of the word over time.

2.4 A Global view of the effect of the crisis on the world economy

This global visualization aims to illustrate the worldwide impact of the 2008 financial crisis by showcasing changes across various indicators such as unemployment rate, poverty levels, national debt, and GDP. By presenting these dimensions through a dynamic, temporal map, the objective is to provide a broader perspective on how the crisis affected different countries over time.

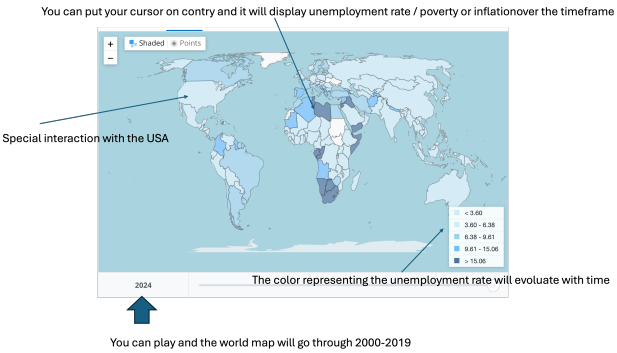


Figure 4: Draft of the dynamic world map with economic indicators

The basic features of the visualization will include a world map that evolves from 1995 to 2019, a time cursor, a play/pause button for timeline progression, and interactive tooltips showing time-series data for selected indicators (e.g., unemployment, GDP, debt) when having the cursor over a country.

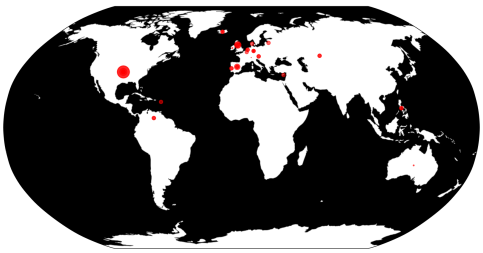
More complex and challenging features will include an indicator selector for customizing the data shown, testing and refining which indicators work best for the global view, and the ability to click on the United States to transition into a detailed state-level interactive map. This US-focused view will connect directly with the previously described "Map of the mortgage default evolution in the United States," but with extended indicators revealing the broader socio-economic impact per state. If possible, we would also like to implement **bonus features**, including clustering countries by similar unemployment trends, and providing a detailed view of Switzerland, similar to the in-depth exploration we plan for the U.S.

To develop this visualization, we will use: **CSV Data Files** to load the global data (Lecture 4), **Leaflet** to build the interactive world map (Lecture 8), and **D3.js** to handle transitions, time-series plots, and interactivity when hovering or clicking on countries (Lecture 5).

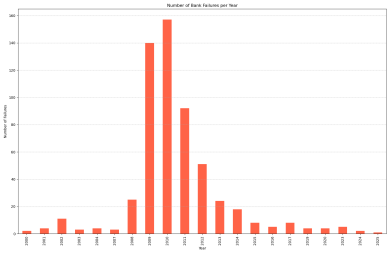
2.5 The Collapse of the Financial Industry

The aim of this section is to provide a global and regional perspective on the institutional failures that marked the height of the 2008 financial crisis. The first visualization is an animated world map displaying major financial institutions that either failed or were acquired, with the size of each bubble reflecting the cumulative size of the transactions within the corresponding country.

Paired with this is a detailed visualization of the wave of U.S. bank failures between 2000 and 2025, with a yearly breakdown. This bar chart enables users to identify when the crisis peaked and how long the effects persisted across the regional banking sector. It will be accessible via sliding to the right twice (the first slide leading to the analysis of the map).



(a) Dynamic world map of bank collapses.



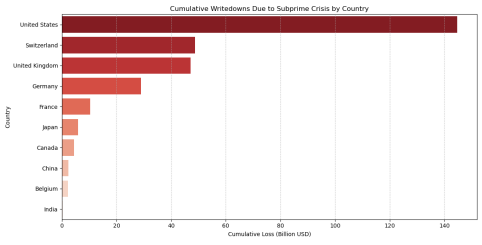
(b) Bar chart of U.S. bank failures.

Figure 5: Visualizing the institutional impact of the crisis, globally and within the United States.

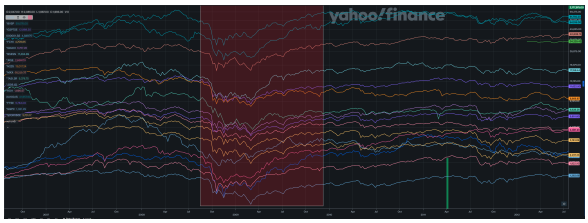
The minimum viable product will include an animated map of collapses with clickable bubbles and a bar chart showing the timeline of U.S. bank failures (using **.csv** data with **D3** and **Leaflet**, Lecture 4, 5 and 8). Possible extensions include switching the map scale metric (number of failures vs. size) and include a short story on each major collapses when clicking on a bubble (user interactions, Lecture 5).

2.6 The Stock Market and Institutional Exposure

This section highlights both the financial consequences for institutions and the broader market reaction. The bar chart on the left shows cumulative writedowns by financial institutions in dollars, grouped by country, and illustrates where the heaviest losses were concentrated. On the right, a normalized multi-line time-series tracks major stock indices from 2006 to 2009, revealing the staggered timing of the global market downturn and the time it took to go back to a normal trend.



(a) Cumulative financial writedowns by country.



(b) Stock index evolution (2006–2009), normalized.

Figure 6: Stock market dynamics and institutional losses during the crisis.

The minimum viable product would include an interactive bar chart and a time-series line chart with tooltips and normalized values (**D3**, Lecture 4 and Lecture 5). The main tools would be to switch between log and linear returns, focus on one or more index, change the time frame, etc. Possible extensions include more advanced analysis on the stock and ways of accessing to details on the banks that experienced the biggest writedown.