

CS416 Visual Narrative project

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For my project I decided to create a visual for a story that I've heard anecdotally before. The Story follows Bob, an investor who always gets his timing wrong by investing at market peaks, but also never touches his money after depositing, only letting it compound and grow. After all the investment blunders he manages to still become a millionaire. **The narrative for my project follows Bob's story with the message to novice investors to not try and time markets and don't withdrawal money because of economic downturns.**

The narrative structure I chose for this project was the martini glass structure. I chose to follow this structure not by going page to page, but rather through the progression on the same chart. By incorporating a button click the user is forced to go through 3-4 scenes before the final sidebar opens to users and they can interactively follow Bob's journey along with SP average values for the years mentioned. (**ISSUE:** something in the last day or so and the button no longer clicks initially, please hover over first datapoint then click)

Since this is a more complicated story the visual structure had to re-enforce the narrative, while also showing the SP500/economy at the time. The easiest way to do this was to first show a line graph (with title explaining axes) of the SP500 over the years (I used average, but had I done this again I'd probably use year-end closes) and stitch Bob's story along with the story of market crashes in throughout the years. This is done by both having a narrative box explaining Bob's story, and annotation boxes to give some context of Bob and the period in history. Altogether, you get a scene-by-scene visual mapping of the SP500 with background narrative on Bob and annotations on major market events. In addition to this, there is also hovering which allows the user to view key values in the S&P, the overall economy, and Bob's money. By reinforcing Bob's story in the narrative, hovering, and annotations, you get a good background on what is going on quickly in the first scene, then scene by scene you can pinpoint where the narrative is occurring by looking at the annotations. This ensures the user is well informed as they are moving through the scenes and the buttons for navigation are clearly labelled.

The scenes are strategically set up to highlight and guide the user. The narrative box (upper left) is bold, filled in, and bordered. This draws the viewer's eyes there first for background context. The graph also starts off mostly empty, except for the first point and annotation setting up more context around "Bob". This initial minimalist approach (Tufte) helps the reader orient and adjust to the annotations and layout before populating the graph with points/lines. Finally on the bottom left is the button to advance. This is made smaller and hopefully is noticed last. As the viewer progresses more annotations pop up and the narrative background box changes. Old annotation boxes still stay visible, and the axes are fixed, so as to keep the viewers oriented to the

graph/information. Given this data is continuous the button clicks simply add more data, annotations, and information onto the screen without zooming/filtering. After a few button clicks the entire set of data is displayed and an additional slider appears to allow the user to navigate back and forth on other points in history. The user can also hover along the way to find out more information about a particular year.

The scenes in my visualization occur on the same chart as suggested in the prompt. They also follow a chronological and continuous change from scene to scene. The first scene is a minimalist view of one point on the graph. This absence of data makes the reader more fully fixate on the narration info-box and the first annotation. Clicking on the advance button from here fast forwards to 1965 with 1 more annotation box and a changed narration in the infobox. The thought was to slowly add in annotation boxes so as to not overwhelm the viewer. The next scene introduces a fast forward to 201X along with 3 more narration boxes. This might be more hectic, but in playing with single annotations it felt repetitive to add these 1 by 1 being much closer in time periods. The viewer also should be oriented to the annotations by now and can comfortably read at their leisure. The final scene shows SP500 inflation adjusted data up to 2023 and adds one final annotation box (along with updated narrative). It also unlocks the slider bar to allow free exploration of a year by year advancement/decrement (also allowing a quick reference in the info-bar to see Bob's Money without the need to constantly hover).

For annotations, d3.annotations library was used via hosting from cloudflare. These annotations were set up using an angled elbow annotation (annotationCalloutElbow). This seemed the cleanest options as the wavy line boxes felt distracting. An elbow extends from the point in time to an annotation info-box with title explaining the market peaks, and body explaining narrative on bob's investment with context around the impending crashes. The annotations themselves don't change scene to scene, but the boxes are added to each scene. The info-box narration (top left) does change scene to scene to give more info around total wealth and additional information.

Several parameters were used to help with updating/redrawing the graph. The two main parameters are "buttonclicks" and slider indexes and define what data/info and states are shown on the page. Buttonclicks were counted from page load to increment and update the data shown in the visual. Buttonclick counts were also used to change the narration in the info box and sync the annotation boxes with the data shown. At the end, buttonclick count unlocks the slider allowing for free play. slider increments are then used as a parameter to sync with the total number of years displayed. Sliding back and forth increments/decrements the number of data points shown and the number of annotation boxes displayed. Buttonclicks only progress the data whereas the slider increments allow the user to go backwards and forwards. Other minor parameters include hovering and changing circle size

The two main triggers are clicking the "advancing" button, hovering over points, and moving the slider increments. The button click affordance was simply a button describing what it does and

a coloration when hovering over it. The button is minimal so as to not distract from the messaging in the current scene, but still very visible and explanative. Hovering was a little less subtle and an annotation box was used in the initial scene to tell the viewer they can hover over points. This drops out in the subsequent advancements so as not to be a distraction throughout. The slider appears with clear blue contrast to the rest of the graph with a bubble node indicating it can be clicked and moved. A title was created for this but not being able to use the d3 slider library made it more difficult and I had trouble displaying it.

Please see the additional readme in my github (<https://github.com/aravni2/aravni2.github.io>) for some methods around calculations, adjusting for inflation, and the resources. It's important to note that the inflationary/deflationary years changed the context of Bob's total money compared to the SP500 adjustment for those years. There were also multiple sources of data stitched together for the years and although they use similar consumer price indexes, using inflation adjusted amounts affect the total growth % and wealth of Bob, even in declining years.