

CS416 Narrative Visualization Project Essay

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Link to the Visualization slide show: <https://guhaindranil83.github.io>

Data source: <https://catalog.data.gov/organization/hhs-gov>

Messaging

This narrative visualization is looking into the provisional data on covid-19 deaths within United States to show how US population by age group has been effected by covid-19 and what are the common underlying medical conditions that was involved in the death toll within USA. Furthermore we are looking into how USA has administered vaccines over the covid time line and how does that help to encounter this death tolls over the covid duration between January 2020 and June 2023. It also provides user to interact with the data related to covid death trend for each state within USA and/or any Age group of interest. User can also use a slider to select a date range of their interest to see the death trend chart for the specific selections.

The narration is broken down in three scene, one slide per scene.

Scene1: This scene includes two interactive bar chart. 1st bar chart is showing the overall death counts in USA by age group – 0-24 Years, 25-34 Years, 35-44 Years, 45-54 Years, 55-64 Years, 65-74 Years and 75+ Years. Percentage of deaths for each age group is shown over tooltip on mouse over. 2nd Bar chart is showing the death counts on overall population of USA by the underlying medical conditions reported in the death. The percentages of deaths for each medical condition is available for user at the tooltip on mouse over.

Message being delivered from scene 1:

Q. Which age group receive the most fatality? What is most common medical condition involved in covid death?

A. 77% of deaths are within 65+ age group shows the older people are most effected population. Only 1% of deaths reported within 0-34 age group showing kids and young adults were not severely affected. The most common conditions for Covid deaths includes - Respiratory, Heart diseases, Diabetes.

Scene2: This scene includes a dataset for vaccine counts administered and the monthly total vaccines administered is plotted against the time scale to explain the pattern. The second line chart plots monthly total death counts over the same time scale to visually compare how vaccines administered trend is related to the death trend chart. These charts

are also interactive as user can mouse over and see the vaccines counts and death counts for the months in the covid time scale.

Message being delivered from scene 2:

Q. How United States administered vaccines to encounter covid-19 over the covid timeline between Jan 2020 to June 2023?

A. US administered most vaccinations during the first half of covid however the total death counts could not be controlled until April 2022. Total count of vaccinations administered by US as of May 2023 is **13,033,446**(13M). These two chart on same time scale also draws attention on the vaccination administered trend in comparison to various peaks of covid-deaths during different time period when the three major covid variants Alpha, Delta and Omicron were causing the infections. It also shows Omicron variant was less fatal than its predecessors in terms of death tolls.

Scene3: This scene is purely interactive where user can choose various parameters such as US State, Age Group and Date Range and drill down the dataset to see the death trends for the selections. The default view shows the death trend chart for all States and overall population over the full time line for covid Jan 2020 to June 2023.

Message being delivered from scene 3:

Various covid related events has been called out on the time scale on which the chart has been plotted and let the user interact the data by selecting the data range of their interest along with the other filters on State and Age group.

Narrative Structure

This presentation is an Interactive slide show (no animation, user need to click individual slides)

Messaging:

The narrative messages has been delivered on the overall dataset on scene 1 and scene 2 with annotations about the observations and inferences. 3rd scene is looking at the death trend chart over a time period per user's filter selections.

User Interactivity:

There are three slides per scene and CSS buttons on the top that user can click to go to any specific slide. User can mouse over to the bars in the first scene to see the percentage breakdowns of deaths by Age and Medical conditions. On Scene 2 the user can mouse over to the scatter plots to see the exact death counts on a particular month on the time scale. And third slide has the most user interactivity as it provides option to filter the data by

State and Age group and also a date range can be selected on the slider and can deep dive into the dataset.

Visual Structure.

Q. What visual structure is used for each scene? How does it ensure the viewer can understand the data and navigate the scene?

There are three scenes in this presentation each scenes are slides and ordered in the form of a slide show. Each scenes starts with the messaging section on the top describing the scenes and key observations. **Scene 1** contains two interactive Bar charts to breakdown the overall covid death counts by Age group and Medical Conditions. X and Y axis for the plotting has been labeled to clearly show the counts on the top of the bar and percentages are available on tooltip for user to mouse over. Annotations used to deliver the key highlights about the view of the data. **Scene 2** is another slide is two scatter plots connected with a line to show the trend about the vaccines counts and deaths counts. Both chart has been shown separately using the same time scale so user can draw a correlation. All axis are labeled and annotations used to deliver the key highlights about the data view. **Scene 3** contains dropdown lists for user to choose a state or age group to interact with the dataset, a date slider has been given on top of the death trend chart using the same X-axis scale for better user intractability. Also, to add more details each date where some event occurred that may have some user interest about the topic to help them guide through the date slider. All axis has been labeled, exact coordinates of scatter plots are available for user at tool tip on mouse over.

In addition to the specified, all slides has the same visual structure, background colors, font sizes and other visual attributes to keep the user oriented.

All these would help user to keep oriented throughout the navigations of these slides.

Q. How does it highlight to urge the viewer to focus on the important parts of the data in each scene?

A. In the top messaging section, a pointer is given to indicate the user interactivity elements in the slide such as filters, sliders, mouse overs etc. Annotations are made to highlight the key messaging and observations. All the axis are labeled to keep user aligned.

Q. How does it help the viewer transition to other scenes, to understand how the data connects to the data in other scenes?

A. This is a slide show (with no animations) and buttons are provided on the top of each slide to guide user to transition from scene to scene, these buttons are named as “Scene-1”, “Scene-2” and “Scene-3” to keep user oriented about the ordering of the slides.

Scenes.

Below are three scenes in the slide show. These scenes are ordered by providing CSS buttons for users to click on each slide, these buttons are names as “Scene-1”, “Scene-2” and “Scene-3” to made the order self-explanatory.

Scene1: This scene includes two interactive bar chart. 1st bar chart is showing the overall death counts in USA by age group – 0-24 Years, 25-34 Years, 35-44 Years, 45-54 Years, 55-64 Years, 65-74 Years and 75+ Years. Percentage of deaths for each age group is shown over tooltip on mouse over. 2nd Bar chart is showing the death counts on overall population of USA by the underlying medical conditions reported in the death. The percentages of deaths for each medical condition is available for user at the tooltip on mouse over.

Message being delivered from scene 1:

Q. Which age group receive the most fatality? What is most common medical condition involved in covid death?

A. 77% of deaths are within 65+ age group, only 1% of deaths reported within 0-34 age group showing kids and young adults were not severely affected. The most common conditions for Covid deaths includes - Respiratory, Heart diseases, Diabetes.

Scene2: This scene includes a dataset for vaccine counts administered and the monthly total vaccines administered is plotted against the time scale to explain the pattern. The second line chart plots monthly total death counts over the same time scale to visually compare how vaccines administered trend is related to the death trend chart. These charts are also interactive as user can mouse over and see the vaccines counts and death counts for the months in the covid time scale.

Message being delivered from scene 2:

Q. How United States administered vaccines to encounter covid-19 over the covid timeline between Jan 2020 to June 2023?

A. US administered most vaccinations during the first half of covid however the total death counts could not be controlled until April 2022. Total count of vaccinations administered by US as of May 2023 is **13,033,446**(13M). These two chart on same time scale also draws attention on the vaccination administered trend in comparison to various peaks of covid-deaths during different time period when the three major covid variants Alpha, Delta and Omicron were causing the infections. It also shows Omicron variant was less fatal than its predecessors in terms of death tolls.

Scene3: This scene is purely interactive where user can choose various parameters such as US State, Age Group and Date Range and drill down the dataset to see the death trends for the selections. The default view shows the death trend chart for all States and overall population over the full time line for covid Jan 2020 to June 2023.

Message being delivered from scene 3:

Various covid related events has been called out on the time scale on which the chart has been plotted and let the user interact the data by selecting the data range of their interest along with the other filters on State and Age group.

Annotations.

Q. What template was followed for the annotations, and why that template?

A. Label annotations has been used across the scenes with Line connector and arrow end. Annotations are used in this presentation to highlight the key messaging and notes about the dataset under consideration.

Q. How are the annotations used to support the messaging?

A. Annotations are used in this presentation to highlight the key messaging and notes about the dataset under consideration.

Q. Do the annotations change within a single scene, and if so, how and why?

A. No. All annotations are fixed to highlight the key messaging.

```
const annotations1 = [
  {
    note: {
      label: "77% of Total deaths are in older people of age group 65 and above. Childrens and kids received least fatality due to covid (1% of total deaths).",
      bgPadding: 1,
      //wrap: 30
      //title: "Annotation title"
    },
    connector: {
      end: "arrow", // none, or arrow or dot
      type: "line", // Line or curve
      //points: 3,    //Number of break in the curve
    }
  }
]
```

```

        lineType : "horizontal"
    },
    x: 550, y: 80, dy: 10, dx: 10,
    color: "#444444"
    // type: d3.annotationCalloutCircle,
    // subject: { radius: 30, radiusPadding: 1 }
    // type: d3.annotationCalloutRect,
    // subject: { width: 10, height: 20}

}
];

// Add annotation to the chart
const makeAnnotations1 = d3.annotation()
    .annotations(annotations1);

document.fonts.ready.then(function () {
    d3.select("svg")
        .append("g")
        .attr("class", "annotation-group")
        .style("font-size", "80%")
        .call(makeAnnotations1);
});

```

Parameters

Q. What are the parameters of the narrative visualization? How are the parameters used to define the state and each scene? What are the states of the narrative visualization?

A. The parameters in this narrative visualizations are following:

Scene number : The numbers are associated with the CSS buttons on top of each slide, “On click” the corresponding html page will be rendered on the browser.

State Filter : Scene 3 has the drop down list to choose state from the list and the death trend chart is rendered for that selected state.

Age Filter : Scene 3 has the drop down list to choose a age group from the list and the death trend chart is rendered for that selection.

Date Range : Scene 3 has a date slider where user can select a date range and the data is filtered for that specific date range to render the chart below.

The state machine is available on scene-3 where the data on the dataset is being filtered based on the choices user made on the slide to render the chart accordingly. Also, On click of the button the respective html page is rendered on the browser so this can also be stated as a state machine.

Triggers

Q. What are the triggers that connect user actions to changes of state in the narrative visualization?

Following triggers are used:

1. Each slide has three buttons, **“On Click”** of each button the corresponding page will be rendered on the browser.
2. Each slide has **“On Mouseover”** and **“On Mouse Out”** event listener to appear and disappear the tooltip information respectively.

```
3. .on('mouseover', function (d, i) {
4.     d3.select(this).transition()
5.     .duration('50')
6.     .attr('opacity', '.65');
7.     div.transition()
8.     .duration(50)
9.     .style("opacity", 1);
10.     let num = (Math.round(((d.totdeaths / x1_tot) * 100), 2)).toString() + '%';
11.     div.html("% of Deaths: " + num)
12.     .style("left", (d3.event.pageX + 10) + "px")
13.     .style("top", (d3.event.pageY - 15) + "px")
14. })
15. .on('mouseout', function (d, i) {
16.     d3.select(this).transition()
17.     .duration('50')
18.     .attr('opacity', '1');
19.     div.transition()
20.     .duration('50')
21.     .style("opacity", 0);
22. });
```

23.

24. Scene-3 has 2 dropdown selection button for State and Age. “**On change**” of selection event listener is defined to use the user selection and filter the data and render the chart with filtered data.

```
25.     d3.select("#selectButton1").on("change", function(d) {
26.         console.log("change option 1");
27.         // recover the option that has been chosen
28.         stateFilter = d3.select(this).property("value");
29.         // run the updateChart function with this selected option
30.         console.log(stateFilter);
31.         console.log(ageFilter);
32.         data = filterandRollup(saveData, stateFilter, ageFilter, startDate, endDate);
33.         console.log(data);
34.
35.         drawChart(data);
36.
37.     });
```

38. Scene-3 has a slider range for user to select a date range and “**on change**” event listener is defined to use the user selection and filter the data and render the chart with filtered data.

```
sliderRange.on("onchange", val=> {
//var dater = d3.select(this).property("value");
console.log('slider:');
startDate = parsedate(val[0]);
endDate = parsedate(val[1]);
console.log(startDate);
console.log(endDate);
console.log(data);
data = filterandRollup(saveData, stateFilter, ageFilter, startDate, endDate);
console.log(data);

drawChart(data);

});
```


39. Also the call back functions for the axis are triggers as it is changing the state of with the scale being passed as a parameter.

```
40. d3.select('svg')  
41. .append("g")  
42. .attr("transform","translate(150,310)").call(d3.axisLeft(y1));
```

Q. What affordances are provided to the user to communicate to them what options are available to them in the narrative visualization?

On scene-1 and Scene-2 user can see the tooltip information on mouse over, a message is provided in the top messaging section to indicate mouse over option is available for them.

On scene-3, along with mouse over they can use the two dropdown selection button to select any option from the list and also can use the slider range to select a date range. The two filter for State and Age and the date slider user can use in any combination, the event listeners are handles to render the chart for only selected data.