1. Overview

This visualization uses **interactive slideshow structure** which takes the user through the Dataset of the Google Review Analysis in the year of 2019. The dataset itself aggregates user rating for more than 10,000 Applications from the Google Play Store. However, due to the consideration of loading time, this analysis filter the data to the size of 2,000. This main purpose of this visualization is to focus on the Content Rating applied to different age groups. In particular, how would Apps in Google Play Store be impacted by the content rating they received from official children protection institutions. The impact includes the score rating as well as number of downloads. In this analysis scope, the content rating includes 18+, 15+, 7+(mature) and everyone(all-age).

2. Messaging.

What is the message you are trying to communicate with the narrative visualization?

- The high-level overall view shows that there is a negative correlation between the number of published Apps in market verses the level of content restriction. In other words, as the application is available to a wider range of users in different ages, then the restriction is more lenient, thus there are more author publishing to the Google Play Store
- As the distribution shows regarding customer rating (scaled from 1 to 5), as the application is more restricted to mature people (e.g. 10+ or 18+), the average customer rating tends to be lower. On the contrary side, when the application contains fewer restricted content, the review is less controversial and most people opt to rate 3 or 4 stars
- As we partition the number of free applications and the number of paid applications, such as the separation in Google Play Store, we found that there are more applications with age restriction. In particular, most of the free application are welcomed to all age people, while the proportion of age restricted applications takes a greater occupation for paid Apps in terms of number of installations

3. Narrative Structure.

Which structure was your narrative visualization designed to follow (martini glass, interactive slide show or drop-down story)? How does your narrative visualization follow that structure? (All of these structures can include the opportunity to "drill-down" and explore. The difference is where that opportunity happens in the structure.)

- **martini glass show.**

The overall schema of the website is a serial of slide shows, which covers the topic of the analysis, the source of the dataset as an introduction to the visualization. These are purely **author-driven**, in other words, users are not allowed to freely dive deep into the areas they are interested in the first several slides.

Then when the page reaches the overview display page(bubble-page), then the use can choose in what dimension they want to view and group the data. Whether it's by rating star or by content rating(age), and they can choose whether they want to see free Apps or paid Apps in the bar char. Those drill-down activities are all followed by an understanding of the problem itself.

As an summary, since the transition to explore happens in the middle of the slide show, and there is no ability to drill-down in first 3 slides, this is a martini glass show.

4. Visual Structure.

What visual structure is used for each scene? How does it ensure the viewer can understand the data and navigate the scene? How does it highlight to urge the viewer to focus on the important parts of the data in each scene? How does it help the viewer transition to other scenes, to understand how the data connects to the data in other scenes?

I used the bubble chart structure and stacked bar chart, which I think it will help the user focus on the aggregation. As the user dives deep, they have the ability to go from macro to details. To simplify the scene, I didn't provide user much information from the overview and the limited buttons will direct user," Hi, this is the way to go deeper and group the elements".

The viewer can understand the data by simply hover at each element, since I provide tooltips to all of my scenes, for the navigation part, I provided a navigation bar at the right which can help user navigate to their interested information. Inside each of the scene, I also provided buttons for users to take full control. In the bar chart, I highlighted users' mouse hover in red because I want to prevent them to loose in track in the stacked bar chart.

In the bubble chart, the color difference is my way of highlight of the separation of different content age groups. Meanwhile, I provided annotations in light color to ensure users are on the same track of my designed key take-away.

In the bubble chart, all the three transitions are used within one chart, which guarantees the users have the same color and convention between the scenes. In the bar char, I also used the same categories, same age groups as well as the same color scheme.

5. **Scenes.**

What are the scenes of your narrative visualization? How are the scenes ordered, and why

The scenes are **linearly** ordered.

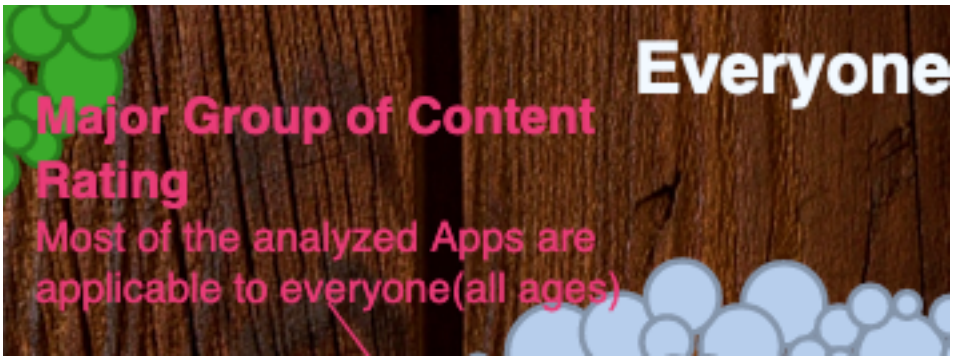
The scene is ordered from generic to specific. After know what problem the analysis is tackling, user will first see an overview of all Google Play Application data, and then the size of the circles will give me an idea on the major ones, and the color will show them what are the categories we are examining. Afterwards, the user will go to the staked bar chart, which is multi-dimensional, so they can cherry-pick filter the attributes they are interested in.

The top-down structure is defined by the author because I intend to walk them through the process to partition and aggregate all the individual Apps and the way to find the patterns.

6. **Annotations.**

What template was followed for the annotations, and why that template? How are the annotations used to support the messaging? Do the annotations change within a single scene, and if so, how and why

The annotations follow a enter()-transition()-exit () template. In the code, I defined when I want the annotation to appear. For example, in the bubble chart, I let the light-color annotation pop up when the user start partition by the star (1-4). There is also a transition period, 750ms, that the annotation must wait until all the points floating to its gathered center. Lastly, once the user wants to go back to the overview or switch to another view, the annotation will disappear immediately.



In the bubble chart, the annotation together with the tooltips deliver the key message I want to convey to the user. That is, “Most of the analyzed Apps are applicable to everyone (all ages)” as well as "Most of the reviews have ratings at 3 or 4".

In the bar chart, the annotation includes the legend to show the color pattern for user to distinguish the stacks. Also the number of aggregated installation on top of each bar shows the overall number of downloads for each specific age group.

Annotations do not change within a single scene to keep the consistency for users. However, they do switch between scenes to accommodate to the switch of different types of presentations and dimensions.

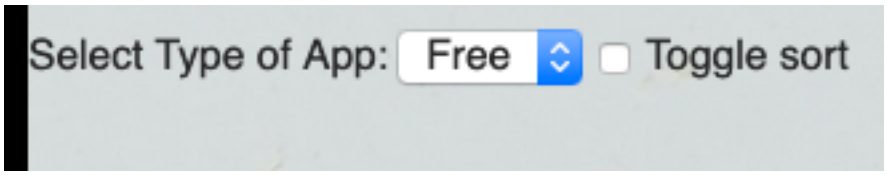
7. **Parameters.**

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

Both parameters and triggers are used in all visualizations.

In the bubble chart, the parameters are the x,y coordinate of the central points(gravity points) of different age groups. It depends on a which group a data record falls into, to obtain the central gravity point associated to the data point. As user switch between “all”, “grouped by content rating” and “grouped by stars”, the parameters change for each individual App’s data point

In the bar chart, parameters are set to be the Type of the App(Free or Paid). The parameter are changed depends on what type the use is interested. This also determines what is the domain for the bar chart. The other one is a Boolean parameter whether the user wants the data to be sorted.



8. **Triggers.**

What are the triggers that connect user actions to changes of state in the narrative visualization? What affordances are provided to the user to communicate to them what options are available to them in the narrative visualization?

In the bubble chart, the trigger is the clicking activity of the button. There are 3 states of the scene, and it’s set to state 1 by default, where the user click on the buttons, the state of the graph switches between 1, 2, 3.

- To give user affordance, a button has been set to different display schemes when it’s clicked or not-clicked. At the beginning, to alarm the user that the button is clickable, the current state is by default set to white to distinguish from the non-active state color.

In the bar chart, the trigger is the drop-down menu and the click box. Both controls how the what and how the data will be displayed via the bar chart.

- The dropdown menu is also illustrating there are options applied to the bar chart graph.