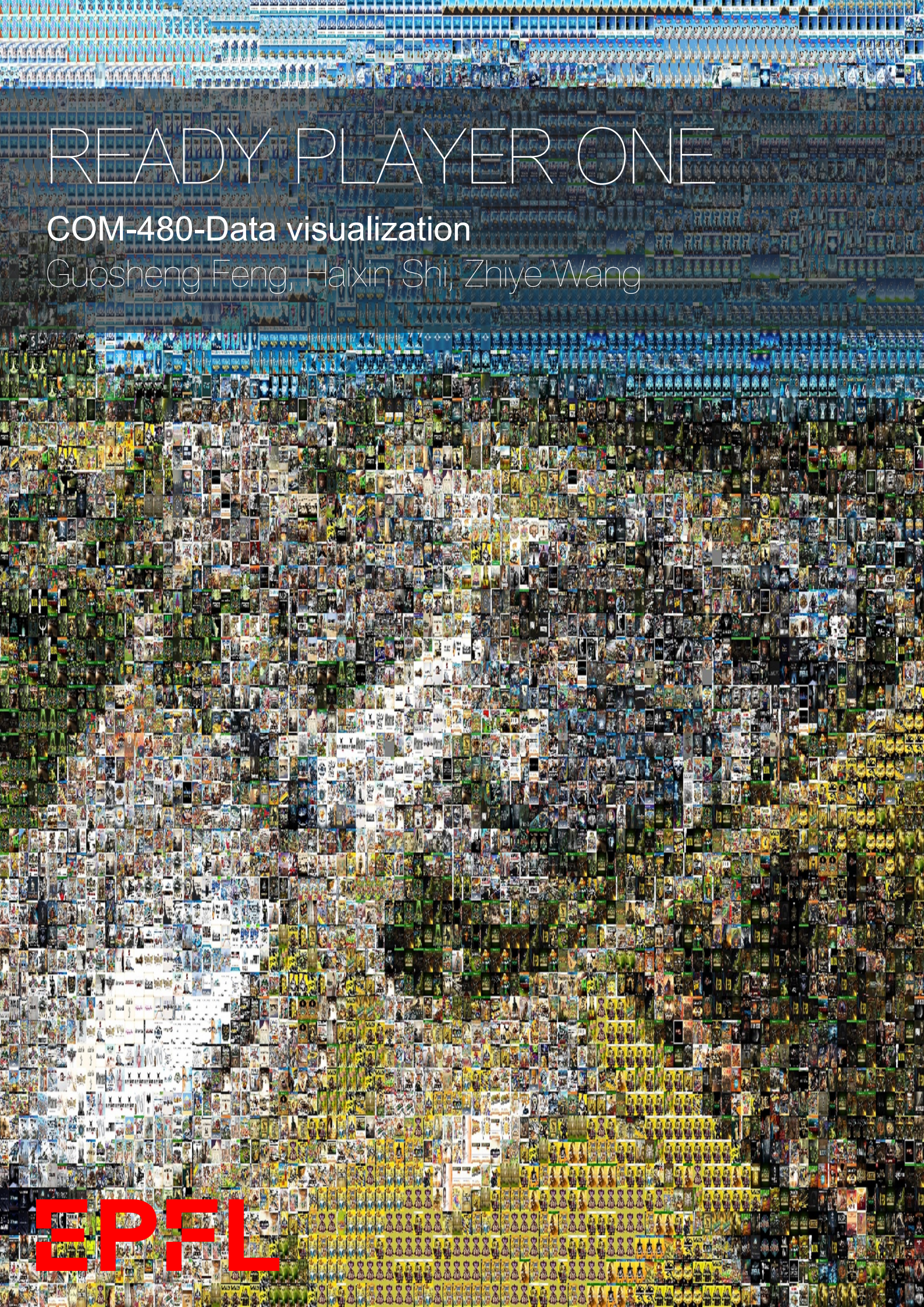

READY PLAYER ONE

COM-480-Data visualization

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EPFL

0.1. Path For Our Project

- **At the Initial period:** We first held a bunch of meetings together and brainstormed some questions:
  - **Our topic:** Which dataset should we worked on? Thanks to Kaggle.com so that we can get in touch with many datasets. All of us have an almost maniacal love of computer games so we made our decision to set up a website with an overview introduction about video game industry.
  - **Our modules:** What we want to present for our users? As game lovers, we want to know about who develop games, on what platform do the games run and any recommendation games for me. We made a preliminary plan for the function of the modules.
  - **Our analysis:** How do we analyze this huge amount of data? Python is a convenient tool to process and analyze the data. We noticed that the url column involved in the dataset can be used to crawl a lot of additional information such as release time, picture, and video. So we first filled in the missing data by crawling and then analyzed the data statistically like mean, medium, count, unique etc.
- **At the Sketch period:** Once we made up our ideas, we started to design and sketch our modules and an overall design of our website. We had a deep thought about through what kind of tables and charts can we best convey the message and meaning to our users. Modules should be designed for their purpose, to be interactive or informative and to be colorful or concise.
- **At the Implementation period:** We found some great templates on Observable gallery, which matches what we want to visualize.
  - **Integrate introduced templates** We first remove the useless components in the template and put it into our website at the approximate place as we designed in sketch.
  - **Load our data set** We tried to use d3 to load our data set and share a common loading and processing data function between modules.
  - **Develop new features** After ensuring that the data can be fed successfully, we started to develop our own features like showing games cards, dashboard for games information and keywords cloud.
  - **Optimize our product** When we finish all the functions we need and the graphs can responds correctly, we try our best to polish the visualization effects, which is mostly based on modifying the css files and we also did some extra work on animation and shadow effect which are implemented by events listener such as mouse-over and mouse-click
- **At the Report period:** We would like to tell a good story with our website no only through paper report but also through a vivid video. We split our team into two parts: Guosheng tries to make a fancy video to present our product while Zhiye and Haixin tries to demonstrate our product in detail in the report. In the explanation of each graph, we would cite what we thought and designed previously and then what kinds of changes we make and corresponding convincing reasons. What is more, we would talk about what kinds of changes we met during the implementation process.

0.2. WHO ARE THE TOP GAME COMPANIES?

At the beginning, we design a graph(in Figure 1) to demonstrate the information of top game companies in terms of how to use it, what is its role, and what we may improve it in real implementation:

- **Introduction:** Every bubble represents a company and the size of each bubble means the number of games that corresponding company publishes. When we move our mouse to a specific company, the circles with mouse on would become large; and at right side there would appear top 6 games of that company. When we move out the mouse, the size of circle would return to normal size and the games would disappear;
- **Functionality:** This graph can vividly show the circulation as well as market share of different game companies. What is more, for a specific game, you can find the most popular games published by it so as to have a basic impression on it;
- **Expectation:** For the final product, we want to change the color of bubbles into the logos of corresponding companies. Besides, we would provide the real data of a specific company when moving mouse on it.

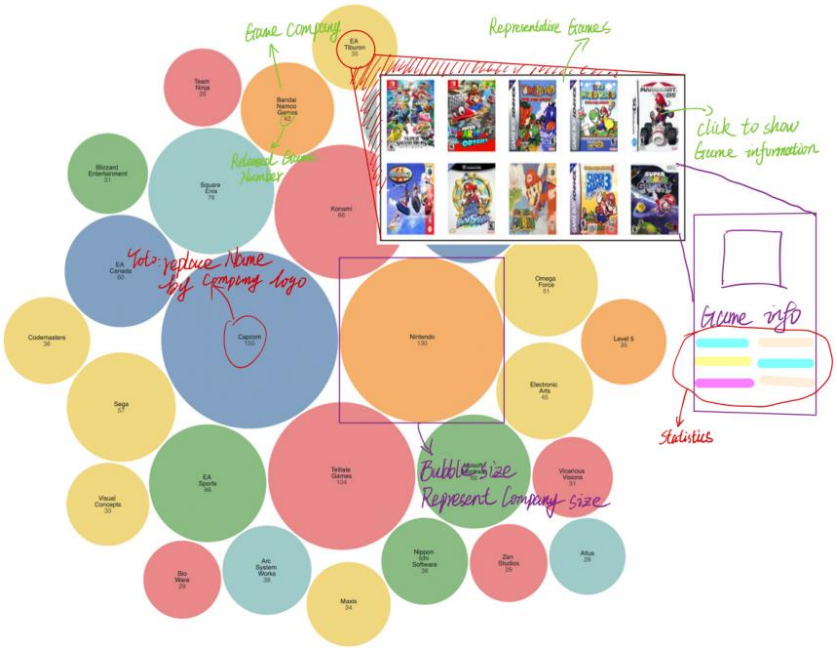

Figure 1: Design Draft Of Top Game Companies Graph

- **Changes:** In Figure 2, we achieve what we mentioned in previous design session(). Besides, we innovatively think that we should split the space into three columns so as to deliver more information via vivid visualization: we can click the company icon to get the information of it at right side, while clicking the game icon in the right sidebar to show its information and video.

Figure 2: Implementation Of Top Game Companies Graph

For challenges, we devote our effort to deal with css formats and mouse-event-related animations, which set basic style for following charts!

- **Center Main Graph:** We add images on the bubbles while automatically adapting the size; what is more, the bubbles would not overlap with each other after carefully tuning.
- **Information Column:** On left and right column, we design the red rectangle right before key the to hightlight the the region such as name and release date, and we also tune the box to show value for each key. For the long description, we use the scrolling bar to compress the space to contain more information.

- **Video:** We want to make our website fill with wonderful media, so we challenge ourselves to add the video at the left column.

0.3. MAYBE SOME RECOMMENDATION?

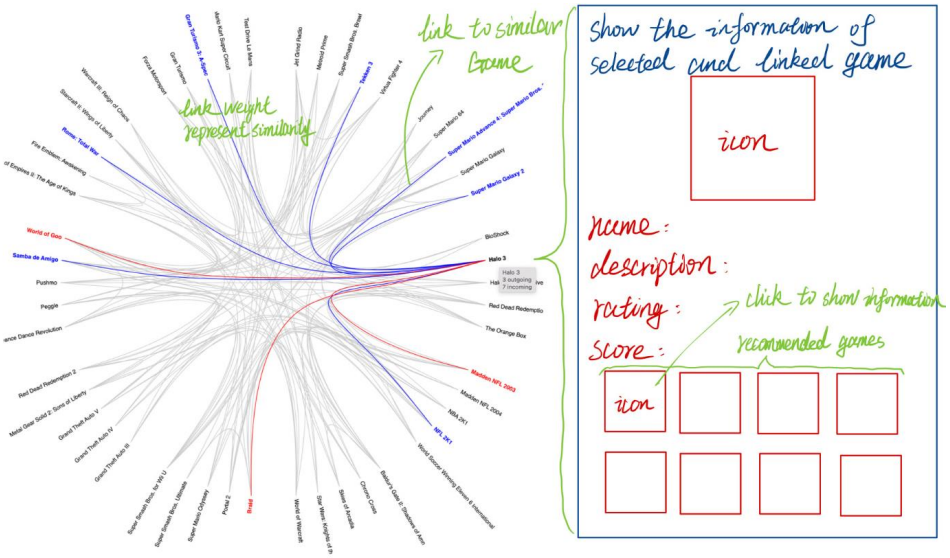

Figure 3: Design Draft Of Similar Game Recommendation

At the beginning, we design a graph(in Figure 3) to demonstrate the information of similar games in terms of how to use it, what is its role, and what we may improve it in real implementation:

- **Introduction:** In the circle, a group of points represents the games from a company. The links between points represenst similarity between two games with respect to genre, rating(E, M, T etc), and type(multi/single player). When we move our mouse to a point, it would hightlight links from this point to other points, namely games;
- **Functionality:** This graph can help game players to find out some games that are similar to their favorite games. Besides, it can also help companies to find their competitors. As for investers, they can have a better understanding of the games that they invest;
- **Expectation:** For the final product, we want to deliver more information via the links like the similarity ratios corresponding to genre, rating(E, M, T etc), and type(multi/single player).
- **Changes:** In Figure 4, we achieve what we mentioned in previous design session except delivering information via links. The reason we dropped this idea is that it would be annoying for users to recognize changes via purely thin links in terms of shape or color. Instead, we want to use word cloud to effectively deliver messages. Also, we use three columns. when we move our mouse over the game names in the center chart, we can see its links with similar games vividly and games at the right side would have flipping effect. At the same time, on the left side, we can find the keywords of selected game and its similar games(**the word cloud is interactive!**), also with their average similarity score on the left bottom. when clicking one of the games, we can fix the right column. After moving out our mouse from the right column, the center games are unfixed again to allow you to choose. Click the right game cards to show the similarity score from the target game and also the detailed information of it.

We encounter a lot of challenges when implementing this graph. These challenges comes from two sub-graphs including the center circle chart and keyword cloud.

- **Circle Chart:** The original format is directed graph. Since relationship between two similar games can be more properly shown if we use undirected graph, we need to carefully adapt the template and deal with data input and construction while taking similarity metrics into consideration. Besides, we want to make sure that the visualization effect of center chart is good, we need

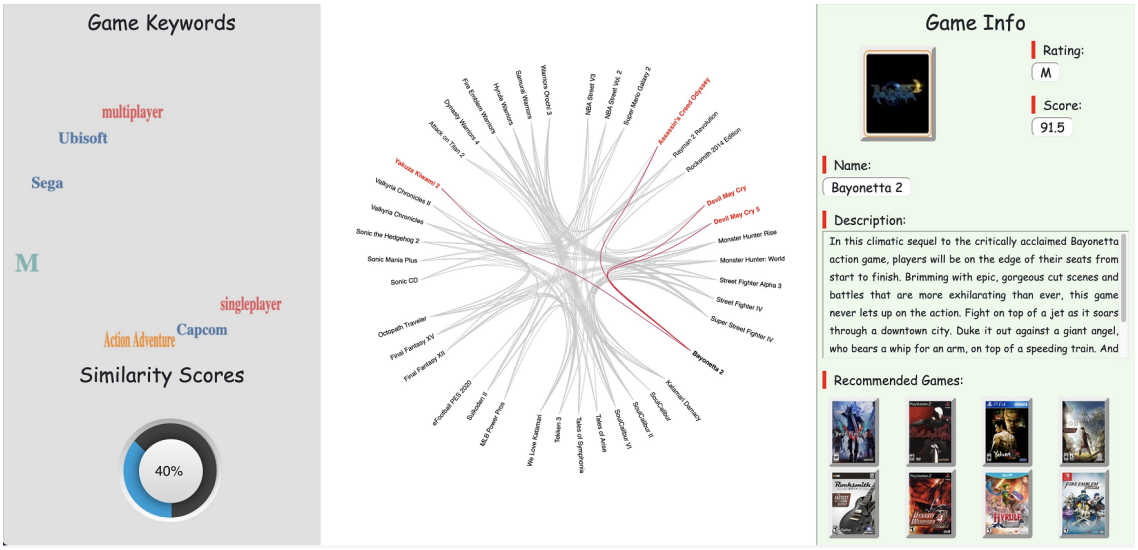

Figure 4: Implementation Of Similar Game Recommendation

to ensure the data density is proper. What's more, we want to show the flipping effect of game cards at right side when we move mouse over the names of games. Also, when we move our mouse to the right column, we need to deliver accurate information including similarity score and detailed information from clicking.

- **Keyword Cloud:** The template(in Figure 5) is different with what we generally encounter: we tended to rely on SVG before, while the template is based on canvas.
  - It is necessary for us to learning the process of rendering so as to change circles to texts properly(For every frame, it keeps rending). We previously failed because of it should append canvas with text instead of images with text on the transparent circle(We reply circle collision so we need the circles!).
  - We need to understand the coordinate system of the the template in order to avoid overlapping among keywords.

Figure 5: Keyword Cloud Template

0.4. WHAT KIND OF THE GAME DO YOU LIKE?

We aims at fast-searching and recommending games according to types of games for our users in this part.

- **Introduction:** What kind of game do you like? One of the most important thing of playing games is staying curious and willing to accept new things. Here you only need choose your famous kind of game, and by clicking the recommend button, you will get a new game that most likely you never knows before!
- **Functionality:** This module aims at helping and accelerating the process when finding potential interested games.

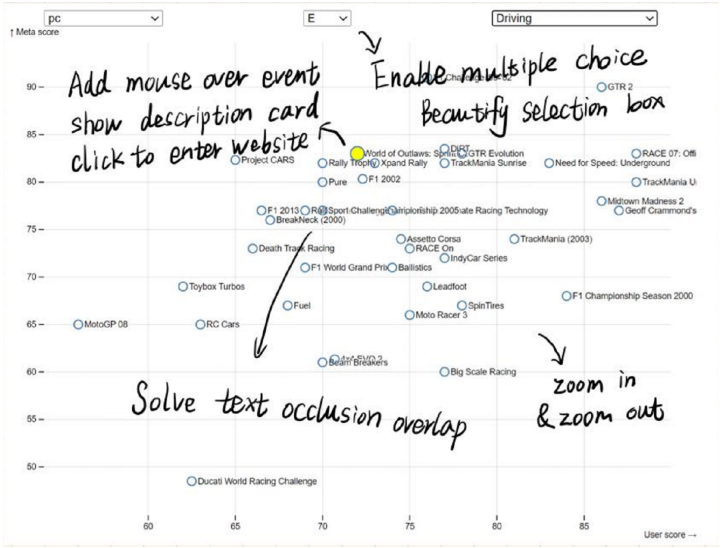

Figure 6: Design Draft Of Give Me A Recommend

- **Expectation:** There are three selectors(rating, platform and genre) at top of the Figure 6. Users are able to set conditions and filter out the games that meet the criteria. For the scatter part, x-axis stands for user score and y-axis represents meta score. Scores for games from meta and other users are obvious to the users in a scatter plot. Filtered games are going to be shown on the figure according to their scores. When users hover their mouse on the points, A hover box will display a breif discription about the game. If users are interested in the description, they can futher click the points and enter the games website.
- **Changes:** All in all, The original version was more like a graph extracted from a scientific paper than a tool for users to make quick decisions.Find our final version in Figure 7. In previous milestone, we expected to make this chart with selectors and scatter plot. However, in the actual implementation, we found that a scatter diagram would have complicated points arrangement. Many games would gather together, and the interaction and visualization effect was not good. So our final version decided to use a game console wrapped around a box filled with bouncy balls. The pattern of the bouncy ball is filled with the game pattern while the size is determined by the meta score and user score. A button locates in the middle of the screen. Clicking on the button will recommend a game according to the score and the game type. At the same time, it will pop up a modal dialog showing the the details of the recommended game. The user can click more information button on demand to jump to the games' official website to get more information.

Here I would like to depict some problems we met during the project.

- **Front-end developing cooperation:** Actually, all three of us have not too much experience in developing front-end and we got problems in how to name .css styles and elements' id. Sometimes we had conflict names and select wrong elements when using d3.js which occurred some weird mistakes.
- **Game console:** We also have some troubles in making a length and width adaptive game console interface. Our laptops screen are diverse from 13-inch to 16-inch and have different aspect ratio. So if we set a fixed width for the game controllers at the both sides of screen, the shape of our game console will become weird.

0.5. WHICH PLATFORM WILL YOU CHOOSE?

This module is for users who are interested in the changes and upgrading of platform. It can help users understand the history and current status of various game platforms.

- **Introduction:** There are many platforms that run the games. Our plots show some statistics of different platforms. Our users can also check the active time and amount of game released on different platforms.

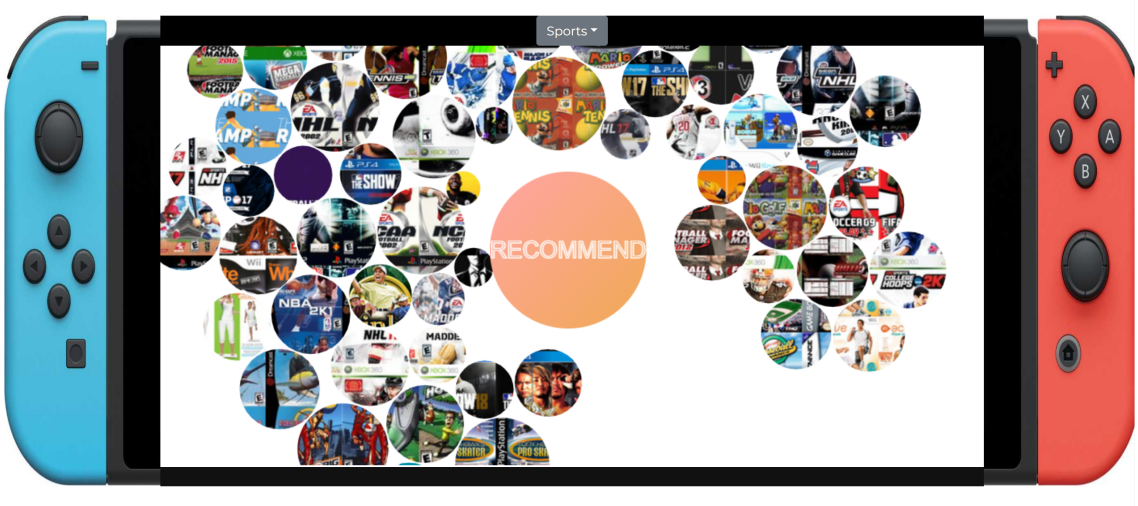

Figure 7: Final Product Of Give Me A Recommend

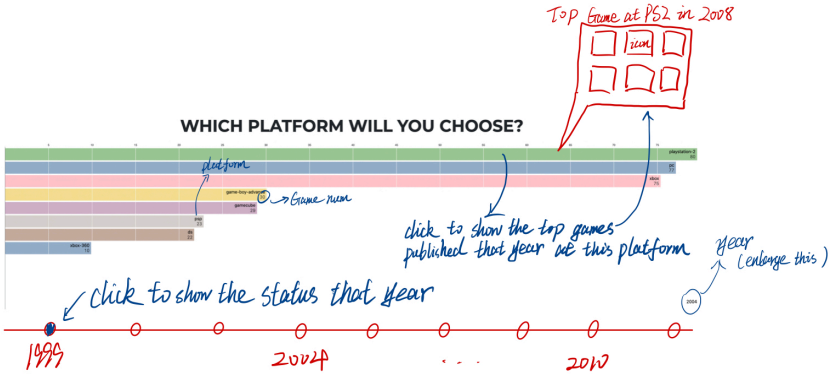

Figure 8: Design Draft Of Platform introduction

- **Functionality:** For a game enthusiast, this module can help users understand the history and current status of various game platforms.
- **Expectation:** It is a ranking bar chart that count the number of games released per platform per year from 1995 to 2021. Every annual data will last for about three seconds and we also draw a transition animation between two frames to present the chance process. When users hover their mouse on the plot, the animation will pause and wait for a further check from the users. When users move their mouse from the plot, the animation will continue to play. The Figure 8 above is a sketch that shows our previous expectation.
- **Changes:** We are eager to let our users obtain a full view of how the platforms develops. We expect our users to get more comprehensive information rather than visual interaction so that we tend to present the data in the form of diagrams at the expense of cool interaction. The final product is shown as Figure 9 and from the diagram, some statistics of different platforms are presented. We can see, by clicking the bar, the diagram will show release date of the selected single platform and obviously PC is popular all over the time.

The challenge we encountered in this module is limited thanks to vega framework. By using vega, it is very convenient for us to show our data with a pre-defined diagram. The most important work for us is to find appropriate diagram that have a better presentation of our data and make our data more understandable and intuitive.

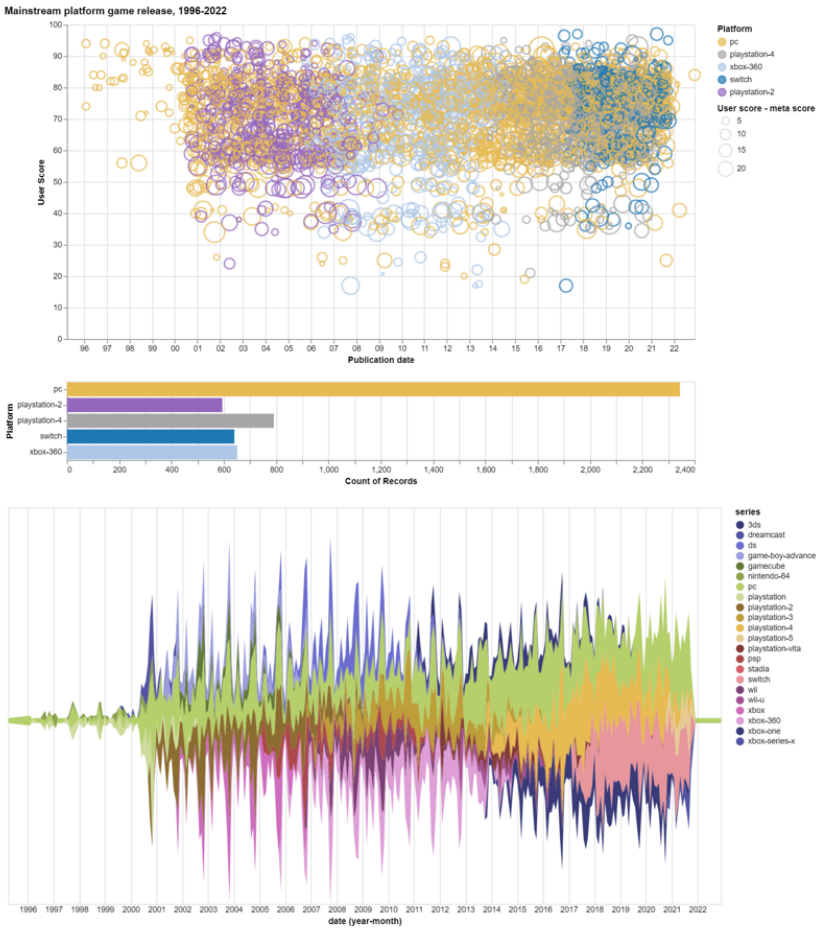

Figure 9: Final Product Of Platform introduction

0.6. Peer Assessments

During the whole project, we always try to start brain storms via Zoom platform and collect a lot of interesting ideas from each other, and make decision together, leading to this fancy data visualization product. We try our best to establish reasonable work division and cooperate with each other closely. The following is a clear breakdown:

- **Guosheng Feng:** I worked on the implementation ”WHO ARE THE TOP GAME COMPANIES?”. I implemented a three-column layout style and video embedding. Besides, I pre-processed raw data from kaggle website and did a data analysis. I have a good vision of overall situation and can also come up with a lot of new ideas about data visualization, which is a great contribution to our work. I am also responsible for editing a video to present our work. We are a united team and enjoy a great time.
- **Haixin Shi:** For implementation, I mainly contribute to the graphs in ”MAYBE SOME RECOMMENDATION?” and help teammates understand Observable framework in D3.js. For process book, I am responsible for writing chapter 1, chapter 2 and chapter 3; besides, I also wrote code to build the the cover picture, which comes from all online images of real game data we used! During the process, I cooperate with Guosheng and Zhiye closely and they help me a lot.
- **Zhiye Wang:** I am responsible for the code implementation and process book written work of module which is about choosing a kind of game you like and the other module about some knowledge about platform. I also used python to crawl images, videos and release date data from the websites and provided the data with my teammates. It is a great experience working with Haixin and Guosheng. They are helpful and we cooperated with each other smoothly.