STA 141B: Superhero Shiny App Report

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1. Introduction

 Superhero api contains 563 universes superheroes with their name, biography information , quantified abilities such as speed and power and so on. We get the data from this api and make transformations on the data format as well as extracting the most useful information from the original data. Then we build a shiny application which focuses on introducing the detailed information of single superhero or some superheroes. It is s user-friendly shiny application both for the new comers to Superheroes and for those who have already known about them. Generally, the application contains 3 different parts:

1. An introduction to the a single superhero which is selected by the user. The introduction includes a spider plot of the superhero's 6 powerstats, biography information such as full name, place of birth, appearance information such as gender, race and height. Also, the image of this single superhero is shown in the middle of the page, too.

2. An comparison between 2 superheroes with respect to their 6 powerstats. The difference of the two superheroes powerstats are quantified and visualized by the spider plot and the histogram plot.

3. A hero mapping which shows the distribution of all superheroes' birthplace on the American map. There is an pattern where you can select the publisher and the map will change according to user's choice.

2. Motivation

Our project aims to provide a useful and interesting app to help users learn more about the detailed information of certain superheroes. Many people are familiar with the name and the first appearance of some of them. However, there are far more information in their stories. For example, most of the superheroes are connected to each other in various patterns and few of us know much about such kind of relationships. So we decide to reveal those things that are often ignored by people and demonstrate them in a clean way that people could get an easy access to .

For those who are kind of familiar with those superheroes, this application will give them a brand-new experience with the help of the visualization plots.
For those who do not have much prior knowledge, this application can be used to give a general picture of some superheroes' story.

3. Description of the data source:

The superhero.api contains 563 superheroes and for each superhero, there are 6 list-form variables separately containing the powerstat, appearance, biography, connection, work and the image. Each of these list-form variables contains several elements. Detailed information is introduced below:

1. Powerstats(list): intelligence, power, speed, durability, combat and strength
2. Biography(list): full name, birthplace, publisher, first-appearance, alignment and so on
3. Appearance(list): gender, race, height, weight, eye-color and hair-color
4. Ooccupation(list): jobs
5. Connections(list): text content introducing relationships like the relative, wife or teammate
6. Image(list): url of the corresponding superhero's image

4. Methodology

In our project, we apply some methods learnt from this quarter's lectures and homework.
Data tidy: Filtering the original data and making selections on the variables, convert the variable's format and subsetting.
Visualization: Spider plot to shown all the 6 quantitative powerstats in a single plot which is easy to catch and to understand.
API: Building connections to the API website and make dynamic extraction of the data for using.
Shiny: Editing the User Interface and the Server in order to make a nice front end for the users .

5. Data-processing

One of the important features of the original data we get from API is that most of its variables are in the format of list. As a result, we need to "unlist" these variables into vectors and then, select the important elements of the vector. For example, we need to "unlist" the "powerstat" into 6 individual numeric variables and "unlist" the "biography" into 9 individual characters.

Also, there are some missing values in very strange forms such as "-" in variable "height". We need to first check out the specific missing patterns and make corresponding adjustments on that to make sure the data set the shiny built on is a complete-case data set.

For Heroes Introduction part, one superhero's name will be selected by the user, and then the corresponding powerstat, biography and appearance information will be matched to that single superhero and be shown in the interface. Also the image of the superhero will also be shown in the middle of the main panel which is stored in the data set and a url link.

For Heroes Comparison part, two superheroes' names will be selected by the user separately. The ariable "powerstat" will be used for drawing two plots: a histogram and a spider plot.

For Heroes Mapping part, the element "place of birth" and "publisher" in variable "biography" are extracted. The distribution of the birthplace is shown on the American map.

6. User Guide

Welcome Page

This page introduces some basic information about the project such as the authors, the motivations and an abstract of the main contents.

Heroes Introduction

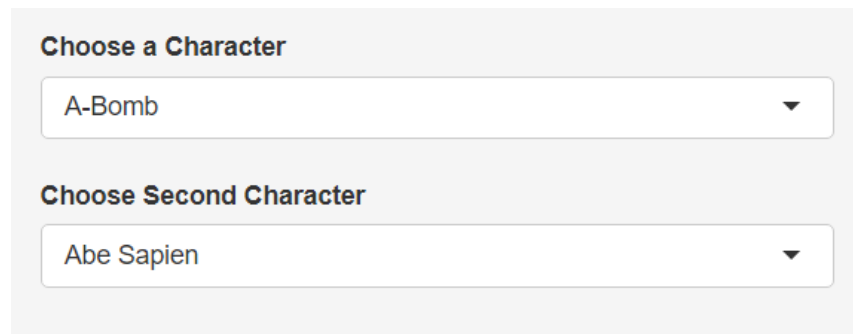Users need to click on the side panel to choose the name of the superhero they are interested in:

Then the spider plot of the superhero's powerstat and the biography information will be shown in the down part of the side panel while the appearance information, the image and the superhero's relatives will be shown in the main panel. Users can change their choice of superhero at any time.

Heroes Comparison

Users need to choose two superheroes separately.

After selection, the powerstat of each superhero will be demonstrated on a histogram and a spider plot:
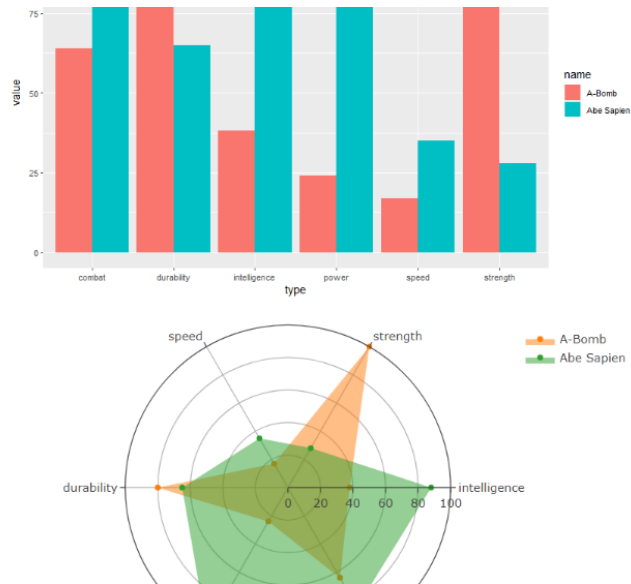
Figure 1. Example plots in the Superheroes Comparison

These two plots quantitatively show the difference of each of the 6 powerstat of two superheroes. Users could change their choice of the two superheroes at any time.

Heroes Birthplace Mapping

Users need to select the publisher:

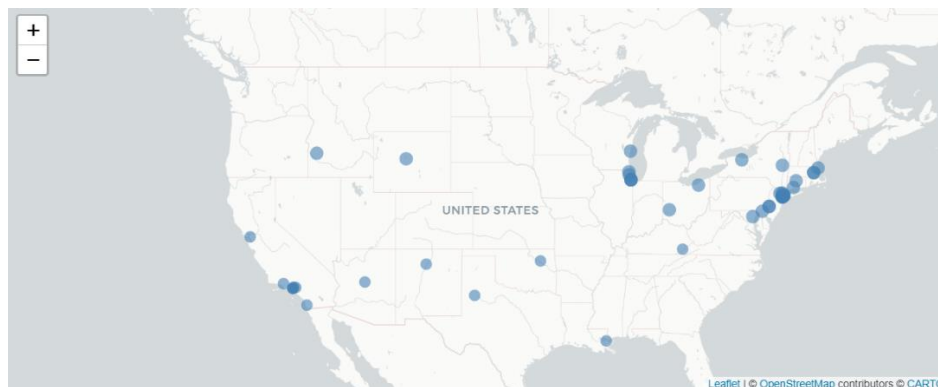After the selection, the distribution the corresponding publisher's superheroes' birthplace will be shown in an American map:

Figure 2. Example map of Superheroes' Birthplaces Distribution