INFO 5100

Data-Driven Web Applications

Final Project

Who Moved My Cereal Bowl?

Professor David Mimno

Team Members:

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Yilu Sun (ys767)

SriTapasya Kothapally (sk2889)

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1. Work Completed by Each Team Member

1.1 Qianyan Yao (qy62)

Qianyan takes care of the milk data visualization part and she is the coding lead to make sure all the codes are compatible when put together.

(1) She cleaned the milk dataset, standard daily nutrition intake data and make them into useable json file.

(2) She created the visualization of the liquid flowing bowls and used the buttons to view the milk nutrition information across different categories. She also linked this milk information to the bowl representation on the right.
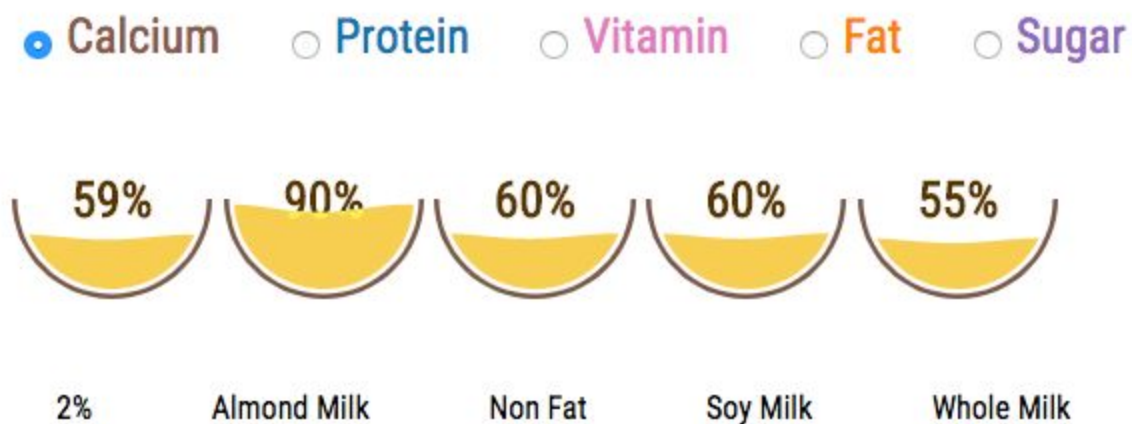
(3) She put all the codes together to make sure they are compatible and helped the other teammate to debug the code when encountering problems.

(4) She found the image of the bowl and the spoon and adjusted the color and saturation of the bowl image and the spoon image.

(5) She cleaned up the formatting, adjusted the positions of all visualization and layout to make sure the style looks nice and all the codes are compatible with each other.

1.2 Yilu Sun (ys767)

Yilu takes care of the cereal bowl data visualization part (on the right) and the cereal picture categorization part. She is the design lead to make sure all the designs look clean and nice when put together.

(1) She designed the header "Who Moved My Cereal Bowl."

(2) She found the milk dataset, standard daily nutrition intake dataset and cleaned the cereal dataset and turned it into a usable json file.

(3) She found pictures of 30 cereal images, cropped and resized the images to usable files and make them into the categorization filter. Additionally, Yilu also turned these images into clickable buttons that when users click them the corresponding information will be called and passed on the bowl on the right panel.

Step 2 Pick your favorite cereal
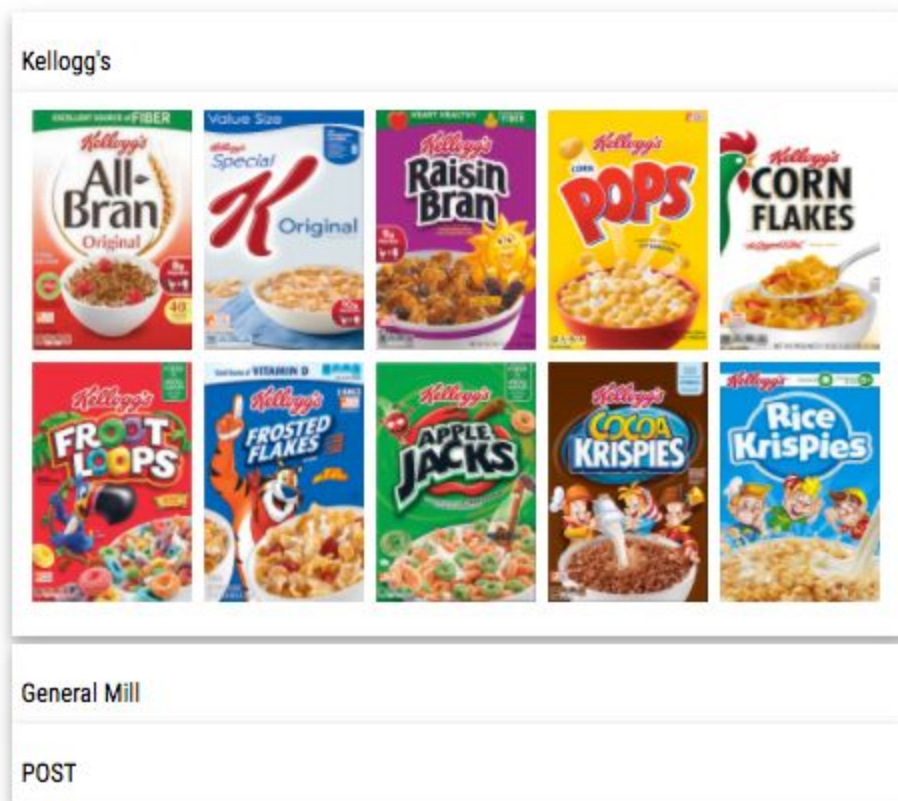
(4) She came up with the idea of using a force layout to visualization the amount of nutrition information. She designed the shape of the "cereals" and coded the entire force layout part.

(5) She also figured out how to append image to the d3 and use the dummy images to make sure they are working.

(6) She also helped to clean up the interface. She adjusted the styling of the border of the categorization cards, re-adjust the fonts to make them look clean and professional.

1.3 SriTapasya Kothapally (sk2889):

(1) Tapasya was actively involved in the stages of ideation and brainstorming and working with the cereal-box data and the cereal-bowl design were part of her initial storyboard.

(2) She also curated the images dataset for the interactive cereal box wall.

(3) Post selectively picking some of the famous and widely used cereals from top manufacturers, she made the interactive cereal poster wall using svg and d3, which on clicking would populate the cereal bowl with nutritional fact percentage.
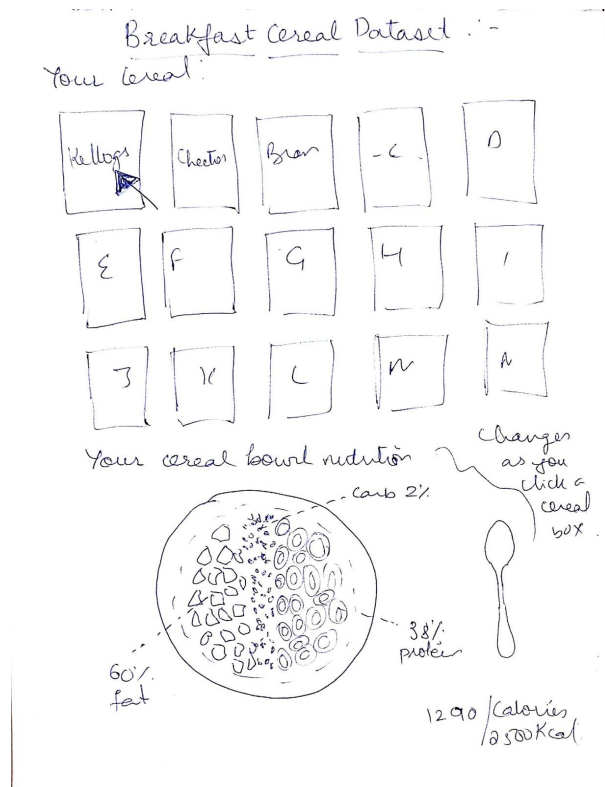
The initial storyboard
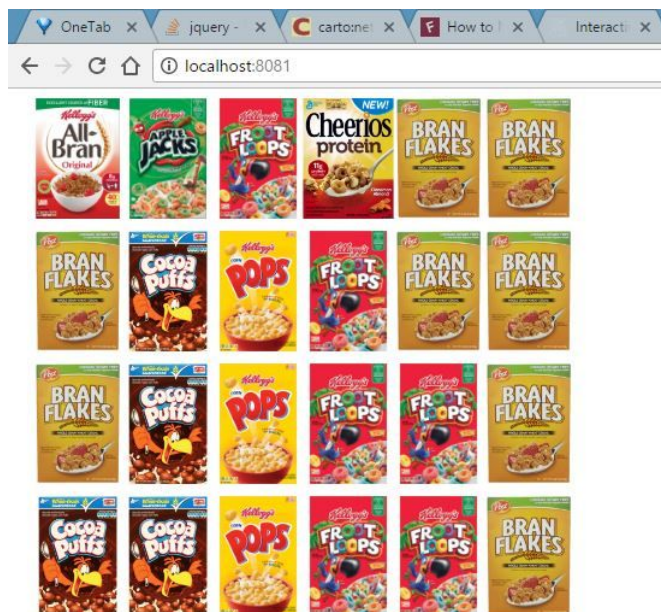
First iteration of the cereal box wall

2. Data Description

A good breakfast starts a healthy day. As 65 percent of Americans eat cold cereals for breakfast, the nutrition facts of the cereal are critical in people's daily life (Langer, 2005). Therefore, we are inspired to provide a nutrition guide to help people learn more about the cereals they eat and how to make wise decisions and pick healthy items from a variety of choices.

We got our data from United States Department of Agriculture (https://ndb.nal.usda.gov/ndb/search/list) and Australian Food & Grocery Council (http://www.mydailyintake.net/nutrients/). These websites are considered as prestigious sources of the information. When people have cereals for breakfast, milk is also an important complement. Additionally, we also need to find a credible standard to compare the nutrition intakes from users' different choices. Therefore we used three different datasets to make our visualization:

2.1 Cereal dataset

The cereal dataset consists of the nutrition facts of 30 cereals from three major cereal companies "Kellogg's", "General Mill", "POST". For each company, we pick their top ten popular cereals, five targeting adults (the covers of the cereal boxes are more clean with their flavor information) and five targeting children (the covers of the cereal boxes are more colorful and consist of animals and cartoon characters).

Within each dataset, we decided to pick protein, fat, carbohydrates, fiber, sugar, calcium and vitamin among the rest of the nutrients for the following two reasons:

(a) These nutrients take the majority of the cereals and are of greatest interests to consumers.

(b) Some nutritions also take the majority part of the nutrition facts in the milk. And we are interested in the combined nutrition facts information.

Therefore, these are the nutrients that we picked from the cereal dataset. As we do not want to overwhelm the users by too much information, we combined the vitamin A and vitamin D information together. Also, we used the nutrition facts in 1 NLEA serving as the standard to make sure the data is comparable among different groups. Additionally, we also used the energy variable to help us to calculate the total calories from cereals.

2.2 Milk dataset

Since the milk nutrition information among different brands are similar, we picked the milk from different categories to create comparisons: 2% milk, nonfat milk, whole milk, almond milk, and soy milk.

Among these milk information, we picked the nutrients: calcium, protein, vitamin, fat and sugar as these are the most important information of most of the user's interests. In order to reduce the amount of information clutter, the combined the vitamin A and vitamin D information together. We also used the nutrition facts in 1 cup of milk as the standard so that we can compare data among different groups. Additionally, we also used the energy variable to combine with the cereal calories to find the sum of the total nutrition intake for breakfast.

2.3 Nutrition intake standard

First we found the data of daily nutrition intake for protein, fat, carbohydrates, fiber, sugar, calcium, vitamin and energy. Since we found the nutrition intake for every day instead of for breakfast only, we divided the number by three as the breakfast standard.

For the cereal box cover, we picked the three major cereal suppliers of the cereal market, "Kellogg's" "General Mills" and "POST". For each brand, we take ten most popular cereals and find their cereal box covers' images from Google for visualization. So altogether we used the images for 30 cereals. We crop and resize each image to make sure they are not too big to increase the loading time.

3. Mapping Data to Visual Elements

Our visualization is consist of three major parts:

- the milk bowls reflect the milk nutrition facts
- the cereal categorization cards reflects 30 cereal for the users to choose from
- the cereal bowl reflects nutrition facts information

And we are going to describe how we map the data into visual elements in the following three sections.

3.1 Milk Bowl & Nutrition Facts

For the milk nutrition dataset, we want to know what is the percentage of each nutrient compared to the total amount that people should have. So we divided the original data by the standard amount of nutrients that people should have for breakfast,

converted it into percentage and rounded to a whole number.

When clicking on each button (calcium, protein, vitamin, fat, and sugar), the comparison result will show by percentage in the bowl. For example, when clicking on "Calcium" button, users can easily tell that almond milk has the most calcium and whole milk has the least calcium.

When clicking anywhere on the bowl these nutrition information presented will be pass on to the cereal bowl on the right. The cheerio-shaped circles (small hollow circles) of each cluster will come back to full colors depending on the percentage nutrition facts in the item picked .

3.2 Cereal Categorization

First, we loaded all 30 cereal box images in CSS. For each brand, we present 10 cereals and we set them into two rows. The first row is targeting towards adults as the covers of the cereal boxes are more clean with the flavor information. The second row is targeting to children as the covers of the cereal boxes are more colorful and consist of animals and cartoon characters. For each image, we also put them in the same label with a radio button and hide this button. So when users click on the image the corresponding information will be called. Also, when click on the image, a red border will be put around the cereal box to indicate the users that this cereal is selected and the corresponding information will be presented on the bowl on the right.

In order to save space and reduce the amount of image clutter, we categorize these 30 images into three different "cards". When clicking on each brand, the card will

reveal and show the 10 cereals in that brand in two rows. We used a jQuery library for this part of the visualization. Additionally, in order to create a clean interface, we created a shadow effect for each "card" in CSS and changed the border of the "cards" to white.

3.3 Cereal Bowl & Combined Nutrition Facts

We used a force-layout to create the visualization for nutrition facts. Each cluster represents one kind of nutrition: blue= protein, orange=fat, green carbohydrates, red=fiber, purple=sugar, brown=calcium, pink=vitamin. When the page is first loaded, we set the transparency to 0.2. So users can still tell that there are seven different nutrition facts presented here. When users choose a cereal or a milk, the percentage information will be shown as the color of the circles will come back to the original color (transparency = 1). When users click a cereal and one kind of milk, the information will aggregate.

When designing the visualization, we decided to use a force layout as the hollow circle looks like cereals. Additionally, we made these circles draggable and moveable to add more interaction with users.

For the nutrition facts data from cereal, we divided the original data by the standard amount of nutrients that people should have for breakfast, converted it into percentage and rounded to a whole number. Also we coded the number in each cluster is 20, so that we can map the percentage information and compare them on the same level. We multiply each nutrient percentage by 0.2 and use the Math.round() to get the round number. Each node has an index number. When the users click or choose a cereal or milk, and the percentage is calculated, we push the amount of index number into an

array and change the color of nodes have these index. We also created clear labeling to let users be clear about what each color means.

4. The Story

Every time, one walks into the cereal and breakfast section isle of the supermarket, there is always major confusion about which cereal to buy and which milk to pick. Several times it's difficult to evaluate the nutritional value of the cereal boxes at once.

By interacting with the visualization we designed, we learned that almond milk has the most amount of calcium while whole milk has the least amount. If someone wants to gain more protein, he or she probably should not choose almond milk as it has the least amount of protein. Milk among different categories have similar vitamin A&D. If someone wants to lose weight, then nonfat milk will be a great option with the least amount of fat while whole milk has the most fat.

Additionally, it is interesting to notice that though some boxes of cereals labelled themselves as high of certain nutrients but they don't actually have that much nutrients compared to other brands or products. For example, "high fiber", such as "crunchy pecans" cereal from POST, they are actually do not have that much fiber compared to other cereals, such as "All Barn" from Kellogg's. As cereal is a good source of carbohydrate, most parents will buy them for their children's breakfast. However, most cereals tailored towards children (with cartoon characters on the box) but are not high

on the ranking of carbohydrate, but on high the sugars. So parents should be aware of these nutrition facts when they are picking the cereals.

Through our interactive visualization "Who Moved My Cereal Bowl," we want to let people better choose and understand their cereals, nutritional facts, and milk options based on the most famous and sold out cereal boxes of top brands to actually help them have healthier diets and happier lives.

5. References

Langer, G. (2005). What Americans eat for breakfast. ABC News. http://abcnews.go.com/GMA/PollVault/story?id=762685