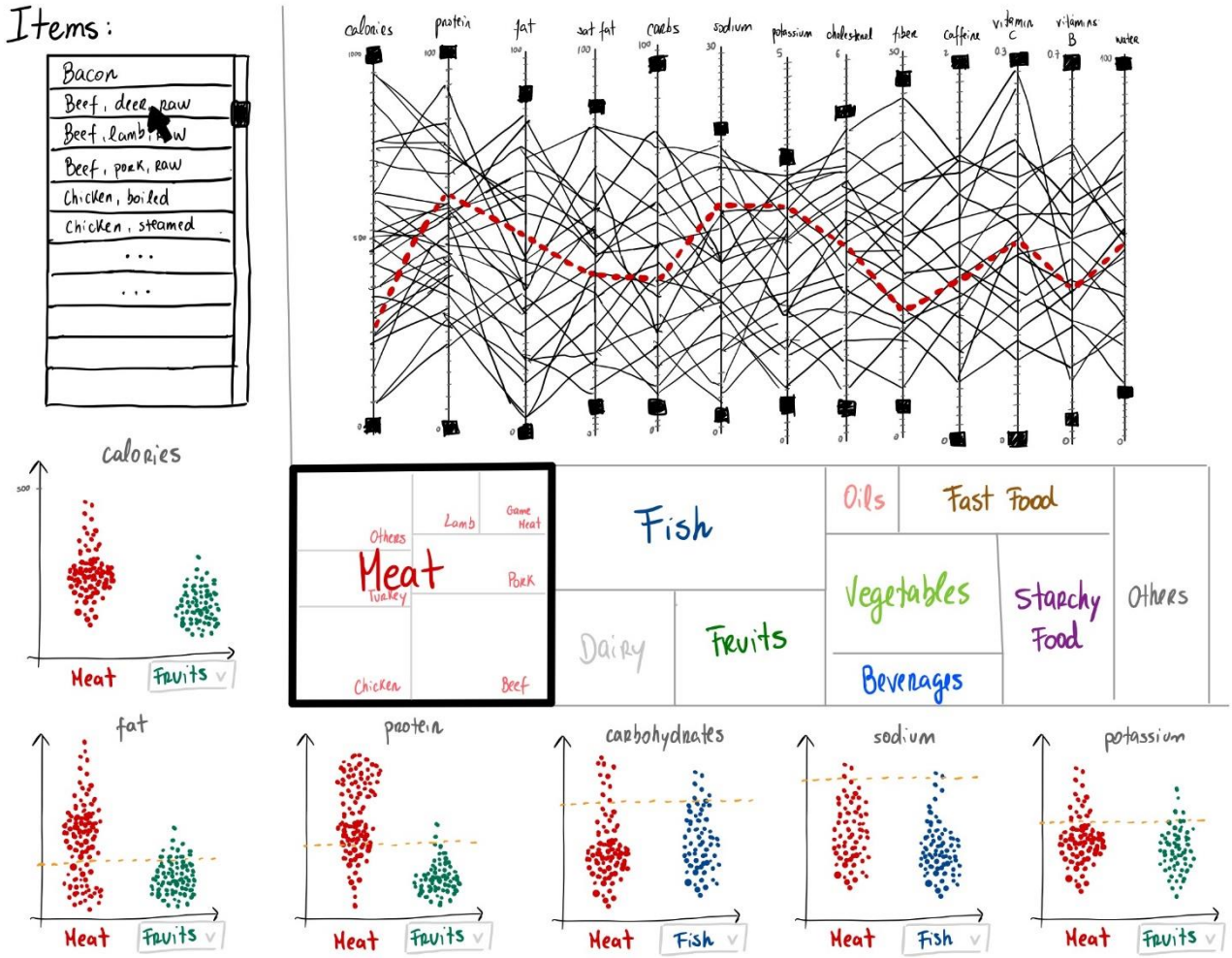
Checkpoint III: Visualization Sketch

Group: G09
Date: 2022/10/21

Overview



Visual Encoding

We decided to represent our data using a **List** and three different plots/charts: **Parallel coordinates plot**, a **Treemap** and six **Jitter Plots**.

The **Parallel coordinates plot** takes into account 12 attributes of the food items. Each one of them can be filtered by adjusting the lower and upper bonds. By doing that, not only the lines in the plot are filtered but also the items shown in the **List**. An item is represented by **line mark** that crosses every attribute bar. Each **value** on the y-axis in every bar **encodes** the quantity of that attribute in that specific item. When a **category is selected**, the plot shows only the items for that category (respecting the applied filters on the bars) and a **dashed line** that encodes the **average** value for each attribute for that category.

In the **List**, it is shown the items that are represented in the Parallel coordinates plot for a better visualization of the selected and filtered items.

The **Treemap** shows the composition of the dataset by dividing it per **categories**. Each category is represented with a **rectangle mark** and its **channel, size**, represents their affluence in the dataset. The user can press a rectangle that corresponds to a category and the selection **propagates** through all the plots. **Each category** is encoded by a different **color hue** in every idiom. When a ***Category* is selected** a **border** appears on its rectangle and it starts **showing** the **Types** in that *Category*. The user can press them to filter even more. Also, when a *Category* is selected, instead of showing all the items, the **Parallel coordinates plot** shows only the items in the *Category*. As for the **Jitter plot**, the left value on the x-axis (the fixed category) changes to the selected category.

Finally for the six **Jitter plots**, we chose to draw one plot for the attributes that have a recommended daily intake (*calories, fat, protein, carbohydrates, sodium* and *potassium*)**.** Each plot has **two categories** encoded in the **x-axis** and shows the distribution of the items. Each item has its **percentage value of that attribute** (**excluding the calories** attribute in which the quantity of that attribute itself is shown) encoded in the **y-axis**. For every plot, the *Category* represented at the **left is "fixed"**, that is, it is the selected category in the **Treemap**. The **right** one has a **dropdown menu** that lets the user **select a *Category*** to compare with the fixed one. Both these "columns" show all the items if no categories are selected. The **recommended percentage of each attribute per day (DRD %)** is represented by an **orange line** in the plots, except for the calories since its much higher than the calories of each individual item and has no relevancy. Also, by **clicking in a point from the "fixed" Category** in any Jitter plot its **Type is selected** and this **filter propagates** to every other plot i.e. Parallel coordinates, Tree Map and the other Jitter plots. When items are **filtered in the Parallel coordinates**, the sizes of the rectangles for the selected category (**Types**) **can change** if the proportions change.

Answering the Questions

- Do food items with a high **protein percentage** and **low calories per serving** generally have a **low percentage of saturated fat**?

We can use the filters on the **Parallel coordinates plot** to select which items will appear. Knowing this we just need to filter for high protein and low calories. Afterwards we can check both the **Jitter Plot** and the **Parallel coordinates** plot to see if the filtered items have a low percentage of saturated fat.

- How does the **total fat** and **sodium** influence the **cholesterol** of an item?

On **Parallel coordinates plot** adjust the *fat* and *sodium* upper bonds and check the *cholesterol* levels for that specific filtration.

- Does **fiber** rich **starchy food** tend to have less **cholesterol**?

We select the category *Starchy foods* in the **Treemap** by clicking on its rectangle. Then, on the **Parallel coordinates plot**, we can adjust the *fiber* lower bound to get a filtered list of fiber rich starchy foods.

- Is **water** rich food **healthier**?

We use the parallel coordinates graph to filter to a desired water level. Afterwards we can compare them with the daily recommended percentage of their attributes, present in the **Jitter Plots**, to see if they are considered "healthy" i.e. have a good balance of the main macronutrients compared to the recommended.

- Does **caffeine** reduce the presence of **B-vitamins**, **vitamin C** and **minerals** in the food?

Using the filters on the **Parallel Coordinates plot** we increase the *caffeine* level. Afterwards we can observe the *vitamins B*, *vitamin C* and minerals (*sodium* and *potassium*) levels on the filtered items. This observation can be made in the **Parallel Coordinates plot.**

- Is **meat** with a low **fat percentage** generally **more caloric** than **fish**?

We start by selecting the *Meat* category on the **TreeMap**. Then we use the filters in the **Parallel Coordinates graph** to select items with low *fat* by adjusting the *fat* upper bound. Finally, on the calories **Jitter plot** we use the drop-down menu button to select a comparison with the *Fish* category, observing the distribution of calories for both. **(Shown in the Storyboard)**