Nutrition Bytes: Visualizing Food Content

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Motivation

Obesity and other diet-related health issues are on the rise and food choice is a more confusing task than ever before given the amount of information accessible to the everyday consumer. While food labels include nutrient and ingredient information, this is only a limited subset of the total information available to consumers. In this paper, we explore the design space for representing foods with a focus on ingredient and nutrient information. We further augment this information with sentiment surrounding ingredients to indicate general beliefs regarding that ingredient.

Design Process

We employed Munzner's nested model to guide our visualization design process. We use semi-structured interviews to gather data for the domain characterization. Data and task is based on the transcribed interview data and illustrated in Tables 1 and 2 respectively.

Data	Type
Ingredient Name	Nominal
Ingredient Relative Amount	Ordinal
Nutrient Name	Nominal
Nutrient Group	Nominal
Nutrient Percentage Daily Intake	Quantitative
Derived Ingredient Sentiments	Quantitative

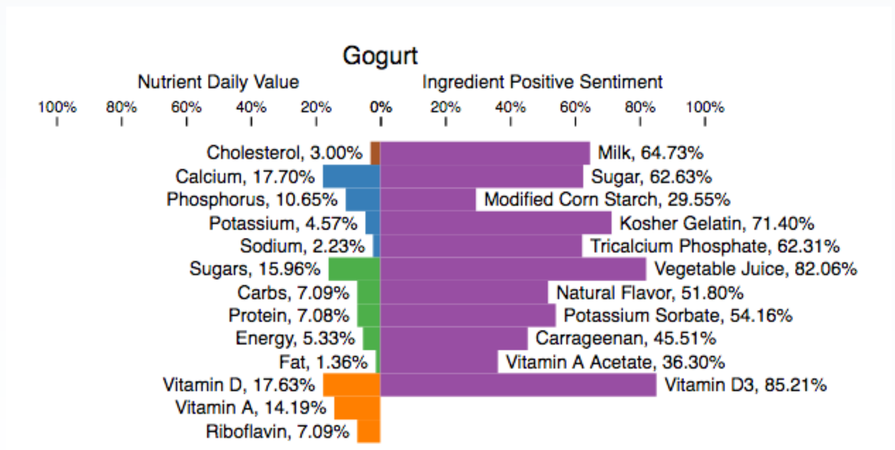
Table 1. Data Abstraction

User Tasks to Support
Compare nutrient amounts
Lookup the amount of a specific nutrient a product contains
Lookup ingredients and nutrients in a food
Compare relative ingredient amount
Identify the sentiment of an ingredient
Identify items without certain allergens
Compare different food items
Get an overview of a food item

Table 2. User Tasks

Iteration 1

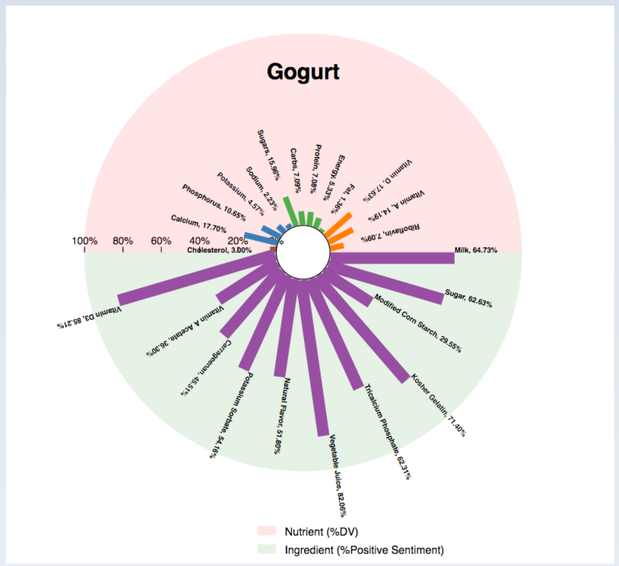
The two numeric percentage values 1) nutrient daily intake and 2) positive sentiment are represented with a bar **length** encoding. **Color** distinguishes different nutrient groups as well as ingredients from nutrients. We also visually separated nutrients from ingredients using two sides of a vertical axis. The intent was to provide an overview of the total number of nutrients (left) and ingredients (right). Text labels are used to communicate nutrient and ingredient names.



Iteration 1. Design

Iteration 2

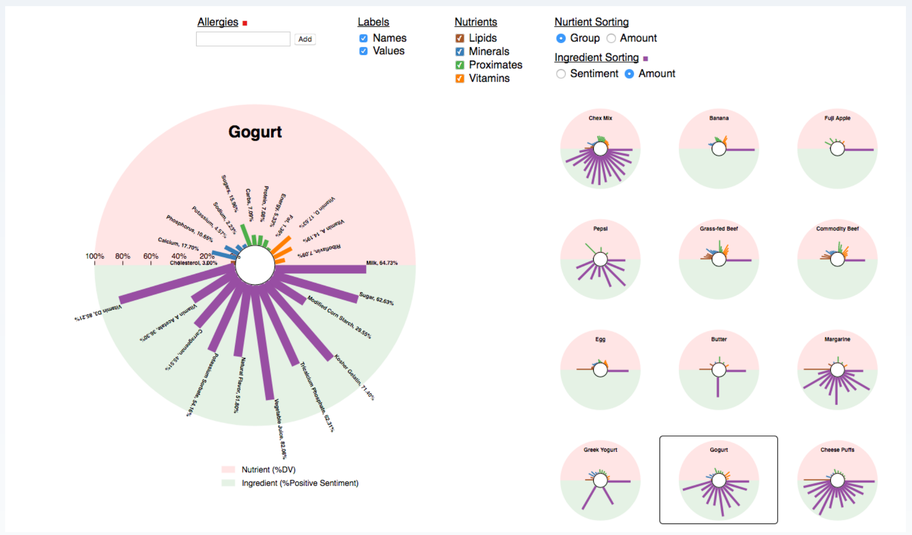
Based on the feedback we collected from iteration 1, the shared vertical axis between nutrients and ingredients was confusing to some users. It encouraged them to compare ingredient bar lengths to nutrient bar lengths, which was not intended, violating the expressiveness principle. In iteration 2, we replaced the shared axis with a **radial layout**. The percentage scale is encoded on the circle radius.



Iteration 2. Design

Design Principles

The main interface provides multiple functions and empowers users to interact with the food information. The landing page provides an "**overview first**" view. Users select the food that they are interested in to see the details. (Detail-on-demand). **Small Multiples** is used to compare different food items. Users can also **sort** and **filter** the nutrients by amount or group, and **sort** and **filter** ingredients by amount or positivity. Pilot studies suggest that users find the interface interesting and intuitive to interact with.



Overview

Future Work

We are currently conducting user studies to further explore the space and validate our design choices (data and task). A set of card sorting activities are being conducted with each card representing an activity associated with a person's food decision-making process. In addition to the card sorting study, we are conducting additional interviews to understand users' general usage of food information, including understanding the specific contexts users consider and activities users engage in. These will be consolidated coherently as data and task abstraction for future visualization designs.

We will also augment the text analysis algorithm to determine food related sentiment to differentiate health opinions from general attitudes (e.g., taste).

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