CEREALICIOUS !

A fun way to visualize nutrients in milk and cereals.

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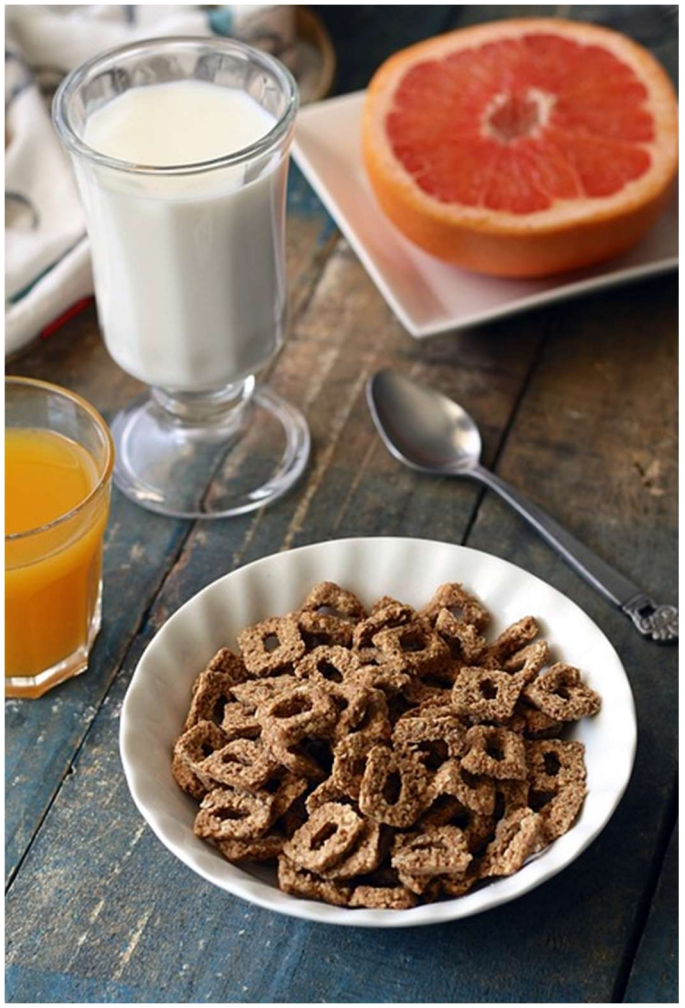
Motivation

- Health and nutrition awareness
- Diverse milk options
- Cereal variations
- Lack of comprehensive information
- Need for visualization
- Cost considerations



Intended Audience

- Budget-conscious individuals, such as college students or those on a tight budget, seeking affordable breakfast options.
- Health-conscious individuals interested in selecting nutritious breakfast choices.
- Dietitians and nutritionists who analyze and provide guidance on meal planning and nutrition.

Questions

- What are the different nutrient constituents in different kinds/types of milk and cereal?
- What is the most affordable breakfast option per serving?
- Can we compare different cereal and milk combinations?
- What are the environmental impacts of a glass of milk?

Dataset and Tools

Datasets:

Manual Data Collection

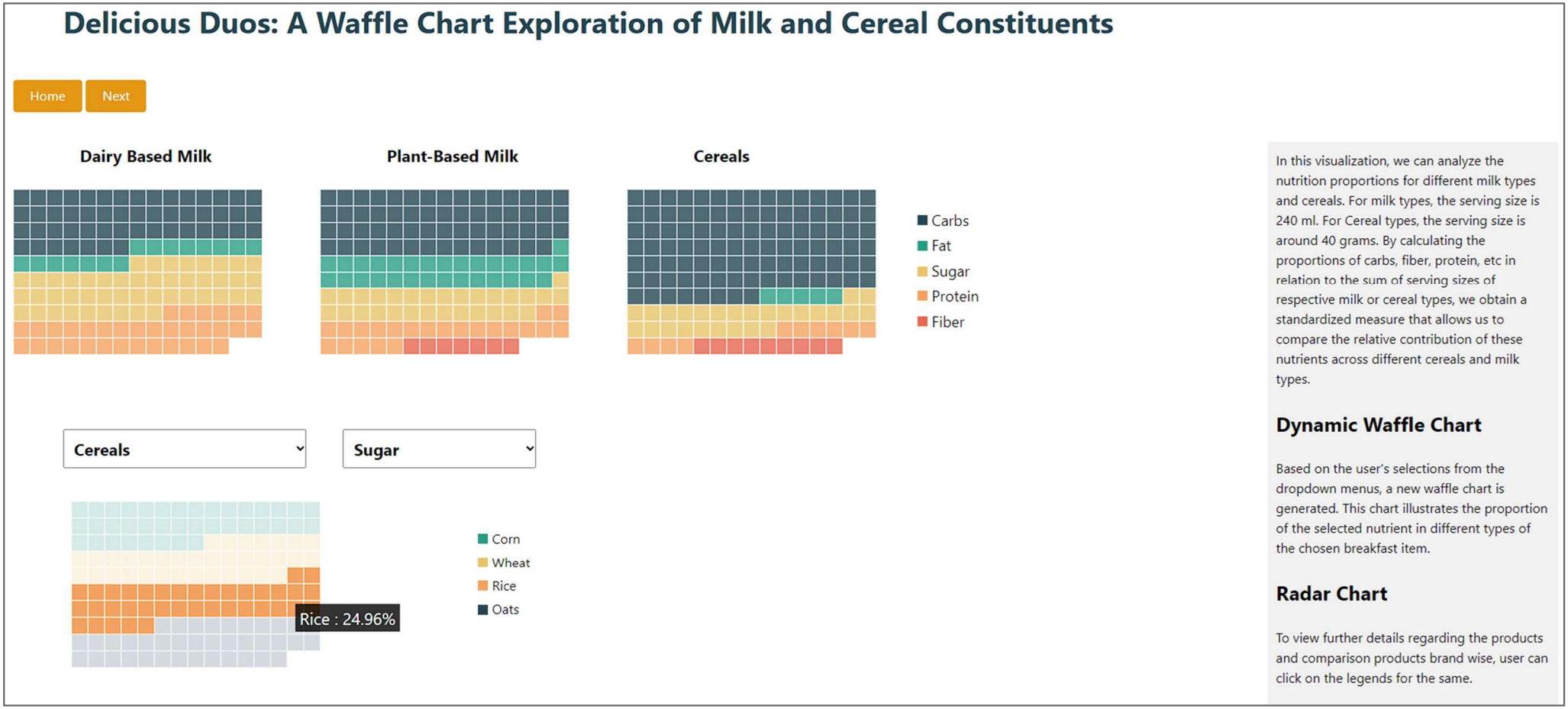
The below pictures are taken for various cereals from Costco store.

- *Credits: Aditya*

Tools :

- Preprocessing
  - Excel
  - Python
- Visualization
  - D3.js

Design Rationale: Waffle Charts



Design Rationale: Waffle Charts

Nutrient Proportions: Serving size considered is 240 ml(milk) and 35-40g(cereals), By calculating the proportions of carbs, fiber, protein, etc in relation to the sum of serving sizes of respective milk or cereal types, we obtain a standardized measure that allows us to compare the relative contribution of these nutrients across different cereals and milk types.

Percentage Visualization: Each cell corresponds to a specific proportion, and the quantity of cells assigned to a nutrient reflects its percentage, allowing for an intuitive visual comparison between nutrient proportions.

Legend: The waffle chart design incorporates different colors for each nutrient. Color coding enhances visual distinction and aids in quickly identifying and associating specific nutrients. We used a dynamic legend, which is changed according to the drop down values chosen.

Interactive tooltip: We have used the opacity factor to highlight the proportion when it is hovered and added a tooltip displaying the corresponding nutrient name and its percentage. This interactive feature adds clarity and context to the visualization, facilitating a deeper understanding of the nutrient distribution.

Using this visualization, users can quickly grasp the relative distribution of the nutrients in the different breakfast items, providing an overview of the nutritional composition.

Questions and Answers:

What are the different nutrient constituents in different kinds/types of milk and cereal?

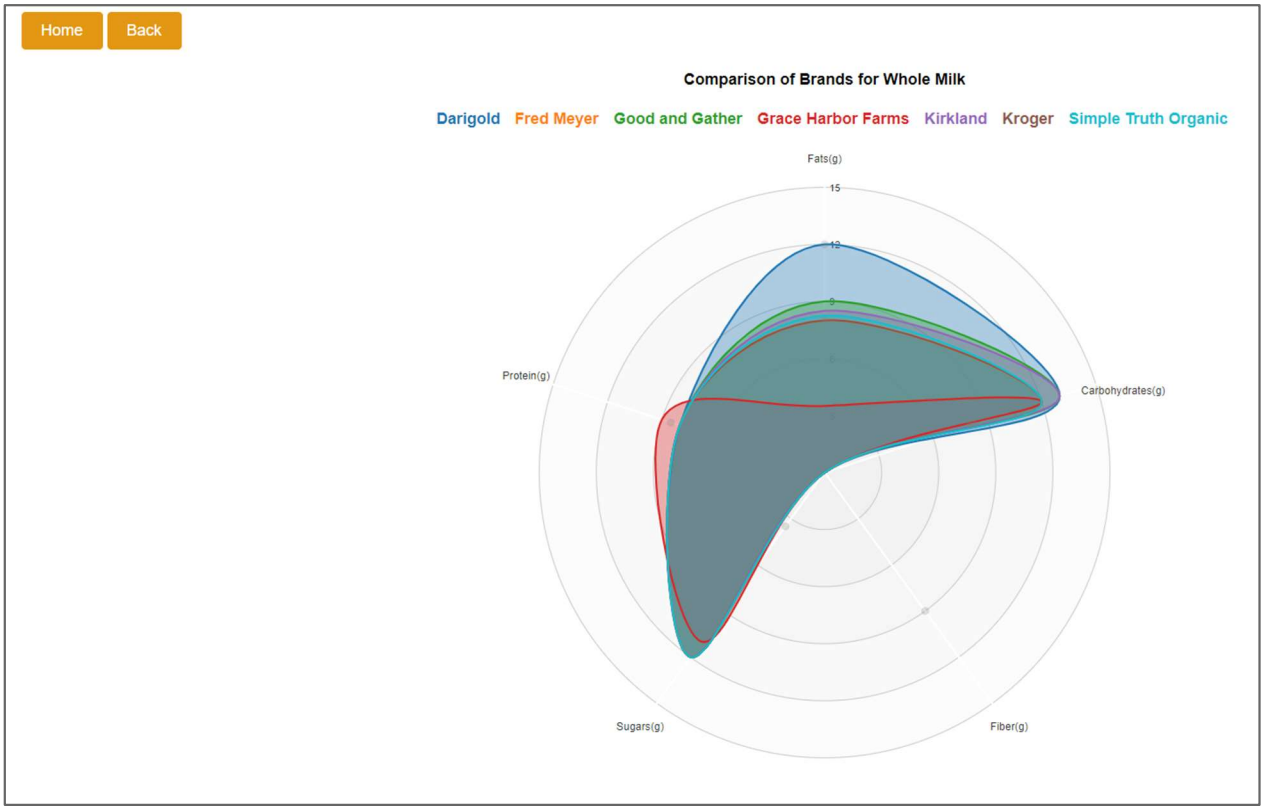
Overall Comparison:

- Proportion of carbs and fiber is more in cereals.
- Proportion of sugar is more in dairy based milk compared to plant.
- Proportion of fat is more in plant based milk compared to dairy.

Nutrient and breakfast item (milk or cereal) wise comparison:

- Proportion of fats more in Whole milk, Proportion of protein more in Soy milk, Proportion of Fiber more in Oat and soy milk
- Proportion of fats is more in Oats based cereal, proportion of fiber is more in Oats and wheat based cereal
- Its notable that rice based cereals are low in essential nutrients like protein, fiber, healthy fats but more of carbs and sugars, they lack the overall nutritional diversity found in other cereal grains, this would not be a healthy choice.

Design Rationale: Radar Charts



Design Rationale: Radar Charts

Nutrients Values : Nutrient contribution for each serving size is being considered for major nutrients for each dairy-milk types, plant-milk types and cereal types. Serving size considered is 240 ml(milk) and 35-40g(cereals),

Visualization: Each spoke of the radar chart represents one of the major nutrients of the products and each circle represent the quantity of nutrient in each serving.

Legend: The radar chart uses multiple colors for each brand. Color codes help distinguish the same for each brand in the polygons of radar and legends of the same.

Interactive components: Polygons and Tooltips appear interactively when mouse hover action is performed by the user on the polygon or on the legend of the chart

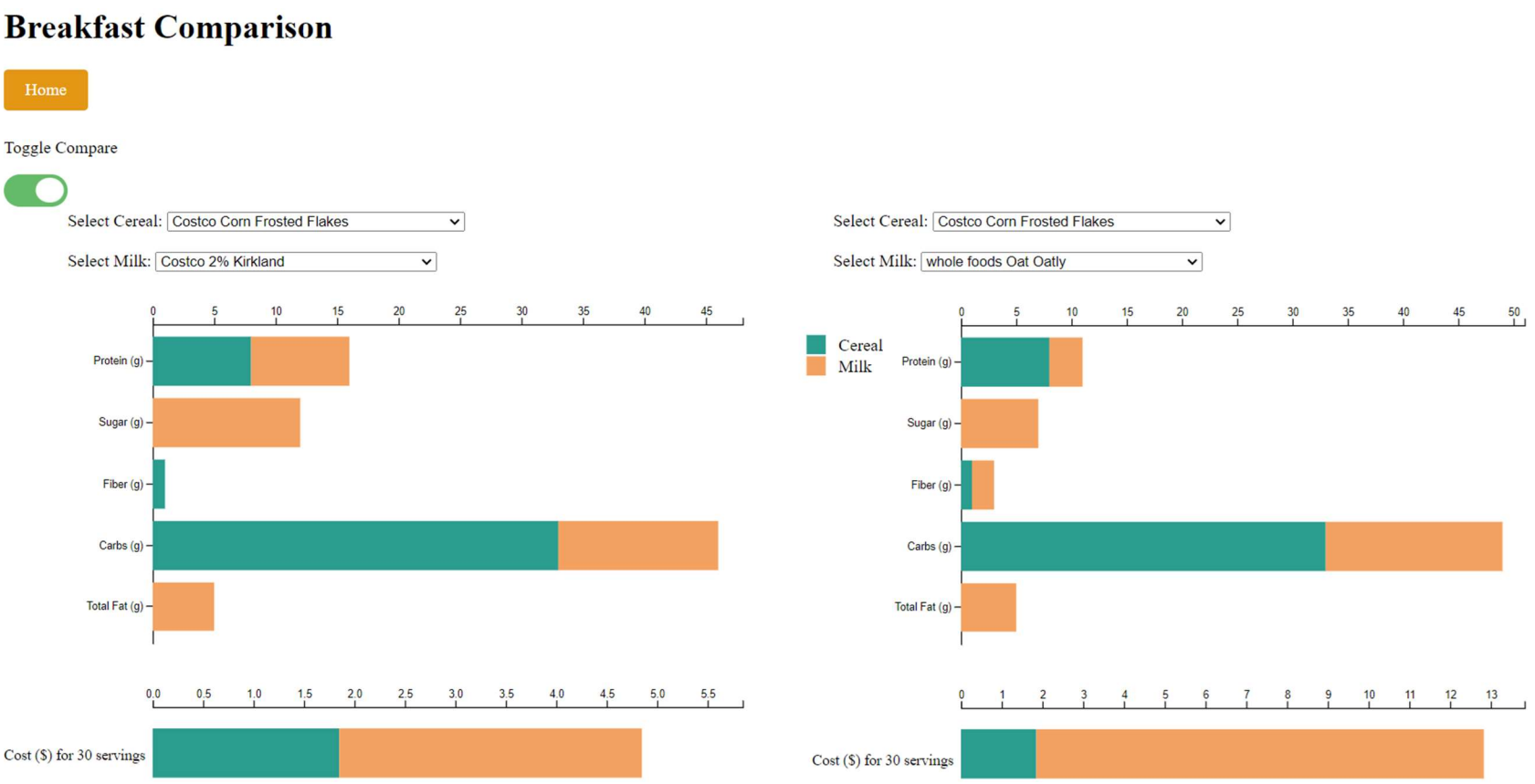
Question and Answer: Radar Charts

What are the different nutrient constituents in different kinds/types of milk and cereal?

Type/ Category wise Comparison between various brands:

- Brands of each type can be compared with each other to show the similarities and contrast between the various products of each categories.

Design Rational : Stacked Bar Charts



Design Rational : Stacked Bar Charts

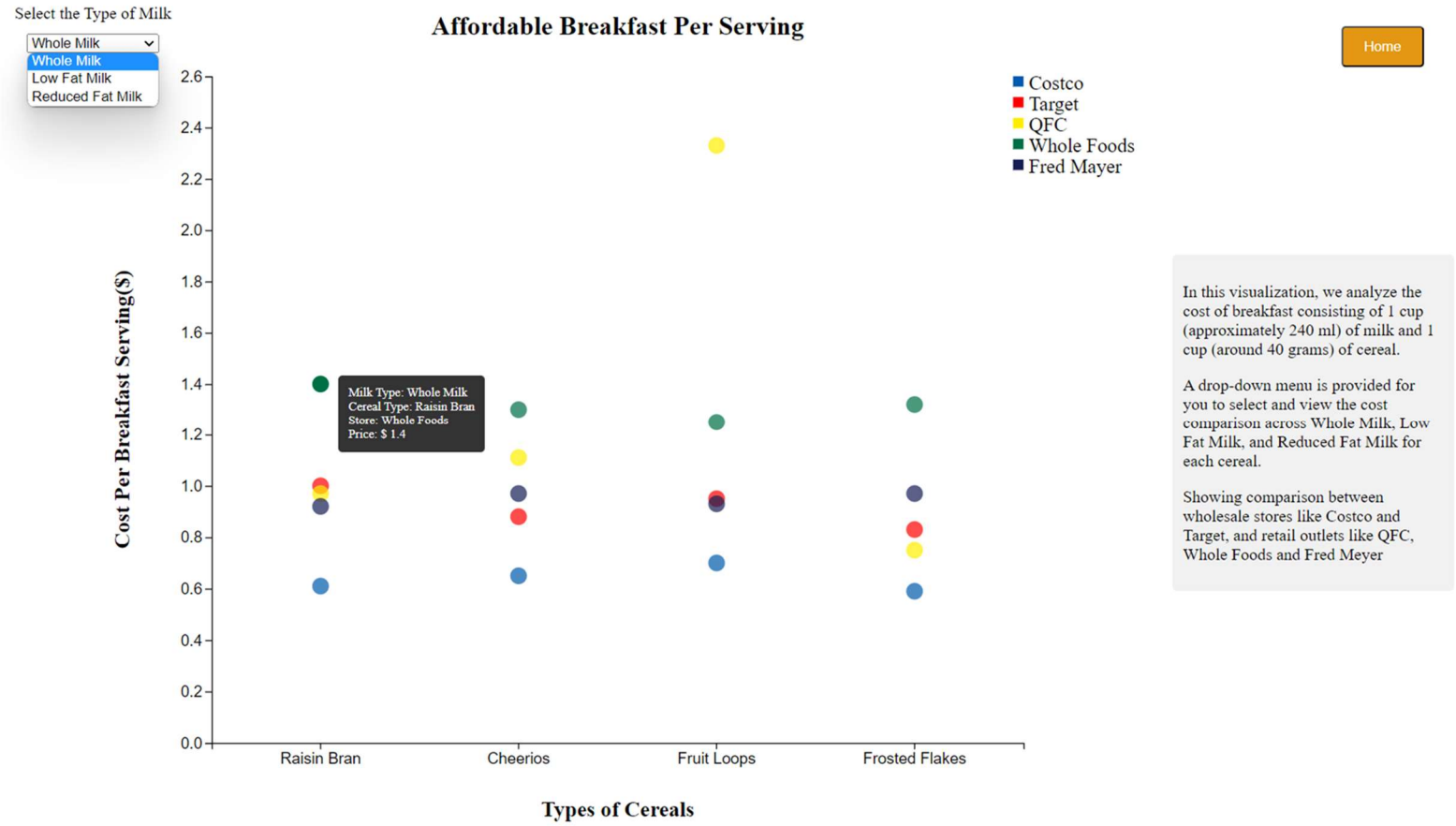
- Toggle button is provided so that user can compare two breakfasts.
- The dropdowns help user select different types of cereal and different type of milks.
- The stacked bar chart is helpful as it provides the total constituents of various nutrients in the meal. This helps us highlight the amount added my milk and cereal separately.
- The cost is as per 30 servings, this is done to help users estimate how much they would spend on breakfast for the selected cereal and milk for a month.

Questions and Answers :

Can we compare different cereal and milk combinations?

- The Breakfast Comparison visualization helps us compare different combinations of milk and cereal.
- It would help user to visualize different nutrients and the cost associated with the meal.

Design Rationale : Dot Plot



Design Rationale : Dot Plot

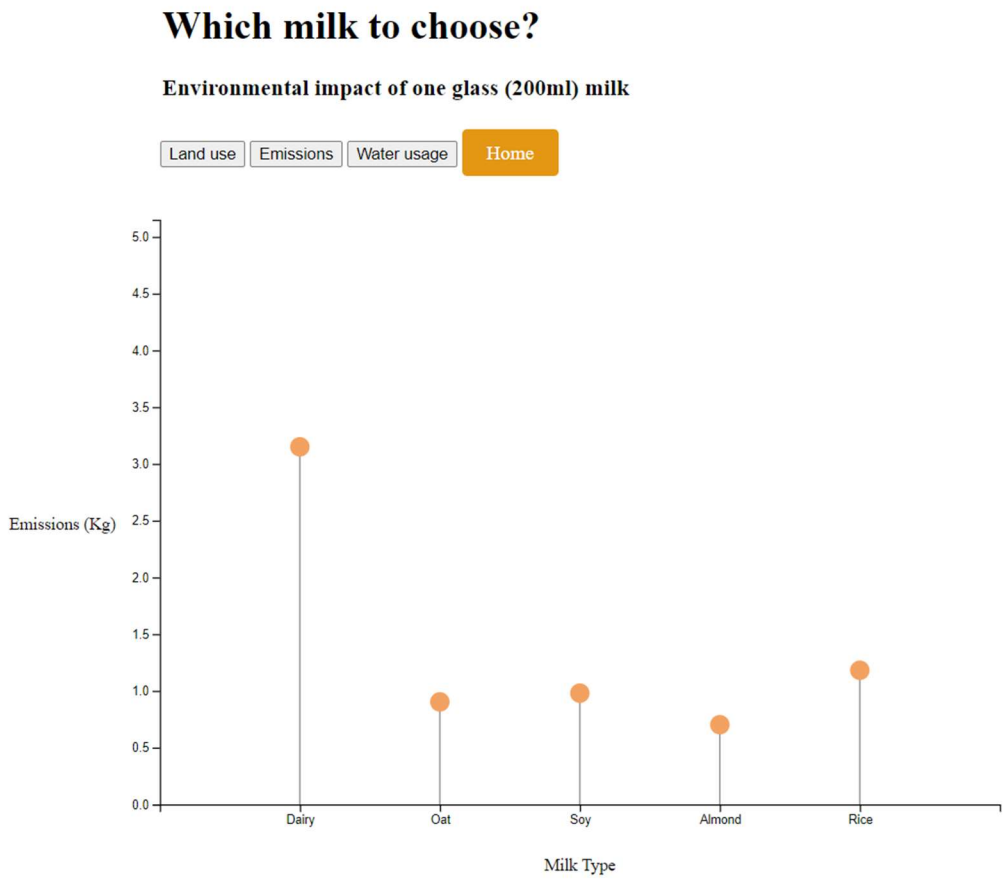
- We used a dot plot to compare the cost of breakfast per serving. The breakfast includes 1 cup of milk (approximately 240 ml) and 1 cup of cereal (around 40 grams).
- From our prior visualizations, we found that Whole Milk, Low Fat Milk, and Reduced Fat Milk are the three cheapest options. You can use the drop-down menu to compare the cost of each cereal with these milk options.
- We compared the cost per serving of different cereals, such as Raisin Bran, Cheerios, Fruit Loops, and Frosted Flakes.
- The visualization aims to determine the most affordable store for breakfast. We compared wholesale stores like Costco and Target, as well as retail outlets like QFC, Whole Foods, and Fred Meyer.
- Each dot on the plot represents a store, allowing easy comparison. The interactive legend helps compare different breakfast combinations within the same store to find the best option.
- Tooltips have been added to provide additional information such as milk and cereal type, store name and cot per serving when hovering over specific data points
- This “Comparative Analysis” helps individuals on a tight budget in finding the store with the most economical breakfast prices.

Questions and Answers :

What is the most affordable breakfast option per serving?

- The most affordable breakfast option per serving is the combination of reduced-fat milk and frosted flakes, at Costco.
- Among the stores, Costco consistently offers the best prices for affordable breakfast combinations. Surprisingly, Fred Meyer, a retail store, offers lower prices compared to Target. This finding highlights the importance of exploring different stores to find the most cost-effective breakfast options.
- Notably, Fruit Loops tend to be more expensive at QFC compared to other cereals.
- This information helps individuals make cost-effective choices for their breakfast needs.

Design Rationale : Lollipop Plot



Question :

What are the environmental impacts of a glass of milk?

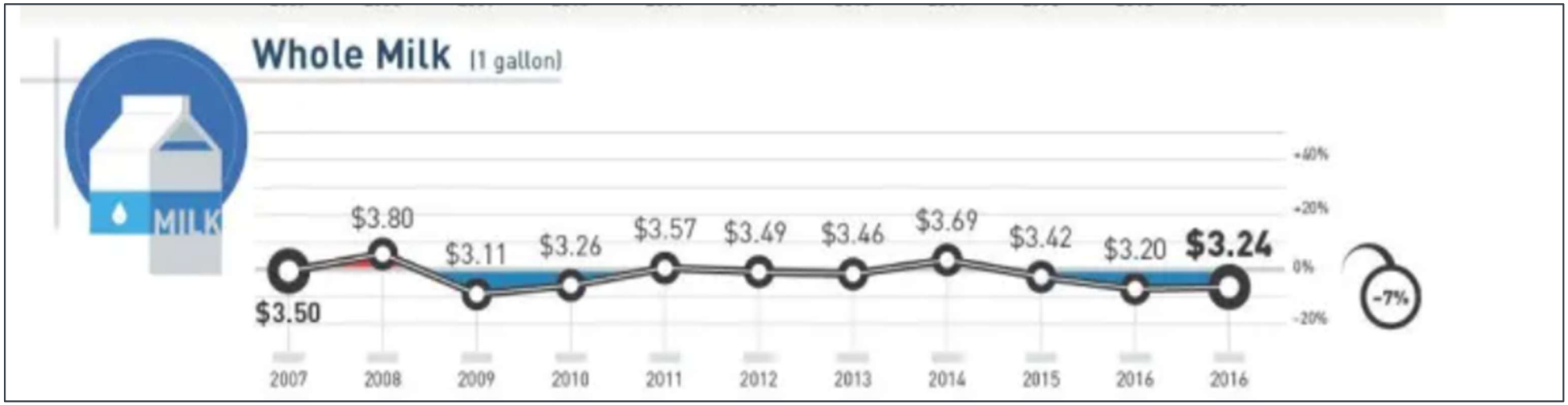
Answer:

Dairy Milk has the most environmental impact.

Design Rationale : Lollipop Plot

- We used a lollipop chart to compare how different milk types affect the Environment. We looked at Land Use, Emissions, and Water Usage.
- The units used in our lollipop chart are specific to each environmental impact category.
    - For Land Use, we use square meters (sq m) to represent the amount of land required.
    - Emissions are expressed in kilograms (kg), signifying the amount of greenhouse gases produced. Lastly,
    - Water Usage is quantified in liters (L), showing the volume of water needed.
- These units help us accurately depict and compare the environmental impacts of different milk types.
- From the chart, we see that dairy milk harms the environment the most in all three areas.
- This “Comparative Analysis” to see the impacts of different milks on the environment. We hope it helps people make better choices for a healthier planet.

Related work - 1



https://www.titlemax.com/discovery-center/home-and-family/cost-of-common-groceries-10-years/

In our visualisation, we are making comparisons across nutrient contents for different milk types and cereal types and also showing the price aspect of breakfast meals (milk and cereal).

Related Work - 1

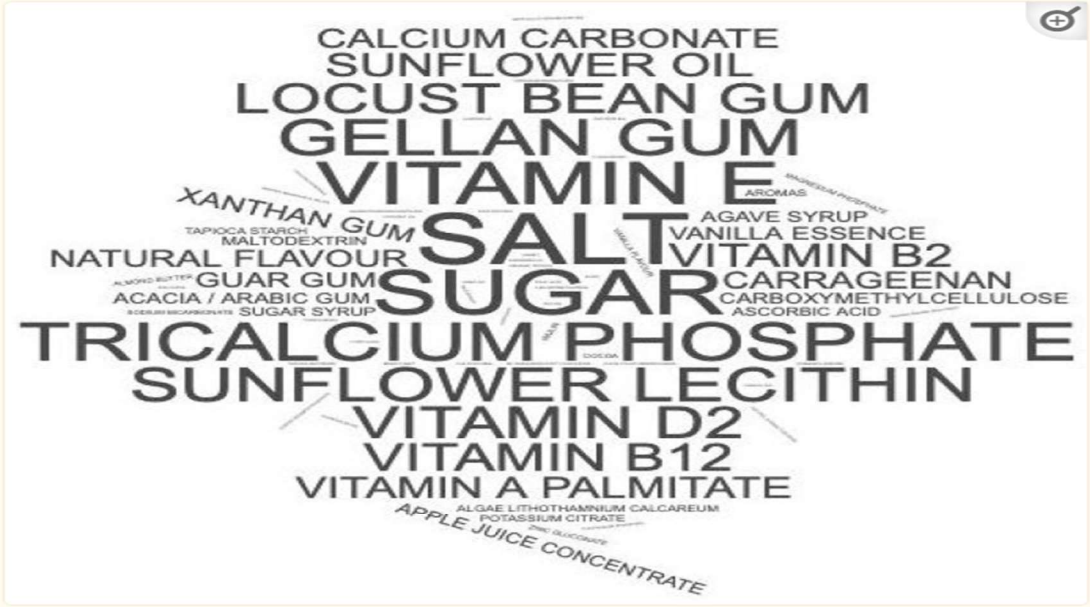


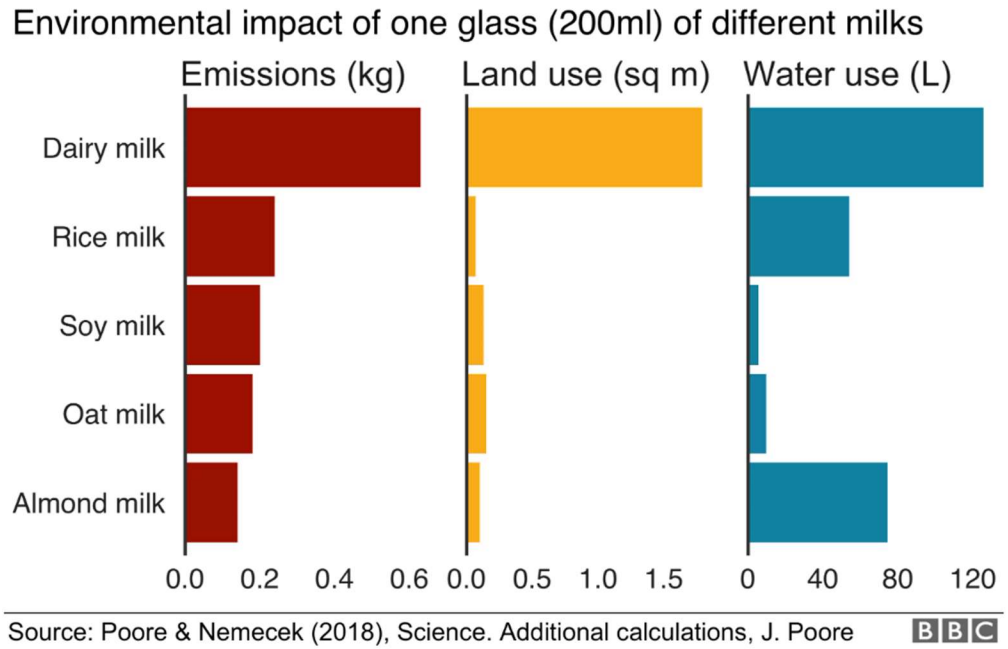
Figure 1

Word cloud of added ingredients from plant-based beverages from scientific studies selected according to the inclusion and exclusion criteria. Words are presented according to their proportional frequencies among all samples, given that greater sizes correspond to greater frequencies.

Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8399839/

In our visualization, we are showing the proportions of the chosen nutrient for different milk types, cereal types, or brands using waffle chart and radar charts

Related work - 3



Source: Climate change: Which vegan milk is best?, BBC, 2019, https://www.bbc.com/news/science-environment-46654042

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- https://www.hsph.harvard.edu/nutritionsource/milk/
- https://en.wikipedia.org/wiki/Milk

Future Work

- We can collect more data from different stores.
- Visualizing the different additives and preservative amounts in different milk and cereals.
- Collecting the sales data to find out which type is most popular.
- Performing surveys on different milk types.