

Exploring Time Series Macronutrient Data Across the Globe

Junying Li, Jason King, Ryan LaMarche, Michael Osei

1 Introduction

Macronutrients, in modernity, are becoming a leading topic of discussion within our society. Due to several biomedical technological advancements, the introduction of non-organic foods, GMOs, and genetically engineered food products has become more and more widely spread throughout our communities, as well as globally. Global energy imbalances and related obesity levels are rapidly increasing [4].

A big concern moving forward is finding different avenues in which we can further educate, inform, and inspire our communities to live a more nutritious lifestyle. With that being said, the consequences of not understanding the nutritious lifestyle can not only be harmful on a micro level but can cause a severe impact on the macro level. Global obesity rates are steadily rising [1]. Globally, one of the biggest technological problems we will face comes in the form of providing nutritious foods to the world. As we move forward in achieving this goal we must communicate, inform, and showcase how nutrition is impacting our world today.

2 One-Sentence Description

This project will deliver an interactive map for users to explore the differences in macronutrient consumption and obesity rates across the globe, as well as perceive how it changes over time.

3. Project Type

Interactive exploratory map

4. Audience

Ideally, the audience for this project will include a wide range of people with varying backgrounds and education levels. Anybody interested in making comparisons of fat consumption or protein consumption between two countries should be able to use this. It will not require any level of expertise and aims to provide a high-level overview visualization so that anybody can explore the data and draw their own conclusions or find patterns among the data.

5. Approach

Many existing visualizations for macro nutrient data and obesity data rely on line charts to show trends, or other types of charts that neglect the geospatial aspects to this data. Identifying trends in geospatial data can be challenging, especially when the data visualizations do not take this into account. We believe that making use of an interactive map with other linked charts and visualization techniques can augment comparison tasks and help users identify trends from a geospatial perspective.

To target beginner users and make the experience less reliant on end-user expertise, we plan to implement an SVG avatar that reacts to changes in the selected data points. For instance, when a user selects a country that eats a lot of fat and has a high obesity rate, the avatar's belly will grow in size proportional to the data. If the user selects a country that has a high amount of protein in its diet, the avatar will grow more muscular and healthy to reflect that. We believe this personification of visual elements will provide a more pleasant experience to users who are less interested in the numbers and statistics, but would just like to explore the data at a very high level.

Auxiliary charts and visualizations will be linked to the interactive map as well, that will make more precise comparison tasks possible, such as bar charts, and line charts to show trends and changes in this data over time.

6. Best-case Impact Statement

The best case scenario is that our visualization is able to successfully augment the exploratory process for users who want to consume this data, and that they are able to draw meaningful conclusions and make the necessary comparisons between countries.

7. Major Milestones

- Determine a technique to visualize both types of data
- Create a geographical visualization juxtaposing macronutrient consumption with obesity rates across countries
- Feature to compare two countries across both statistics
- Information panels defining/explaining macronutrients, as well as what constitutes "obesity"

8. Obstacles

- Combining the various datasets needed to achieve any research question can be challenging, especially with visualization. In our case, we must make sure that we account for macro nutrition, obesity rates, and geospatial data. It can be hard to make sense of different forms of data as well as challenging

to find the relations between all the different forms mentioned above.

- Anytime data is involved in generating assumptions about a general populous, it is important to try and not introduce negative bias that can influence the end user. When personal data are involved in visual mediums there can be design decisions that negatively sway the end user.
- Making design decisions that effectively tells a story is a goal our team has in the back of our mind. The challenge is making sure we account for relevant fields within our datasets without giving our end user too much information.

9. Resources Needed

- GeoJSON data representing countries across the world
- Historical global macronutrient data
- Historical obesity rates

10. Related publications

- Our World In Data has a series of visualizations covering obesity [2]
- A New Approach For Visualizing Quantified Self Data Using Avatars [3]
- Popkin, B. M. (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with noncommunicable diseases—.

The American journal of clinical nutrition, 84(2), 289-298. [4]

11. Define Success

This project will be considered successful if new users, who do not have any level of expertise in nutrition or global health studies, are able to consistently explore the data using our visualization and draw meaningful conclusions.

References

- [1]
<https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- [2]
<https://ourworldindata.org/grapher/share-of-adult-men-overweight-or-obese-vs-daily-supply-of-calories>
- [3] Alissandrakis, A., & Nake, I. (2016). A new approach for visualizing quantified self data using avatars. *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct*.
<https://doi.org/10.1145/2968219.2968315>
- [4] Popkin, B. M. (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with noncommunicable diseases—. The American journal of clinical nutrition, 84(2), 289-298.