IBM HACK CHALLENGE 2023

MALNUTRITION

A DISEASE THAT NO ONE CARES ABOUT

Abstract

MALNUTRITION, a condition in which nutrient consumption is inadequate for an individual's growth, development and overall health. It can occur because of insufficient food intake or by having poor diet quality or improper absorption and utilization of nutrients by the body. The term "MALNUTRITION" stands for both the "UNDERNUTRITION" that is wasting , stunting, micronutrient deficiencies and many more and "OVERNUTRITION" that is overweight, obesity and many more. It refers to deficiencies, excesses or imbalances in the intake of energy, protein and/or other nutrients.

Benefits of good health are perceived not only at the individual level but also at the level of society and country level as well. Health of an individual is determined by the interplay of various factors like social factors, economic factors, dietary factors, lifestyle related factors, environmental factors, government policies and political commitment, etc.

The goal of the project is to analyze the malnutrition overall the world and take actions based on the achieved outcome that is

1.Improve the quality of the nutrition.

2.Lay the foundation for proper psychological, physical and social development.

3.Reduce the incidence of mortality, morbidity, malnutrition.

IBM Cognos is playing the major role of our project as it leverages the business intelligence capabilities, gains the insights and identifies the trends, patterns and correlation and generates the meaningful reports and visualizations to monitor progress, high- risk groups, underlying causes and many more.

In the Business Challenge aspect, the project doesn't contribute to addressing a single societal issue but also leads to the improvement of supply chain management, customer satisfaction and strengthening the social impact.

Introduction

Malnutrition refers to a condition where an individual's diet lacks the necessary nutrients, vitamins, and minerals required for the proper functioning of the body. This condition can occur due to various factors, including inadequate food intake, poor diet quality, or problems with nutrient absorption.

There are two main forms of malnutrition:

Undernutrition: This occurs when the body doesn't receive enough calories, protein, or other essential nutrients to maintain proper health and growth. Undernutrition can lead to conditions like stunting (impaired growth and

development), wasting (severe weight loss), and micronutrient deficiencies (lack of essential vitamins and minerals).

Overnutrition: This occurs when an individual consumes more calories than their body needs, often in the form of unhealthy foods high in sugars, fats, and processed ingredients. Overnutrition can lead to obesity and related health issues such as diabetes, cardiovascular diseases, and metabolic syndrome.

Malnutrition can affect people of all ages, but it is particularly critical for children, pregnant women, and the elderly. In children, malnutrition can have lasting effects on physical and cognitive development. Pregnant women who are malnourished are at a higher risk of complications during pregnancy and childbirth. The elderly may be susceptible due to decreased appetite and difficulty absorbing nutrients.

Common causes of malnutrition include poverty, inadequate access to nutritious food, poor feeding practices, lack of education about proper nutrition, certain medical conditions that affect nutrient absorption, and food insecurity. Addressing malnutrition requires a multi-faceted approach that includes improving access to nutritious foods, promoting education about proper nutrition, and addressing underlying socio-economic factors.

It's important to recognize that malnutrition can have severe and long-lasting consequences on both individual health and society as a whole. Efforts to combat malnutrition often involve a combination of nutritional interventions, healthcare, education, and policy changes to create an environment where all individuals can access and afford nutritious food.

Uniqueness About Project

Till now what we got to know, is that everyone is just focusing over the improvement of quality or how to make the rate of malnutrition individuals overall where as my approach is firstly to gather which state is having high rate of malnutrition individuals and which are not, by the help of the data like severe wasting high at which country or what is the income classification and so likewise getting the insights for the stunting, overweight, underweight, wasting upon the total population, individually which can help in getting a deeper insights for fighting with the malnutrition in each country individually and so can getter a better clearance of which strength has to be improved or which decision has to be taken for the growth.

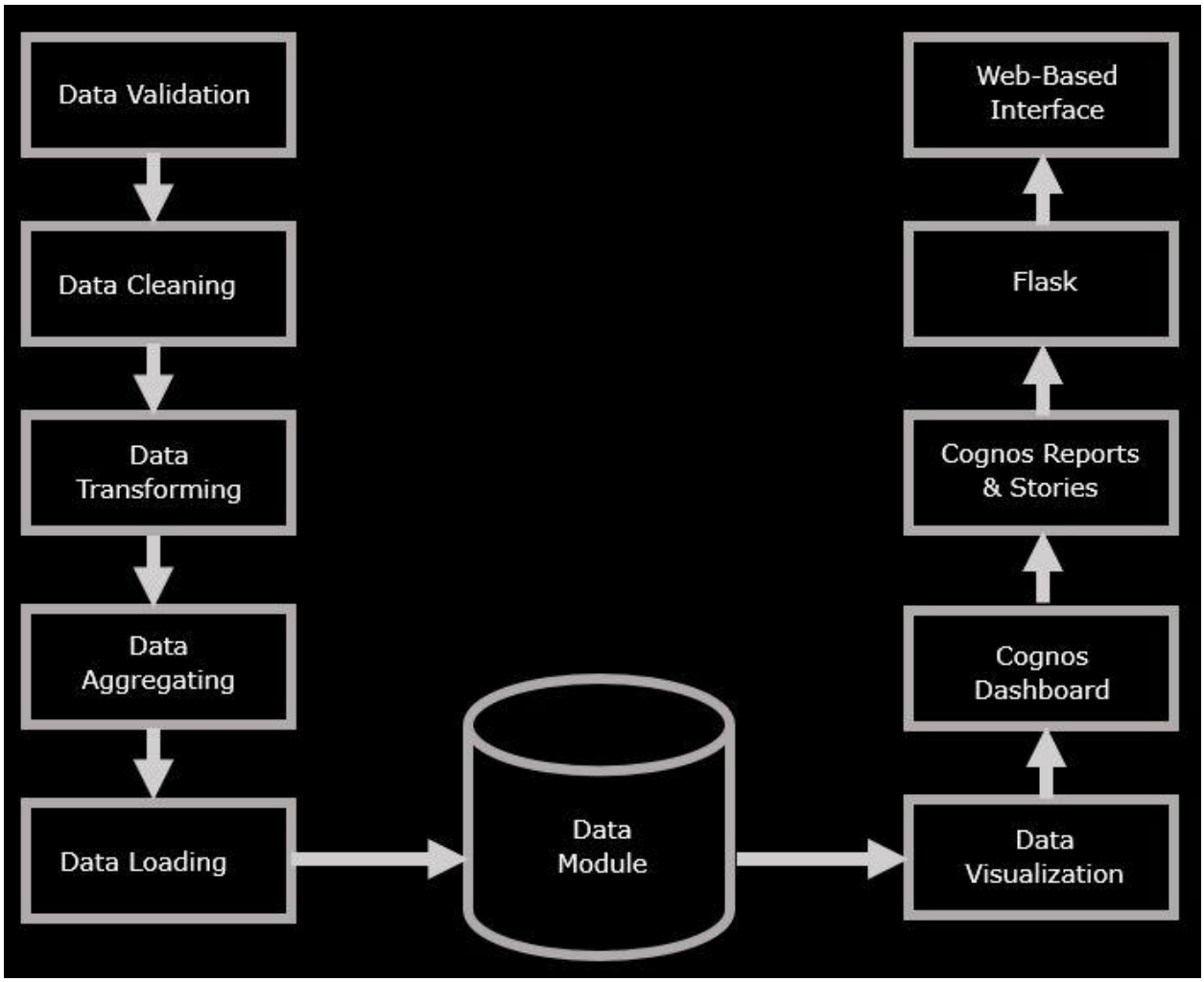
For example, if a country is having high-rate of underweight individuals there we have to improve the quality of the food consumption by making food prices low or any other process, similarly the country which is having high-rate of overweight individuals there lowering the prices of food won't work so by detailed insights we can achieve better way to be carried on.

Social Impact

By analyzing malnutrition and implementing evidence-based intervention we can work towards reducing the malnutrition rates, improving overall rate and reducing inabilities, empowering marginalized populations and promoting sustainable development which could solve a small point of social implication whereas in the aspect of business model businesses can not only contribute to addressing a critical societal issue but also identify market opportunities and improve supply chain management , consumer satisfaction and strengthening their social impact so by the way of moving towards each smallest data to its deepest note we can help in getting a better business structure to be under malnutrition.

In terms of time to roll in or budgeting or analyzing the requirements, the smallest and the better approach would be to give importance to each smallest instance as the smallest and the deepest learning leads to get a better accuracy to achieve.

Architecture



The architectural flow of our project is provided by attaching an image that is :-

The very first step is to validate the given dataset and then clean the irrespective or ambiguous information present over the dataset.

Over here, we are using the Malnutrition across the globe dataset.

After cleaning the data we will perform transformation and aggregate the data into data modules.

The created data module would be called in the IBM Cognos Analytics by which we would try to design the visualization taking the consideration of each and every specific feature present in the dataset.

The visualizations would further help us in developing the Dashboard, Reports and the stories based on malnutrition and its significant insights.

IBM Cognos gives an excellent feature of sharing the visualization directly as a hyper-text markup language link reference which can directly be called out in a HTML file just by copy-pasting the link.

Thus, utilizing this feature of IBM Cognos, we are trying to develop a web based interface with the help of Flask which is a python web-based framework in which all the insights would be clearer with a good accuracy.

Working

In the provided problem statement, the modules on which we would be working is in the list below :-

1.**Data Validation:** The process of ensuring that data entered into a system or database is accurate, consistent, and reliable. It is an essential step in data management to maintain data quality and prevent errors that can lead to faulty analyses and decisions. The goal of data validation is to identify and correct errors, inconsistencies, and inaccuracies in the data before it is used for analysis or other purposes.

2. **Data Cleaning:** Data cleaning is the process of identifying and correcting errors, inconsistencies, and inaccuracies in a dataset. It is a critical step in data management and data analysis, as it helps ensure that the data used for further processing is accurate, reliable, and of high quality.

3. **Data Transforming:** Data transforming refers to the process of converting raw data into a suitable format for analysis or modeling. It involves manipulating the data to make it more informative, consistent, and compatible with the requirements of the chosen data analysis or machine learning techniques.

4. **Data Aggregating:** The process of combining and summarizing individual data points or records into a more concise and manageable form. It involves grouping data based on certain criteria and then applying aggregation functions to obtain summary statistics or calculated values for each group. Aggregating data is common in data analysis and reporting to gain insights from large datasets or to present data in a more understandable format.

5. **Data Loading:** The process of bringing data from external sources into a target system or database for further analysis, processing, or storage. It is a critical step in the data pipeline, as it sets the foundation for any data-driven project. Data loading is typically performed when new data needs to be added to an existing dataset or when starting a new data analysis task.

6. **Data Module:** Refers to a module or component within a software system that deals primarily with data-related operations, such as data processing, data storage, or data retrieval.

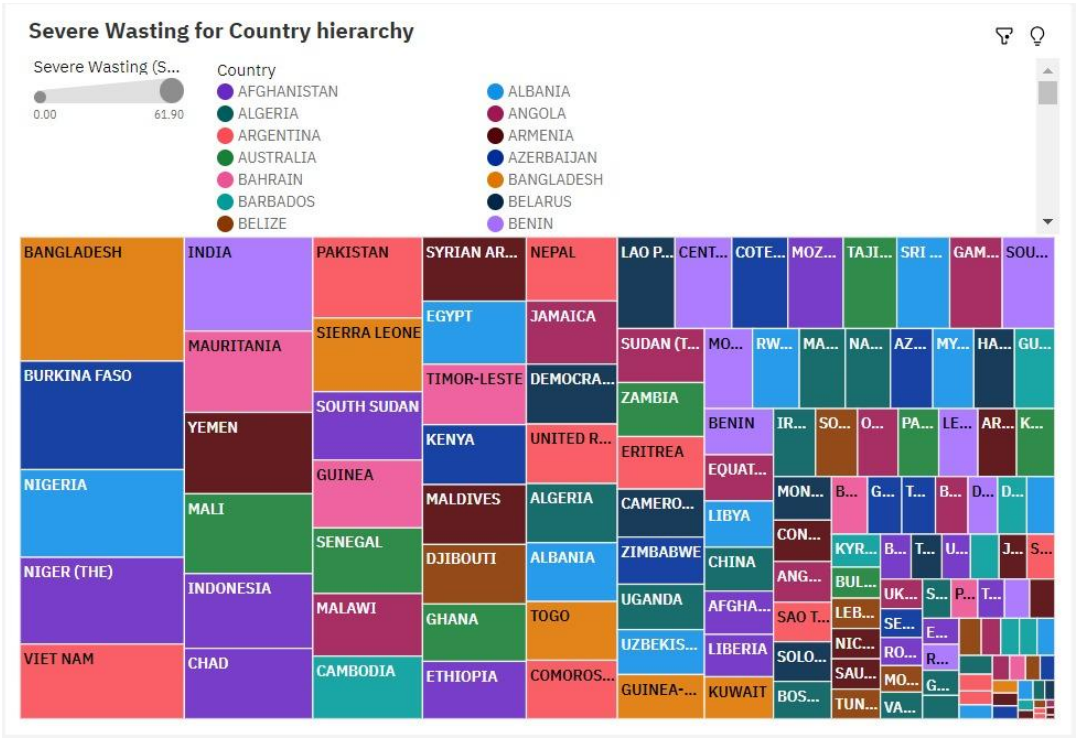
7. **Data Visualization:** The graphical representation of data and information to help people understand patterns, trends, and insights hidden within the data. It is a crucial aspect of data analysis and communication, as visual representations can often convey complex information more effectively than plain text or tables. Data visualization allows users to explore data, identify patterns, and make data-driven decisions.

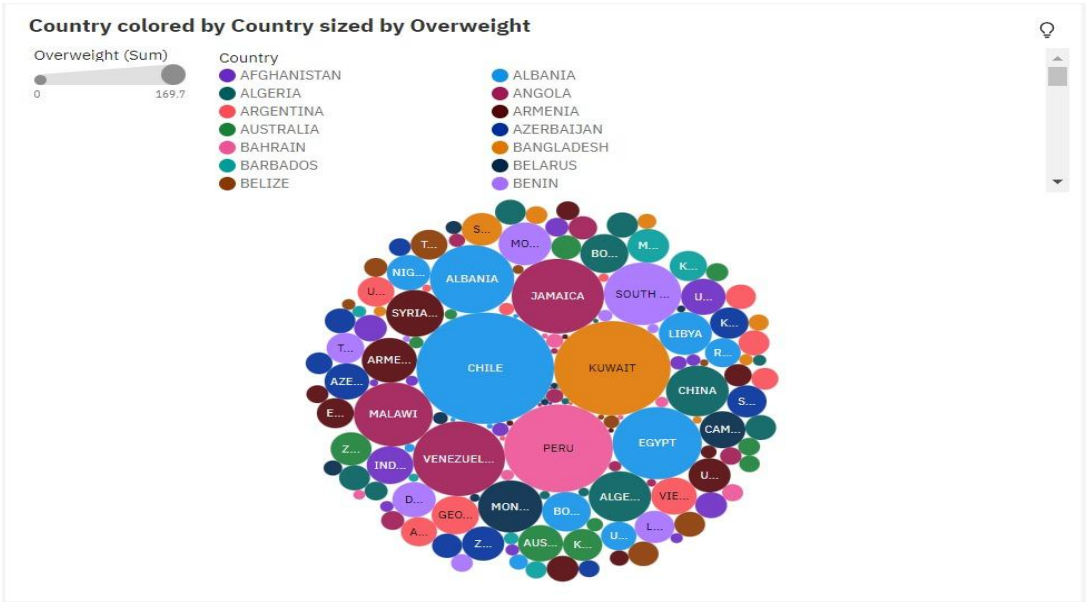
8. **Dashboard, Report & Story :** IBM Cognos provides the feature of utilizing the designed visualization to enact with all of these applied concepts.

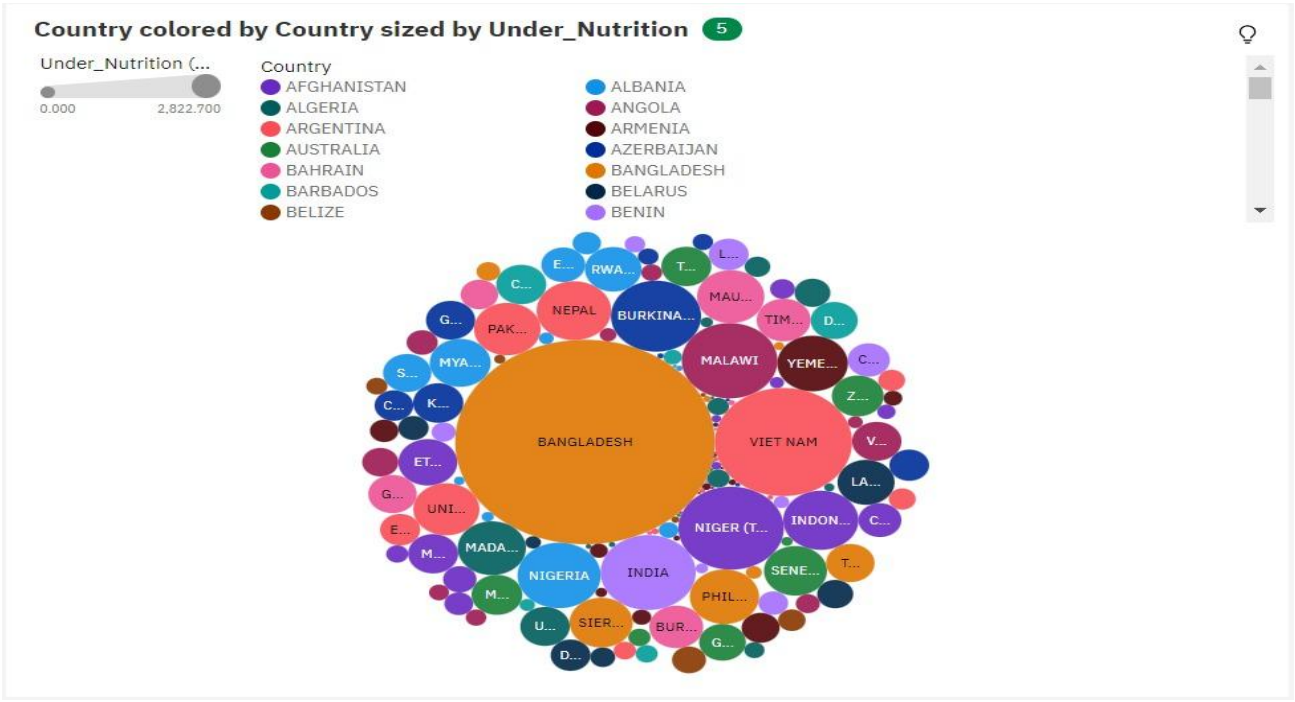
After defining the above modules we would create a web-based application with the help of flask and showcase the necessary visualizations and its insights.

Explorations

Showcasing some of the following explorations are as under -



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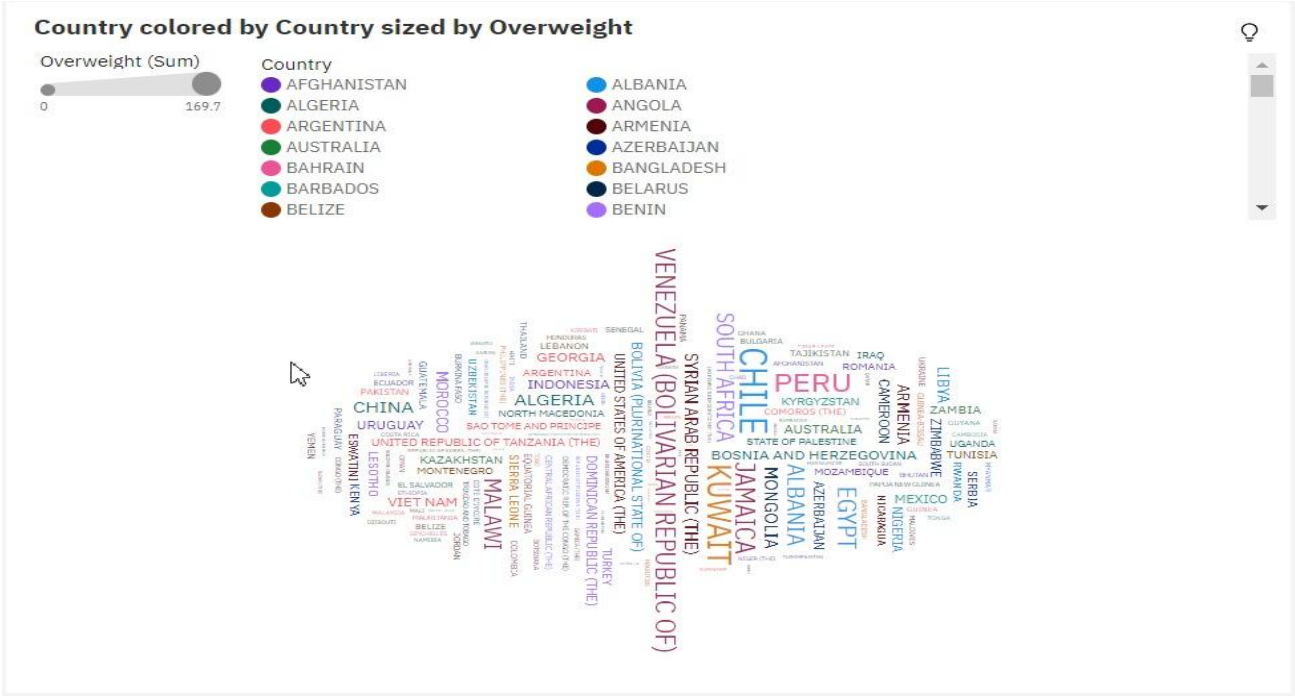
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BAHRAIN
BANGLADESH
BARBADOS
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BELIZE
BENIN
VENEZUELA (BOLIVARIAN REPUBLIC OF)
SYRIAN ARAB REPUBLIC (THE)
SOUTH AFRICA
CHILE
PERU
KUWAIT
JAMAICA
EGYPT
MONGOLIA
ALBANIA
AZERBAIJAN
BOSNIA AND HERZEGOVINA
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SIERRA LEONE
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URUGUAY
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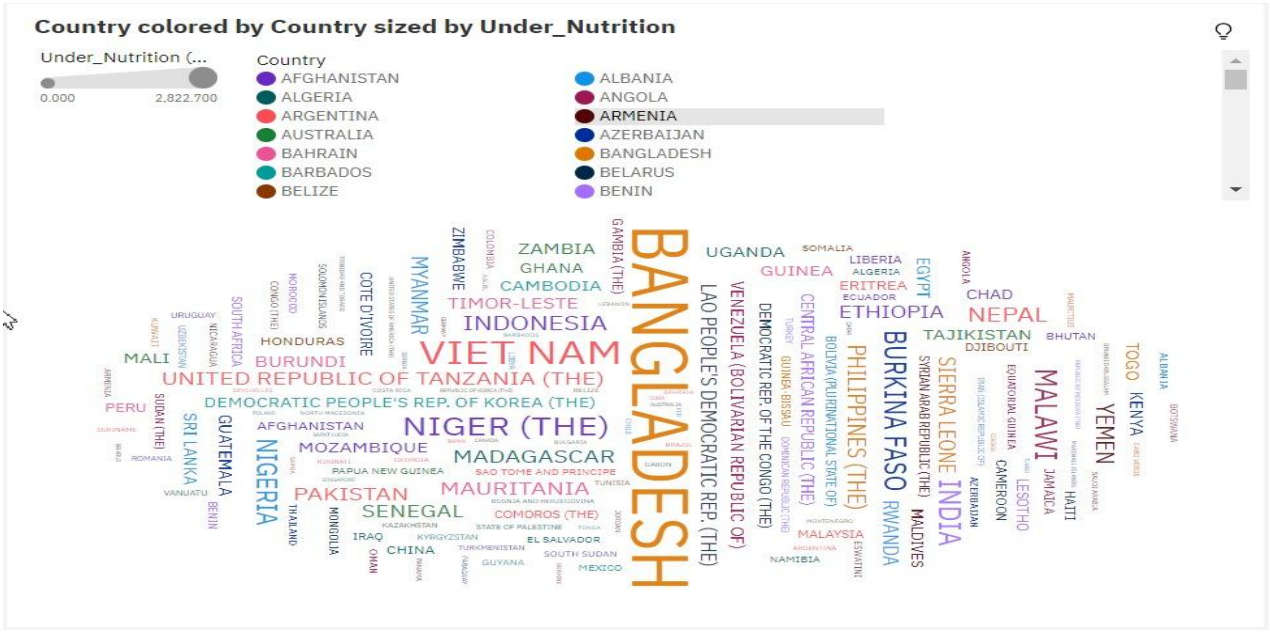
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YEMEN
KENYA
TOGO
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DEMOCRATIC REP. OF THE CONGO (THE)
CENTRAL AFRICAN REPUBLIC (THE)
EGYPT
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LIBERIA
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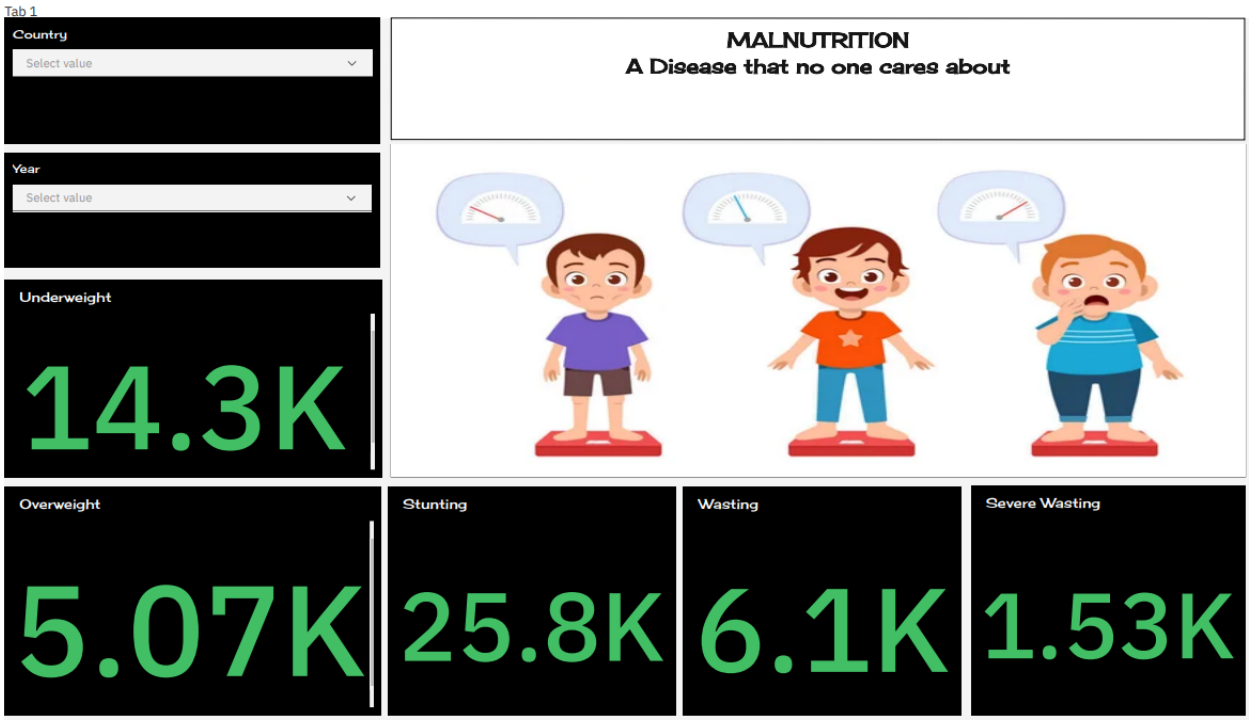
CAMEROON
LESOTHO
HAITI
JAMAICA
MALDIVES
CHINA
IRAQ
MEXICO
SOUTH SUDAN
EL SALVADOR
COMOROS (THE)
SAO TOME AND PRINCIPE
PAPUA NEW GUINEA
GAMBIA (THE)

Dashboard


Tab 1
Country
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Underweight
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MALNUTRITION
A Disease that no one cares about
Overweight
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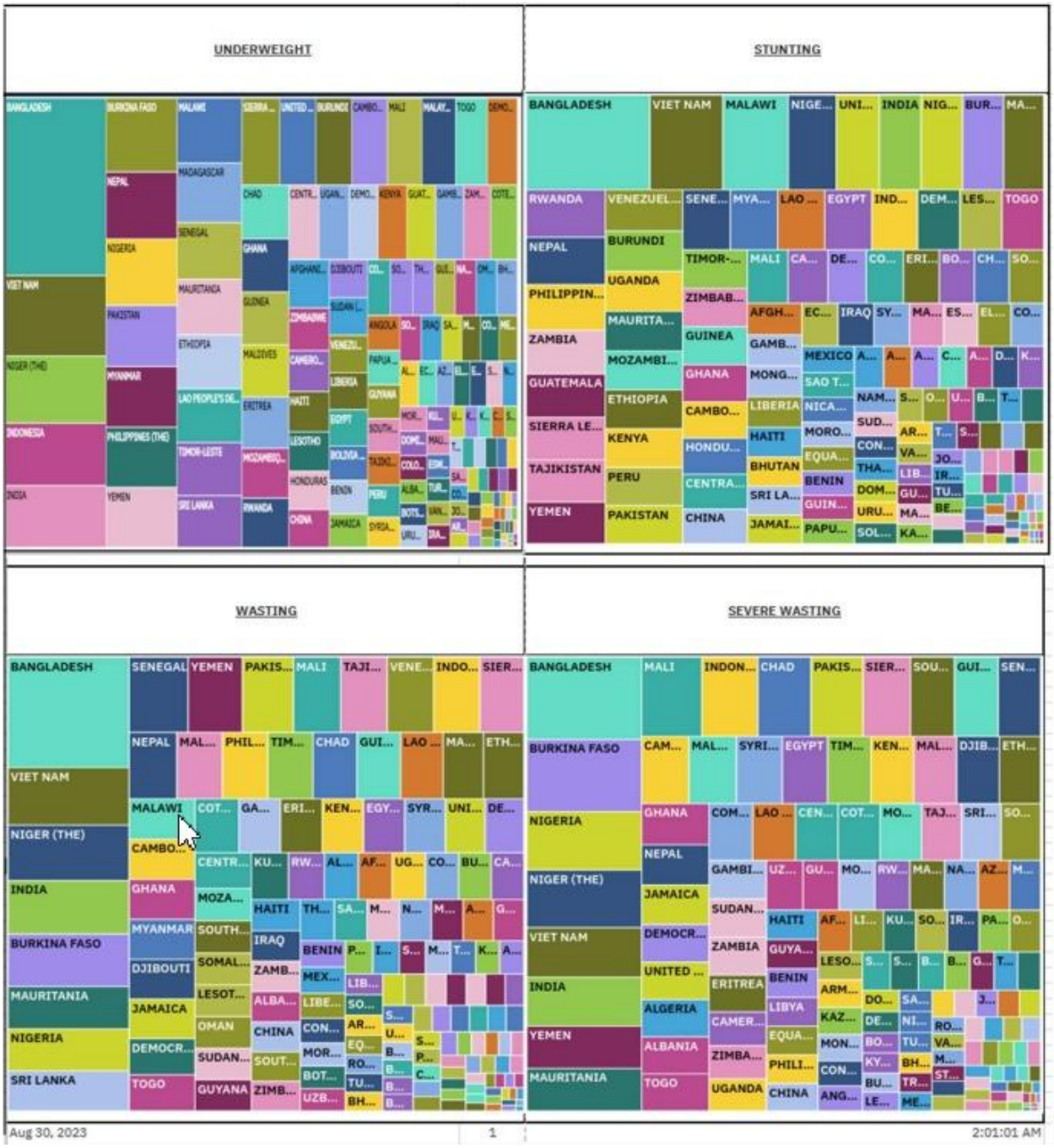
Stunting
25.8K
Wasting
6.1K
Severe Wasting
1.53K

Report


UNDERWEIGHT
STUNTING
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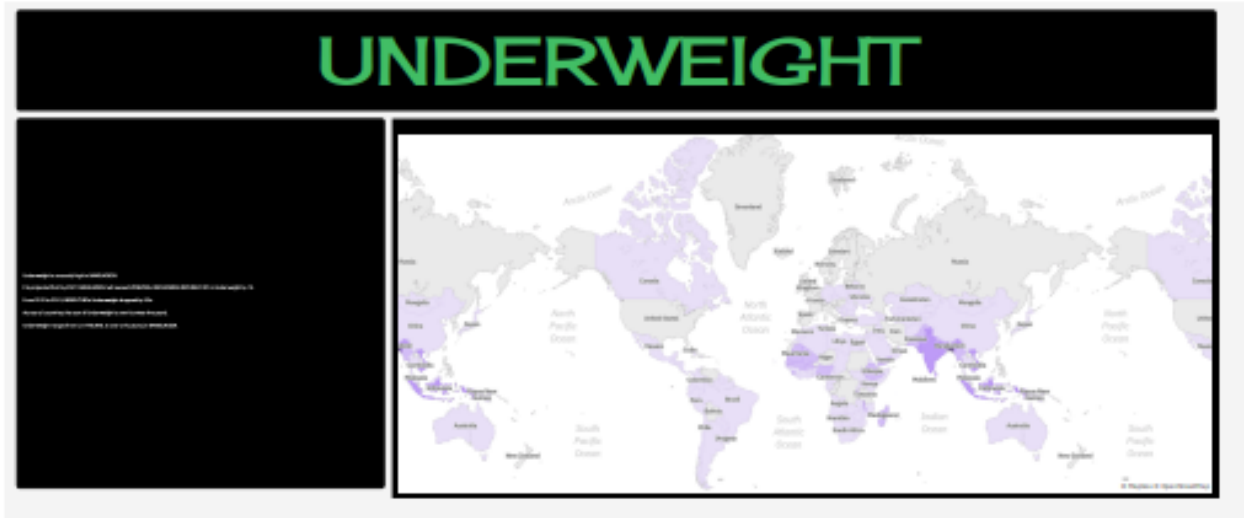
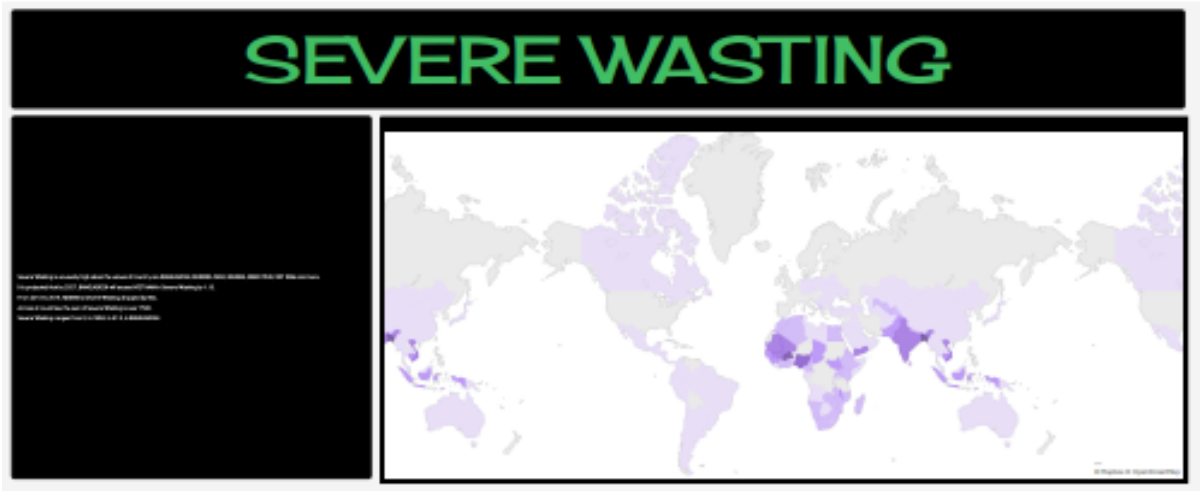
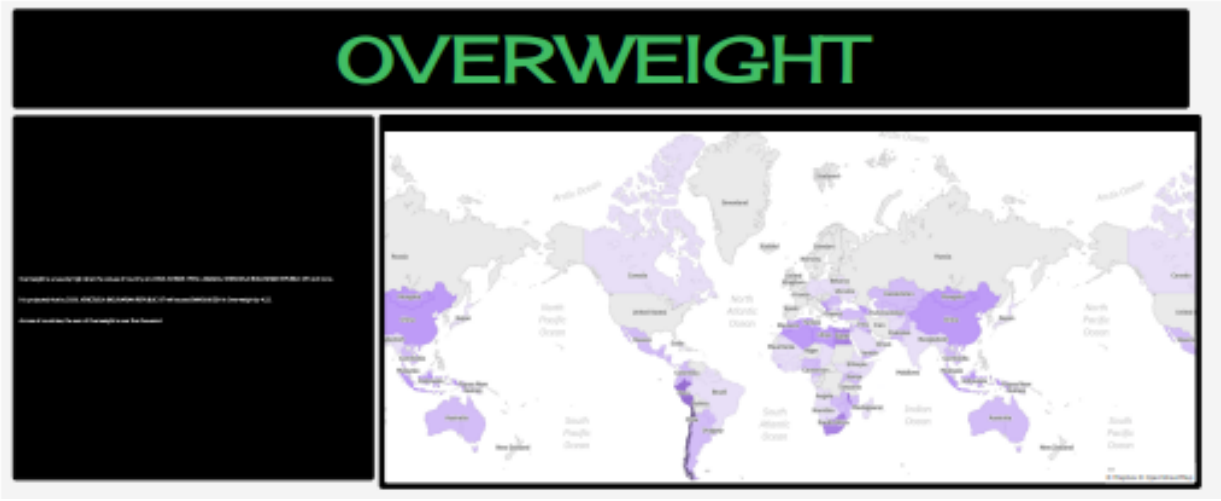
Story


Malnutrition
A Disease that no one cares about


UNDERWEIGHT





Conclusion

Malnutrition remains a critical global health challenge with far-reaching consequences for individuals, communities, and nations. It is a complex issue influenced by a variety of factors including inadequate access to nutritious food, poor feeding practices, lack of clean water and sanitation, and limited healthcare services. The impact of malnutrition is profound, affecting physical growth, cognitive development, immune function, and overall well-being.

Efforts to address malnutrition must be multifaceted and comprehensive. Immediate interventions are required to ensure access to sufficient and diverse nutritious foods, particularly for vulnerable populations such as children, pregnant and lactating women, and the elderly. Alongside nutritional support, educational programs are essential to promote awareness about balanced diets, appropriate infant and young child feeding practices, and the importance of hygiene and sanitation.

It's crucial to recognize that malnutrition is not solely a matter of food availability, but also of socio-economic factors, political will, and global cooperation. Sustainable solutions require collaboration among governments, non-governmental organizations, healthcare systems, and the private sector. Investments in agricultural development, poverty reduction, and healthcare infrastructure are fundamental to combating malnutrition effectively.

Dataset

https://www.kaggle.com/datasets/ruchi798/malnutrition-across-the-globe

Team Members

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AppetFight