Challenge Title : IBM Hack Challenge 2023
Project ID : SPS_PRO_4018
Project Title : Malnutrition: A Disease That No One Cares About
Team Name : Techies
Team size : 4

MALNUTRITION: A DISEASE THAT NO ONE CARES ABOUT

INTRODUCTION

Overview:

"Malnutrition: A Disease That No One Cares About" is a comprehensive web application which aims to tackle the critical issue of malnutrition. As malnutrition continues to be the reason for making children much more vulnerable to diseases and death worldwide. We provides a platform which show cases data driven insights which helps stakeholders to gain actionable insights, identify effective interventions, and allocate resources strategically to address malnutrition effectively. The visualizations presented can help raise awareness, drive policy changes, and improve the effectiveness of nutrition programs, ultimately leading to a reduction in the prevalence and impact of malnutrition.

Purpose:

The purpose of this project is to comprehensively address the global issue of malnutrition through an informative and interactive web application. The project aims to achieve the following objectives:

1. Raise Awareness : By presenting detailed analyses and visualizations of malnutrition indicators, the project aims to raise awareness about the extent and severity of malnutrition on a worldwide scale. This increased awareness can help foster a sense of urgency and encourage individuals, organizations, and governments to take action.

2. Data-Driven Insights : The project seeks to provide data-driven insights into the underlying factors contributing to malnutrition. By analyzing socio-economic, health, and dietary data, the web app enables users to understand the root causes of malnutrition and make informed decisions for intervention strategies.

3. Informed Decision-Making : The web application's dashboard and reports empower stakeholders, including policymakers, healthcare professionals, and NGOs, to make informed decisions. By offering a comprehensive overview of malnutrition's different facets, users can

devise targeted interventions and allocate resources more effectively.

4. Advocacy and Funding : The project aims to support advocacy efforts by presenting a compelling narrative that showcases the countries most affected by malnutrition. This narrative can be used to advocate for increased funding, support, and attention to regions and populations that are disproportionately impacted by malnutrition.

5. Holistic Understanding : By covering various malnutrition indicators—overweight, underweight, stunting, wasting, and severe wasting—the project provides a holistic understanding of the issue. This comprehensive perspective enables a more nuanced approach to addressing malnutrition's multifaceted challenges.

6. Education and Collaboration : The web application serves as an educational tool, helping individuals and groups understand malnutrition's complexities and consequences. It also encourages collaboration among stakeholders by providing a common platform to access and share information.

7. Measuring Progress : Over time, the project can be used as a benchmark to measure progress in the fight against malnutrition. By tracking changes in malnutrition indicators and analyzing the impact of interventions, the project contributes to ongoing efforts to improve global nutrition.

In summary, the purpose of this project is to leverage technology and data visualization to combat malnutrition. By raising awareness, providing insights, and enabling informed decision-making, the project aims to drive positive change and contribute to the global efforts to eradicate malnutrition.

LITERATURE SURVEY

Existing problem:

According to the World Health Organization (WHO) and the World Bank, malnutrition is one of the most serious but least-addressed development challenges in the world. The double burden of malnutrition now facing many countries worldwide is characterized by the coexistence of undernutrition along with overweight, obesity or diet-related noncommunicable diseases. In many countries, these different types of malnutrition co-exist at the national and household levels and across the life course. In the 2018 Global Nutrition Report, nearly 2 billion adults worldwide were overweight and obese, with a further 2 billion suffering from micronutrient deficiency. An estimated 38.3 million under five year olds are now overweight and obese, 150.8 million are stunted, and a further 50.5 million are wasted. The developmental, economic, social and medical impacts of this global burden of malnutrition are serious and lasting for individuals,

their families, and countries. Today, nearly one in three persons globally suffer from at least one form of malnutrition: wasting, stunting, vitamin and mineral deficiency, overweight or obesity and diet-related non communicable diseases. Nutrition-related factors contribute to approximately 45% of deaths in children aged under 5 years (mainly due to undernutrition), while low- and middle-income countries are now witnessing a simultaneous rise in childhood overweight and obesity.

Nutrition is critical to both health and economic development. Both undernutrition- and obesity-related diseases contribute substantially to the burden of disease in these societies. The direct and indirect economic costs incurred by individuals and populations are often unsustainable and contribute a significant barrier to economic and social development. Malnutrition could have adverse effects on health, which could result in increased health-care costs, reduced productivity, and lower economic growth. This could in turn perpetuate a cycle of poverty and ill-health. The double burden of malnutrition confers a serious and negative economic impact on individuals and populations. As the burden of malnutrition continues to rise, so too does its economic toll.

While the double burden of malnutrition may pose a significant public health challenge, it also offers a unique opportunity for alignment and coordination for integrated action on malnutrition in all its forms. The identification of the double burden of malnutrition should be regarded as a catalyst for the achievement of key global goals for addressing policy and program interventions.

Determining the approach to care is essential in the evaluation of the performance of health care delivery and its rational planning.Understanding the dynamics between the indicators of population health statistics, economic, and access to health services is fundamental in the evaluation of the effects of ongoing changing health care delivery systems. Unmet health needs may be especially significant for minority population groups, such as children, the elderly or pregnant women. Policy making have previously been informed by studies examining the relationship between socioeconomic status, gender differences in disease incidence and access to health services.

Beyond debate, however, is the need for improved knowledge on nutrition, health, and population statistics to inform policy makers on a broad base issue related to public health planning, health care reform and the evaluation of health care delivery. To contribute to this worthy endeavor, the World Bank has made the malnutrition, health, and population statistics dataset publicly available

Even though the dataset collected by the World Bank contains data from all the countries in the world, a realistic problem faced by analysts (e.g., health professionals, policymakers and

researchers) is that they must yield statistically significant results at the global system level. They must be be able to conclude with certainty the consequences, efficacy, aptness, and costs of care for segments of the population and for disparate structure of health care delivery and compensation. In practice, no particular avenue will produce knowledge appropriate for every research question.

Proposed solution:

"Malnutrition: A Disease That No One Cares About" is a comprehensive web application which aims to tackle the critical issue of malnutrition globally. As malnutrition continues to be the reason for making children much more vulnerable to diseases and death worldwide. We provides a platform which show cases data driven insights which helps stakeholders to gain actionable insights, identify effective interventions, and allocate resources strategically to address malnutrition effectively. The visualizations presented can help raise awareness, drive policy changes, and improve the effectiveness of nutrition programs, ultimately leading to a reduction in the prevalence and impact of malnutrition.

This application features a dynamic dashboard that provides in-depth analyses of malnutrition on a global scale. The dashboard highlights various indicators of malnutrition, including overweight, underweight, stunting, wasting, and severe wasting. By presenting these indicators visually, users can easily grasp the extent of the malnutrition problem worldwide.

Furthermore, the web app incorporates detailed reports that offer deeper insights into malnutrition cases. These reports delve into the factors contributing to malnutrition, such as population and income classification of the countries. The reports provide a holistic understanding of the issue, empowering users to make informed decisions and take targeted actions.

One of the standout features of our project is the creation of a compelling narrative that highlights the countries most affected by malnutrition. This narrative is structured into different categories, providing a nuanced perspective on the various dimensions of malnutrition. By showcasing the top countries suffering from malnutrition in each category, our project effectively raises awareness about the severity of the issue and emphasizes the need for urgent interventions.

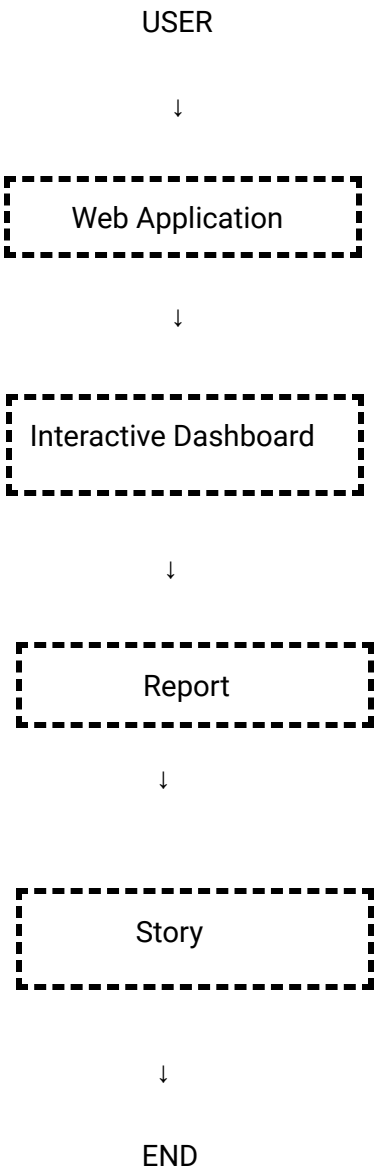
In summary, our web app addresses the global malnutrition problem through an interactive dashboard, insightful reports, and a compelling narrative that underscores the gravity of the issue. By providing data-driven insights and visualizations, our project has the potential to drive meaningful change in the fight against malnutrition.

THEORETICAL ANALYSIS

Conceptual Framework:

The project's core concept is to provide a web application that combines data visualization, comprehensive analysis, and complelling presentations to address malnutrition. It's grounded in the idea that data-driven insights can lead to informed decision-making, policy formulation, and interventions to combat malnutrition worldwide.

Block diagram:



Software Designing:

Steps involved in software designing:

1. Data Collection:
Identify reliable data sources related to malnutrition indicators. Gather data from various sources. Ensure data consistency, accuracy, and completeness.

2. Data Cleaning and Preprocessing:
Perform data cleaning and preprocessing to address missing values, outliers, and inconsistencies. Standardize units of measurement and formats to ensure uniformity across datasets.

3. Data Visualization:
Develop interactive charts, graphs, and maps that convey malnutrition trends effectively. Ensure visualizations are intuitive, clear, and provide insights at a glance.

4. Creation of Dashboard:
Design the user interface for the dashboard, focusing on intuitive navigation and information hierarchy. Integrate the interactive data visualizations, allowing users to customize indicators and regions. Ensure the dashboard is responsive and accessible on various devices.

5. Report Creation:
Structure the report section to provide detailed analyses of all factors. Utilize data insights and visualizations to create informative and comprehensive reports. Present the reports in a format that is easy to understand and share.

7. Storytelling Integration:
Design the story section to showcase the countries affected by malnutrition. Integrate narratives with relevant data visualizations to enhance informational impact.

8. Web Integration:
Develop the front-end of the web application using suitable web technologies. Incorporate the dashboard, report, and story section seamlessly into the web interface. Ensure cross-browser compatibility and responsive design for optimal user experience.

EXPERIMENTAL INVESTIGATIONS

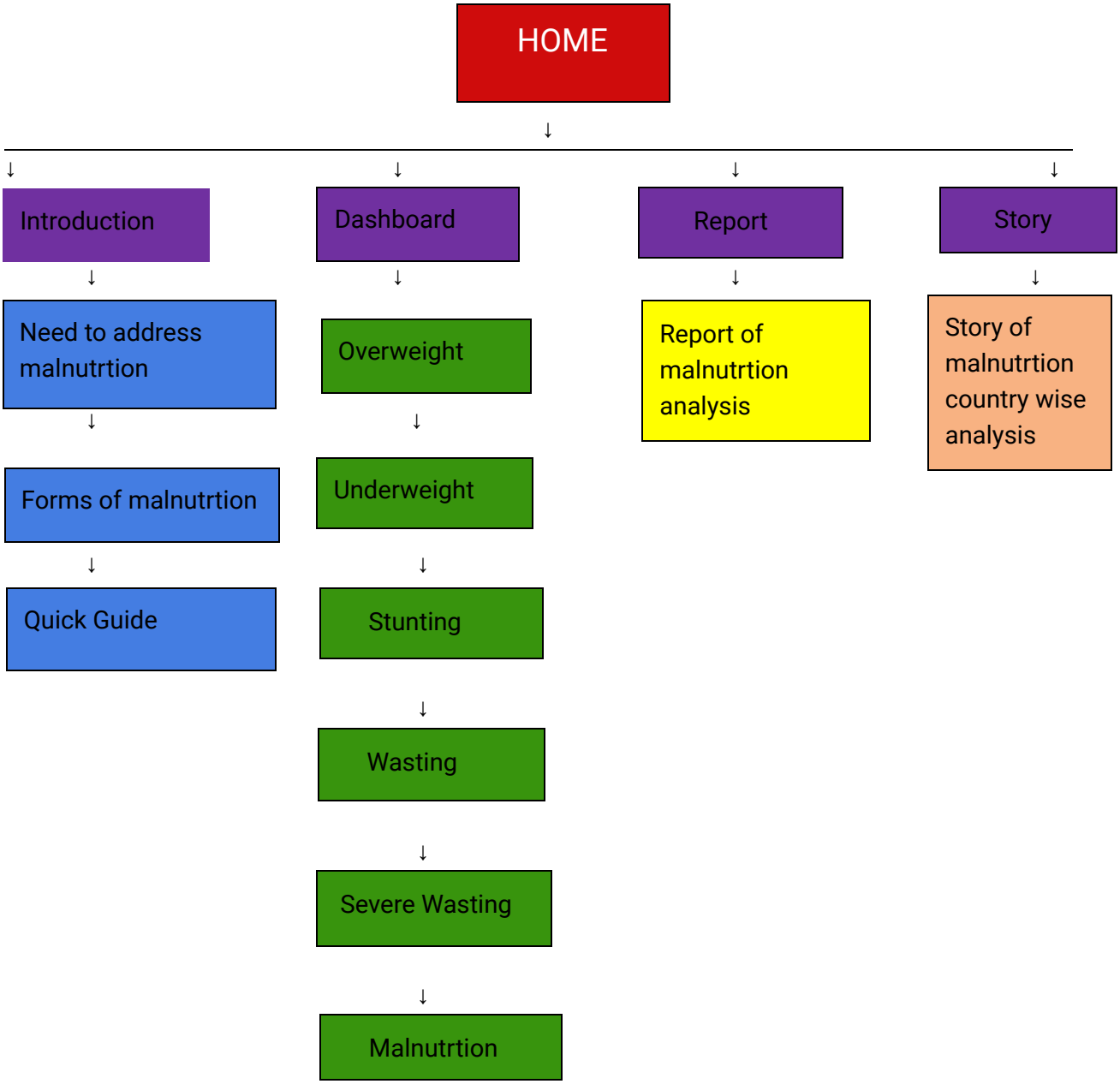
During the course of our project, we conducted an experimental analysis to better understand the current state of awareness and attitudes towards malnutrition. Surveys, interviews, and data collection were employed to gather insights from various segments of the population. The results highlighted a significant lack of awareness and knowledge about malnutrition, indicating the urgent need for education and advocacy.

The project's findings emphasize the potential for positive societal changes through increased awareness and proactive efforts to combat malnutrition. By focusing on education, policy advocacy, and community engagement, we can inspire individuals, organizations, and governments to take action to address this pressing issue.

As part of our project's solution strategy, we recognized the importance of accessible and user-friendly online platforms to disseminate information and engage with the public effectively. Our analysis revealed that existing websites related to malnutrition were often complex and difficult to navigate, hindering the dissemination of information.

Through the experimental analysis, we have identified the need for improved awareness and user-friendly online resources. By focusing on these areas, we can drive positive changes within society, ultimately working towards reducing the prevalence of malnutrition and its associated impacts. The potential for positive transformation is substantial, and with continued efforts, we can make a meaningful difference in the lives of millions.

FLOWCHART

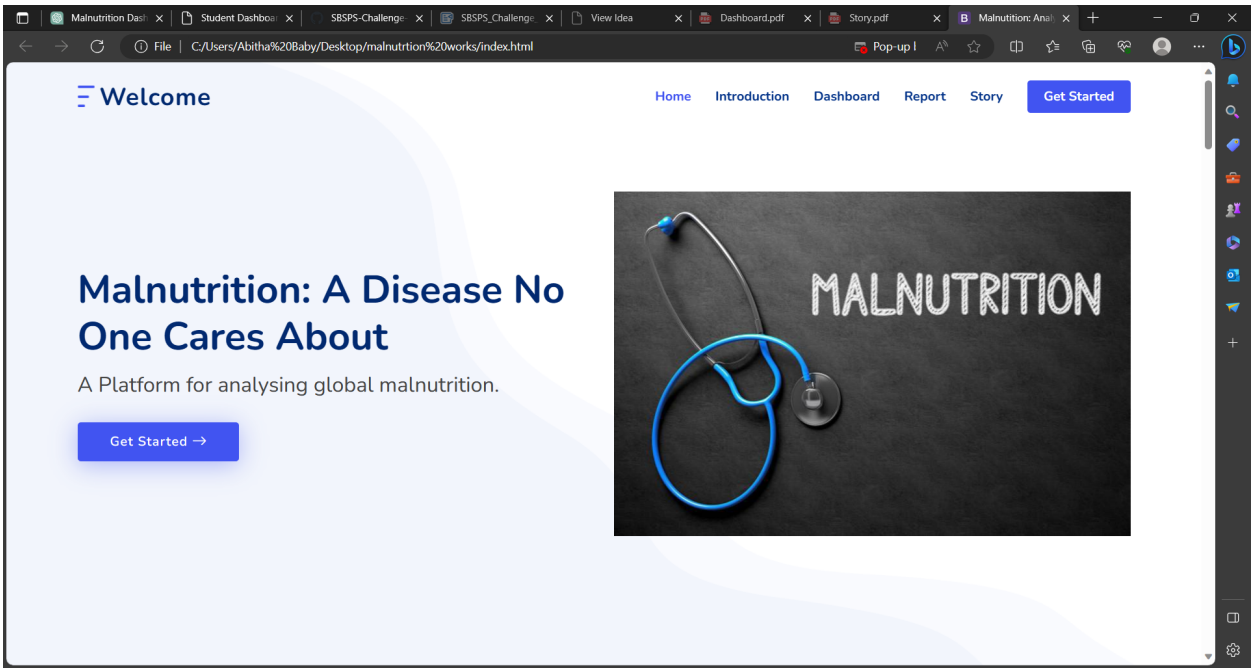

HOME
Introduction
Dashboard
Report
Story
Need to address malnutrtion
Forms of malnutrtion
Quick Guide
Overweight
Underweight
Stunting
Wasting
Severe Wasting
Malnutrtion
Report of malnutrtion analysis
Story of malnutrtion country wise analysis

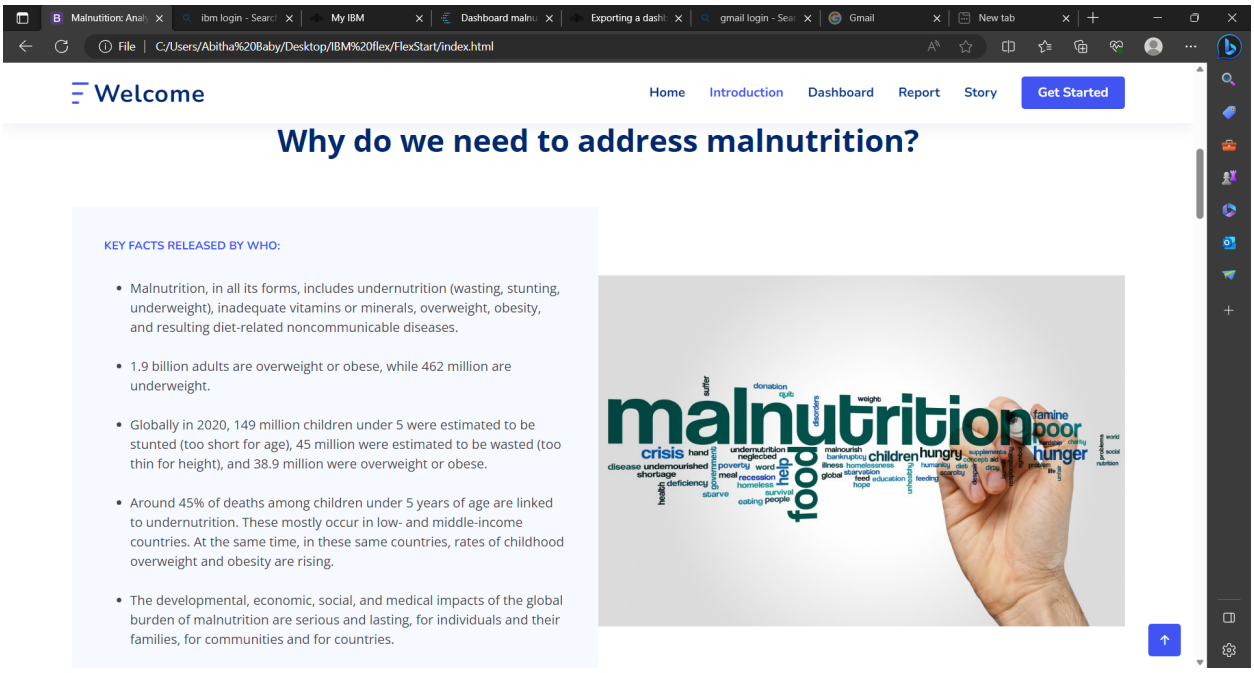
RESULT

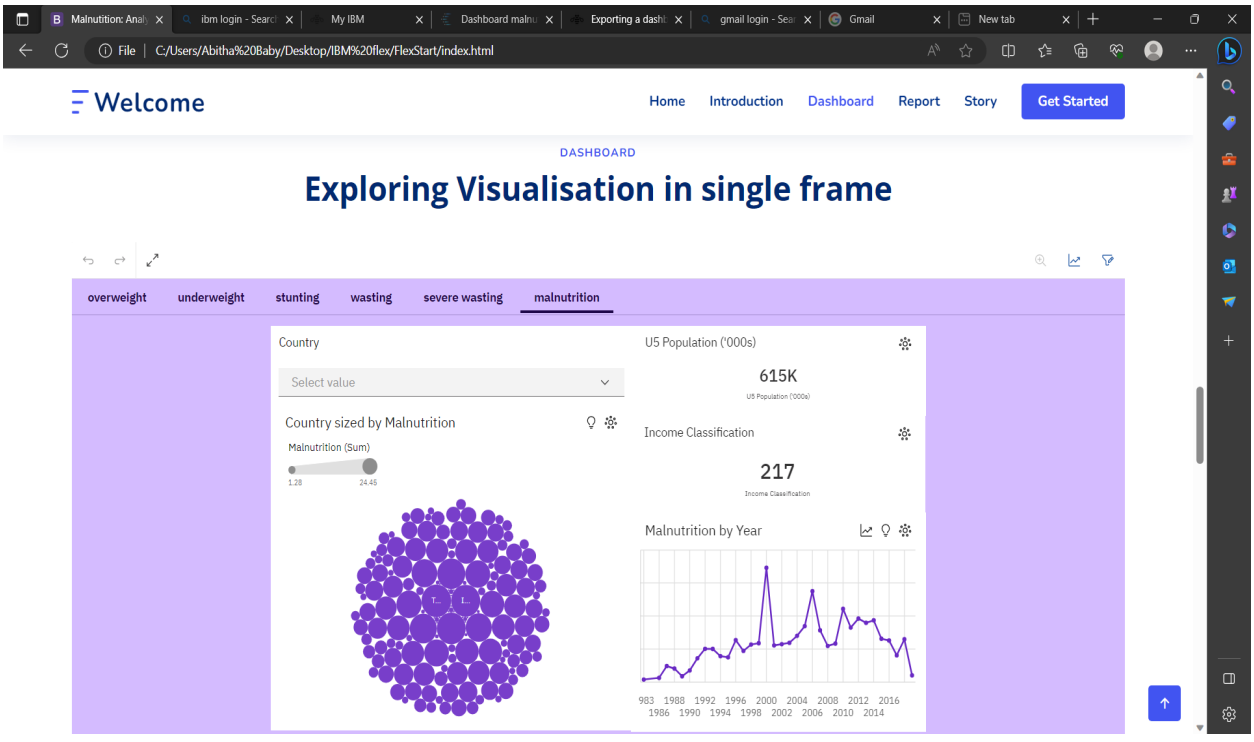
This project yielded insightful outcomes, uncovering crucial trends in malnutrition indicators through data analysis. The interactive dashboard effectively visualized global malnutrition patterns, enabling users to customize their explorations. Detailed reports provided in-depth analyses of socio-economic factors. The story section highlights the countries which need most care.

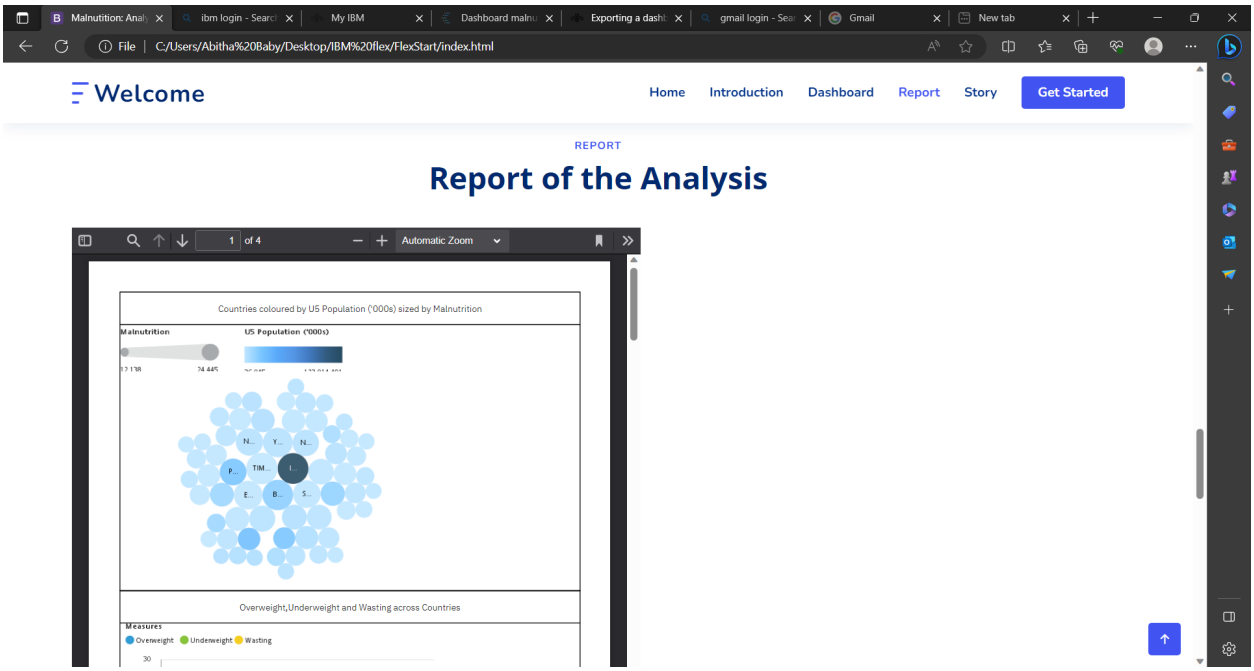
Overall, the project's data-driven insights, user-friendly tools, and compelling narratives contribute to addressing the malnutrition challenge while inspiring positive action.

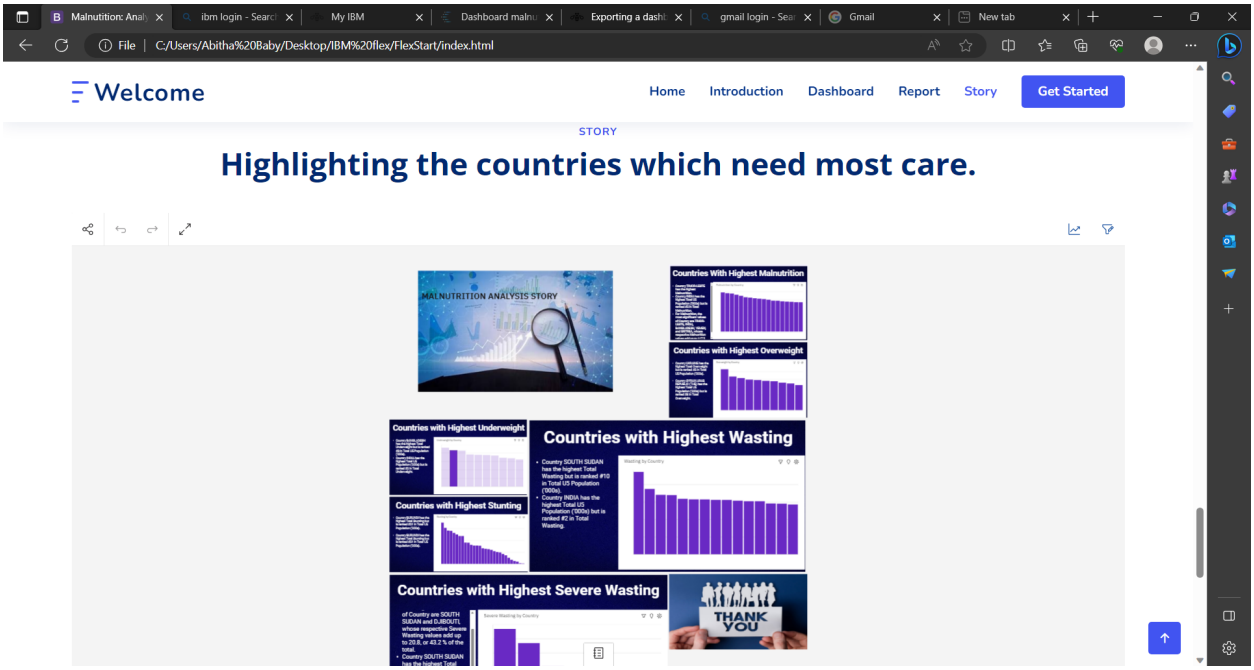
Following are some output screenshots:




Welcome
Home
Introduction
Dashboard
Report
Story
Get Started
Why do we need to address malnutrition?
KEY FACTS RELEASED BY WHO:
Malnutrition, in all its forms, includes undernutrition (wasting, stunting, underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related noncommunicable diseases.
1.9 billion adults are overweight or obese, while 462 million are underweight.
Globally in 2020, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 38.9 million were overweight or obese.
Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries. At the same time, in these same countries, rates of childhood overweight and obesity are rising.
The developmental, economic, social, and medical impacts of the global burden of malnutrition are serious and lasting, for individuals and their families, for communities and for countries.
malnutrition
food
poor
hunger
crisis
children
hungry
famine


Welcome
Home
Introduction
Dashboard
Report
Story
Get Started
DASHBOARD
Exploring Visualisation in single frame
overweight
underweight
stunting
wasting
severe wasting
malnutrition
Country
Select value
Country sized by Malnutrition
Malnutrition (Sum)
1.28
24.45
U5 Population ('000s)
615K
Income Classification
217
Malnutrition by Year
1983 1988 1992 1996 2000 2004 2008 2012 2016
1986 1990 1994 1998 2002 2006 2010 2014





Video demo link

ADVANTAGES

1. Data-Driven Decision Making : The project provides stakeholders with data-driven insights, enabling them to make informed decisions and develop targeted interventions to combat malnutrition effectively.

2. Comprehensive Understanding : By analyzing multiple malnutrition indicators and socio-economic factors, the project offers a holistic understanding of the issue, helping identify underlying causes and correlations.

3. Awareness and Advocacy : The project raises awareness about malnutrition's severity through interactive data visualizations and compelling narratives, encouraging advocacy efforts and policy changes.

4. Customized Insights : Users can access specific data for different regions and indicators, allowing for customized insights that cater to varying needs and priorities.

5. Policy Innovation : Policymakers can use the project's findings to formulate innovative policies addressing malnutrition's root causes, leading to more effective and sustainable solutions.

6. Resource Optimization : Organizations and governments can allocate resources more efficiently by targeting interventions based on the project's analyses, reducing wastage and maximizing impact.

7. Educational Tool : The project serves as an educational resource, helping users understand the complexities of malnutrition and fostering a greater understanding of the issue.

8. Collaboration Facilitation : The web application can bring together various stakeholders, such as governments, NGOs, researchers, and communities, encouraging collaboration and knowledge sharing.

DISADVANTAGES

1. Data Quality and Reliability: The accuracy and reliability of the data used for analysis can impact the validity of insights. Inaccurate or incomplete data may lead to incorrect conclusions and recommendations.

2. Data Privacy Concerns: Gathering and sharing health and demographic data raises privacy concerns. Ensuring proper anonymization and protection of sensitive information is essential to maintain trust.

3. Contextual Variability: Malnutrition is influenced by various socio-economic, cultural, and geographical factors. The project might struggle to capture the full context of each region, potentially leading to oversimplified conclusions.

4. Technological Accessibility: The project's impact depends on users' access to technology and the internet. Disparities in technology access could limit its reach, particularly in marginalized areas.

5. Bias in Data Collection: Existing biases in data collection methods can introduce inaccuracies and inequalities in the analyses, leading to skewed results that do not represent the entire population.

APPLICATIONS

1. International Organizations:

- Global Health Initiatives: Organizations like the WHO, UNICEF, and World Food Programme can utilize the project's data to support their global health initiatives.

2. Public Health and Healthcare Organizations:

- Policy Formulation: Public health agencies can use the insights to design evidence-based policies targeting malnutrition prevention and management.
- Resource Allocation: Health organizations can allocate resources effectively by targeting regions with high malnutrition rates.
- Intervention Planning: Healthcare providers can plan interventions based on specific indicators, such as addressing stunting or wasting in children.

3. Government and Policy Makers:

- Legislation and Funding: Governments can use project findings to develop legislation, secure funding, and create national nutrition strategies.

4. Non-Governmental Organizations (NGOs):

- Targeted Interventions: NGOs can identify areas most in need of their interventions, optimizing their efforts for maximum impact.
- Advocacy and Awareness: The project's data can support NGOs' advocacy campaigns to raise awareness and drive policy changes.

5. Educational Institutions:
- Research and Analysis: Academic institutions can use the project's data as a foundation for research and analysis on malnutrition's causes, effects, and solutions.
- Training Future Professionals: The project can serve as a case study for students in public health, nutrition, and data analysis fields.

6. Media and Journalism:

- Information Dissemination: Journalists can use the project's insights to create informative articles, infographics, and reports that raise public awareness about malnutrition issues.

7.Global Partnerships:

- Collaboration: The project's insights can facilitate collaborations between countries, organizations, and stakeholders to address malnutrition collectively.

CONCLUSION

In conclusion, the "Malnutrition Country-Wise Analysis" project stands as a significant step towards addressing the critical issue of malnutrition across the globe. Through its innovative web application, the project has demonstrated the power of data-driven insights, interactive visualizations, and compelling narratives in shaping a comprehensive understanding of malnutrition's complex challenges.

By providing a centralized platform for stakeholders from various sectors – including public health, policy, education, media, and NGOs – the project fosters collaboration, informed decision-making, and advocacy efforts. The project's strengths lie in its ability to offer a holistic view of malnutrition by analyzing indicators such as overweight, underweight, stunting, wasting, and severe wasting, while also considering population and income classification.

The project's impact extends beyond the virtual realm, influencing policy changes, resource allocation, and interventions that directly impact communities affected by malnutrition. It has the potential to drive substantial progress in reducing malnutrition rates, improving public health, and ultimately enhancing the quality of life for millions of individuals.

However, it's crucial to acknowledge that the project is not without challenges. Data quality, privacy concerns, contextual nuances, and technology accessibility are considerations that demand ongoing attention and refinement. Furthermore, while the project can provide valuable insights, translating these insights into concrete action requires dedication, collaboration, and a long-term commitment to addressing the underlying systemic causes of malnutrition.

In essence, the "Malnutrition Country-Wise Analysis" project is a testament to the transformative power of technology and data analytics. By combining data, insights, and advocacy, the project serves as a catalyst for positive change, fostering a future where malnutrition is not just understood, but actively addressed, prevented, and overcome. The journey towards a malnutrition-free world is ongoing, and this project plays a pivotal role in paving the way for that brighter future.

FUTURE SCOPE

1. Real-Time Data Integration: Incorporate real-time data feeds to ensure the most up-to-date information is available, allowing for quicker responses to emerging malnutrition trends.

2. Predictive Analytics: Develop predictive models to forecast malnutrition trends based on historical data, enabling proactive interventions.

3. Machine Learning: Implement machine learning algorithms to identify patterns, correlations, and potential causes of malnutrition across diverse datasets.

4. User Feedback Incorporation: Integrate user feedback mechanisms to continuously improve the accuracy, usability, and effectiveness of the application.

5. Artificial Intelligence (AI): Incorporate AI for advanced data analysis, insights generation, and personalized recommendations for users.

BIBILOGRAPHY

1. https://www.mdpi.com/2673-2688/1/1/4#B22-ai-01-00004

2. https://youtube.com/playlist?list=PLjlJJFiCdXML2saDYdP1Sk1Pt1bEgc0OR

3. https://www.who.int/news-room/fact-sheets/detail/malnutrition

APPENDIX

Source Code:

Link to Project Repo