TAYLOR'S UNIVERSITY

Wisdom • Integrity • Excellence

INTAKE: JANUARY 2023

January 2024 – Semester 4

BACHELOR OF COMPUTER SCIENCE (Hons)

GROUP ASSIGNMENT 1 (WEIGHTAGE: 20%)

PROPOSAL FOR WEB APPLICATION

Module Code: ITS 66404

Module Name: Principle of Software Engineering

Hand OUT Date: 15th January 2024, Monday.

Hand IN Date: 17th February 2024, Saturday. (21:44 PM)

Student declaration: we declare that –
1. We understand what is meant by plagiarism. 2. The implications of plagiarism have been explained to us by our lecturer. 3. The assignment is our work, and we have given fully documented references to the work of others. 4. The material contained in this assignment has not previously been submitted for assessment in any other formal course of study.

COURSE LECTURER / TUTOR	MR. ADARSHA KHADKA, MR. JUGAL RAJ SHRESTHA
TOPIC	FOOD AND HUNGER MANAGEMENT SYSTEM
THEME	SUSTAINABLE DEVLOPMENT GOALS, RESOURCE MANAGEMENT

STUDENT NAME	UNIVERSITY ID	STUDENT ID
SUJAL RATNA TULADHAR	036 2483	22013 230
KABIN SHRESTHA	036 1843	22013 216
RIJAN KHAYJU	036 2286	22013 237
BISHAL POUDEL	036 2255	22013 200
AASHISH TAMANG	036 2563	22013 289

Table of Content

1. Introduction 1
   1.1. Vision 1
   1.2. Mission 1
2. Problem Statement 1
3. Solution 2
   3.1. Social Impact 2
   3.2. Competitiveness 2
   3.3. SWOT Analysis of 3 Potential Competitors 3
4. Business Viability 5
5. System Architecture Overview 6
   5.1. Proposed System Architecture Diagram 6
   5.2. UIUX Design 7
   5.3. System Requirement 11
   5.4. System Modules 11
   5.5. Functional and Non-Functional Requirement 12
      5.5.1. Functional Requirements 12
      5.5.2. Non-Functional Requirements 12
      6. System Analysis & Design 13
   6.1. Unified Model Language: Use-Case Diagram 13
   6.2. Unified Model Language: Class Diagram 14
   6.3. Unified Model Language: Object Diagrams 15
7. Conclusion 16
   7.1. Potential Future Enhancements 16
8. Duties and Distributions 17
9. References 18

1. Introduction

Food and Hunger management refers to the methods to guarantee that people have access to sufficient and nourishing sustenance while treating problems associated with malnutrition. Initiatives must be taken on an individual, community, national, and international level to make sure every person has access to the tools and information they need in order to achieve their nutritional needs.

The main goal of Hunger management involves finding problems related to hunger and malnutrition. It covers methods including income support, nutrition education, food assistance programs, efforts to reduce poverty, healthcare services and infrastructure development. We want to believe in a world where not a single one goes to sleep feeling hungry. We wish to address this problem in global scale and transform lives by nourishing communities

Remote to Urban, we wish to work without boundaries, addressing the challenges facing it head on. We want to take part in using up-to-date technologies and sustainable practices to create innovative solutions for food security in our country. We wish to empower all communities, for a brighter future working together while recognizing their strengths.

1.1. Vision

We all know our fundamental right to food, so we wish to envision a world with abundant nutritious food, possible with collective effort of more sustainable agriculture practices. These actions of selflessness can eradicate hunger and improve wellbeing. Knowing we have enough food to feed everyone, we still face the problem of being locked behind a paywall.

Our vision is to create a dynamic website offering interactive features, aiming to serve a global audience about causes. This might involve providing interactive workshops, necessary information on gardening practices, food preservation, and nutrition education with enhanced resilience.

1.2. Mission

Our main mission is to address insecurity, educate communities with the necessary information, implement instruments required to promote and nourish development in the areas and transform lives. Our website aims to educate, uplift, and enable significant action toward the construction of strong, fair, and scientifically sustainable food systems. We want to build a global community dedicated to tackling the interrelated issues of food insecurity and malnutrition by encouraging individuals to make informed choices, creativity, cooperation, and advocacy. Our ultimate mission is to see a society where everyone has access to nutritious food and break the cycle without relying on emergency relief. but in-case we wish to swiftly deploy immediate support.

2. Problem Statement

Although development is seen in major areas, issues of global hunger, malnutrition and food insecurity are still significant states FAO. Hundreds of millions around the world face daily challenges in accessing adequate nutritious food. Poverty (economic inequalities), extreme climate change, scarcity of water, lack of transport infrastructure and limited resources by political instability aggravate this issue. The Global Hunger Index indicates that, as of 2021, 23 countries face alarming or serious levels of hunger, emphasizing the urgency for coordinated efforts to address these complex issues.

3. Solution

Our holistic approach revolves around empowering communities through education. We will champion agricultural productivity while also preserving the environment. Our initiatives include use of technology for efficient water management, to optimize and promote organic farming for yield. We want to provide comprehensive nutrition education articles for dietary supplementary needs. We want to prioritize community empowering ownership, working collaboratively with local leaders. We seek partnership with governments, NGOs, private public businesses to influence policies.

According to the FAO, adopting sustainable agricultural practices mitigates insecurity and increases global food production by 6/10 while preserving natural resources. Data suggests 80% of small-scale farms are family-owned and need heavy investing with access to technology to improve and scale production. If not adapted with measures by 2050, the world could lead to 30% decrease in production yield. International initiatives like the Paris Agreement, recognize the impact on food security by extreme level of climate change. The worldwide board of Agriculture and Food Systems for Nutrition reports that dietary diversification can reduce stunting by 20%. The FAO notes that there would be increase in farm yield by 35% if women had the same access to resources as men, which can potentially lift 150 million out of hunger. Studies from organizations like Oxfam highlight the impact of empowering local communities, considering cultural practices and specific needs. World Economic Forum has reported that use of blockchain technology has increased over years which allows transparency, to be traced and reduced fraud in food in supply chain

3.1. Social Impact

We are dedicated to generating a radical and lasting social impact. Our wish to empower communities for sustainable agricultural practices and also to significantly improve food security. By educating on innovative farming techniques, we hope to raise a miniscule rate of local food production, ensuring homeless have reliable access to nutritious meals. Through comprehensive nutrition articles, we are ambitious to reduce malnutrition rates, particularly among women and children. In emergencies, our prepared relief feature will be designed to enable fast recovery and enhance community resilience in the longer term. From the very beginning, we desire to share and celebrate stories of families breaking free from the cycles becoming self-sufficient. These stories will substantiate the possibilities and achievability of working for common good.

3.2. Competitiveness

beyond just relief we wish to have a long-lasting effect on the world stage.

a. Education and Awareness: Cost-effective and sustainable in the long run, but it may take time to see measurable impacts.
b. Reducing Food Waste: Cost-effective and environmentally friendly, making it highly competitive.
c. Technology Integration: Improves efficiency, transparency, and traceability in food systems, reducing fraud and waste. High potential, but initial investment and digital literacy challenges may exist.

3.3. SWOT Analysis of 3 Potential Competitors

Competitor:	Oxfam	UN: World Food Program	No Kids Hunger
Strengths:	• successful fundraisers and consistent backing from rich financial stakeholders • diverse range of collaboration with governmental and nonprofit organization • Experience in Crisis Response • Strong Partnership, community empowerment • focusing on their own specified region for directness and public impacts • Online awareness platform helping communities to take ownership of their own food production methods, harvest and distribution	• educative approach to nutrition and healthy eating habits • long term food security and capability of producing and contributing sustainable agricultural practices • utilization of innovative approaches to educate society about ingredient, nutrition and healthy diet • Data Analytics for Efficiency • Regulatory Authority • Governmental Funding and support • Advocacy power in agricultural policies	• good worldwide network to reach global audience • increasing community connection from ground up, employing local workforce for deep understanding • large number of resilient volunteers, willing to contribute for effectiveness in program implementation through nationwide networking • Innovative Technology • Scalable Model • Infrastructure for Distribution
Weaknesses:	• donation dependency is based on funds significantly, coming from corporates who are willing to spend capital • Dependence on external Funding • Bureaucratic decision making • Limited influence on policies • lack of flexibility • Vulnerability to tech issues • not having report of analysis or feedback to monitor and re-evaluate for maintenance in adapting to latest program in low scale organization	• lack of consistent donations will have major impact on funding for initiative taken if not distributed carefully • not adapting to rapid technologies advancements may lead to efficiency problem in operations • Vulnerability to tech issues • limited physical infrastructure • trust establishment challenges • large organization like this has slow decision-making process that may hamper from bureaucratic structure	• only focusing on locality, will limit on global reach, but will not impact on scale of scope • reliance to low amount of local donation and not having backing of major hedge fund may impact scalability • not being able to swiftly respond to large scale emergencies due to limited expedient • not focusing on sustainable agricultural practices which has no impact on the longer term

Opportunities:	• we can add feature like monitoring relief efforts and efficient distribution in exploration • finding funding and investor partnership to create a foundation in specific areas • Collaboration with corporate sponsors • searching for established organization to reach wider range of partnership, informing about out of reach localities • integration with supply chain • expansion with new market	• maybe implement education program in enhancing nutrition education to those who may not have access • advocate in hunger relief, humanitarian policies change on national and international level	• foster and nourish local businesses, school, groups collaboration for better life support • expanding to neighboring region and also increase impact with foreign techniques in locality • collaboration with other countries • we can fact check and evaluate with educational institution to donate references for detail rich papers on nutrient education
Threats:	• existence of other similar organizations may hamper the organization with limited resources and donations • political instability • competition for donor funding • lack of foothold and head on collision with major organization will impact the standing • resistance from traditional stakeholder	• lack of preventive measure for natural disaster will strain emergency relief supply • regulation challenges • organizations reach and its ongoing activities may be impacted due to instability in political landscape • changing public sentiment • if extreme climate change is not combatted, it will disrupt all the different practices in agricultural field and may have to resort to using the emergency supplies • public dissatisfaction	• low average economy in communities will affect the flow of local communities • challenging higher authority from a little community may not be possible without proper leadership and it will have challenges during advocacy • budget constraints • nationwide economic challenges will lead to slow input in sustainable funds • competition with similar platform

4. Business Viability

The food and hunger management system are a highly viable business model addressing the critical issue of food scarcity and hunger through a technologically advanced platform. With the IT integrated / technology to connect food donors, distribution organizations and the system streamlines the donation process, minimizes food waste, and efficiently distributes resources. We want to guide people in our easy-to-use platform, connecting them to vital resources related to nutrition

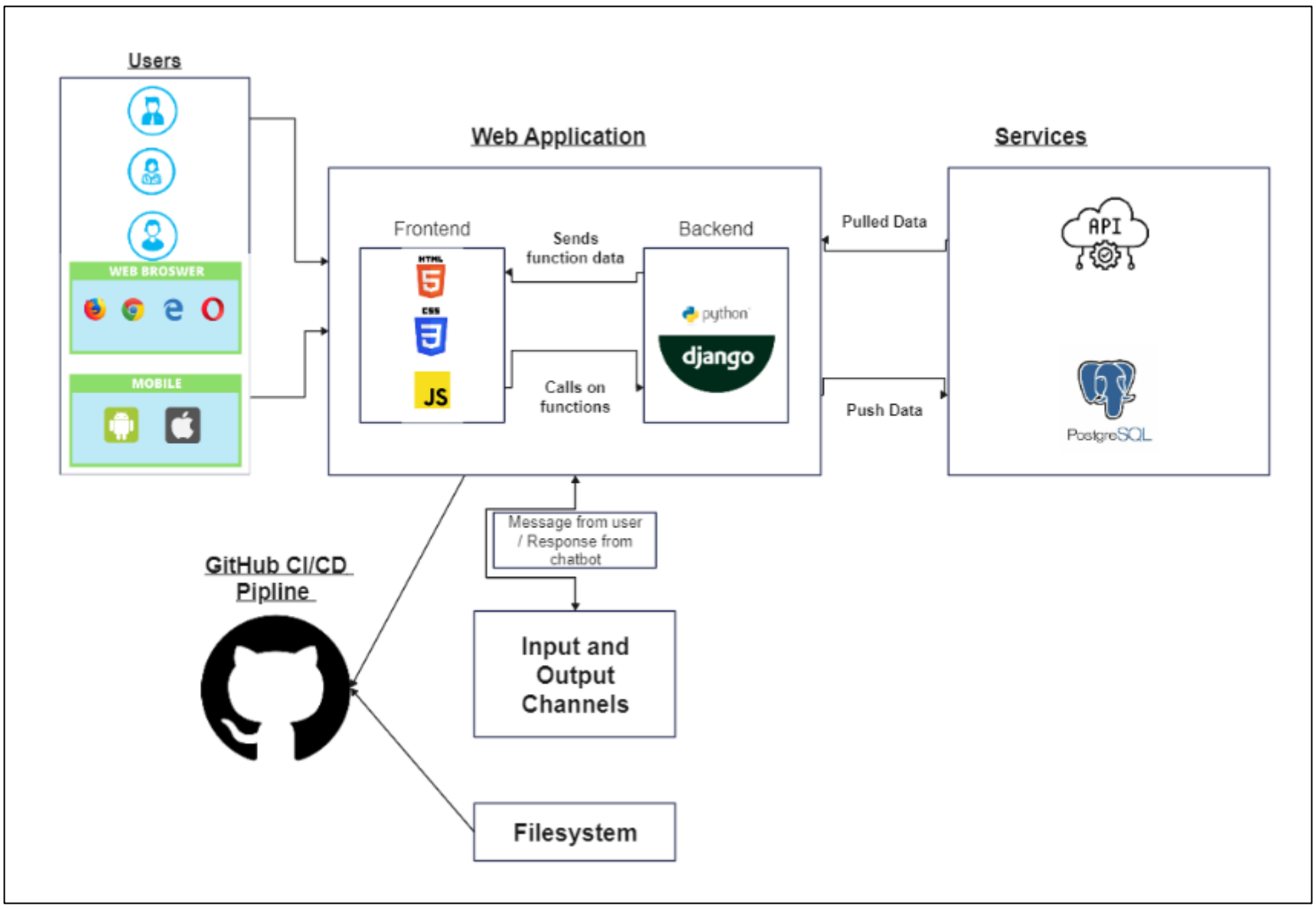
Our main goal is to help communities that are grappling with financial constraints, particularly focusing on vulnerable groups like children and the elderly, who encounter amplified difficulties regarding food insecurity. We are directing our efforts towards areas that are often overlooked, where getting access to nourishing food is tough, and the cost is a substantial worry. In recognizing the unique needs of these communities, our system is designed to tackle issues tied to getting access to healthy food, making it affordable, ensuring good nutrition, and providing education on cultivating healthy eating habits. and making sure they are able to have their own choices.

a. Financial: since it's just the beginning. We don't have a revenue stream. if it pops off, we may look into donations, partnerships, or other sources to further funds,
b. Operational Efficiency: we hope to be able evaluating the impact of sustainable initiatives like agriculture and nutrition education. with efficient effective logistic distribution of resources in the network.
c. Impact Measurement: we wish to monitor and see reduction in malnutrition rate, improvement in food security and resilient community.
d. Community Engagement: strengthening the relationship with partners and stakeholders. empowerment and increased inclusiveness in communities.
e. Sustainability Practices: long term secure access to food and lessening environment impact with help of income generation
f. Innovation and Adaptability: we want to adopt the latest technologies to improve our output
g. Risk Management: assessing risks before, during hard times, opting for mitigation and being well prepared for next

5. System Architecture Overview

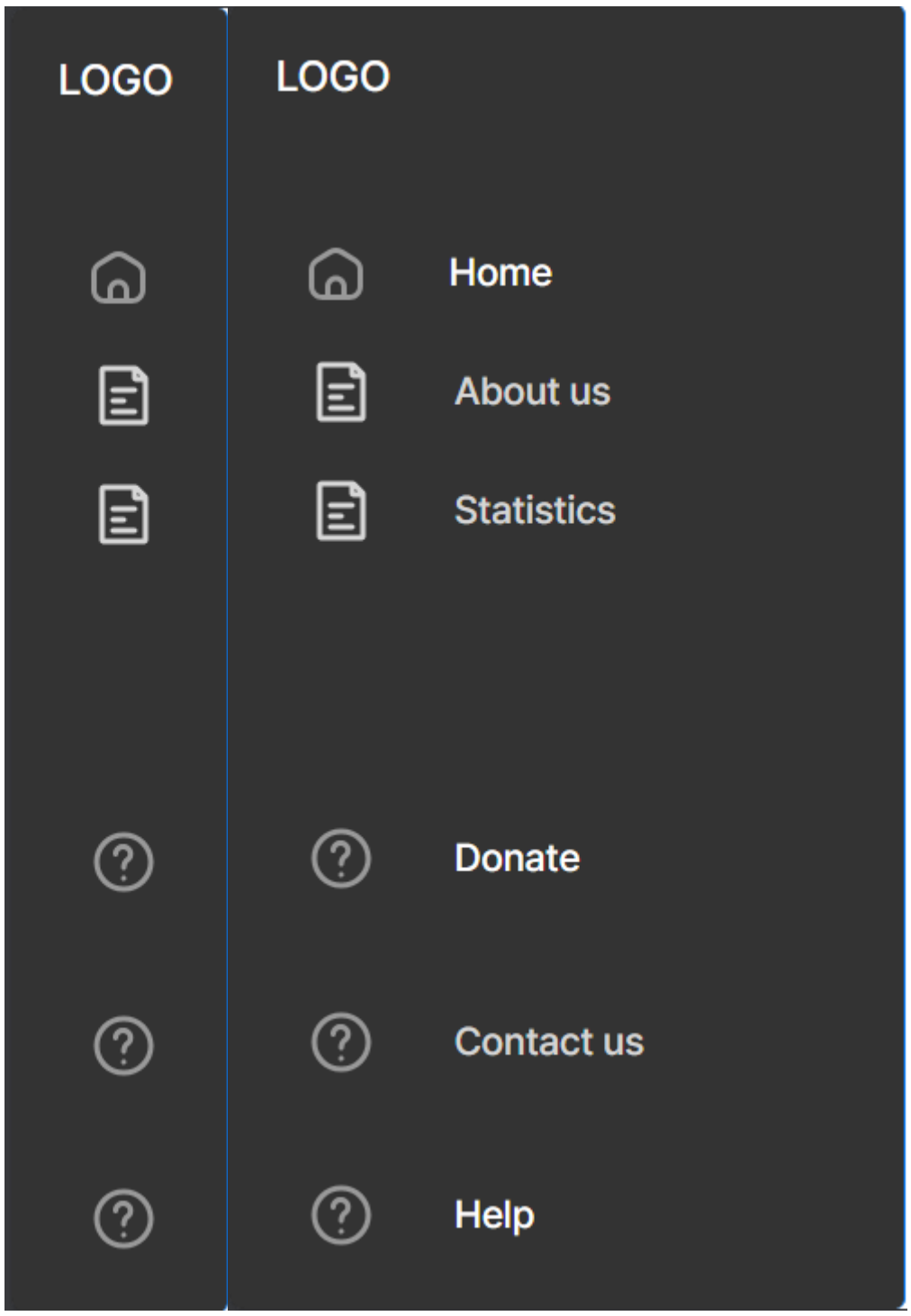
5.1. Proposed System Architecture Diagram

a. User-Centered Design: for our users, who include vulnerable individuals, those who wish to volunteer, those wish to donate and us administrators. We visit multiple sites tackling food and hunger to include in our own.
b. Intuitive Navigation: we aim to have a clear intuitive design that are logical easily understandable and seamless throughout the platform
c. Responsive Design & Visuals: we wish the platform to be accessible across various devices screen size for optimal viewing experience, with enhanced engagement in icons and infographics
d. Accessibility: we want to include accessibility features in the future for differently abled. but for now alt text, color contacts and ability to future keyboard navigation
e. Consistent Branding: to create a trustworthy brand and create a safe image to build recognition
f. User-Friendly Forms: simple effective optimized forms for the user base features
g. Visual Hierarchy: eye catching elements and interactivity during action call and positivity
h. Feedback and Notifications: for success or error during input and maybe updates for events and campaigns
i. Usability Testing: gather feedback for improvement
j. Load Time Optimization: load faster even in limited connection, be efficient compress codes and minimize requests
k. Multilingual Support: maybe for diverse audience, being accurate and culture sensitivity
l. Trust and Security: keep personal information safe and make use of authentication

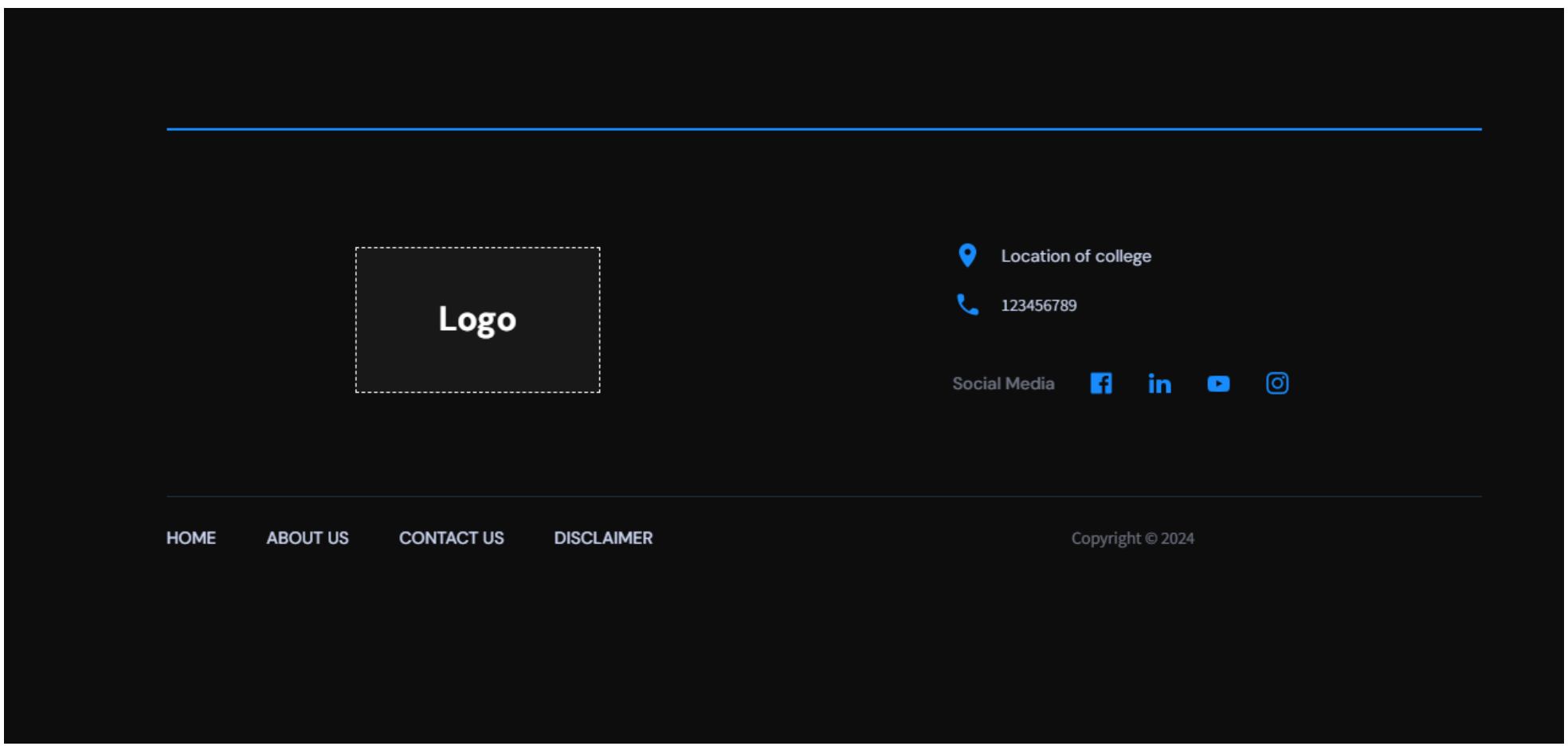


5.2. UIUX Design

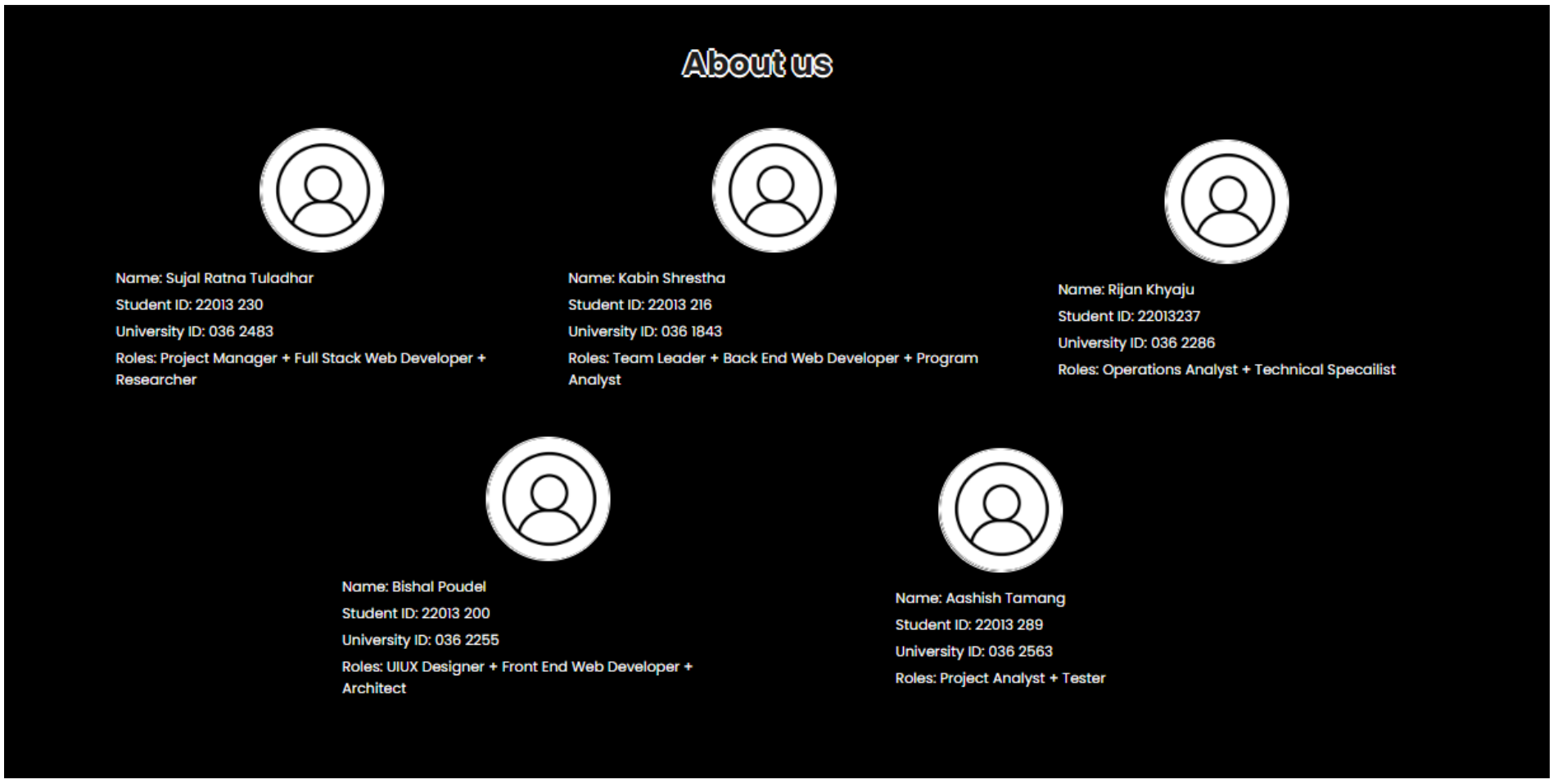
VERTICAL NAVIGATION BAR



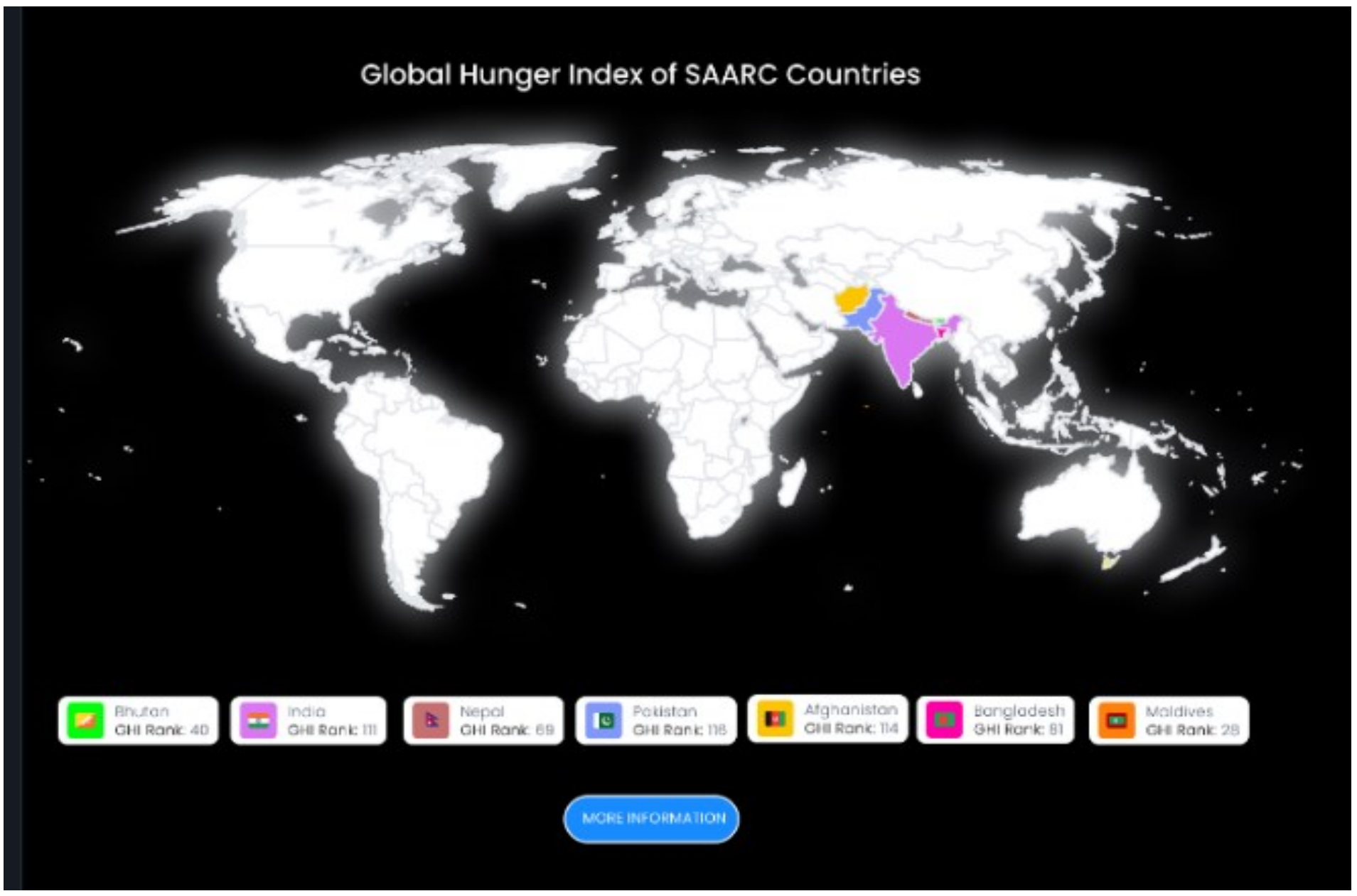
FOOTER



ABOUT US

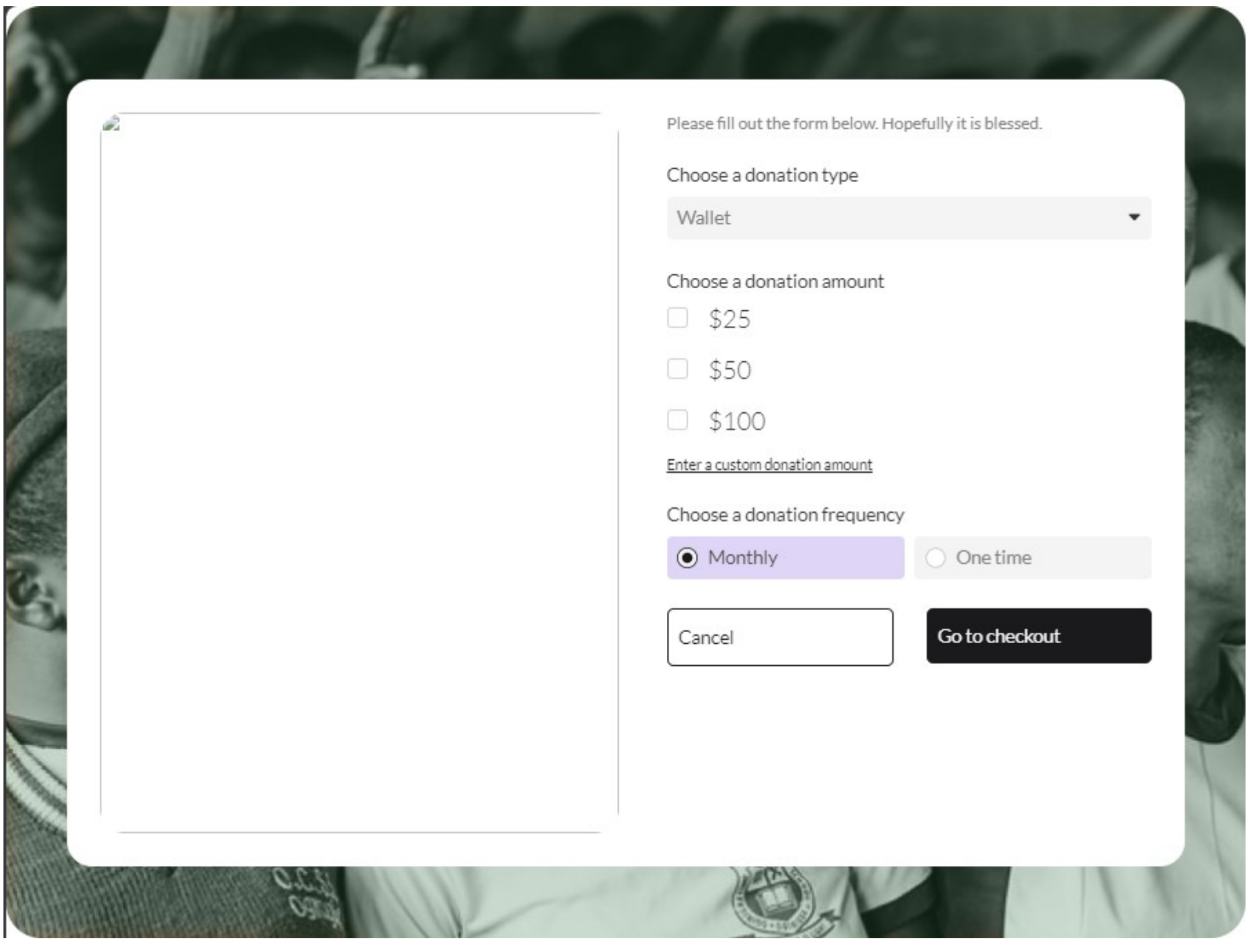


LANDING PAGE

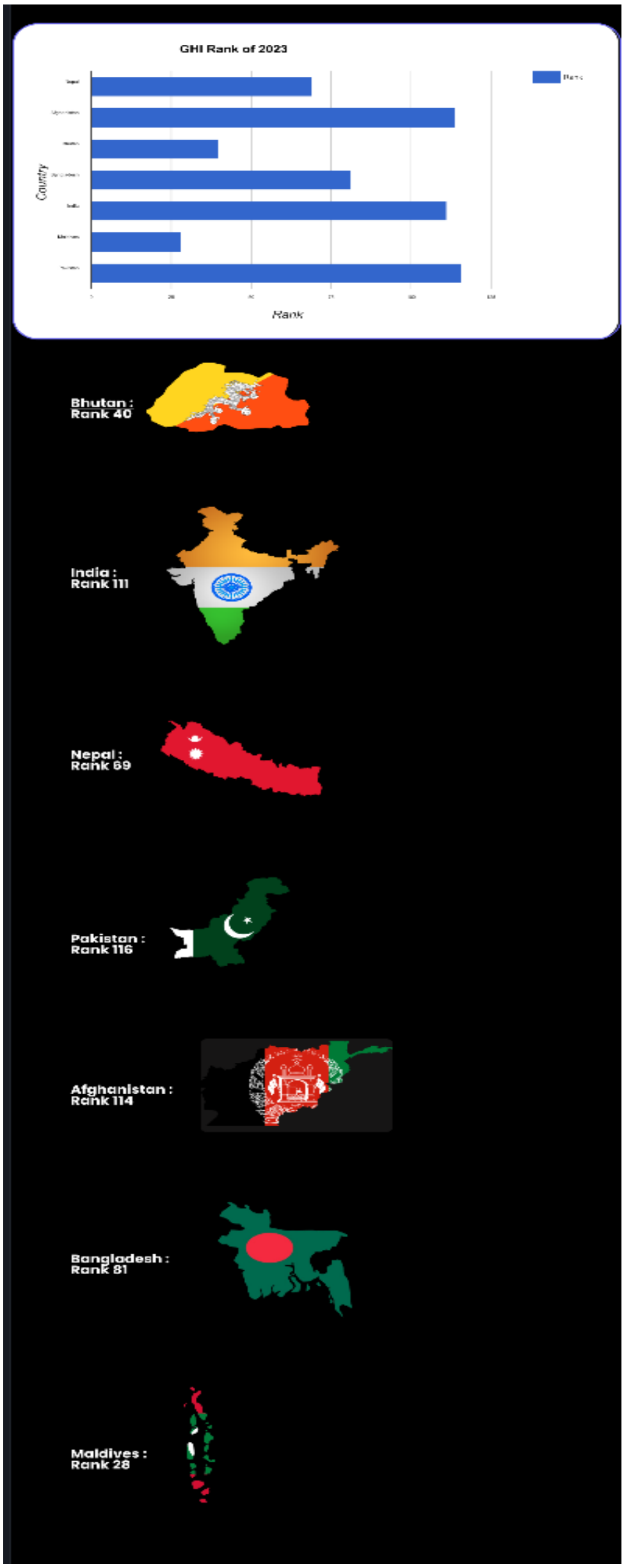


STATISTIC

DONATION



STATS


GHI Rank of 2023
Country
Rank
Bhutan :
Rank 40
India :
Rank 111
Nepal :
Rank 69
Pakistan :
Rank 116
Afghanistan :
Rank 114
Bangladesh :
Rank 81
Maldives :
Rank 28

5.3. System Requirement

easy to use and accessible. works smoothly on the any without needing to download anything extra. easy for everyone to use comfortably, no matter what device or browser they prefer.

<table>
<tr><td>Device</td><td>Web Browsers</td><td>Operating System</td><td>Screen Resolution:</td><td>Application Window:</td></tr>
<tr><td rowspan="3">Laptop, Desktop, Smart Phone, Tablets</td><td rowspan="3">Google Chrome 1, Mozilla Firefox 1, Microsoft Edge 12, Safari 1, Internet Explorer 3, Opera 3</td><td rowspan="3">Windows 7+ (with .NET Framework 4.5+),
macOS high Sierra 10.13+,
Linux 64-bit Ubuntu 14.04+, Debian 8+,
Fedora 24+, Android, iOS</td><td>1280x1024 or larger</td><td>1024x680</td></tr>
<tr><td>RAM</td><td>Internet</td></tr>
<tr><td>min-2GBs, max-4GBs</td><td>Required</td></tr>
</table>

5.4. System Modules

The system module refers to components which are self-contained in a larger software, these modular units perform a specific set of features independently but also make cohesive application.

Modules	Functionality	Features
User	handles user registration, authentication, and authorization.	user profiles, login/logout, role-based access control.
Donation	manages incoming donations.	donation tracking, multiple payment gateways, donor acknowledgment.
Volunteer	volunteer registration, task assignment.	volunteer profiles, event sign-up, recognition for volunteer efforts.
Nutrition Education	delivers nutrition education content and programs.	articles
Analytics and Reporting	pre analyzed data visualization	statistic report
Content	easy management, maintenance, updates	blogs
Communication and Messaging	alerting	email notifications, announcement broadcasting.
Mobile Accessibility	works on multiple browsers	responsive, cross platform
Security	measures to protect user data and integrity of the application system.	encryption, secure authentication, regular security inspections.
Integration	integrates with external systems and APIs for additional functionalities.	geography and location services, statistical integration.
Support and Feedback	provides support channels for user queries and collects feedback.	helpdesk, user forums, feedback forms.

5.5. Functional and Non-Functional Requirement

5.5.1. Functional Requirements

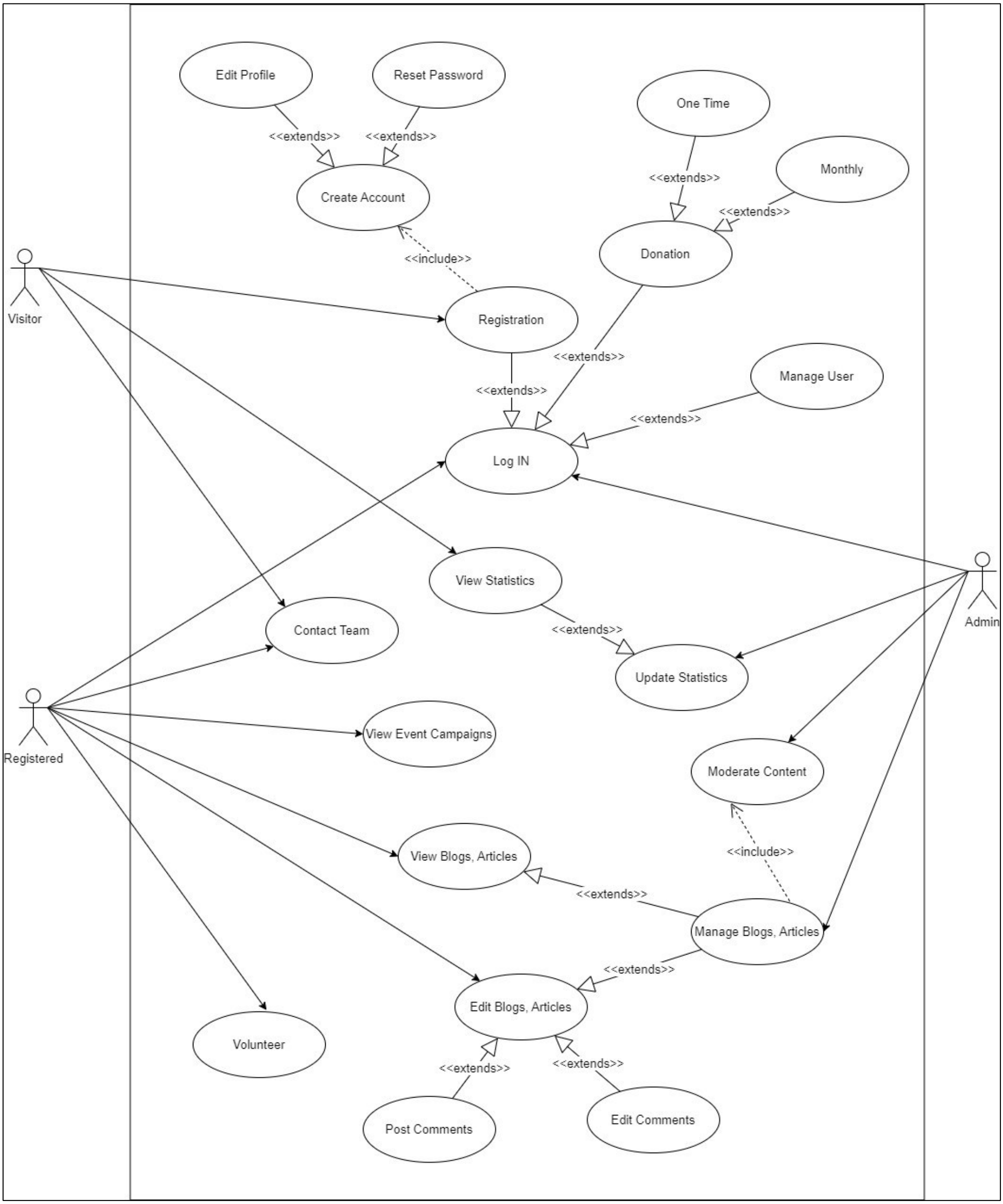
FR_N-ID	Function	Description
FR_1-01	Create Account	Using username, email address, password
FR_1-02	Manage Account	Updating personal information and profile preferences
FR_1-03	Authentication	Email Verification, Two Factor Authentication, Enhanced Security
FR_2-01	Educational Contents	Articles on nutrition, impact, sustainable methods
FR_2-02	Volunteering	Event calendar, optimized schedules, token of appreciation
FR_2-03	Blog Wall	Success stories, true news, tending topics, share experience
FR_2-04	Community Forums	Discussion spaces, ask questions, comment, petitions
FR_3-01	Recognized Donation	Acknowledging contributors in donors list
FR_3-02	Anonymous Donation	Option to be private while contributing
FR_3-03	Donation tracking	Record details, and transaction history
FR_3-04	Specific Amount	Small or large, freedom to choose amount
FR_4-01	Reachability	Support channel, feedback, query and help

5.5.2. Non-Functional Requirements

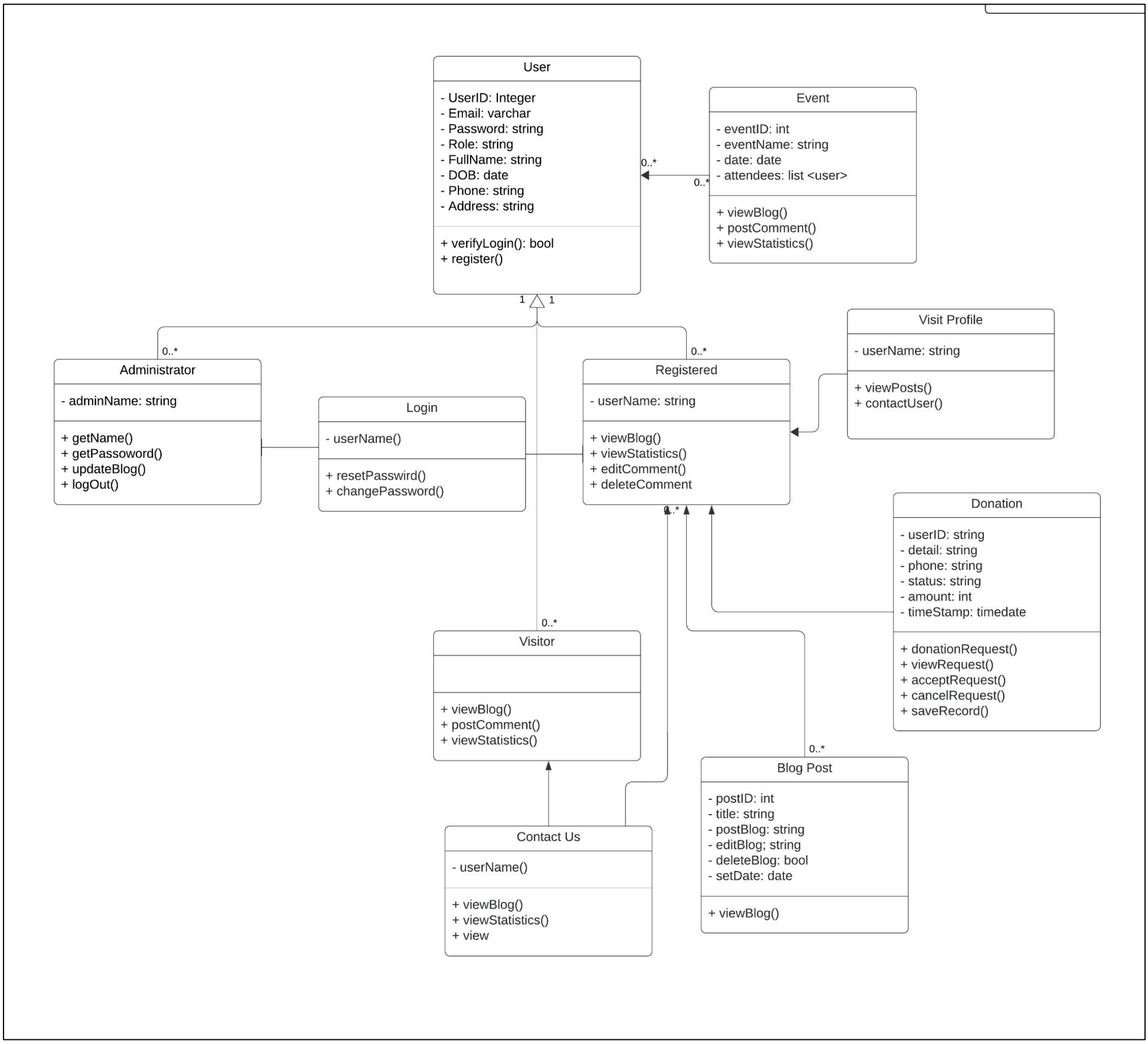
NFR_N-ID	Sub-Function	Description
NFR_1-01	Usability	User friendly, proficient and easy navigation, intuitive and instinctive
NFR_1-02	Accessibility	For those with disabilities, WCAG standards
NFR_1-03	Consistent	Similar color palette, search pattern, terminology
NFR_2-01	Response Time	Minimized waiting, quick prompt responses
NFR_2-02	Scalability	To accommodate concurrent users and data volumes
NFR_2-03	Load Balance	Distribute load and prevent quick degradation
NFR_3-01	Data Encryption	End-to-end guarding of sensitive data
NFR_3-02	Secure APIs	Periodic checkup, threat and vulnerability protection
NFR_4-01	Standardization	Best practices, recognized benchmarks
NFR_4-02	Disaster recovery	Robust plans, mitigation tactics
NFR_4-03	Availability	Minimal downtime, 24/7 operations

6. System Analysis & Design

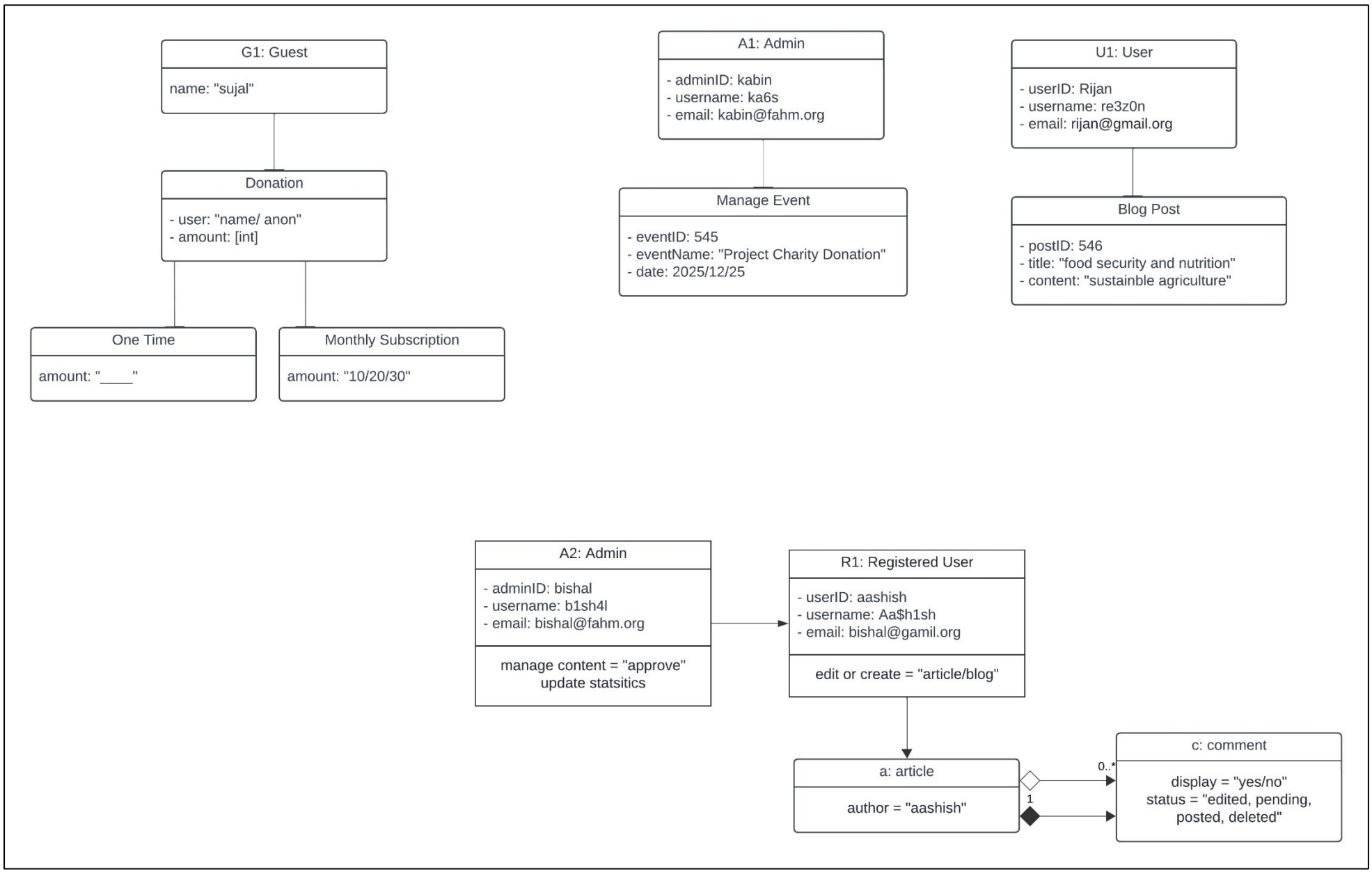
6.1. Unified Model Language: Use-Case Diagram



6.2. Unified Model Language: Class Diagram



6.3. Unified Model Language: Object Diagrams



7. Conclusion

Through heavy research, collaborative efforts and analysis we have identified many key considerations and recommendations which may be significant step toward addressing such critical issue

a. We will emphasize the importance of raising awareness through programs and promoting education at the community level. by empowering individuals with knowledge about sustainable food practices, having healthy food, and the effect of their nutrition diet choices, which contribute to long term solutions.
b. Our project encourages the establishment of donation programs globally and addresses disparities in food access distribution. Globally cooperation and collabs can make global hunger effectively managed.

By understanding the challenges of food and hunger management in great detail. We have also recommended actions, in which we believe that our collective efforts can contribute to a more sustainable and equal future, where hunger will be managed effectively on a global scale.

7.1. Potential Future Enhancements

As group projects evolve in the future, new ideas and plans advance in technology. we could further enhance and expand to several areas. Here are some considerations for applying these enhancements to other sectors like:

a. developing markets where farmers connect directly to consumers. This can increase farmers profit and provide affordable fresh products. without a middle man. offering financial literacy program, job training.
b. find partnership to amplify impact on food and hunger, malnutrition etc.
c. practice and provide tips for storage, and using or distributing eatable leftovers, for finding solution to organic waste
d. optimized and transparent food supply chains using Machine Learning, Block Chain, or Internet of Things promoting trust and reducing middle man fraud

8. Duties and Distributions

Members	Roles	Responsibilities
Aashish Tamang	Project Analyst Tester	• Collaboration with members, deliver requirements • test the project and identify report bugs • documentation, treasurer, working together, diagramming
Bishal Poudel	UIUX Designer Front End Web Developer	• Design user interface and experience, implement design • create wireframing schemes and visually appealing prototyping • implementation and optimization of interactive responsive elements • work with front end developer, accessibility • understand requirements, consistent, feedback usability
Kabin Shrestha	Team Leader Back End Web Developer Program Analyst	• Guide development team • meet and manage project standards, expectations and risks • allocation of tasks, strategize, flexibility • develop and maintain server-side operations • design and implementation of database and statistical analysis • optimize solutions write test code, review and update • seamless implementation of features in entire application
Rijan Khayju	Operations Analyst Technical Specialist	• Oversee operational activities on the team • trouble shooting, collaboration for optimization of system • problem solving and decision maker • address complexity and challenges • debugging, code quality analysis, auditing, utilizations
Sujal Ratna Tuladhar	Project Manager Full Stack Web Developer Researcher Architect	• planning, executing project in defined time and structure • coordinate activities, ensure the goals are met • work and collab with on both front and back-end development • research on current technological tools • use best industry practices, stay well informed • recommend and decision are made with evidence • technical guidance, documentation and methods

9. References

- Action Against Hunger. “Action against Hunger.” Action against Hunger, 2014, www.actionagainsthunger.org/
- Burchi, Francesco, et al. “The Role of Food and Nutrition System Approaches in Tackling Hidden Hunger.” International Journal of Environmental Research and Public Health, vol. 8, no. 2, Jan. 2011, pp. 358–73, https://doi.org/10.3390/ijerph8020358.
- Daphnee, Rose, et al. “From Waste to Plate: Exploring the Impact of Food Waste Valorisation on Achieving Zero Hunger.” Sustainability, vol. 15, no. 13, Multidisciplinary Digital Publishing Institute, July 2023, pp. 10571–71, https://doi.org/10.3390/su151310571.
- fao. “Home.” PRD-FAO Home, 2023, www.fao.org/home/en/.
- “Food Systems Hold Key to Ending World Hunger.” UNEP, 18 June 2020, www.unep.org/news-and-stories/story/food-systems-hold-key-ending-world-hunger.

  Heynen, Nik, et al. “Food Justice, Hunger and the City.” Geography Compass, vol. 6, no. 5, May 2012, pp. 304–11, https://doi.org/10.1111/j.1749-8198.2012.00486.x.
- “International Fund for Agricultural Development.” IFAD, 2020, www.ifad.org/en/.
- Kass, Hannah. “Food Anarchy and the State Monopoly on Hunger.” The Journal of Peasant Studies, Sept. 2022, pp. 1–20, https://doi.org/10.1080/03066150.2022.2101099.
- Kumar, Mukesh, et al. “Enablers to Achieve Zero Hunger through IoT and Blockchain Technology and Transform the Green Food Supply Chain Systems.” Journal of Cleaner Production, vol. 405, June 2023, p. 136894, https://doi.org/10.1016/j.jclepro.2023.136894.
- McConnell, Laura L., et al. “The Future of Agriculture and Food: Sustainable Approaches to Achieve Zero Hunger.” Journal of Agricultural and Food Chemistry, vol. 71, no. 36, American Chemical Society, Aug. 2023, pp. 13165–67, https://doi.org/10.1021/acs.jafc.3c05433.
- “Nepal | World Food Programme.” Www.wfp.org, www.wfp.org/countries/nepal.
- No Kid Hungry. “No Kid Hungry.” Nokidhungry.org, 2020, www.nokidhungry.org/.
- OXFAM. “Oxfam International | the Power of People against Poverty.” Oxfam.org, 2022, www.oxfam.org/en.
- Riches, Graham. “Thinking and Acting Outside the Charitable Food Box: Hunger and the Right to Food in Rich Societies.” Development in Practice, vol. 21, no. 4-5, June 2011, pp. 768–75, https://doi.org/10.1080/09614524.2011.561295.
- “The Global Alliance for Improved Nutrition (GAIN).” Gainhealth.org, 24 Jan. 2020, www.gainhealth.org/.
- The Hunger Project. “The Hunger Project: Empowering People to End Their Own Hunger.” The Hunger Project US, thp.org/.
- “Towards the Future We Want - End Hunger and Make the Transition to Sustainable Agricultural and Food Systems.” Www.fao.org, www.fao.org/fsnforum/resources/reports-and-briefs/towards-future-we-want-end-hunger-and-make-transition-sustainable.
- United Nations. “Food Security and Nutrition and Sustainable Agriculture | Department of Economic and Social Affairs.” Sdgs.un.org, 2015, sdgs.un.org/topics/food-security-and-nutrition-and-sustainable-agriculture
- van Dijk, Michiel, et al. “A Meta-Analysis of Projected Global Food Demand and Population at Risk of Hunger for the Period 2010–2050.” Nature Food, vol. 2, no. 7, July 2021, pp. 494–501, https://doi.org/10.1038/s43016-021-00322-9.
- von Braun, Joachim. “Food Insecurity, Hunger and Malnutrition: Necessary Policy and Technology Changes.” New Biotechnology, vol. 27, no. 5, Nov. 2010, pp. 449–52, https://doi.org/10.1016/j.nbt.2010.08.006.
- Weffort, Virgínia Resende Silva, and Joel Alves Lamounier. “Hidden Hunger – a Narrative Review.” Jornal de Pediatria, Oct. 2023, https://doi.org/10.1016/j.jped.2023.08.009.