
Med Vantage

Supervisor
Mr. Minhajul Bashir
Lecturer
United International University

Course Teacher
Dr. Al-Sakib Khan Pathan
Professor
United International University

By

Md. Maruf Raihan 011201196
Muztoba Rafid 011192103
Tahmidur Rahman Saad 011192019
Md. Habibur Rahaman Alhadi 011192084
Nayeem Muhammad Al Farabi Sikder 011201269

Submitted in partial fulfilment of the requirements
of the degree of Bachelor of Science in Computer Science and Engineering

November 2, 2024



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UNITED INTERNATIONAL UNIVERSITY

Bibliography

- [1] Simon D’alfonso, Olga Santesteban-Echarri, Simon Rice, Greg Wadley, Reeva Lederman, Christopher Miles, John Gleeson, and Mario Alvarez-Jimenez. Artificial intelligence-assisted online social therapy for youth mental health. *Frontiers in psychology*, 8:796, 2017.
- [2] Mohammad Didar Hossain, Helal Uddin Ahmed, Waziul Alam Chowdhury, Louis Wilhelmus Niessen, and Dewan Shamsul Alam. Mental disorders in bangladesh: a systematic review. *BMC psychiatry*, 14:1–8, 2014.
- [3] Lambros Lazuras and Anna Dokou. Mental health professionals’ acceptance of online counseling. *Technology in Society*, 44:10–14, 2016.
- [4] Reeva Lederman, Greg Wadley, John Gleeson, Sarah Bendall, and Mario Álvarez Jiménez. Moderated online social therapy: Designing and evaluating technology for mental health. *ACM Trans. Comput.-Hum. Interact.*, 21(1), February 2014.
- [5] Jia Liu, Qing Zhu, Wenliang Fan, Joyman Makamure, Chuansheng Zheng, and Jing Wang. Online mental health survey in a medical college in china during the covid-19 outbreak. *Frontiers in psychiatry*, 11:459, 2020.
- [6] Jarernsri Mitrpanont, Jaruwan Phandhu-Fung, Nantanut Klubdee, Supanat Ratanalaor, and Teeranan Mitrpanont. icare-stress: An integrated mental health software. In *2017 2nd International Conference on Information Technology (INCIT)*, pages 1–6. IEEE, 2017.
- [7] Jo Ann Oravec. Online counselling and the internet: Perspectives for mental health care supervision and education. *Journal of Mental Health*, 9(2):121–135, 2000.
- [8] Olugbenga Oti and Ian Pitt. Online mental health interventions designed for students in higher education: A user-centered perspective. *Internet Interventions*, 26:100468, 2021.
- [9] Zhiyu Ye, Wentian Li, and Ruizi Zhu. Online psychosocial interventions for improving mental health in people during the covid-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, 316:120–131, 2022.

-
- [10] Xiaoyun Zhou, Sisira Edirippulige, Xuejun Bai, and Matthew Bambling. Are online mental health interventions for youth effective? a systematic review. *Journal of Telemedicine and Telecare*, 27(10):638–666, 2021. PMID: 34726992.

Abstract

Due to this increasing demand for more access to mental health care, Med Vantage was created online to connect patients with certified psychologists for counseling sessions. This project entails easing the booking process to make the support for mental health more accessible for those facing challenges in visiting a practitioner in person. Guided by specifications for the design of the platform, an extensive review of current online mental health services, gathered user feedback, and integrated the opinions of professional personnel in mental health about their wants and needs. We found that there is an interest in online counseling since it is convenient, private, and can be scheduled freely. Med Vantage is important in enhancing mental health services since there is timely and professional support. We want to use technology so as to make a friendly place where people will be able to feel comfortable seeking mental health help. This is because sometimes there is attached a sense of negativity towards mental health issues. Finally, the initiative aims at restoring overall well-being for a healthy society by connecting patients with mental health care.

Acknowledgements

Acknowledgements: We would want to start by giving thanks to Allah. Additionally, we would like to offer our sincere gratitude to our supervisor, Mr. Minhajul Bashir for his skillful leadership and assistance in seeing our project through to completion. Additionally, we would like to express our gratitude to our course teacher Dr. Al-Sakib Khan Pathan. We are also grateful to all of our department's professors for teaching us numerous crucial topics that are necessary for resolving computational problems. Our appreciation also extends to our esteemed family members.

Publication List

[Optional] The main contributions of this research are either published or accepted or in preparation in journals and conferences as mentioned in the following list:

Journal Articles

1.

Conference Papers

1.

Additional Publications

Following is the list of relevant publications published in the course of the research that is not included in the thesis:

1.

Table of Contents

Table of Contents	v
List of Figures	vi
List of Tables	vii
1 Introduction	1
1.1 Project Overview	1
1.2 Motivation	1
1.3 Objectives	1
1.4 Methodology	2
1.5 Project Outcome	2
1.6 Organization of the Report	2
2 Background	4
2.1 Preliminaries	4
2.2 Literature Review	4
2.2.1 Similar Applications	4
2.2.2 Related Research	9
2.3 Gap Analysis	11
2.4 Summary	13
3 Project Design	14
3.1 Requirement Analysis	14
3.1.1 Functional and Nonfunctional Requirements	14
3.1.2 Context Diagram	16
3.1.3 Data Flow Diagram Level 1	17
3.1.4 UI Design	18
3.2 Detailed Methodology and Design	24
3.3 Project Plan	26
3.4 Task Allocation	27
3.5 Summary	27

4 Implementation and Results	28
4.1 Environment Setup	28
4.1.1 Design Environment	28
4.1.2 Version Controlling Environment	28
4.2 Testing and Evaluation	29
4.3 Results and Discussion	29
4.4 Summary	39
5 Standards and Design Constraints	41
5.1 Compliance with the Standards	41
5.1.1 Software Standards	41
5.1.2 Hardware Standards	41
5.1.3 Communication Standards	42
5.2 Design Constraints	42
5.2.1 Economic Constraint	42
5.2.2 Environmental Constraint	43
5.2.3 Ethical Constraint	43
5.2.4 Health and Safety Constraint	44
5.2.5 Social Constraint	45
5.2.6 Political Constraint	45
5.2.7 Sustainability	46
5.3 Cost Analysis	46
5.4 Complex Engineering Problem	47
5.4.1 Complex Problem Solving	47
5.4.2 Engineering Activities	49
5.5 Summary	49
6 Conclusion	51
6.1 Summary	51
6.2 Limitation	51
6.3 Future Work	52
References	54

List of Figures

List of Tables

5.1	The Washington Accord Knowledge Profile has eight elements.	47
5.2	Mapping with complex problem solving.	48
5.3	Mapping with complex engineering activities.	49

Chapter 1

Introduction

1.1 Project Overview

Our venture is to develop a website for people in Bangladesh, from where they will receive online mental health support. They can book appointments, pay online, and consult with a qualified doctor. We are making the website secure and compliant with all regulations. Each and every citizen in Bangladesh must receive necessary mental health support, irrespective of geographical distances and affordability. We are working hard to make this website easy for anyone to use and understand. We aim to use technology to facilitate conversations about mental health and to lower the barriers to seeking help without shame or stigma. We are also working with experts on how to ensure that the site works and is trustworthy. Our project deals with ensuring mental health care for happy, healthy living among people of all walks of life in Bangladesh.

1.2 Motivation

The dire urge to address the looming mental health crisis in Bangladesh serves as the motivation for the idea behind the online mental health platform. Because of this lack of access, combined with stigma and cultural barriers, many individuals have been left without appropriate support. The use of technology will bypass these geographical and social obstacles; the platform should democratize mental health care by offering quality, affordable, and stigma-free service to all Bangladeshis irrespective of location or socioeconomic status.

1.3 Objectives

This would be the aim of the online mental health platform for Bangladesh-to develop a platform that is intuitive and accessible to users of any level of technical ability, which translates to ease of use and broad accessibility. Verification of healthcare providers and adherence to data protection regulations instill trust in the platform and maintain its high

credibility. This would be achieved through community outreach and education to break down the barriers of stigma associated with mental illnesses, enabling individuals to seek help without fear of judgment. The platform should, therefore, ensure access to mental health services that are affordable and reach remote or underserved areas irrespective of one's financial status. Regular collection of user feedback and data analysis will ensure the platform is continuously improved to maintain effectiveness and relevance and that it is user-friendly.

1.4 Methodology

It includes comprehensive market research and stakeholder consultation to understand the user needs and existing gaps in Bangladesh's mental health landscape. The online mental health platform, co-designed and co-developed with experts in healthcare and technology, is made friendly to use and culturally appropriate. Thorough verification processes of healthcare providers, strict regulations for compliance on data protection, build trust and observe ethical standing. It implements an iterative development process with continuous testing and incorporation of user feedback to meet user needs. Community-based events and mental health education aim at stigmatizing mental health and increasing the use of the platform. Through ongoing, in-depth analysis of user feedback and data, refine and enhance the features and services of the platform.

1.5 Project Outcome

Resulting from this project, an online mental health platform should be created that will be scalable, sustainable, and greatly enhance access to mental health services in Bangladesh. This will provide an easy-to-use interface for patients in booking appointments, paying consultation fees online, and receiving online and offline counseling. The portal shall gain trust and credibility among the users by verifying health care providers and by assuring data privacy. These will reduce stigma for mental health and increase treatment-seeking behavior through community engagement and education. The overall impact of the project will be an improvement in the outcomes and access related to mental health, therefore creating an enabling environment for the care of mental health throughout diverse populations in Bangladesh.

1.6 Organization of the Report

In Chapter 2, we discuss the current situation on mental health in Bangladesh: challenges, possible solutions, and a review of the literature. This background research will set the context and provide grounds to understand the urgency of our project. It will elaborate on designing process, project planning, and task distribution among group participants with respect to our project methodology in Chapter 3. Chapter 4 assesses the setup of

the online platform, as well as the evaluation of the project and the obtained results. It supports our findings with a thorough discussion. Chapter 5 is an overview of the technical requirements: what specifications hardware and software required will be, what limitations it has, and cost analysis. This chapter also discusses how our platform effectively deals with complexities associated with providing support for mental health. Chapter 6 will finally depict the conclusion of our project by summarizing key insights and stating the future direction of improving access to mental health in Bangladesh.

Chapter 2

Background

2.1 Preliminaries

It is important to note that this may involve needs assessment, definition of objectives, identification of key stakeholders in the form of health workers, professionals involved in mental health, and users. A certain degree of resource allocation will be required to ensure the project has appropriate funding, technology, and expertise. These activities involve comprehensive market research to comprehend user needs, analysis of workflows for the optimization of the design platform, and identification of software solutions appropriate to the user-friendliness and data protection regulations. At the same time, measures must be taken regarding security so that user data will be protected and confidentiality maintained. Quality assurance plans should be developed alongside training programs for healthcare providers and users to ensure effective utilization of the platform. Ongoing community outreach and education initiatives will help address stigma associated with mental health. Implementation strategies will therefore have to be planned out, complete with mechanisms that allow for periodic feedback and enhancement. In addition, backup measures and disaster recovery procedures will be highly important in ensuring the reliability of the platform. User support and maintenance considerations, as well as monitoring and evaluation processes to review the performance and impacts of the platform concerning accessing mental health in Bangladesh, will conclude the initial stage.

2.2 Literature Review

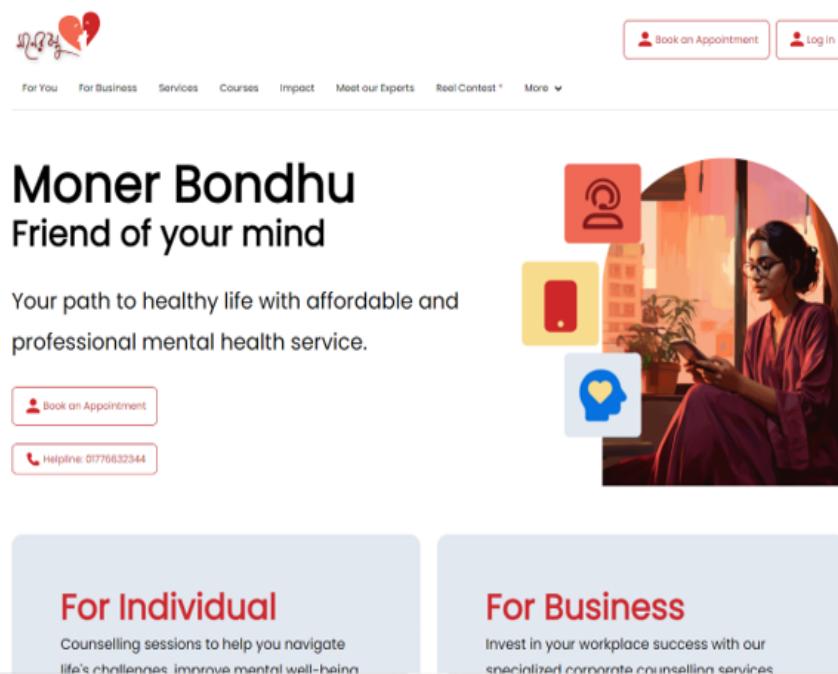
The literature that we analyzed for our project is provided in this section. This covers the articles we discovered that are pertinent to our research.

2.2.1 Similar Applications

Moner Bondhu:

Moner Bondhu is a mental health and wellbeing platform originating in Bangladesh since 2016. Has been working to achieve SDG 3.4, which calls for universal access to affordable

mental health care. Online, they have reached over 4 million people and in life over 100,000 persons. happens through events, courtesy of dynamic management that is experienced and qualified. are psychosocial professionals, advocates, and mental health workers, and 1500 volunteers. teers. Its CEO and founder, Tawhida Shiropa of Moner Bondhu, has 13 years of experience. in the humanitarian sector. She is also a fellow of the IVLP of US State Department and an Acumen fellow. Moner Bondhu was awarded the Tommy Hilfiger Fashion Frontier StartUp Challenge recently. Besides, Startup Bangladesh was the winner of Call for Nation Its production includes Moner Bondhu 2020.

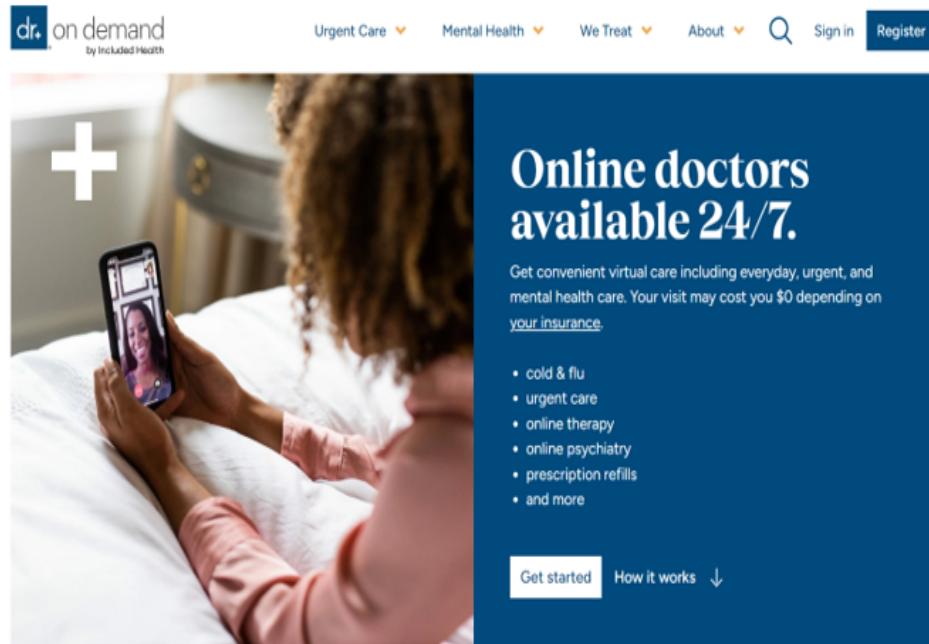


Esho Nije kori:

Esho Nije Kori is a community-based initiative based in Bangladesh. We are committed to supporting individuals struggling with mental health issues who cannot seek help in public due to social stigma. We extend our support to all in need of mental health support and respect their rights to privacy. It was when we were watching those who were suffering from mental illness fight against the stigmas that our community had against those who were afflicted with this sickness that the idea of Esho Nije Kori—which in English means "Let's do it ourselves"—came into being. Unlike the acknowledgement of physical illnesses, mental health issues are not viewed as valid health issues in our society. Among the pioneering organisations on matters of mental health, we offer a platform on which individuals, families, companies, and communities among other organizations can find it easy to open up and create a conversation to bring about a solution for themselves.

Doctor on Demand: Connect face-to-face with a physician, psychiatrist or psychologist through video on your phone, tablet or computer. Doctor On Demand by Included

Health works with or without insurance and is available at reduced rates through many major health plans and large employers. You'll always see your cost upfront and won't receive a surprise bill after your visit.



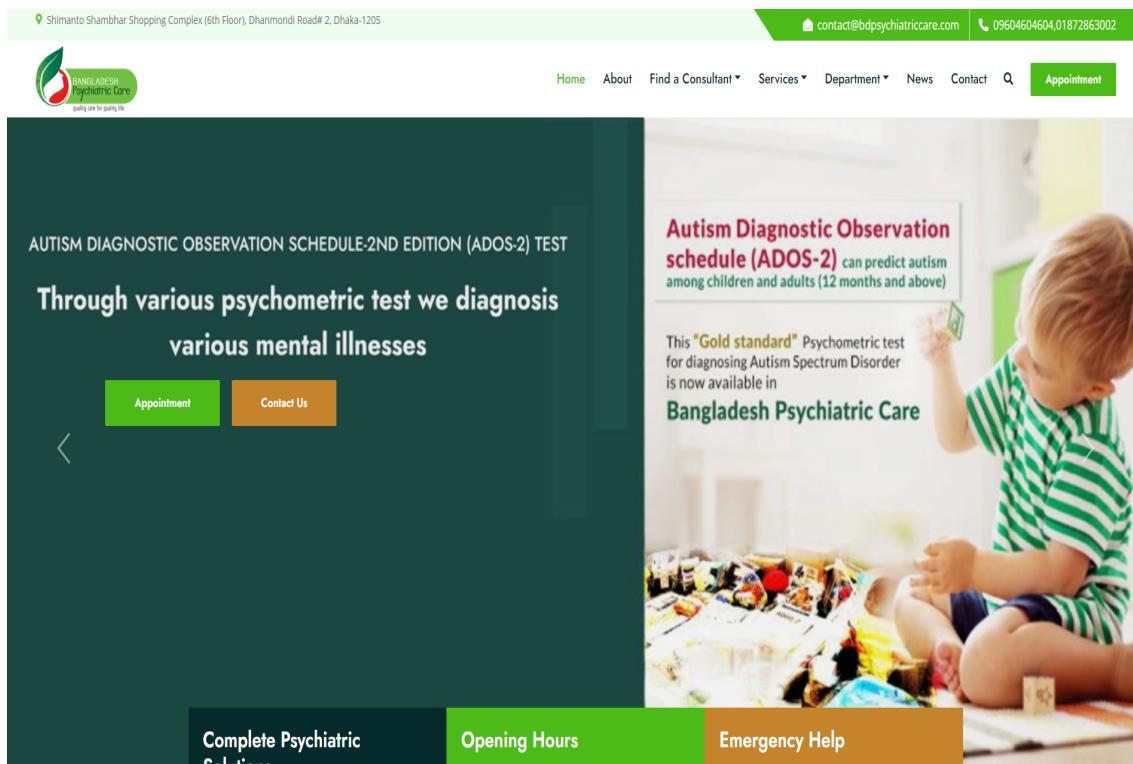
Mind Sheba:

Recent years have made many people realize the importance of mental health, especially in Bangladesh, because society stigmatized these issues and never allowed talking about them openly. People are going for online counseling as more and more come forward to seek support for mental health problems. Such therapy may offer convenience and access, able to be done from within a person's home to find a qualified professional. It is also called Telepsychotherapy, a means of delivering psychological services through electronic media, such as video calls, messaging, and even phone calls. The growing demand for it represents the desire to pursue mental health at the cost of emerging barriers to traditional face-to-face psychotherapy for many. The following guide will closely look at the importance of online counseling in Bangladesh, its advantages, the most popular portals for online services, and general tips if one considers this type of support. Learning about the options opens doors to active steps toward a good mental state and moving through life's challenges with appropriate help. Your journey towards better mental health begins here.

The screenshot shows the homepage of the Mind Sheba website. At the top, there is a header with navigation links for Home, About, Psychologist, Our Services, Branch, Blog, and Contact, along with an Appointment button. Below the header is a large blue banner featuring a person's face and the title 'Best Online Counseling In Bangladesh: Your Guide To Mental Health'. Underneath the banner, there is a breadcrumb navigation path: Mind Sheba > News > blog > Best Online Counseling in Bangladesh: Your Guide to Mental Health. The main content area contains a blog post with a date (May 21, 2024), author (Mind Sheba), and category (blog). The post discusses online counseling in Bangladesh, mentioning its convenience and accessibility. It includes sections on '1. Introduction', '1.1 Overview of Online Counseling', and '1.2 Importance of Mental Health'. On the right side of the page, there are sidebar sections for 'Search Keywords' (with a search bar and magnifying glass icon), 'Categories' (listing Blog and Uncategorized), and 'Recent Posts' (listing 'August 1, 2024' and 'Best Couple/Marriage Counselor in Bangladesh').

Bangladesh Psychiatric Care:

BPCL is committed to the cause of uplifting mental health and wellbeing through its customized services for employees at workplaces, encompassing group counseling, psychotherapy, and relaxation therapy. Its expert team of health professionals trains employees in different sectors, which helps meet the increasing demand for mental health solutions in Bangladesh. Other core services include employment medicals, wellbeing seminars, training programs, EAP, and corporate discounts. On-site psychological assessments using the SCID for a wide range of psychiatric disorders are also part of our key services and useful in determining employee retaining factors. Verified by a psychiatrist, results are provided confidentially to the employer. Recruitment and regular tests should encompass these tests to help any organization in picking out suitable candidates and identifying the motives for such candidates. A proactive approach will go a long way to ensure positive workplace culture, wellbeing, and reduced mental health stigma in the workforce.



Zoyfull:

Zoyfull is a dedicated platform providing private mental health consultations with professional therapists. Emphasizing a personalized approach, Zoyfull ensures confidentiality for all clients and offers affordable pricing options. The platform also focuses on continuous progress monitoring, allowing clients to track their mental health journey and adjust their treatment plans as needed. With Zoyfull, individuals can access the support they need in a safe and welcoming environment.



2.2.2 Related Research

- The current study extends previous works in stress detection by incorporating the analysis of brainwaves and neuro feedback methodologies. This also embeds effective screening tools like GHQ, PHQ-4, GAD-7, and PHQ-9 for better detection. It also resorts to CBT in imparting psychoeducation in disease management, thus increasing the potentiality of online mental health treatment. [6]
- While diverse factors encourage attempts at online therapies on mental illnesses, the challenges in stigma, the engagement issues, the cognitive deficits, and the variability in treatment response prevail. This is promoted to be vital for the integration of social networking sites and web-based psycho education to bridge gaps in effectiveness and accessibility in online mental health interventions. [4]
- Studies explored the efficacy of Web-based mental health treatments for youth, including modalities such as web-based self-help, applications, synchronous chat, and AI chat bots. Indeed, encouraging findings showed that 64% of these were effective in managing various conditions of mental health, which really showcases the potential of digital platforms in providing support to the mental health of youths. [10]
- The most important will be the development of an algorithm suggestion delivery inside the MOST system, with sophisticated and automated content delivery mechanisms, focusing on how to enhance the evolution of the system by improving personalization of the treatments in mental health. [1]

- It focuses on digital mental health interventions among higher education students in view of depression, anxiety, general well-being, and awareness about mental health. The review investigated a number of design methodologies, ways of engaging different stakeholders, and aspects affecting end-user acceptance; thus, it provided an overview of effective implementation and adoption.[8]
- The first case of COVID-19 in Wuhan, China, had brought up global concerns about mental health, subsequently accelerating online interventions. Digital platforms for mental health support were necessitated by pandemic restrictions on face-to-face therapy, and these allowed continued access to care despite the social distancing policies. [9]
- The COVID-19 pandemic has atrociously affected the mental health of students. This fact is measured by using online surveys. Online surveys, for assessing the level of depression and anxiety, respectively, used PHQ-9 and GAD-7 scales. These results indicated increased rates of both depression and anxiety among medical students due to the pandemic and called for immediate attention to enhance targeted mental health support and interventions among this population. [5]
- Mental disorders represent one of the leading global public health concerns, and their burden in low- and middle-income countries is the highest. In addition to poor survival and life expectancy, such disorders also face a lack of prioritization in health care delivery. In Bangladesh, mental health information is scanty and under-researched, indicating an urgent need for greater emphasis and resources toward better mental health online, where accessibility and reach can be enhanced.[2]
- Online mental health care is a greatly beneficial yet fraught-with-potential-peril modality. There is very limited research into the effectiveness of online counseling, broader questions of efficacy. Ethical issues include confidentiality, data security, and quality of interactions between therapists and clients. Anyhow, the mental health service online would be likely to empower the clients even further with much easier accessibility, flexibility, and convenience to people who have mobility problems, or those with tight time or living in the most remote villages. Besides these, there are ethical considerations of effectiveness that have to be resolved to get the best effect on the client.[7]
- According to TAM, perceived usefulness is an antecedent factor for the intention and actual usage of online counseling platforms among mental health professionals. That is, when the professional perceives that online counseling will improve his or her work efficiency, thus increasing effectiveness, he or she is bound to adopt the innovation into practice. [3]

Table 2.2: Tabular form of Related researched papers functionality

Related Research No.	Limitations	Uniqueness
[6]	Relies on existing screening tools; may not cover all aspects of mental health.	Combines brainwave analysis with established screening tools for enhanced detection.
[4]	Challenges in stigma and engagement; variability in treatment response.	Promotes integration of social networking for improved access to psychoeducation.
[10]	Generalizability of findings on youth effectiveness may vary.	Explores diverse modalities of web-based mental health treatments for youth.
[1]	Requires sophisticated algorithms; potential tech challenges.	Development of an automated content delivery system for personalized mental health care.
[8]	Limited to higher education; may not generalize to other groups.	Examines various design methodologies for digital mental health interventions.
[9]	Focuses on pandemic context; long-term effects not assessed.	Investigates the acceleration of online interventions due to COVID-19 restrictions.
[5]	Survey-based; may not capture all dimensions of mental health.	Specific focus on the impact of COVID-19 on medical students' mental health.
[2]	Lack of mental health information; under-researched area.	Highlights urgent need for online mental health resources in low- and middle-income countries.
[7]	Ethical issues related to confidentiality and data security.	Discusses both benefits and challenges of online mental health care, including accessibility.
[3]	Limited research on the efficacy of online counseling.	Focuses on the role of perceived usefulness in adopting online counseling by professionals.

2.3 Gap Analysis

1. Poor availability of mental health facilities in isolated and rural areas

Current Gap: Rural areas in Bangladesh receive poor mental health care due to the fact that most mental health facilities are situated in metropolitan areas. However, in general, the overall system is lacking for those people residing in some remote places without physical or digital access to taking advantage of these mental services.

Med Vantage Solution: Med Vantage plans to get around this barrier by offering its platform on low-bandwidth internet and hence making it accessible in areas where the connectivity is unequal. So that mental health support would easily be accessible, especially to those not comfortable with cutting-edge technologies.

2. High Levels of Social Shame Involving Mental Health

Current gap: In Bangladesh, mental health problems carry heavy stigma. People are not oriented towards seeking mental health treatment. As talking about issues related to mental health is often disapproved of, sometimes they feel unsafe to talk about mental health.

Med Vantage Solution: We work on normalizing discussions about mental health in the most culturally sensitive manner, seeking help without any embarrassment, through content creation, information campaigns, and community engagement.

3. Lack of Competent and Officially Licensed Mental Health Professionals

Present Gap: Online platforms currently cannot be trusted because of the required verification of professionals; this raises questions about safety and quality, eventually driving the user away from online mental health support.

Med Vantage Solution: Med Vantage will introduce a strict verification process for health care providers, therefore. Only the certified and qualified professionals are listed on the site. It will create a place of trust for the service receivers.

4. Mental Health Services Are Too Expensive

Current gap: Traditional mental health service can be unaffordable, thus impossible for people with lower incomes. Consequently, far too many people, especially from

economically underprivileged communities, are unable to receive the necessary support.

Med Vantage Solution: Med Vantage will offer flexible payment options; thus, the service levels and prices must provide a range that will make mental health care affordable for customers. It also intends to give access to mental health support to as many people as possible, regardless of their income.

5. Low Digital Literacy and Technological Barriers

Current gap: Online mental health services may not be accessed by potential users, especially for older people and those from rural areas due to their lack of experience with digital devices and applications.

Med Vantage Solution: The platform has an easy user interface built for naive users who have little or no experience with digital technology. It also offers multilingual support, inclusive of Bengali, to serve users with different language preferences and literacy levels, thus expanding the circle of users availing of this service.

2.4 Summary

Our background analysis involved reviewing various scholarly papers and evaluating the existing online mental health platforms like Moner Bondhu, Esho Nije Kori and Doctor on Demand. The scholarly papers highlighted issues including limited access to mental health services, high level of societal stigma, and the need for affordable, competent and reliable mental health care solution. Moner Bondhu provides online service, counseling and self-help resources, although access is constrained by a lack of digital literacy. Esho Nije Kori focuses on community-based mental health support and awareness campaigns, effectively reducing stigma but lacking a robust online infrastructure. Doctor on Demand has a robust telemedicine platform with vetted professionals and user-friendly interfaces, though it is targeted at markets with more advanced digital infrastructures. Such analyses point out the need for a platform merging accessibility, affordability, verified professional support, and effective stigma reduction, tailored to the specific context in Bangladesh. Our proposed platform aims to integrate the strengths of these existing solutions while addressing their limitations to offering comprehensive mental health services across the nation.

Chapter 3

Project Design

The project's initial phase, known as project design, is when the project's concepts, features, structure, and deliverables are structured.

3.1 Requirement Analysis

3.1.1 Functional and Nonfunctional Requirements

Functional Requirements

Specific tasks or behaviors that a system must be able to carry out are known as functional requirements. The following competencies are functional requirements for Med Vantage:

1. User Registration and Authentication

- Users must be able to create accounts and log in securely.
- Support for password recovery and two-factor authentication.

2. Appointment Booking

- Users can view available time slots and book appointments with healthcare providers.
- Users can modify or cancel appointments as needed.

3. Payment Processing

- Integration of secure online payment options for consultation fees.
- Users should receive confirmation and receipts for payments made.

4. Consultation Services

- Provide options for both online (video/chat) and offline consultations.
- Users should be able to communicate with healthcare providers through a secure messaging system.

5. Healthcare Provider Verification

- Verification process for healthcare providers to ensure credentials and qualifications.
- Display profiles and specialties of verified providers to users.

6. Feedback and Ratings System

- Users can provide feedback and rate their experience with healthcare providers.
- The platform should allow for collection and analysis of user feedback.

7. Resource Library

- Access to educational materials on mental health topics, including articles, videos, and FAQs.
- Option for users to share resources within their communities.

8. Community Engagement Features

- Discussion forums or chat groups for users to engage in conversations about mental health.
- Events calendar for community outreach and mental health awareness programs.

9. Data Privacy and Security

- Implementation of strong data encryption methods to protect user information.
- Compliance with relevant data protection regulations.

Non-Functional Requirements

Non-functional requirements are qualities that a system should have even when they have no direct connection to particular activities or behaviors. For Med Vantage, non-functional requirements include:

1. Usability

- The platform must have an intuitive and user-friendly interface, accessible to individuals with varying levels of technical ability.
- Multilingual support, including Bengali, to cater to a diverse user base.

2. Performance

- The website should load quickly and handle a high volume of users without performance degradation.

- Scalability to accommodate an increasing number of users and services.

3. Reliability

- The platform must be available 24/7, with minimal downtime.
- Regular backups to ensure data integrity and availability.

4. Accessibility

- Compliance with accessibility standards (e.g., WCAG) to ensure usability for people with disabilities.
- Responsive design to support various devices, including smartphones and tablets.

5. Security

- Robust measures to protect against data breaches and cyber threats.
- Regular security audits and updates to maintain compliance with regulations.

6. Maintainability

- The system should be designed for easy updates and maintenance.
- Comprehensive documentation for developers and administrators.

7. Community Trust

- Regular community outreach and transparency in operations to build trust among users.
- Continuous monitoring and improvement based on user feedback.

8. Cultural Sensitivity

- The platform's content and design should be culturally appropriate and resonate with the local population.
- Engagement with local mental health professionals to ensure relevancy and sensitivity.

3.1.2 Context Diagram

This context diagram (Figure 3.1) shows the system entities and their primary functions within the system.

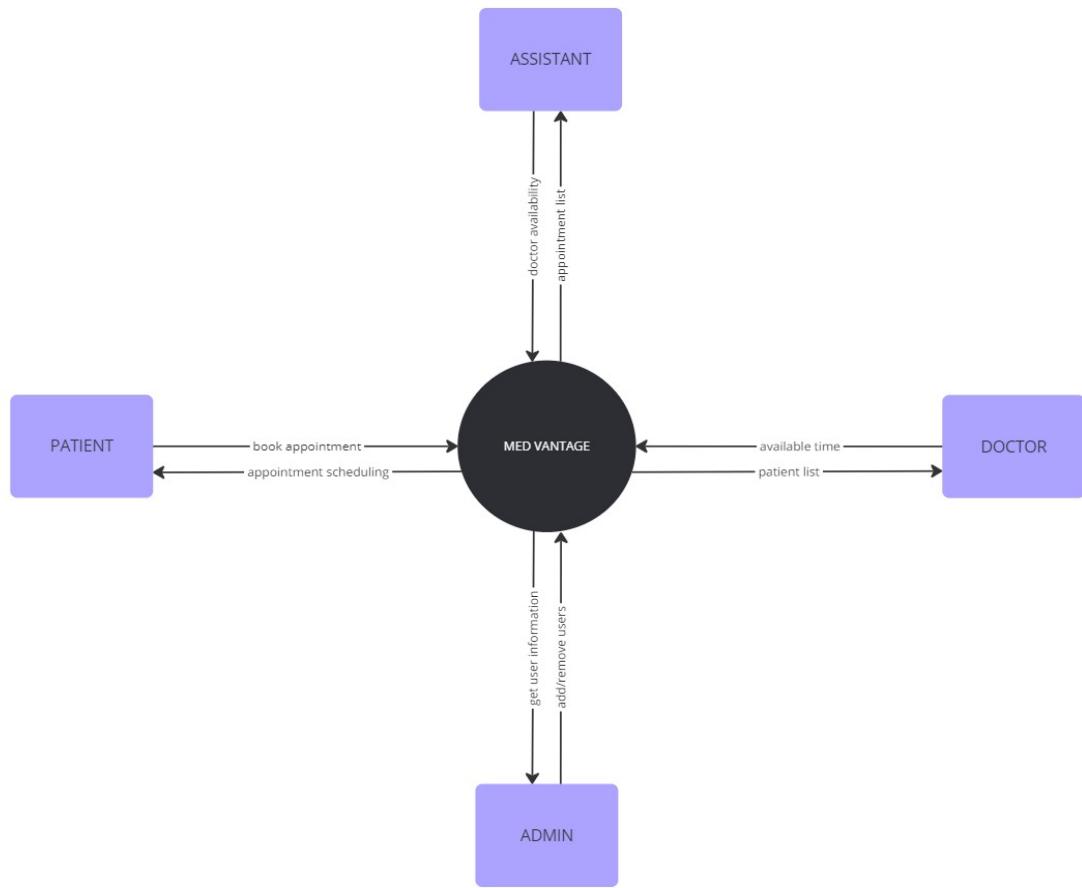


Figure 3.1: Context Diagram

3.1.3 Data Flow Diagram Level 1

These essential actions will be examined in the DFD Level 1 in terms of user response and the flow of each procedure.

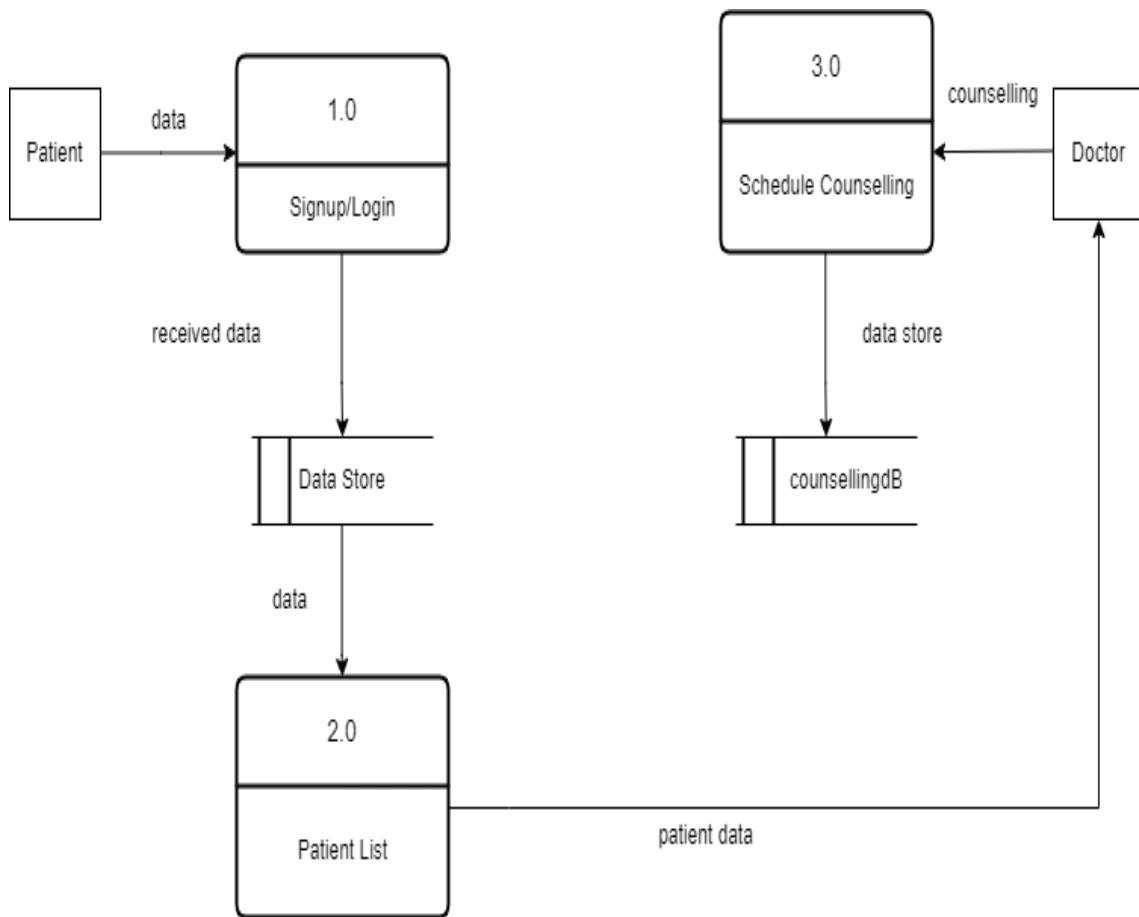


Figure 3.2 DFD

3.1.4 UI Design

Any software or system must have a user interface (UI), which provides users with a visible and interactive platform for interaction. The UI is crucial in creating user-friendly interfaces, intuitive navigation, and effective controls, all of which are designed to enhance usability, overall satisfaction, and the user experience.



Figure 3.3: (Home Page).

This is Landing page (Fig. 3.3) design for our project. In this landing page patient(user) can login or sign up easily. After logging in , patient (user) can check available doctor list, book their appointment and took counselling. Also Doctor can login and see patient

request.

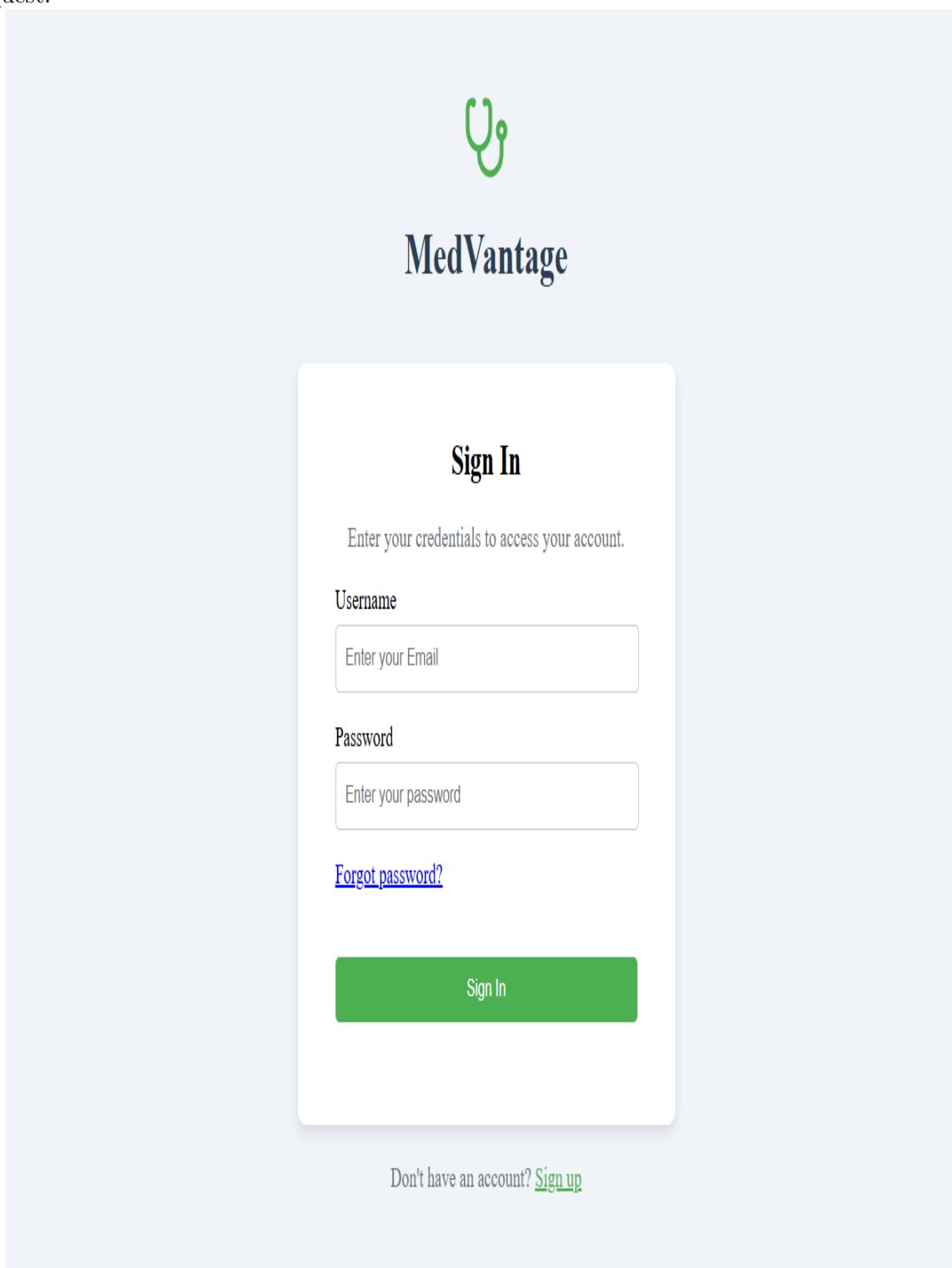


Figure 3.4: Login Interface.

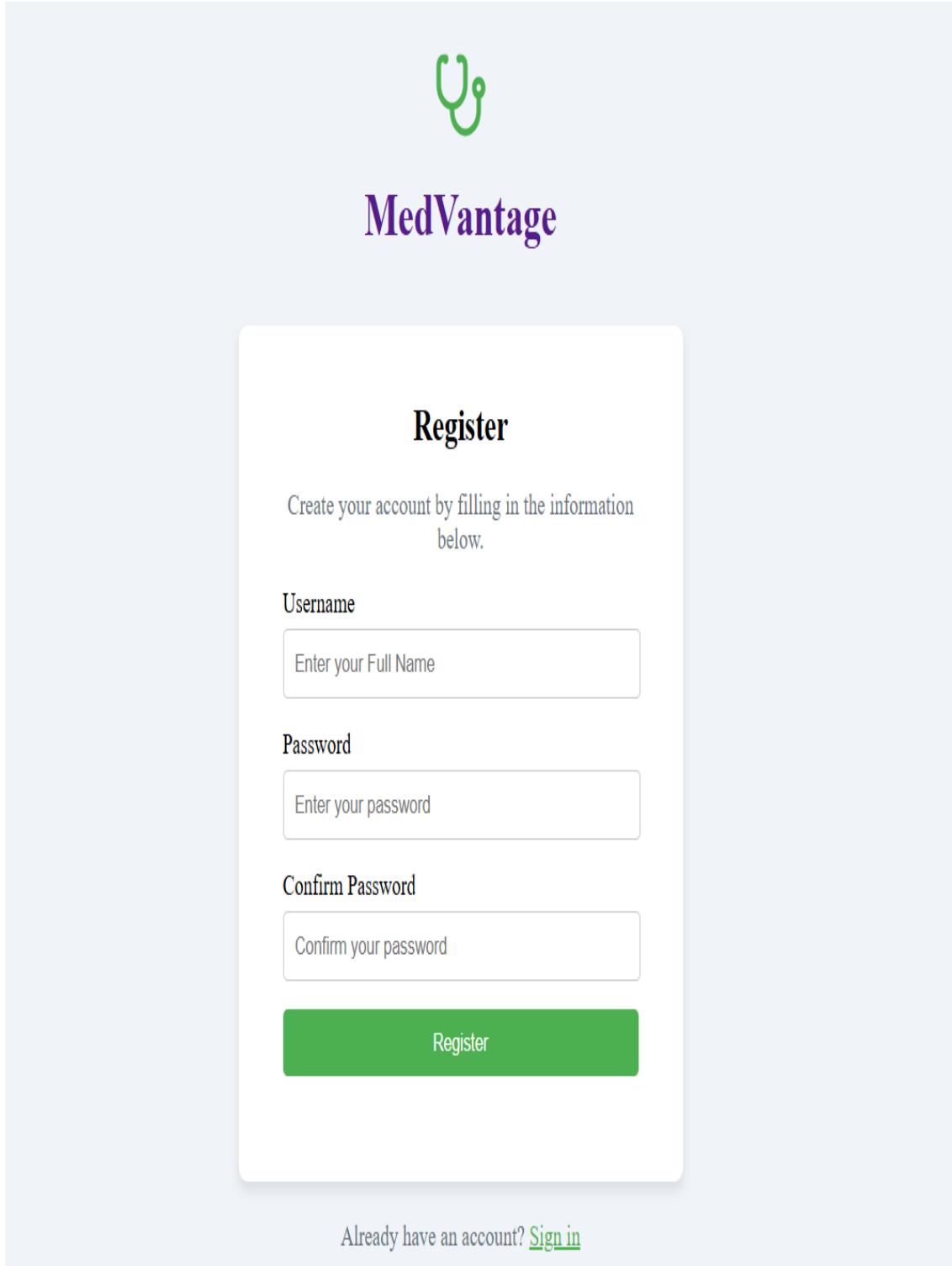


Figure 3.5: Signup interface.

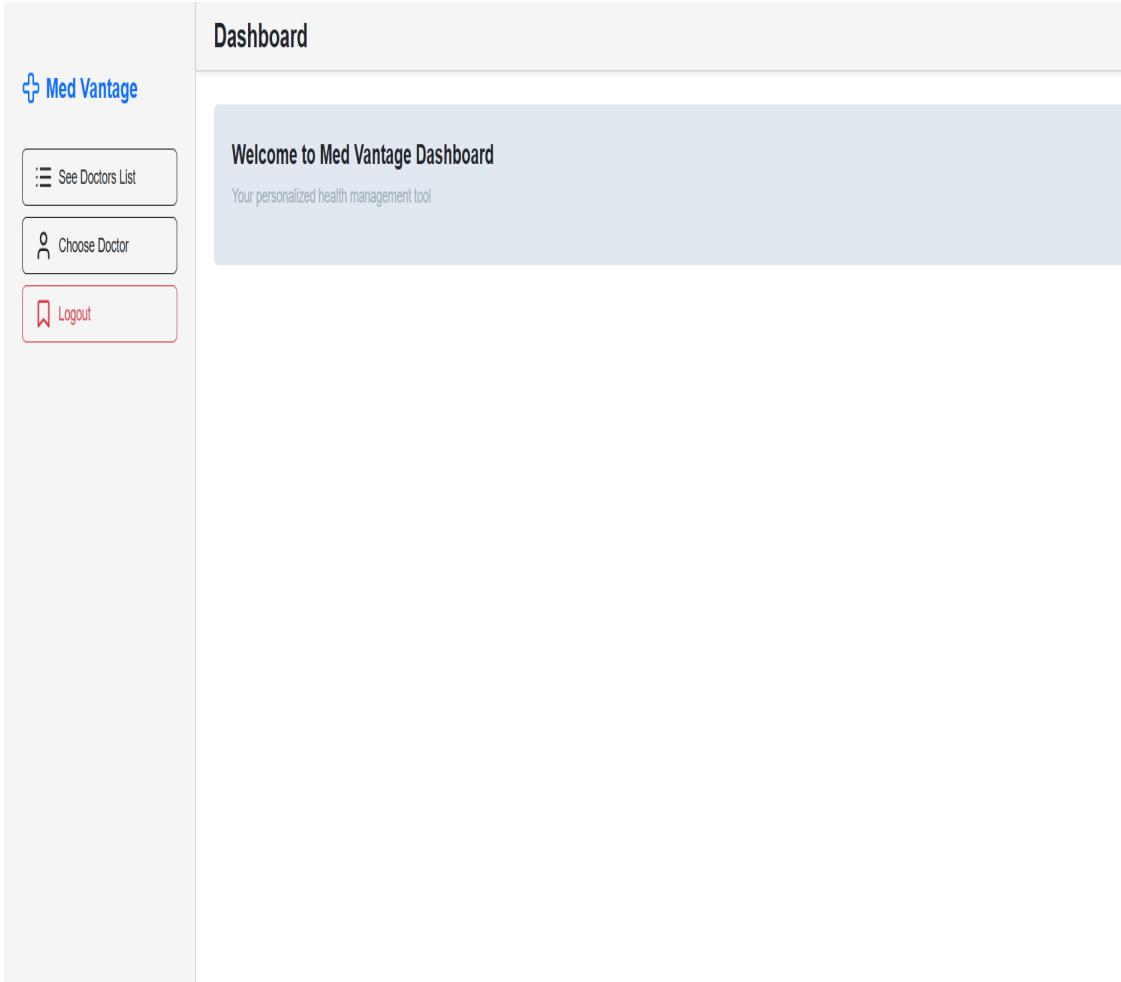


Figure 3.6: User interface.

In this interface (Fig. 3.6), patient(user) can see available doctor list. Patient can book appointment and continue counselling.

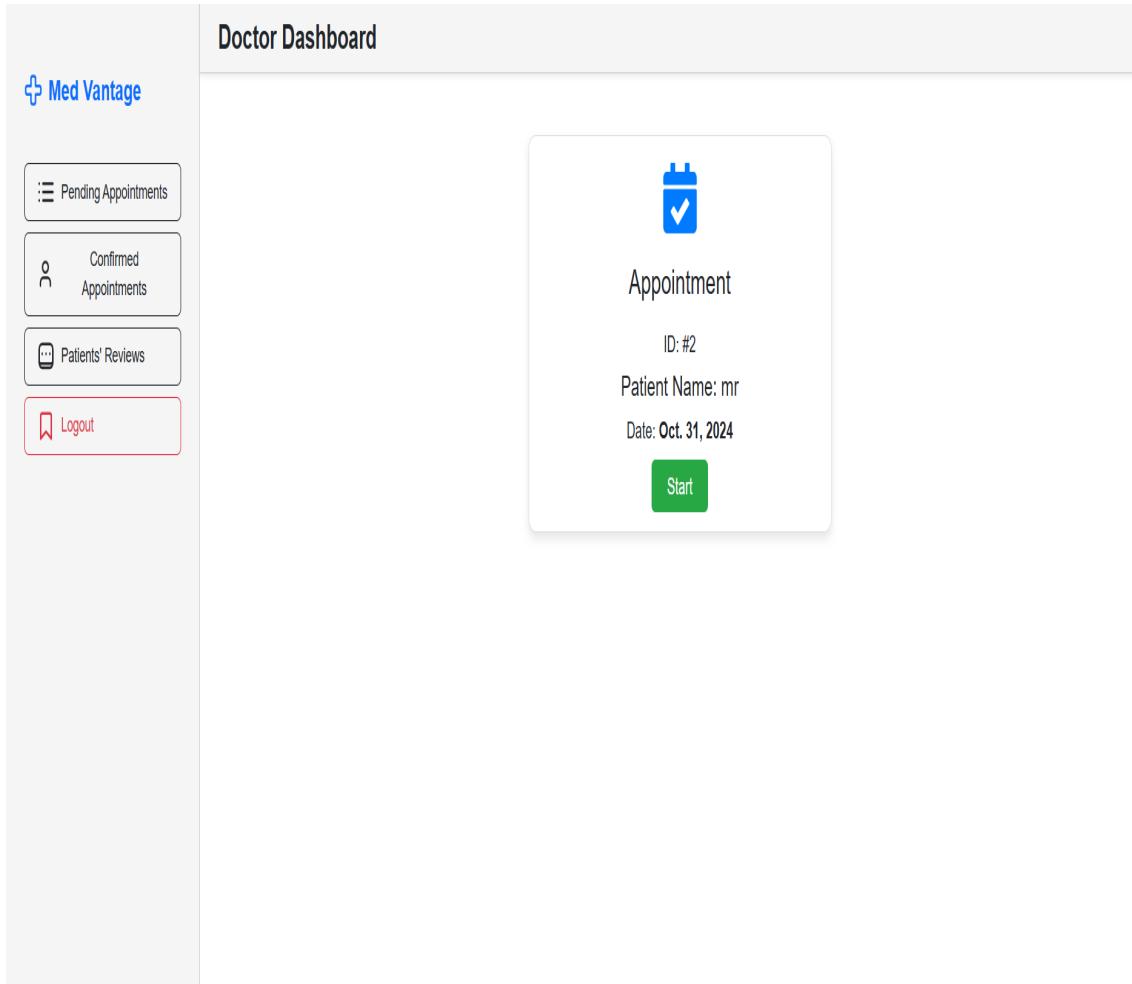


Figure 3.7: Doctor interface.

This is the interface (Fig. 3.7) for Doctor. Doctor can see patient list and continue their counselling one by one.

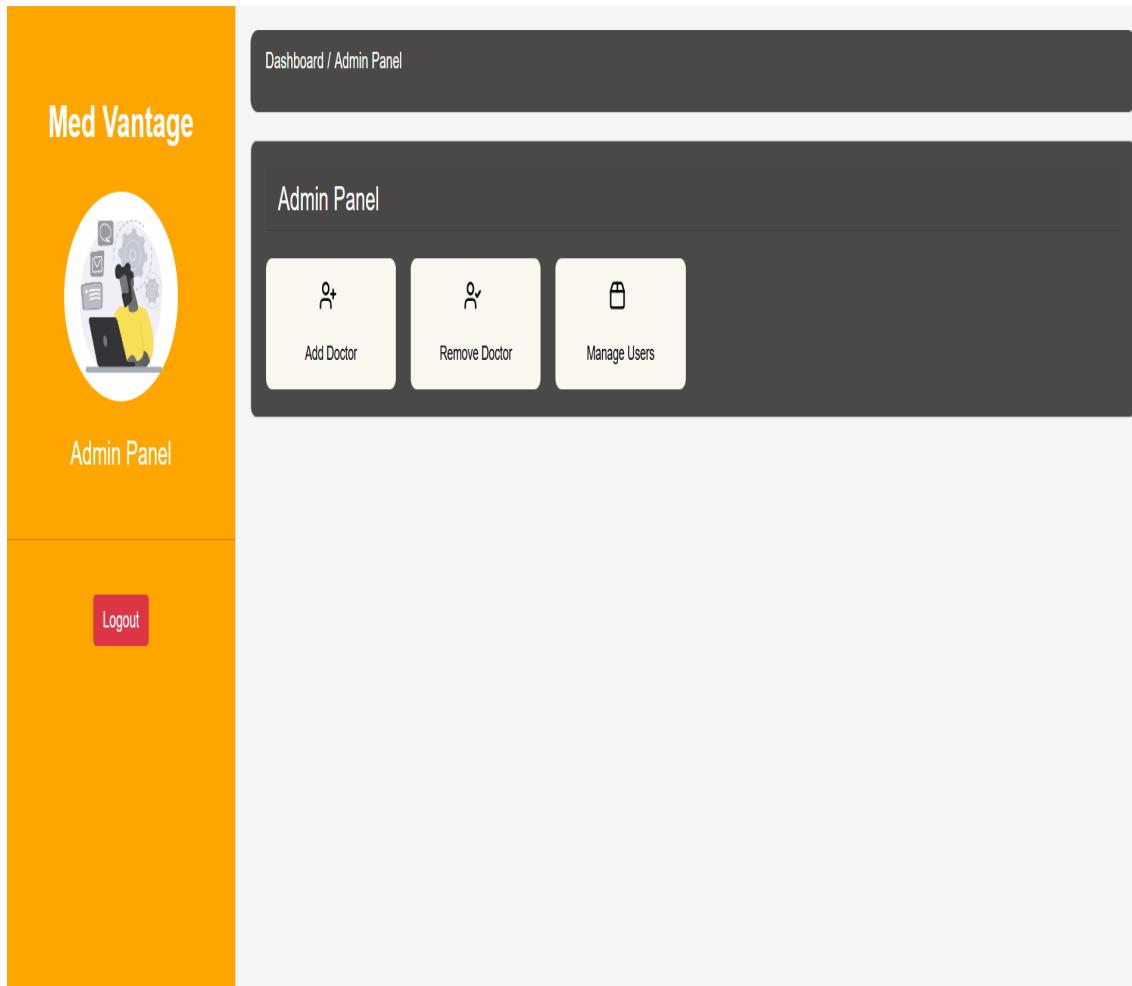


Figure 3.8: Admin interface.

3.2 Detailed Methodology and Design

From the patient interface, if any patient successfully logging in then he/she can see available doctor list. After selection doctor they can easily book their counselling hour and they need to pay through online system. Then Doctor accept their request and provide counselling link and for offline counselling doctor provide schedule. Then Doctor store their mental health related data.

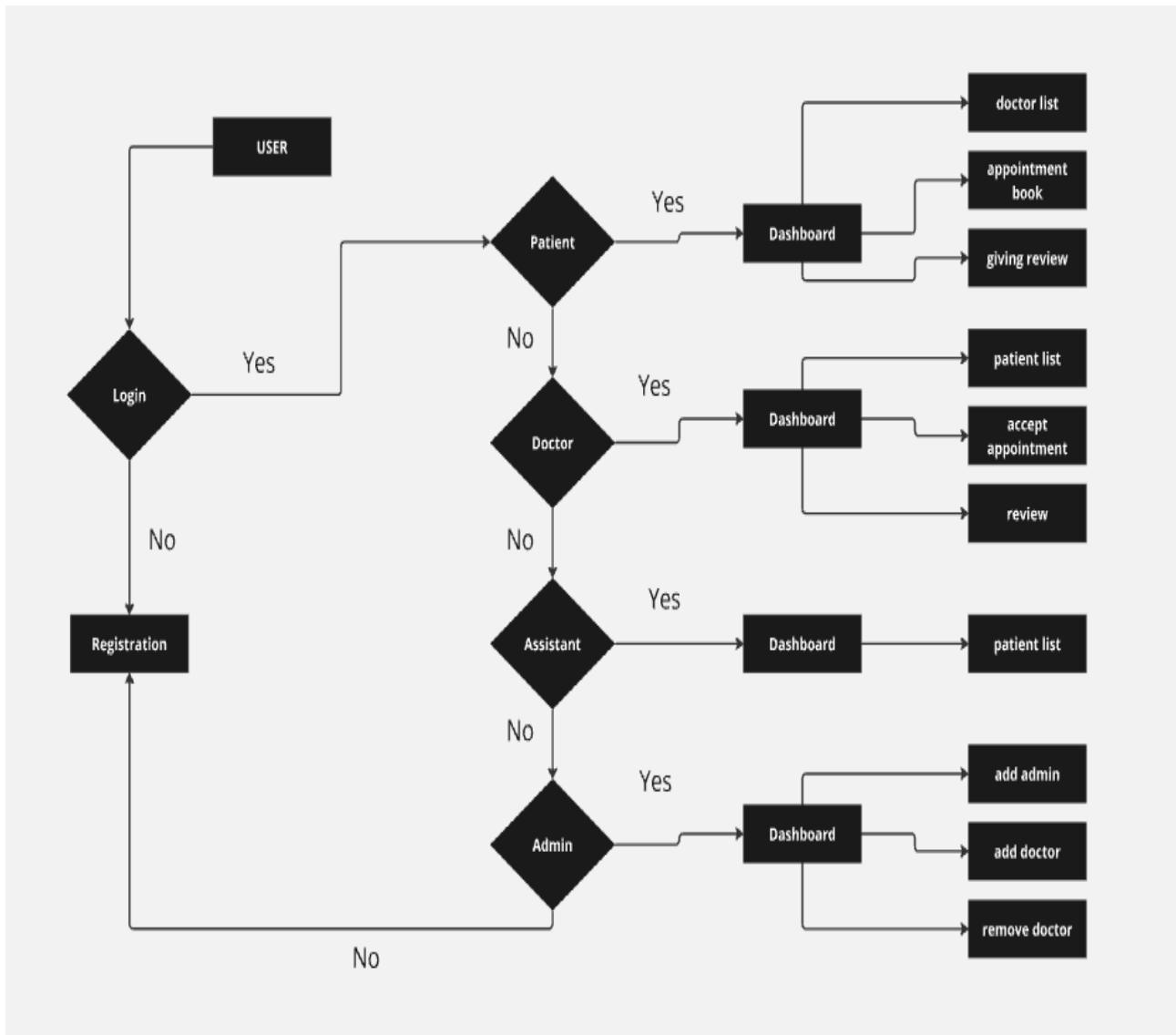


Fig. 3.8 (Detailed Methodology Design)

3.3 Project Plan

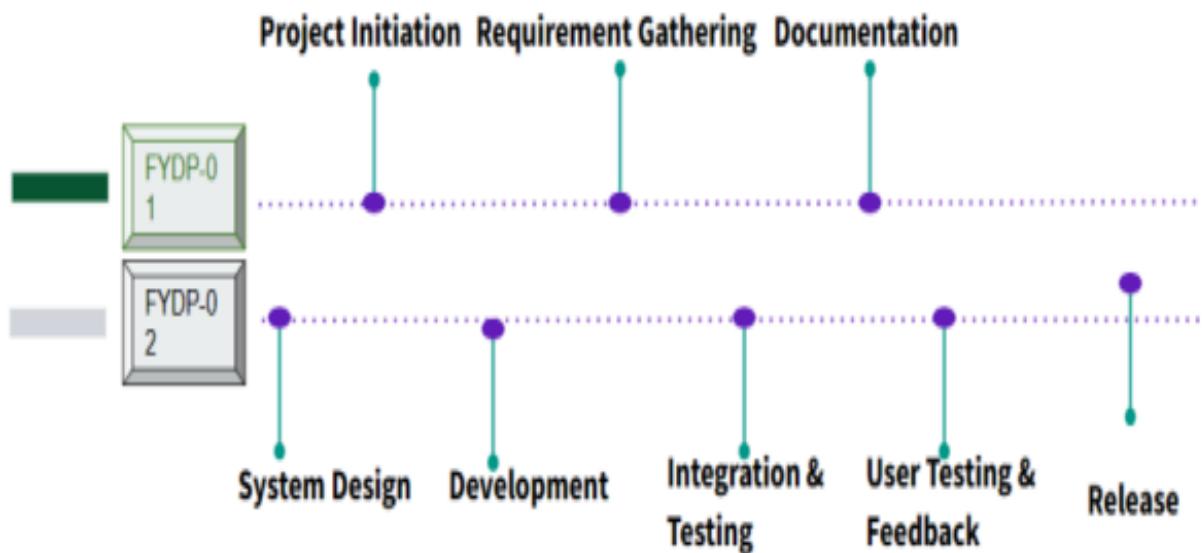


Figure 3.9: Project Plan

3.4 Task Allocation

Maruf	Rafid	Hadi	Saad	Farabi
* Define Functional & Non-Functional requirement	* Literature Review	* Diagram	* Complex Engineering Problem	* Literature Review
* Diagrams	* Methodology	* Literature Review	* Introduction	* Define Project Scope
* Design Prototype	* Motivation & Objectives		* Took Survey	

Figure 3.10: Task Allocation

3.5 Summary

This section outlines the overall project procedure, covering both functional and nonfunctional requirements. By including an image of the user interface, users can get a general idea of the system's design and what to expect during interactions. Tasks have been distributed equally among all project members.

Chapter 4

Implementation and Results

In this chapter we will talk about our implementation strategy for the project. This part is organized according to the various strategies we will use to carry out our plan and ensure its success, including what tools we will utilize and how.

4.1 Environment Setup

4.1.1 Design Environment

In our Med Vantage project, we have utilized Visual Studio Code (VS Code) as our primary development environment. Known for being open source, VS Code offers a robust set of features that enhance the development process. It provides intelligent code generation, syntax highlighting, and powerful debugging capabilities. Additionally, its seamless integration with Git allows for efficient version control, making it an ideal choice for collaborative development.

Front-end Design: We have used the HTML, CSS, Bootstrap 5, JavaScript to design the UI/UX of our system.

Back-end Design: For the back-end design, we used Django.

4.1.2 Version Controlling Environment

We will talk about version control in this subsection. We require a version-controlling platform for a project like this so that we can effectively track our group work and check for faults. For version management, we went with GitHub and Git.

4.2 Testing and Evaluation

Testing is an essential part of the software development process. We also devised our project's testing protocols. We'll employ three distinct methods for testing.

Unit Testing: Unit testing is an approach that involves examining each function in our project to see whether or not it is functioning appropriately.

Integration Testing: If a feature passes each unit test, it will be combined with the other project features and tested to determine if they work together as a cohesive unit.

System Testing: In our project on Med Vantage, after carrying out unit and integration testing, we will make use of the Black-Box testing technique in system testing. This technique allows us to engage in the inputs and outputs of the system without considering the inside of the system. We will be reviewing effectiveness-actual level of use by users, response times-and data integrity by review of error logs and audit trails. Acceptance by user will be measured by end-user satisfaction surveys and statistics of use; post-implementation, scalability will be reviewed for acceptance to ensure that the system can be scaled to meet future needs. These form the basis for understanding and rating the effectiveness of our system in the improvement of the mental health counseling service delivery.

4.3 Results and Discussion

Med Vantage has been built to converge with topmost goals of the community through survey and targeted interviews for collecting inputs from the people. That would ensure workability so that we can firmly develop a system which would actually facilitate the diverse needs of individuals concerned about mental health counseling in Bangladesh by ensuring efficiency, transparency, and shared ownership.

Survey Feedback:

How comfortable are you with using online platforms for mental health counseling?

 Copy chart

50 responses

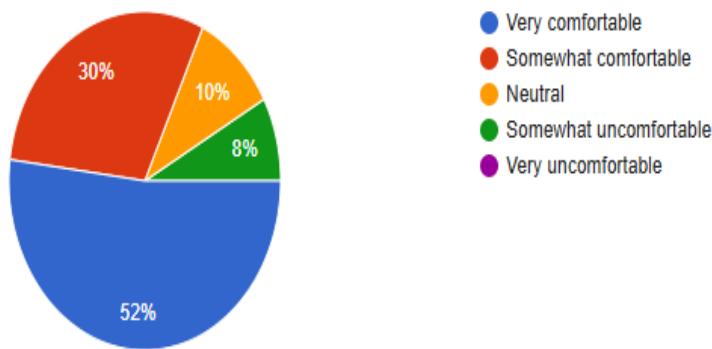


Figure 4.1: Feedback of user question 1

What is your age group?

 Copy chart

50 responses

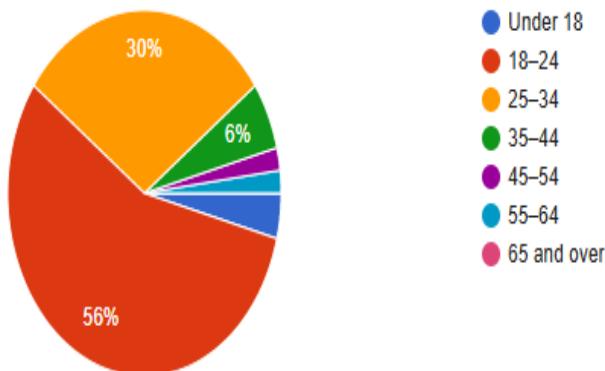


Figure 4.2: Feedback of user question 2

In which age group do you think mental health services should be tailored to?
(Select all that apply)

 Copy chart

50 responses

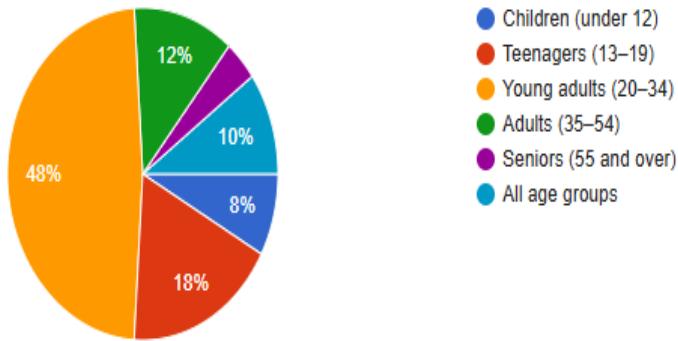


Figure 4.3: Feedback of user question 3

How does your age influence your choice of mental health services?

 Copy chart

50 responses

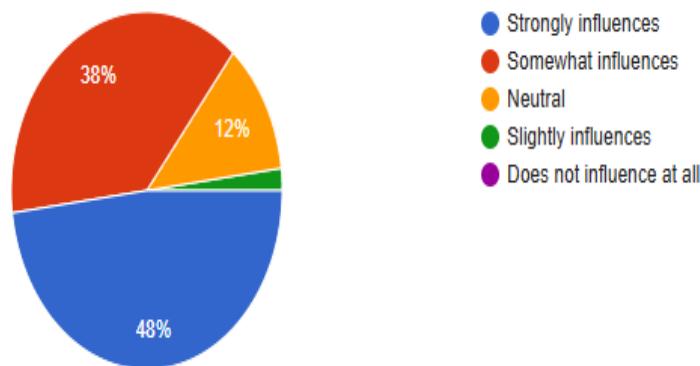


Figure 4.4: Feedback of user question 4

What factors are most important to you when choosing an online mental health service?

 [Copy chart](#)

50 responses

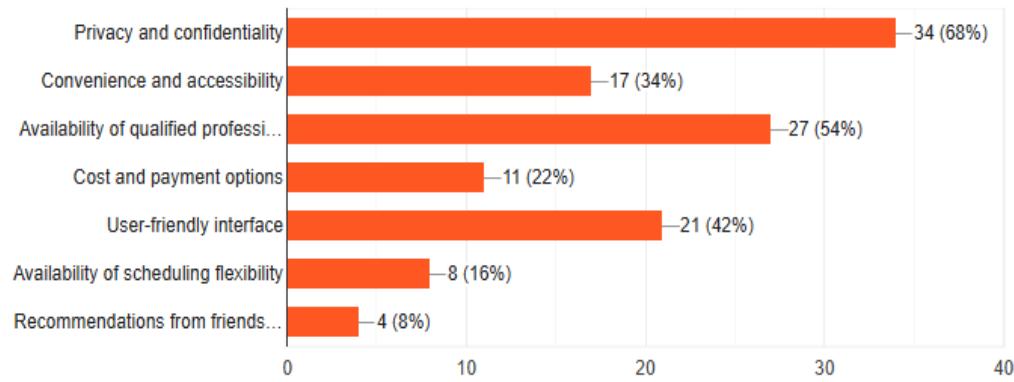


Figure 4.5: Feedback of user question 5

How likely are you to use Med Vantage for mental health counseling if it meets your needs?

 [Copy chart](#)

50 responses

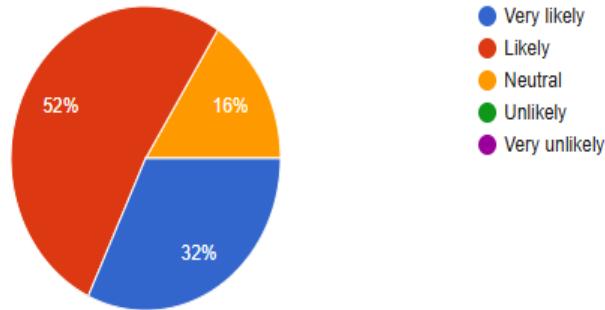


Figure 4.6: Feedback of user question 6

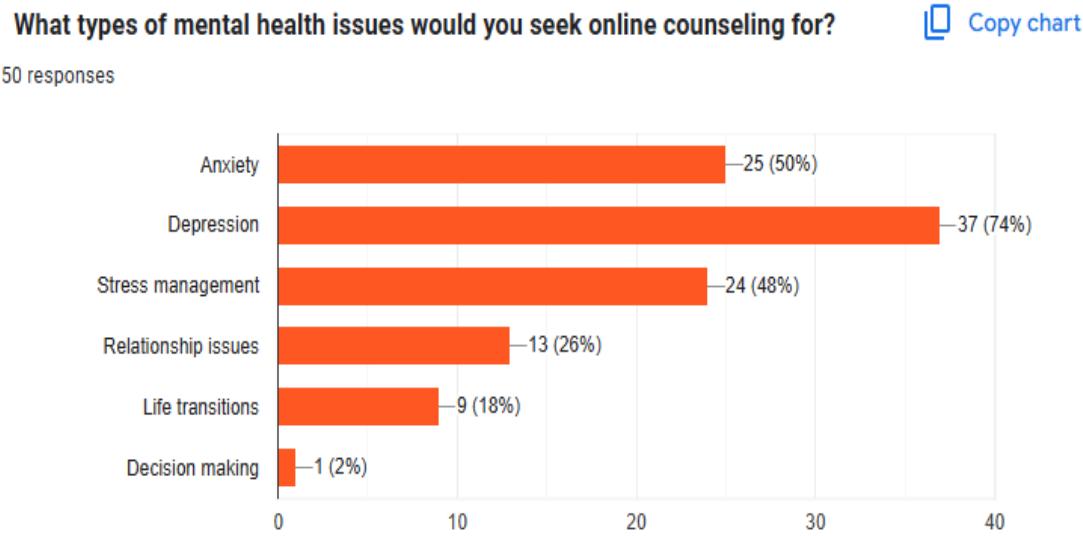


Figure 4.7: Feedback of user question 7

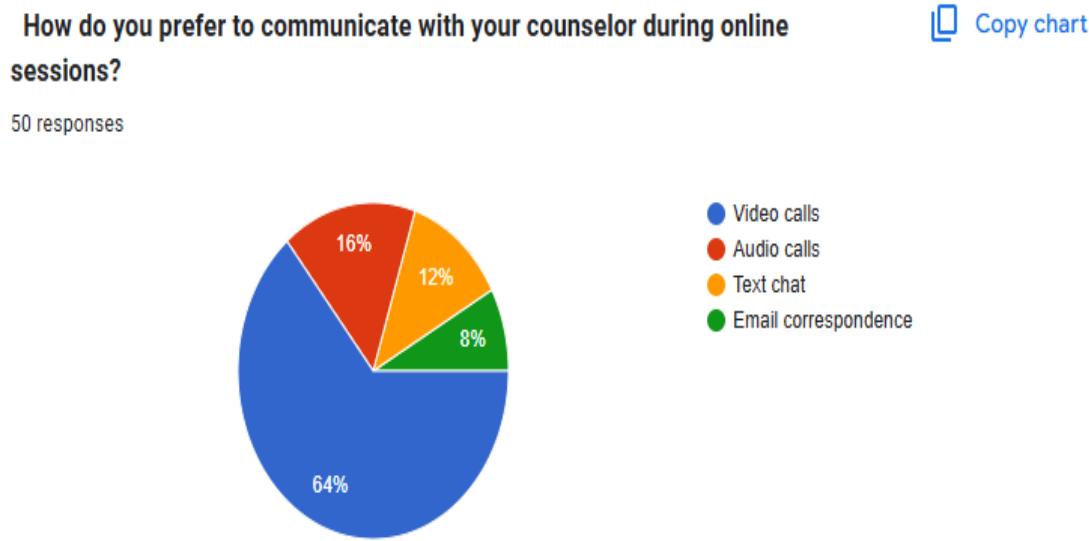


Figure 4.8: Feedback of user question 8

What barriers have you faced in accessing traditional mental health services? [Copy chart](#)

50 responses

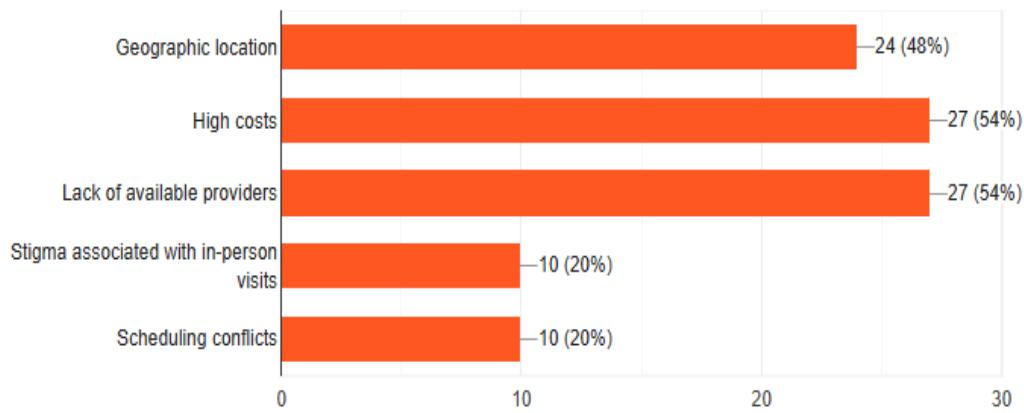


Figure 4.9: Feedback of user question 9

What features would you find most helpful on an online mental health platform? [Copy chart](#)

50 responses

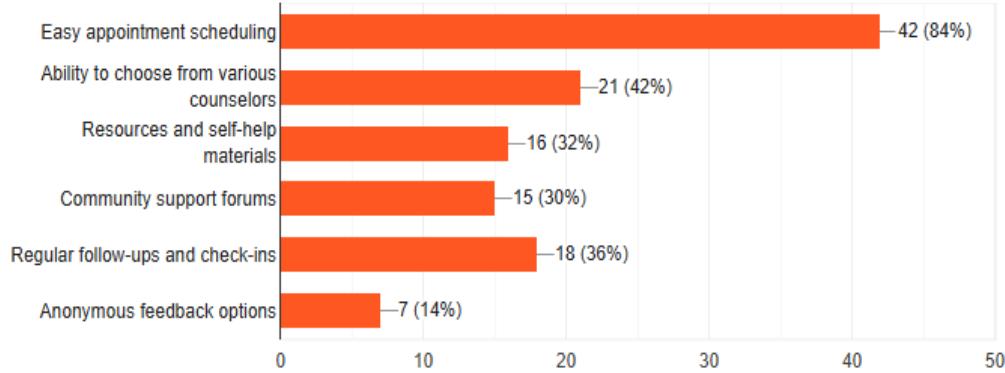


Figure 4.10: Feedback of user question 10

How important is it for you to have access to mental health resources (e.g., articles, videos) alongside counseling services?

 Copy chart

50 responses

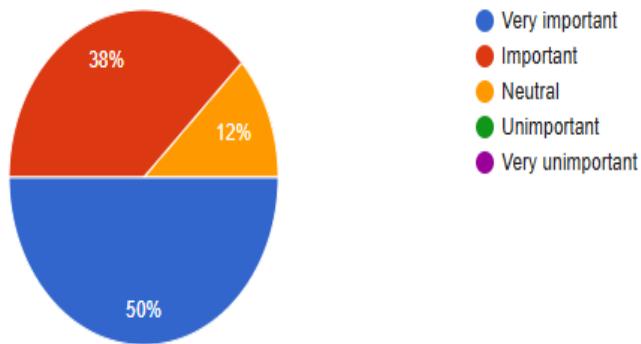


Figure 4.11: Feedback of user question 11

How did you hear about Med Vantage?

 Copy chart

50 responses

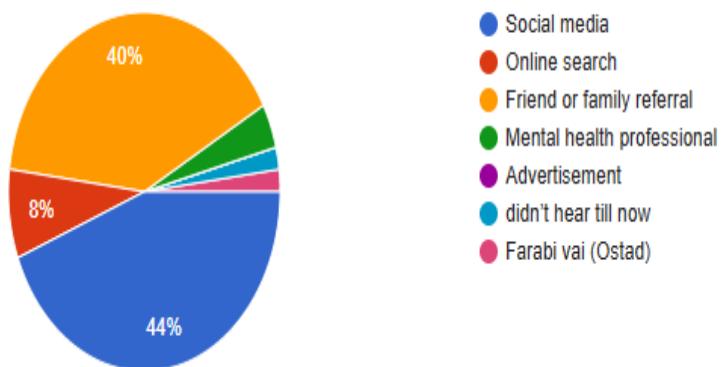


Figure 4.12: Feedback of user question 12

What is your preferred frequency for counseling sessions?

 Copy chart

50 responses

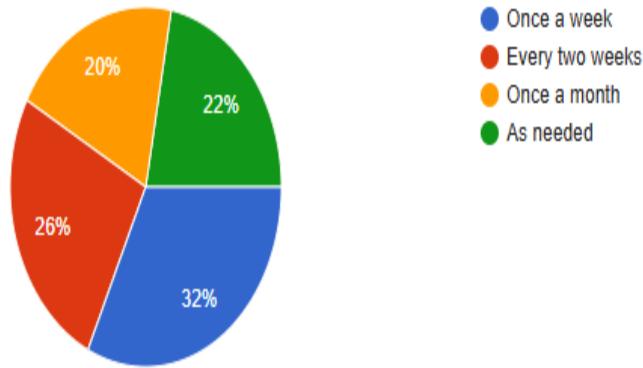


Figure 4.13: Feedback of user question 13

How do you feel about the use of technology in mental health services?

 Copy chart

50 responses

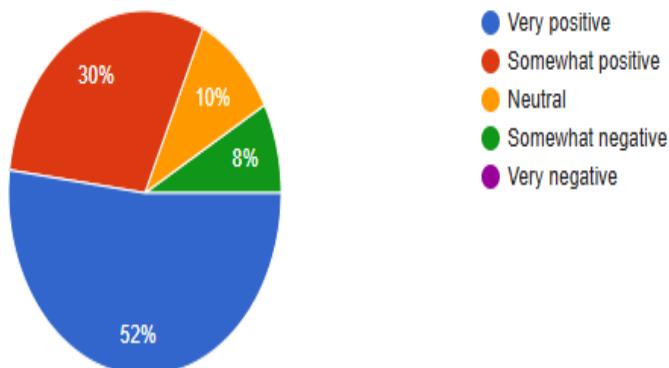


Figure 4.14: Feedback of user question 14

What time of day do you prefer to have counseling sessions?

 Copy chart

50 responses

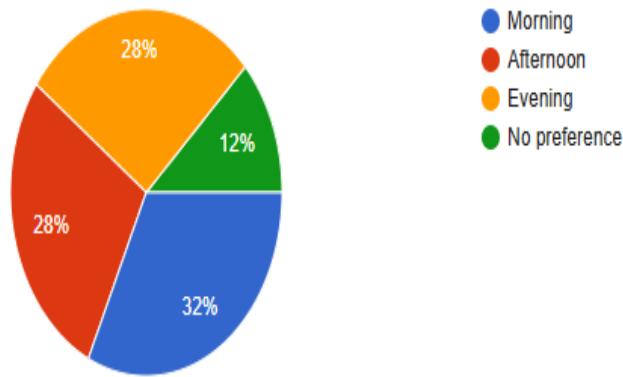


Figure 4.15: Feedback of user question 15

How important is it for you to have a counselor who specializes in your specific area of concern?

 Copy chart

50 responses

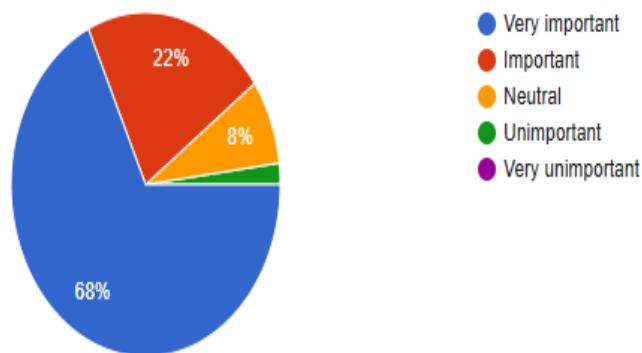


Figure 4.16: Feedback of user question 16

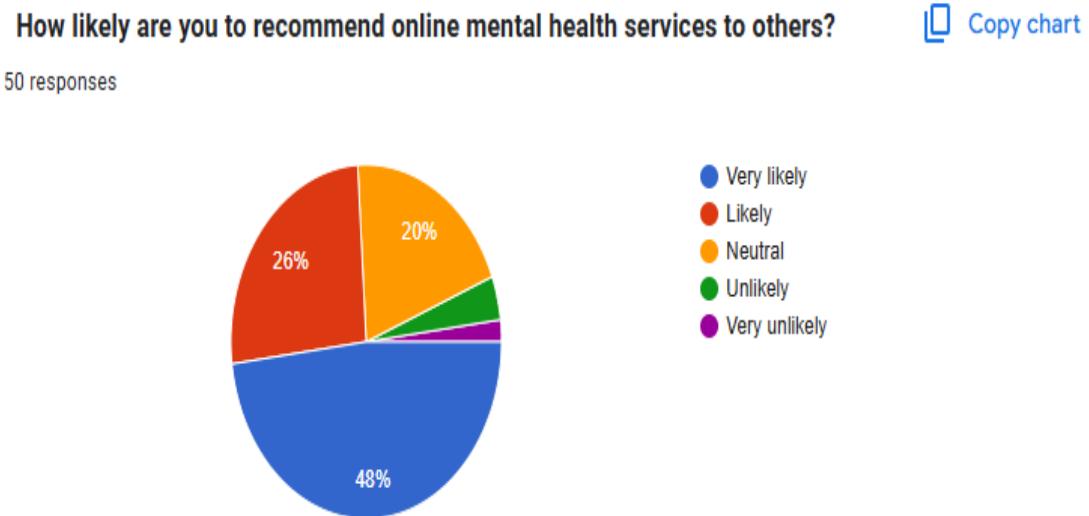


Figure 4.17: Feedback of user question 17

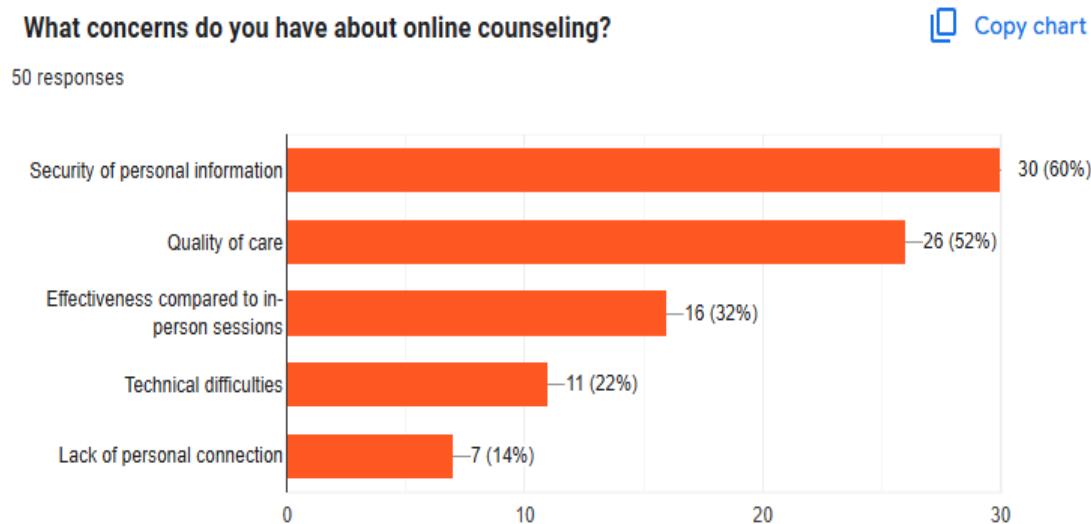


Figure 4.18: Feedback of user question 18

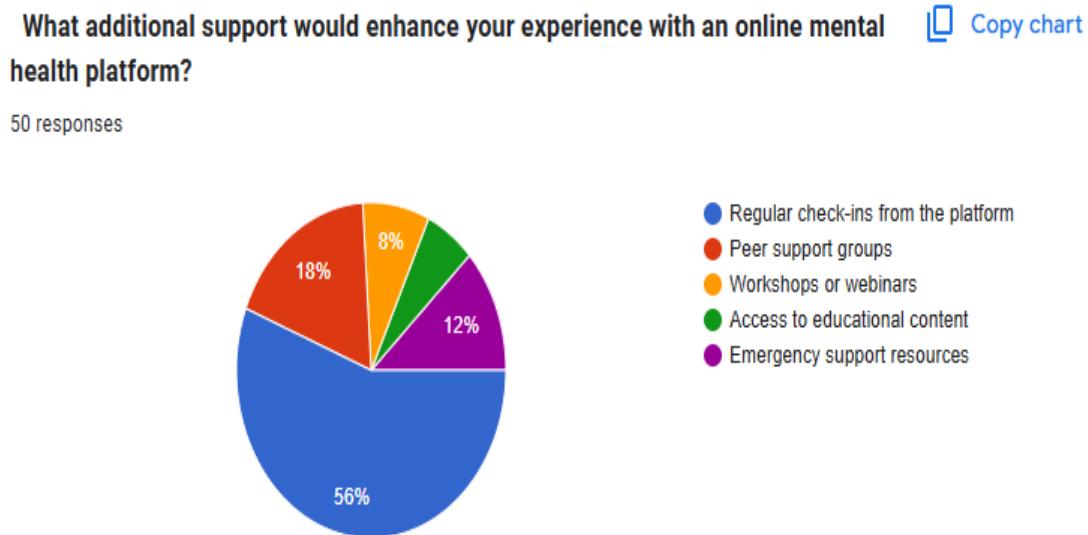


Figure 4.19: Feedback of user question 19

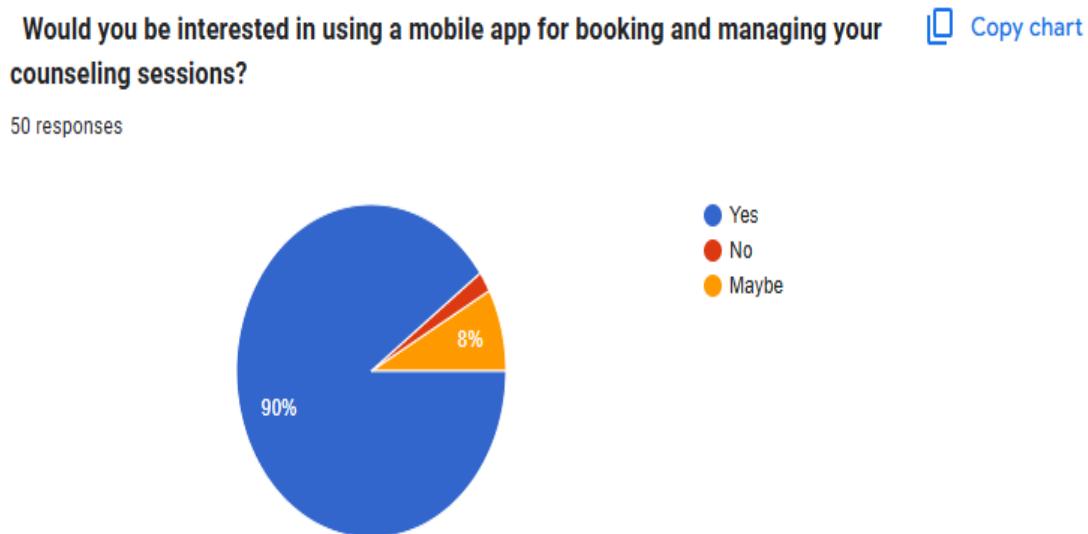


Figure 4.20: Feedback of user question 20

4.4 Summary

The implementation phase of the project, where the Med Vantage platform was developed by following a structured approach that included numerous design and testing methodologies. Such development included creating a technical environment of front-end and back-

end frameworks, designs of the user interface, and security of data. The tests involved unit testing, integration testing, and system testing to ensure functionality, performance, and reliability. The major outcome of the implementation is going to be a full-fledged platform wherein the facility of appointment booking, modes of secure payment, and counseling both online and offline will be provided to the users. It will be able to support numerous users and seamless experiences with verified healthcare professionals.

Chapter 5

Standards and Design Constraints

In this 5th chapter, we will talk about different standards, design constraints, cost analysis, design thinking and complex engineering problems.

5.1 Compliance with the Standards

For doing this project, we have followed some standards. There are:

- UI design standards for better user experience.
- Project Management tools for managing the project.
- Washington Accord Guidelines

5.1.1 Software Standards

It makes certain that the development is uniform, quality standards are met, and maintenance and integration processes are able to function smoothly. Our services include encapsulation of all system features into modular units, and they can easily integrate with other systems using an Application Programming Interface or simply API. This ensures that the usability of the system is not dependent on the programming language used. The software is developed under a micro-service architecture to be useful in a wide variety of areas. We at [Company Name] follow the CMMI level for software documentation, development, and maintenance. We take proactive steps in mitigating risks through appropriate risk planning for future projects.

5.1.2 Hardware Standards

The system is designed to be lightweight to minimize the consumption of very expensive hardware so that it can manage speed and space complexity. It can work efficiently on a low-end private or shared server. The processor may use a clock speed of 1 GHz and 4GB RAM to deliver the best performance. The user's load or portal participation, if more than the threshold value, the clients will be notified to upgrade their hardware

capacity. Nevertheless, the system is functional, though with lower RAM, it will have longer feedback times.

5.1.3 Communication Standards

Design constraints are the fundamentals of understanding and working within those constraints to come up with an effective and workable solution. Meeting design constraints enables designers to make informed decisions, prioritize requirements, strike a balance between competing factors, and deliver successful products. We guided our design process by the principles of user-friendly design as proposed by Donald Norman; we applied a system that is compatible with existing client systems. We have standardized headers and footers, major interface elements with primary color nodes that adapt to the integrated system. In developing this design, we have minimized each design decision to one or two steps so that the user can complete tasks in a very short time and reduce the load on his short-term memory.

5.2 Design Constraints

Design constraints for an online mental health facility: The platform design must be user-friendly for all users, irrespective of their technological literacy level, considering the lesser digital literacy rates in rural areas. The platform must be multilingual, given the varied ethnic population in Bangladesh. In terms of data, privacy and security are very important, implying strong encryption and following health care regulations. It also has to be scalable in order to take into account an increasing number of users. Moreover, it should be accessible over low-bandwidth Internet connections typical of the most remote areas. Also, there should be inbuilt secure online payment systems and an assurance of seamless communication both during the online and offline counseling sessions. This set of constraints makes the platform inclusive, secure, and reliable for all users.

5.2.1 Economic Constraint

When developing an online mental health platform for Bangladesh, several economic constraints can impact both the development and implementation phases. Here are some potential factors to consider:

Development Costs:

- Costs of research , programming and testing
- Costs of project management, quality assurance, and UI/UX design.
- Cost of integrating voter ID and phone number verification services.
- Developing a robust system for verifying doctor degrees and IDs.
- Use of third-party libraries, API and tools.

Infrastructure :

- Server costs, including cloud services (e.g., AWS, Google Cloud).
- Database management systems.
- Security measures to protect sensitive health data (encryption, firewalls).

Training and Marketing :

- Training doctors, assistants, and patients on how to use the platform effectively.
- Promoting the platform to potential users, including digital marketing, social media campaigns, and possibly traditional media.

Affordability, Market Readiness and Pricing:

- Setting a pricing model that is affordable for a broad spectrum of users in Bangladesh.
- Balancing between covering costs and making mental health services accessible.
- Potential resistance from traditional healthcare providers and users unfamiliar with digital health solutions.

5.2.2 Environmental Constraint

When developing an online mental health platform for Bangladesh, several environmental constraints should also be considered. These constraints can affect the development, deployment, and sustainability of the platform. Here are some potential environmental factors:

Infrastructure and Connectivity:

- Variability in internet connectivity across urban and rural areas.
- Reliance on stable and high-speed internet for online consultations and data transfers.
- Frequent power outages in certain regions can disrupt access to the platform

Technological Infrastructure :

- Ensuring the platform is optimized for various devices with different processing powers and screen sizes.
- Prevalence of older or lower-end devices among users.
- Environmental impact of data centers (e.g., energy consumption, cooling requirements).

5.2.3 Ethical Constraint

Developing a Mental Health Counselling system involves several ethical considerations to ensure the well-being and privacy of individuals. Here are some ethical constraints that should be taken into account:

Privacy and Confidentiality:

- Ensuring that patient data is securely stored and protected from unauthorized access.
- Implementing robust encryption methods for data transmission and storage.
- Ensuring that only authorized personnel (doctors, assistants) have access to sensitive data.

Informed Consent:

- Ensuring patients give informed consent before using the platform or sharing personal information.
- Allowing patients to withdraw consent and delete their data from the platform if they choose.

Equity:

- Providing equal access to services for all users, regardless of their socioeconomic status, gender, ethnicity, or location.
- Ensuring that no group is unfairly disadvantaged or excluded from using the platform.

Ethical Use of Technology:

- Using AI and machine learning responsibly to analyze patient data and provide insights
- Ensuring that algorithms are free from bias and do not perpetuate discrimination.

Patient Empowerment:

- Empowering patients to make informed decisions about their mental health care.
- Providing options for patients to choose between online and offline counseling.
- Establishing mechanisms for addressing complaints and resolving issues fairly and promptly

5.2.4 Health and Safety Constraint

When developing an online mental health platform for Bangladesh, it's crucial to consider health and safety constraints to protect users and ensure the platform provides reliable and effective care. Here are some key health and safety considerations:

Ensuring Quality of Care

- Implementing a rigorous verification process for doctors and their assistants to ensure they are qualified and licensed to provide mental health services.
- Regularly updating and re-verifying credentials to maintain high standards.
- Ensuring providers are up-to-date with the latest mental health practices and health protocols.

Patient Safety:

- Establishing clear protocols for handling mental health emergencies or crises, including

guidelines for referrals to in-person care or emergency services.

- Implementing systems to monitor patient progress and ensure follow-up appointments.
- Using reminders and notifications to encourage adherence to treatment plans.

5.2.5 Social Constraint

When developing an online mental health platform for Bangladesh, it's essential to consider social constraints that could impact the platform's adoption and effectiveness. Here are some key social constraints to be mindful of:

Socioeconomic Factors :

- Affordability of online mental health services for lower-income individuals.
- Variations in education and literacy levels, affecting the ability to use digital platforms.
- Need for clear, simple instructions and user interfaces to accommodate users with different educational backgrounds.

Social Norms:

- Sensitivity to gender-specific needs and preferences in mental health care.
- Influence of family and community opinions on individuals' decisions to seek mental health care.

Cultural Attitudes and Stigma:

- High levels of stigma associated with mental health issues can discourage individuals from seeking help.
- Cultural beliefs that mental health problems are a sign of weakness or failure can prevent open discussion and treatment.
- Preference for traditional, in-person consultations over virtual ones.

Licensing and Data Protections :

- Obtaining necessary licenses and permits to operate as a healthcare service provider.
- Adherence to data protection and privacy laws, such as the Digital Security Act, to ensure the confidentiality and security of patient information.
- Compliance with government regulations regarding the provision of healthcare services, including mental health.
- Flexibility to adapt to new policies or regulations as they arise.

5.2.6 Political Constraint

Political constraints can significantly impact the development and operation of an online mental health platform in Bangladesh. Here are some key political considerations to keep

in mind:

Political Interference and Influence:

- Safeguarding against undue influence from political actors on decision-making processes or service delivery.
- Maintaining transparency in operations and decision-making processes to build trust with users and stakeholders.
- Mitigating the risk of political interference or pressure that could compromise the independence or integrity of the platform.

Political Stability:

- Consideration of the impact of political instability or unrest on the operation of the platform.
- Monitoring political developments for potential changes in healthcare policies or regulations that could affect the platform.

5.2.7 Sustainability

Various reasons can be attributed to the sustainability of the proposed online mental health platform in Bangladesh: basically, there has to be financial viability with a substantial revenue model and cost efficiency, with diversification of funding sources for long-term stability; it has to be scalable, where it would accommodate growth and expansion to reach underserved populations; and social acceptance is about community engagement, cultural sensitivity, and user feedback that help build trust and dismantles stigma. Additionally, it shall consider the environmental impact regarding green practices and efficiency in the use of energy. Compliance with regulatory legislation is not an option; rather, it is a call for strict adherence to laws, regulations, and ethical standards. Long-term impact assessment will be useful in showing the value of the platform and continuous improvement. The platform is at a better position to establish itself as sustainable toward improved mental health outcomes and societal well-being in Bangladesh in response to these facets.

5.3 Cost Analysis

Cost analysis of the online mental health platform project involves identifying and estimating all expenses associated with its development, implementation, and operation. Here's a step-by-step guide to conducting a cost analysis for launching this system:

1. Personnel Cost:

- Team Member 1 (Development): 40,000 tk/month
- Team Member 2 (UI/UX): 35,000 tk/month
- Team Member 3 (Database): 38,000 tk/month
- Team Member 4 (Testing): 37,000 tk/month
- Team Member 5 (Documentation): 34,000 tk/month

2. Software and Tools:

- Development Software Licenses (e.g. IDEs): 10,000 tk
- Design Software (e.g., Adobe Creative Cloud): 12,000 tk
- Version Control System (e.g Git): Free

3. Infrastructure:

- Cloud Hosting (8 months): 8000 tk
- Domain Registration: 2000 tk

4. Total Project Cost:

- Sum of all the above costs: 216,000 tk

5.4 Complex Engineering Problem

5.4.1 Complex Problem Solving

The Washington Accord emphasizes that a key trait of the engineering profession is the capacity to handle complexity and uncertainty, as no two real-world engineering projects are alike. Consequently, complex engineering problems demand a high level of technical expertise and knowledge. These challenges are typically marked by their intricate nature, uncertainty, and the necessity for interdisciplinary collaboration. The Washington Accord Graduate Attribute Profile consists of 12 components, supported by a Knowledge Profile (K1–K8) and a Level of Problem Solving Definition (WP1–WP7).

Table 5.1: The Washington Accord Knowledge Profile has eight elements.

K1	K2	K3	K4	K5	K6	K7	K8
Natural Sciences	Mathematics	Engineering Fundamentals	Specialist Knowledge	Engineering Design	Engineering Practice	Comprehension	Research Literature

Complex engineering problems possess a range of attributes. Some or all of the following may be addressed in a professional engineering school program:

P1: For our project, we need to examine existing models with similar objectives (K8), gather data for machine learning predictions (K3, K4), understand the design of machine learning models (K3, K4), develop a web-based front end (K6), and integrate various components (K5, K6).

P2: Conflicting technical requirements: Building a machine learning model with low variance in the absence of primary data presents a challenge.

P3: The limited availability and variability of mental health patient data pose challenges in formulating a clear machine-learning problem. Additionally, the complexity of the analysis required makes it difficult to choose a specific algorithm from many alternatives.

P4: Computer science and engineering graduates usually lack exposure to mental health or depression issues, resulting in limited familiarity with such problems.

P5: We must need a permission from our patients to use their problems and solutions . We have to follow the ethical standards and government rules of our country.

P6: Stakeholders often harbor diverse thoughts and needs, which may occasionally conflict with one another. It's essential to navigate these differences and address conflicting requirements to ensure a balanced and satisfactory outcome for all involved parties

P7: Project involves a number of interdependent sub-systems (components), such as, appointment booking, payment system, organize counseling ,patient data collection, training module, doctor and assistant authentication, front-end application development, etc.

Table 5.2: Mapping with complex problem solving.

P1 Dept of Knowl- edge	P2 Range of Con- flicting Require- ments	P3 Depth of Analysis	P4 Familiarity of Issues	P5 Extent of Applicable Codes	P6 Extent of Stake- holder Involv- ement	P7 Inter- dependence
✓	✗	✗	✓	✗	✓	✓

5.4.2 Engineering Activities

The features of complex engineering tasks, some of which a skilled engineering student might be able to handle:

A1 (Range of Resources): The project needs to engage diverse resources including people, money, equipment, materials, information and technologies.

A2 (Level of interaction): Resolution of significant problems arises from addressing interactions between various technical, engineering, and other conflicting issues. Through iterative discussions among stakeholders, mental health professionals, and our team, effective solutions are achieved.

A3 (Innovation): A degree of innovation is needed to develop the machine-learning based Mental health prediction model using the Available patient data.

A4 (Consequences for society and the environment): The project helps the mental health people for getting a better platform . And our society aware about the mental health problems cause and solutions.

A5 (Familiarity): The project deals with a very crucial area of our society .For this project, people are more familiar with the mental health problems and can find the easy solution of that problems.

Table 5.3: Mapping with complex engineering activities.

A1 Range of re- sources	A2 Level of Interac- tion	A3 Innovation	A4 Consequences for society and environment	A5 Familiarity
×	×	√	√	√

5.5 Summary

In this chapter, we viewed various aspects of standards and design constraints in the context of developing a mental health problems and solutions system. We highlighted the importance of compliance with software, hardware, and communication standards to ensure the system's effectiveness and compatibility with existing systems. We also aimed design constraints, including economic, environmental, ethical, health and safety, social, political, and sustainability constraints, emphasizing the need to consider these factors

during development. Furthermore, we analyzed the costs to figure out how much it would take to build and run the system. We looked at different budget areas to see if it's financially possible and sustainable. Also, we talked about complex engineering problems and activities. We looked at things like how deeply we need to think about them, how well we know the issues, and how different parts depend on each other. We also considered new ideas and how they affect society and the environment. In summary, this chapter covered everything from standards and design limitations to analyzing costs and tackling complex engineering challenges in creating our Online mental health solutions platform.

Chapter 6

Conclusion

6.1 Summary

Bangladesh online mental health platform is a structured approach to making access to effective mental health services available for all citizens of Bangladesh. Indeed, this is one of the good platforms providing diverse features for admin, doctors, assistants, and patients, which contain security for appointments, online payment, and counseling. Assuring qualifications and credibility of each healthcare provider through certain verification processes and maintenance of compliance with regulations in keeping data private and maintaining ethical standards. The platform addresses the economic, environmental, social, and political constraints part of its striving for sustainability. This was focused on bringing improvement with community engagement and regulatory compliance that will enhance mental health outcomes and promote well-being in Bangladesh.

6.2 Limitation

The limitations are at the level of cultural stigma, diversity in languages, regulatory complexity, challenges in healthcare infrastructure, and technological constraints. Those from rural backgrounds, with poor levels of digital literacy, may be resistant to access due to limited internet penetration. Most importantly, the deep-seated social stigma could lead to users failing to approach the mental health issue, and foreign languages threaten to shut out those who do not speak Bengali. Conforming to complex regulations in health care and data privacy is an ongoing challenge. There can also be shortages of mental health professionals, including technological constraints that may limit effectiveness. These limitations are addressed in the paper through an inclusive promotion strategy, education, regulation conformance, and technology adaption.

6.3 Future Work

The future work involves optimization of access through mobile applications in the low-bandwidth areas of Bangladesh, extension of multilingual support, community outreach to decrease stigma. Other services to be integrated will be tel-medicine services, research in trends of mental health, and partnership with health organizations for better services and reach. AI diagnostics and virtual reality therapy are a few of the technological innovations that hold promise for advanced treatment options. Continuous improvement through users' feedback will make it responsive to evolving needs, hence promoting mental health awareness and accessibility across diverse communities in Bangladesh.

References

- [1] Simon D’alfonso, Olga Santesteban-Echarri, Simon Rice, Greg Wadley, Reeva Lederman, Christopher Miles, John Gleeson, and Mario Alvarez-Jimenez. Artificial intelligence-assisted online social therapy for youth mental health. *Frontiers in psychology*, 8:796, 2017.
- [2] Mohammad Didar Hossain, Helal Uddin Ahmed, Waziul Alam Chowdhury, Louis Wilhelmus Niessen, and Dewan Shamsul Alam. Mental disorders in bangladesh: a systematic review. *BMC psychiatry*, 14:1–8, 2014.
- [3] Lambros Lazuras and Anna Dokou. Mental health professionals’ acceptance of online counseling. *Technology in Society*, 44:10–14, 2016.
- [4] Reeva Lederman, Greg Wadley, John Gleeson, Sarah Bendall, and Mario Álvarez Jiménez. Moderated online social therapy: Designing and evaluating technology for mental health. *ACM Trans. Comput.-Hum. Interact.*, 21(1), February 2014.
- [5] Jia Liu, Qing Zhu, Wenliang Fan, Joyman Makamure, Chuansheng Zheng, and Jing Wang. Online mental health survey in a medical college in china during the covid-19 outbreak. *Frontiers in psychiatry*, 11:459, 2020.
- [6] Jarernsri Mitrpanont, Jaruwan Phandhu-Fung, Nantanut Klubdee, Supanat Ratanalaor, and Teeranan Mitrpanont. icare-stress: An integrated mental health software. In *2017 2nd International Conference on Information Technology (INCIT)*, pages 1–6. IEEE, 2017.
- [7] Jo Ann Oravec. Online counselling and the internet: Perspectives for mental health care supervision and education. *Journal of Mental Health*, 9(2):121–135, 2000.
- [8] Olugbenga Oti and Ian Pitt. Online mental health interventions designed for students in higher education: A user-centered perspective. *Internet Interventions*, 26:100468, 2021.
- [9] Zhiyu Ye, Wentian Li, and Ruizi Zhu. Online psychosocial interventions for improving mental health in people during the covid-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, 316:120–131, 2022.

- [10] Xiaoyun Zhou, Sisira Edirippulige, Xuejun Bai, and Matthew Bambling. Are online mental health interventions for youth effective? a systematic review. *Journal of Telemedicine and Telecare*, 27(10):638–666, 2021. PMID: 34726992.