MindCare Burundi

BSc. in Software Engineering

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i Declaration

I declare that this research project is my original work and has not been submitted elsewhere for academic or professional purposes.

ii Abstract

Mental health challenges in Burundi remain a critical public health issue, exacerbated by limited mental health infrastructure, stigma, and financial barriers. Psychological distress has been observed at high levels, particularly in post-conflict settings, with studies indicating that 44% of individuals experienced distress during the conflict and 29% continued to suffer two years after (PubMed, 2015). Additionally, with only 0.69 mental health workers per 100,000 people, professional assistance remains largely inaccessible, particularly in rural areas (WHO, 2020).

Burundian cultural beliefs influence mental health perceptions, often associating mental illness with supernatural or spiritual causes rather than medical conditions, which impacts help-seeking behaviors (SAGE Journals, 2017). Addressing these challenges requires an integrated approach that respects cultural sensitivities while promoting evidence-based mental health interventions.

This project proposes the development of MindCare Burundi, a web-based platform designed to provide accessible, anonymous, and culturally relevant mental health support. The platform will offer anonymous counseling, educational resources, self-assessment tools, and connections to local mental health services. With a mobile-first approach, it will ensure accessibility for both mobile and PC users, expanding its reach across various demographics.

The system will be developed using a three-tier architecture and follow an agile development methodology to ensure continuous user feedback and iterative improvement. Core technologies will include Django for backend development, PostgreSQL for database management, and HTML, CSS, and JavaScript for frontend implementation.

By leveraging digital solutions, MindCare Burundi aims to bridge the gap in mental health accessibility, reduce stigma, improve awareness, and connect individuals with essential support services. The anticipated impact includes enhanced mental health literacy, increased service accessibility, and a reduction in mental health-related stigma within Burundian communities.

iii Table of Contents

CHAPTER ONE: INTRODUCTION

1.1 Introduction and Background

Mental health challenges in Burundi are often underreported and stigmatized. Post-conflict trauma, depression, and anxiety are common, yet access to mental health services remains scarce. A study assessing symptoms of psychological distress found that distress was present in 44% of individuals during the conflict and in 29% two years after the conflict (PubMed, 2015). With only 0.69 mental health workers per 100,000 people, addressing these challenges requires innovative solutions (WHO, 2020). Traditional approaches to mental health care focus on in-person therapy, which excludes underserved populations in rural areas. By integrating software-based solutions, this project seeks to bridge this gap and provide accessible, anonymous, and culturally relevant mental health support.

Research highlights the importance of local perceptions of mental health in addressing the issue effectively. Many individuals attribute mental illness to spiritual causes, ancestral punishment, or supernatural influences rather than medical conditions (SAGE Journals, 2017). This belief system significantly affects help-seeking behavior, as people often turn to traditional healers instead of professional mental health services. MindCare Burundi aims to incorporate culturally sensitive approaches, including educational resources that align with local beliefs while promoting evidence-based mental health interventions.

1.2 Problem statement

Mental health issues in Burundi remain a critical public health concern, exacerbated by limited access to care, stigma, and a severe shortage of mental health professionals. Existing digital mental health platforms such as BetterHelp and Talkspace provide online therapy services but are not accessible to the Burundian population due to high subscription costs and a lack of localized mental health interventions. Additionally, a study found that psychological distress was present in 44% of individuals during the conflict and in 29% two years after the

conflict (PubMed, 2015). Burundi has only 0.69 mental health workers per 100,000 people, making professional assistance inaccessible to many, especially in rural areas (WHO, 2020).

This research project aims to develop MindCare Burundi, an online mental health platform offering affordable, culturally relevant, and anonymous support. The platform will be accessible via mobile devices, ensuring widespread usability in a country where smartphones are more common than specialized healthcare facilities. By bridging the accessibility gap, this solution will contribute to reducing stigma, improving awareness, and making mental health care more inclusive in Burundi.

1.3 Project's main objective

To develop a software platform that provides mental health support in Burundi, addressing the gaps in accessibility, affordability, and cultural relevance.

1.3.1 List of the specific objectives

1. To conduct a comprehensive study on mental health needs in Burundi by collecting and analyzing data from existing reports to identify key gaps in accessibility and awareness (WHO, 2018).
2. To develop a website offering counseling, anonymous chat, self-assessment tools, and educational resources.
3. To evaluate the platform's effectiveness based on user feedback, service reach, and stigma reduction metrics within six months of implementation.

1.4 Research questions

1. What are the primary mental health challenges faced by individuals in Burundi?
2. How can a digital platform address these challenges more effectively than traditional methods?

3. What features should the platform include to maximize accessibility and impact?

1.5 Project scope

The project will focus on urban and rural populations in Burundi, with an initial pilot in Bujumbura. Target users include individuals experiencing mental health challenges, their caregivers, and mental health professionals. The prototype will be tested with 10-20 users over two months. Participants will be recruited through local healthcare centers and social media campaigns to ensure diverse representation.

1.6 Significance and Justification

The platform will:

- Reduce stigma by normalizing discussions about mental health.
- Improve access to mental health services, especially for underserved populations.
- Empower individuals with tools and resources to manage their mental health.

One limitation of this study is the reliance on internet access, which may exclude individuals in remote areas. However, future iterations could explore offline functionalities.

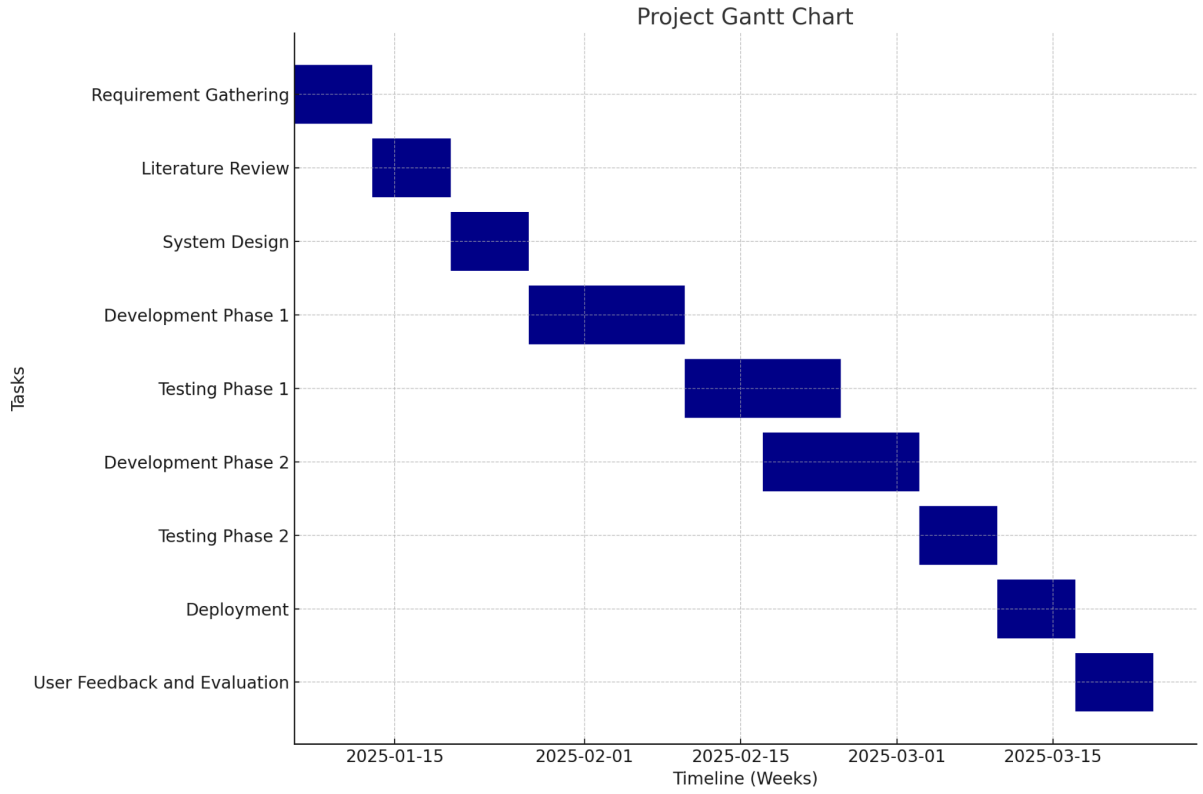
1.7 Research Budget

Item/Service	Description	Cost (USD)
Web Hosting Services	Hosting the platform on a secure server (AWS) for one year.	$120
Domain Registration	Registering a custom domain for the website.	$15

User Testing	Conducting testing with a sample group of users for feedback and debugging.	$100
Marketing and Awareness	Running awareness campaigns about the platform through social media and local events.	$150
Miscellaneous Costs	Additional unforeseen expenses.	$150
Total		$535

1.8 Research Timeline

The Gantt chart to present how different components of the project will be implemented with respect to time.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This literature review examines existing software-based mental health solutions, focusing on platforms that provide counseling, self-assessment tools, and educational resources to improve mental health accessibility in low-resource settings like Burundi. The review analyzes key digital mental health interventions in terms of their effectiveness, usability, and adaptability to different socio-economic and cultural contexts.

Studies suggest that mobile and web-based mental health platforms have significantly improved mental health awareness and access to care in underserved populations (WHO, 2018). Digital interventions such as AI-powered chatbots and teletherapy have played a role in reducing barriers related to stigma and accessibility. However, some challenges remain, including cultural adaptation, affordability, and user engagement in low-income regions (SAGE Journals, 2017).

Additionally, self-assessment tools have demonstrated potential for early mental health diagnosis, especially for individuals reluctant to seek in-person therapy. However, research emphasizes that such tools must be supplemented by human intervention to ensure reliability (WHO, 2020).

To develop an effective mental health platform in Burundi, it is crucial to understand the limitations of existing solutions and integrate culturally appropriate, accessible, and affordable digital interventions.

2.2 Historical Background of the Research Topic

Burundi's mental health challenges are deeply rooted in its history of conflict and its underdeveloped healthcare infrastructure. The aftermath of prolonged violence and displacement has led to high rates of trauma, depression, and anxiety. A 2008 study estimated that 40% of the general population experienced depression, and 62% experienced anxiety

(SAGE Journals, 2008). Furthermore, the United Nations High Commissioner for Refugees (UNHCR) reported that 20–30% of the population may suffer from Post-Traumatic Stress Disorder or trauma-related conditions, owing to the country's history of violence. Despite efforts by NGOs, mental health remains stigmatized, and awareness is limited, particularly in rural areas. The absence of a comprehensive mental health policy exacerbates the situation, leaving large segments of the population underserved.

2.3 Overview of Existing System

Several digital platforms have been developed to provide mental health support globally, focusing on counseling, therapy, and self-help resources. These platforms leverage technology to bridge geographical barriers, offering remote access to mental health professionals. However, many of these solutions are designed for high-income countries and may not effectively address the specific socio-economic and cultural needs of Burundi. Below are two widely used digital mental health platforms:

- **BetterHelp**:
  BetterHelp is one of the largest online therapy platforms, offering users access to licensed mental health professionals through text, voice, and video counseling. The platform allows individuals to schedule therapy sessions at their convenience, promoting flexibility in mental health care.
    - **Achievements:** Provides 24/7 access to therapy, ensures user anonymity, and enables remote counseling.
    - **Limitations:** High subscription costs, primarily English-language services, and a lack of culturally relevant therapy approaches make it unsuitable for Burundi's local needs.
- **Talkspace:**
  Talkspace offers asynchronous and live therapy sessions, allowing users to communicate with mental health professionals via messaging and scheduled video calls. It is designed to offer flexible and accessible therapy for individuals who may have difficulty attending in-person sessions.
    - **Achievements:** Offers structured therapy plans, employs certified mental health professionals, and enables unrestricted access to therapy.
    - **Limitations:** Like BetterHelp, it targets high-income countries, making subscription fees unaffordable for many Burundians. Additionally, it lacks

local language support and does not address unique mental health challenges, such as post-conflict trauma and stigma.

These platforms have successfully expanded access to mental health services globally, particularly in high-income regions. However, they remain largely inaccessible to Burundians due to financial constraints, language barriers, and the absence of localized mental health interventions. Addressing these barriers is crucial for designing MindCare Burundi, a platform that will provide culturally relevant, affordable, and locally accessible mental health support.

2.4 Review of Related Work

Existing literature on digital mental health tools highlights their effectiveness in offering mental health support, raising awareness, and facilitating self-assessment. However, these tools are often designed for high-income settings, making them less effective in low-resource environments like Burundi. Below is a review of key categories of digital mental health tools and their relevance:

1. Educational Platforms

Research underscores the significance of culturally adapted educational content in reducing stigma and increasing mental health awareness (WHO, 2018). Existing platforms such as Coursera and Udemy offer psychology-related courses, while mental health-focused platforms like Psychoeducation Apps provide structured learning.

However, these solutions are not well-suited for Burundi because:

- They are primarily in English, whereas Burundi's population speaks Kirundi and French.
- They fail to incorporate localized cultural beliefs and perspectives on mental health.
- Most platforms lack interactive community engagement, which is crucial in Burundian society.

2. Self-Assessment Tools

Studies show that interactive self-assessment tools encourage users to evaluate their mental health status and seek professional support (Doe & Jones, 2019). Examples include Moodpath, MindDoc, and NHS Mood Self-Assessment. These tools utilize:

- Questionnaires based on clinical diagnostic criteria to assess users' mental well-being.
- Personalized feedback and mental health recommendations based on user responses.

Despite their benefits, these tools face challenges in low-resource environments like Burundi:

- They rely on self-reported data, which is influenced by stigma in Burundian culture.
- They use medical terminology, making it difficult for low-literacy users to understand.
- They do not consider socioeconomic factors that limit mental health access in Burundi.

How MindCare Burundi Improves on Existing Solutions

Although these tools offer mental health support, they fail to address the specific needs of Burundians. MindCare Burundi enhances existing solutions by:

- **Localized Mental Health Content:** Unlike Western platforms, MindCare Burundi offers educational materials and self-assessments in Kirundi, French, and English, ensuring inclusivity.
- **Stigma-Free Anonymous Counseling:** MindCare Burundi provides a safe space for users to access professional counseling services anonymously, reducing fear of judgment.
- **Financial Accessibility:** Unlike BetterHelp and Talkspace, which require costly subscriptions, MindCare Burundi is free or low-cost, making mental health support more affordable.
- **Community Support & Local Integration:** The platform connects users to local mental health professionals, NGOs, and support groups, fostering a strong support system.

2.4.1 Summary of Reviewed Literature

The reviewed literature highlights the need for digital mental health solutions that are:

- Affordable and accessible.
- Localized to address specific cultural contexts.
- Focused on both education and support.

2.5 Strength and Weakness of the Existing System(s)

Strengths: Accessibility and scalability in high-income regions.

Weaknesses: High costs, limited cultural relevance, and lack of anonymity for rural users.

2.6 General comment and Conclusion

Existing systems provide valuable insights but fail to address the specific needs of underserved populations in low-income regions. This project aims to bridge these gaps by creating an affordable, culturally relevant, and accessible platform for mental health support in Burundi.

CHAPTER THREE: SYSTEM ANALYSIS AND DESIGN

3.1 Introduction

This chapter describes the methodologies and tools used to design and develop the MindCare platform. The design process follows a user-centered approach to ensure the platform meets the needs of users in Burundi. Agile development principles will be employed, enabling iterative development and continuous feedback integration. This ensures the platform evolves based on user input and addresses real-world mental health challenges effectively.

3.2 Research Design (including the development model used)

To ensure accessibility and inclusivity, a mobile-first development model will be adopted. This approach prioritizes the design and optimization of the platform for mobile devices, given the high prevalence of mobile internet usage in Burundi.

3.3 Functional and Non-functional Requirements

Use Case 1: User Authentication and Authorization

Actors: User, Administrator
Description: Allows users to securely register and log in with different roles for users and administrators.
Preconditions: The user must have an internet connection and a valid email.
Flow of Events:

1. The user accesses the login or registration page.
2. The system prompts the user to enter credentials (email & password).
3. The system verifies the credentials.
4. If valid, the user is granted access; otherwise, an error message is displayed.
   Postconditions: Users can securely access their accounts.

Use Case 2: Anonymous Counseling

Actors: User, Counselor
Description: Provides real-time chat with trained counselors while maintaining anonymity.

Preconditions: User must be logged in to access chat.
Flow of Events:

1. User selects "Start Chat" on the counseling section.
2. The system assigns a counselor.
3. User and counselor communicate via real-time chat.
4. When the session ends, the chat is deleted to maintain privacy.
   Postconditions: Users receive mental health support confidentially.

Use Case 3: Community Forum

Actors: User
Description: A moderated forum for users to share experiences.
Preconditions: The user must have an active account.
Flow of Events:

1. User accesses the forum section.
2. User creates a new discussion or replies to an existing post.
3. Moderators review posts to ensure compliance with community guidelines.
   Postconditions: Users can engage in peer support discussions.

Use Case 4: Self-Assessment Tools

Actors: User
Description: Users can assess their mental health using standardized screeners.
Preconditions: User must be logged in.
Flow of Events:

1. User selects a self-assessment tool (Depression, Anxiety, Stress).
2. The system presents a series of questions.
3. User completes the assessment.
4. The system provides immediate feedback with personalized recommendations.
   Postconditions: Users gain awareness of their mental health status.

Use Case 5: Educational Resources

Actors: User

Description: Provides access to informative content on mental health.

Preconditions: Users must access the platform.

Flow of Events:

1. User navigates to the "Resources" section.
2. User selects an article or video.
3. The system displays the content.
   Postconditions: Users gain knowledge on mental health topics.

Use Case 6: Appointment Scheduling

Actors: User, Mental Health Provider

Description: Users can book an appointment with local mental health professionals.

Preconditions: User must be logged in.

Flow of Events:

1. User selects "Book Appointment."
2. The system displays available time slots.
3. User selects a date and time.
4. The system confirms the appointment and notifies the provider.
   Postconditions: Users successfully book an appointment.

Use Case 7: Multi-Language Support

Actors: User

Description: The platform supports Kirundi, French, and English.

Preconditions: The user accesses the platform.

Flow of Events:

1. User selects the language option.
2. The system translates the interface to the selected language.
   Postconditions: Users access content in their preferred language.

Non-Functional Requirements

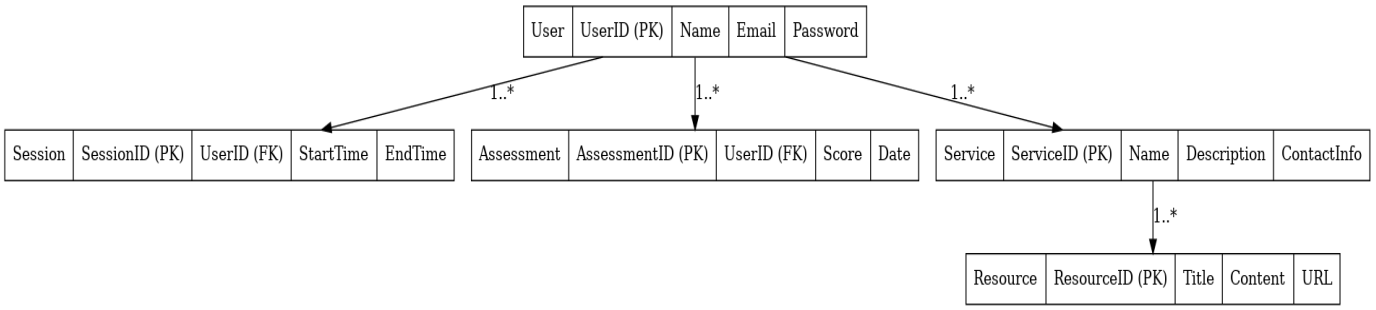
- Usability: The platform will be intuitive and user-friendly for users with varying levels of technological literacy.
- Maintainability: The system will be easy to update and maintain over time.
- Scalability: The platform should handle increasing numbers of users without performance issues.
- Security: User data, including chat history and assessment results, will be encrypted for confidentiality.

3.4 System Architecture

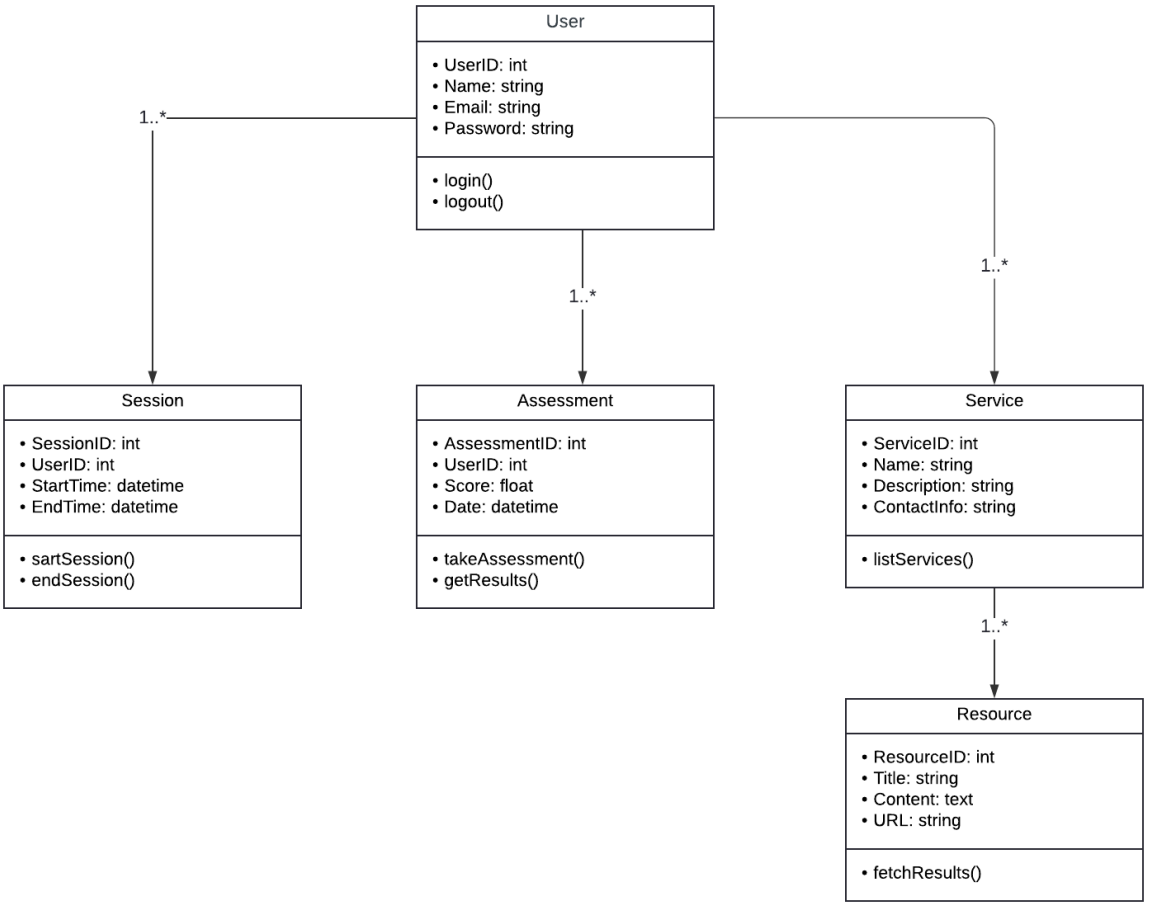
The system will use a three-tier architecture, including a frontend (HTML, CSS and Javascript), backend (django), and database (PostgreSQL).

3.5 UML Diagrams

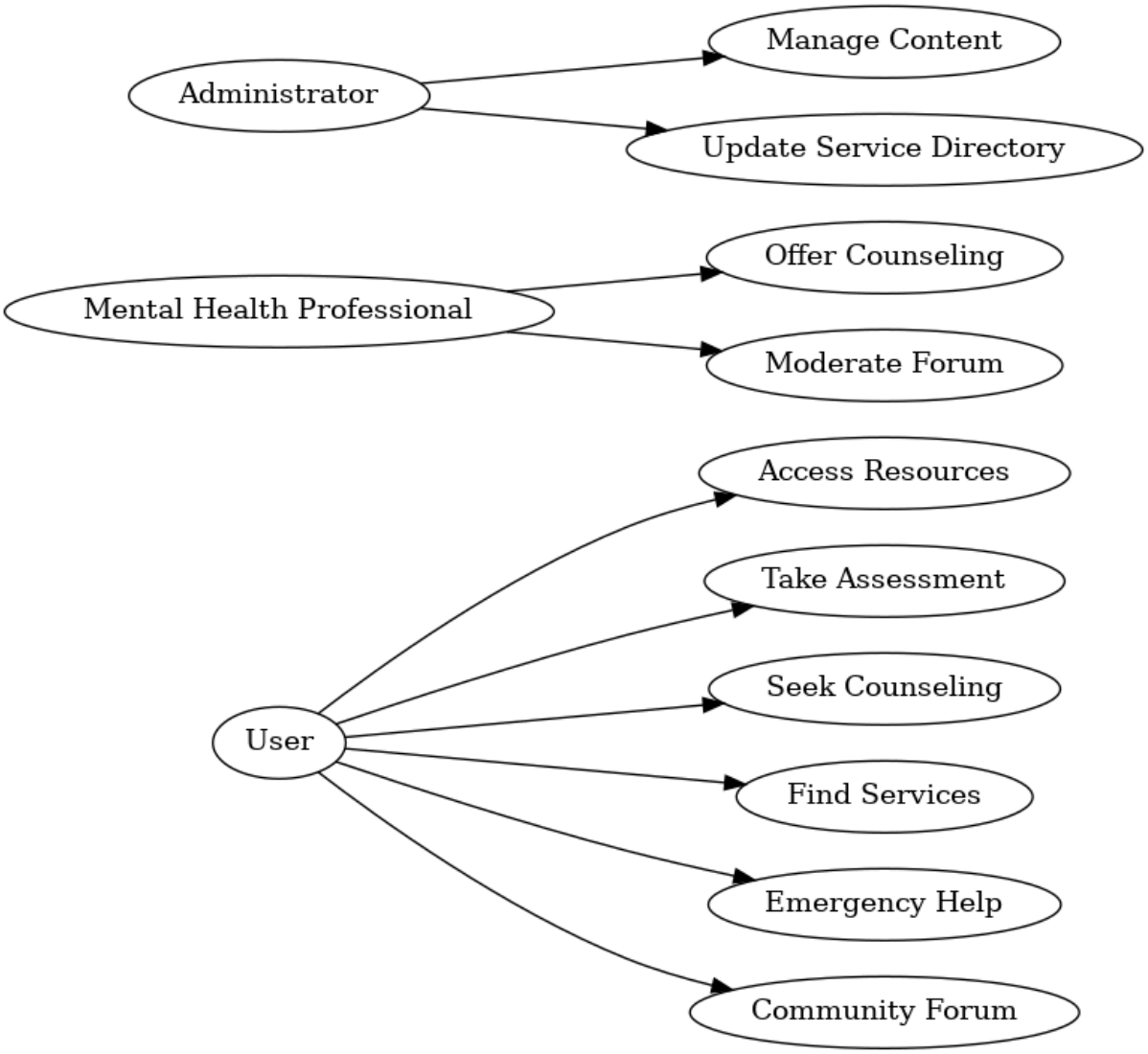
ERD diagram.



Class Diagram



Use Case Diagram



3.6 Development Tools

Front End: HTML, CSS and Javascript

Backend: Django

Database: PostgreSQL

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