POLITECNICO DI TORINO

Master's Degree in Computer Engineering

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Design and Implementation of the UX UI for a Caregiver Service

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Summary

This thesis presents the UX/UI redesign of a caregiver portal for Badacare, a company providing caregiving services for patients, established almost four years ago. The primary objective of this project is to enhance the efficiency and effectiveness of matching caregivers to patients, ensuring rapid connections based on individual needs. Additionally, the redesign includes various status updates to reflect the stages of the hiring process for all involved parties. The project began with comprehensive research and competitive analysis of existing matching portals, along with interviews with recruiter teams to understand their specific goals and challenges. The identified goals are to design a portal that expedites the caregiver-patient matching process, implement real-time status updates for clear visibility, and develop a system to manage and prioritize different types of requests, thereby improving operational efficiency. To address these goals, the redesigned portal features a specialized recruiter dashboard for easy access to necessary steps and tasks, an integrated notification system for prompt updates about the latest customer information, and a breadcrumb navigation design to aid user navigation and comprehension. Specific colors were chosen to enhance visual recognition and categorization, facilitating quicker identification of relevant information. Additionally, advanced filter options were incorporated to allow recruiters to refine their searches efficiently. Usability testing and iterative design improvements ensured that the final product meets user needs and enhances the overall user experience. The results indicate significant improvements in the speed and accuracy of the caregiver-patient matching process, as well as increased satisfaction among recruiters. This thesis underscores the importance of user-centered design in developing effective digital tools for the healthcare sector, providing a blueprint for future UX/UI design projects aimed at optimizing operational efficiency and user engagement. Future developments will explore the integration of AI to further enhance the matching process.

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Acronyms

AI

Artificial Intelligence

Chapter 1

Introduction

1.1 Project overview

Computer User Centred Design or User-Centred Design (UCD)

Figure 1.1: UCD method steps

1.2 Problem Statement

Finding the right caregiver for a patient is a process full of challenges that can slow down care and effect its quality. Most of this is done manually right now; recruiters check caregiver credentials and patient needs before matching. While this approach has been the standard, it comes with several drawbacks. One of the biggest issues is the amount of time it takes—without an automated system, the matching process can be slow and inefficient, delaying the care that patients desperately need. In situations where immediate attention is necessary, these delays can exacerbate a patient's condition.

Lack of real-time tracking is another big problem. Everything is hard to keep up to date by hand because caregiver access, patient needs, and medical conditions

are all always changing. Mismatches, last-minute cancellals or missed chances to offer care can follow from this? Without a system in place to track these factors effectively, recruiters often struggle to keep up, making the entire process less reliable and prone to errors.

The errors in pairing caregivers with patients not only delay care, they also lose companies money. Recruiters spend many hours going over patient needs, checking caregiver qualifications, and making sure workers are available with the present system, which is manual. It's possible they can only match four or five caregivers per day because of it. This slows things down and limits the number of people who can be taken care of. An automated system, on the other hand, would be able to do these things much faster and get through as many as 20 matches in an hour. Companies would be able to serve more customers without hiring more people or spending more on operations, and they would also be able to cut costs and make better use of their resources [1].

By relying on manual record-keeping in the caregiver matching process, the likelihood of errors is increased, further complicating an already intricate task. Mismatches that detract from the quality of care can occur when critical information, such as patient medical histories or caregiver qualifications, is neglected or becomes obsolete. When a caregiver isn't the best fit for a patient, both of them may become frustrated, satisfaction levels may drop, and even there could be some health hazards. There is a chance of making mistakes when these tasks are done by hand, and it takes too much time and effort to do the paperwork instead of caring for patients. Instead of enhancing the whole caring experience, recruiters and managers are compelled to concentrate on record organizing and scheduling coordination. Without automation, important resources meant to improve patient care are instead locked up in repeated administrative tasks, so undermining the process for all those engaged [2].

1.3 Goals of the Project

The project's main goal is to make the Badacare portal more efficient, easy to use, and intuitive.

1.AI-powered matching system:

One of the most important changes is the addition of an AI-powered matching system that will speed up and simplify the process of matching caregivers with patients. Instead of relying on manual searches, the system will use machine learning to look at caregiver qualifications, patient needs, and preferences to find a better match for both parties. This will save time, cut down on mistakes, and help patients get the care they need much faster. The AI will also keep getting better by learning from previous interactions, making its suggestions even more accurate and

useful. This helps patients and caregivers, and it frees up healthcare providers to focus on providing high-quality care instead of spending hours managing logistics. [3].

2.Enhance Status Visibility:

Ensure the portal specifies clear status updates at each stage of the matching process, providing recruiters with real-time information on matching progress. This feature will allow recruiters to easily track the availability and engagement levels of both caregivers and patients, ensuring transparency and efficiency. By having access to up-to-the-minute status updates, recruiters can quickly identify and resolve any issues that may arise, preventing delays in service delivery. Furthermore, this visibility will enable better communication and coordination among all parties involved, fostering a more seamless and responsive matching process. [4].

3. Implement Request Management System:

The caregiving services become precise and easier with the complete request management system due to its ability to categorize requests into different levels of priorities. The system has an automatic triage of requests meaning it organizes them in terms of the steam's urgency and importance to the services it provides. The system permits immediate prioritization and addressing of critical cases that need urgent attention. It also minimizes manual workloads while ensuring that critical assistance like medical aid, for example, receives immediate care as it is needed.

In addition, realtime tracking and reporting is enables system administrators to monitor and check for progress on requests while also checking for delays and optimally utilizing resources. Having a smooth and effective operations is made possible by having a bird's eye view of incoming requests. Resolving such issues within a specified timeline is made possible by this method.

This method enhances communication between the caregivers, patients, and other staff involved in the service to expedite the completion of tasks. The alert and auto updates allow all users to know what the status of the requests is at all time and helps to minimize the chances of misunderstanding and delays in service. The quality of care provided will improve as the speed and efficiency of services will improve using this approach. [5].

1.4 Objectives of the Study

The Badacare portal serves as a bridge between patients in need of caregiving services and suitable professionals. Nonetheless, the current structure has certain inefficiencies like the caregiver-patient matching process which does not always consider the preferences, availability, and requirements of both parties. These inefficiencies can bring about delays, mismatches, and dissatisfaction to both the

patients and caregivers.

In an attempt to resolve the above issues, this thesis undertakes a comprehensive study of the existing platform by integrating user responses and feedback, along with best practices from the industry to develop a scope of work.To make caregiving outcomes more effective, the goal of these improvements is to fully automate the skills matching process and update users regarding caregiver availability in real-time, while also incorporating more user interactions to improve overall satisfaction and responsiveness.[6].

1.5 The process

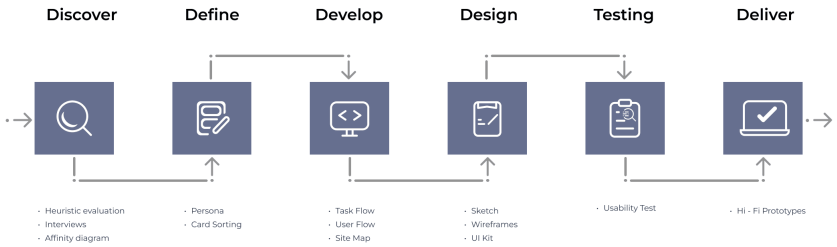

Figure 1.2: Design process

The Double Diamond Design process, based on the Design Thinking Methodology was employed to guide the project through the stages of discovery, definition, development, and delivery. This iterative approach served as a design roadmap, facilitating effective reflection and refinement of ideas. By leveraging the non-linear nature of the Double Diamond framework, the creative process was significantly enhanced, driving innovative solutions.

1.6 Scope and Limitations

The Badacare portal is one of the platforms that connects patients in need of care with trained caregivers. The system is not, however, highly effective in matching patients with the right caregivers based on their unique needs, preferences, and availability at the moment. This causes undue delays and suboptimal experience for both patients and caregivers.

To remedy these issues, this thesis undertakes a detailed analysis of the existing system, such as user input and examining potential improvements. The aim is to redesign the portal with an emphasis on an improved caregiver selection process, one

that better matches caregivers with patients, improves accessibility, and increases overall user satisfaction. The proposed redesign seeks to streamline procedures, reduce time spent on manual matching, and offer a more user-friendly experience, and ultimately improve the overall care-giving service.

1.7 Organization of the Thesis

This foreword provides the context for subsequent chapters, which will examine the research process, design and application, results and findings, and discussions on implications and the future direction of this project. With this project, we hope to make a meaningful contribution to the improvement of caregiver service platforms, which will increase the quality of care provision and improve the overall healthcare experience for both patients and caregivers [7].

Chapter 2

Literature Review

2.1 Overview of Caregiver Services

Always staying up to date with patient advances can be a herculean task, especially when older individuals, people with disabilities or those suffering from chronic illnesses require assistance. These professionals strive to help with daily chores, social interaction, medications, and any other day-to-day activities that may also require monitoring. The population is becoming more and more elderly and suffering from chronic ailments, which has led to an increased demand for caregiver assistance over the years. Additionally, many people prefer "aging-in-place" rather than going to overwhelming establishments, making the task of caregiving easier and instilling more comfort. This has only further increased the necessity for dependable caregiver services, catering to an assortment of patients' needs at home.

Caregiver services aid a patient's care in multiple ways besides just focusing on the immediate attention of the patient. An all-inclusive caregiving strategy has the potential to increase the mental and emotional health of the patients as well as their family members. Caregivers usually develop strong attachments with the patients under their care and offer them companionship and emotional support to enhance their life. Moreover, such services support the patients' self-sufficiency and respect, contributing to their self-esteem and further stability [8].

A multitude of studies emphasize the role of caregiver support in improving patient outcomes and overall quality of life. Schulz and Sherwood (2008) showed that caregivers endure considerable physical, emotional and financial stress which leads to a state of exhaustion and anxiety. This research points to the necessity for solid support systems and suggests that caregiver's psychological health should be focal to guarantee long-term caregiving. Further, some studies have found that caregiver stress and burnout can negatively affect not only the caregiver, but also the recipients of care. Higher levels of caregiver stress have been associated with

poorer health of both caregivers and recipients, including higher prevalence of depression, anxiety, and chronic illnesses. The impact of caregiver stress highlights the need to relieve such burdens by training, providing resources, and giving respite care (Zarit et al., 1980; Pinquart and Sörensen, 2003). Alleviating caregiver burnout with such methods is essential to achieving enduring success in caregiving service delivery and improving patient care and related health outcomes [9].

2.2 User Experience (UX) and User Interface (UI) Design Principles

Having strong principles of User Experience (UX) and User Interface (UI) design is extremely useful for developing websites and applications. The focus of UX design is on empathy and involves spending a great deal of time studying the users' needs, behaviors, and preferences in order to ensure that working with technology is as effortless and enjoyable as possible. In contrast, UI design is focused on the more technical aspects, such as the layout, typography, colors, and even the interface's navigation features.

According to modern research, it is essential to incorporate user-centered experience design, where the interface is designed to predict and cater to user demands and anticipations. Nielson and Molich 1990 declared the foundation of Usability Heuristics, referring to the people's general principles of judging and improving a user interface. The list includes visibility of system status, match between system and the real world, user control and freedom, consistency and standars, error prevention, recognition rather than recall, flexibility, and efficiency of use, aesthetic and minimalist design, help users recognize, diagnose, and recover from errors, help, and documentation. [10].

2.3 Existing Platforms and Their Limitations

Despite the growing demand for caregiver services, as well as the multisectoral development of digital technologies, the majority of caregiver platforms were still highly limited. The platforms provide suboptimal user experiences due to a myriad of issues like limited search functionality, lack of personalization features, and unclear usability. For example, both patients and caregivers can experience challenges in locating appropriate matches within their personal needs, preferences, or schedules. Smith and Clements (2012) discuss such phenomena as "not finding things can be just as frustrating, if not more so, than finding the wrong things," and reveal the issue caused by the lack of searching and filtering capabilities. Further, communication within these platforms, or among caregivers, patients, and family members, tends to be poor which results in many waiting for responses longer than

necessary. In addition, the lack of adequate technical support for scheduling and payment processing also makes caregiving more difficult for users.

Aside from functionality challenges, other studies have pointed out concerning inequalities in access to caregiver services. Disadvantaged populations such as low income and ethnic groups plus those from rural localities continue to be underserved in terms of access to appropriate caregiving help. As per Hayden and Wolff, these gaps have been visible since mid 1990s.

Even with the positive advancements in caregiver platforms, there is still much to be done in terms of fulfilling user experience and user needs. These current platforms are unable to meet the user's expectations when it comes to building self operated and practical personalized interfaces. This literature review describes the most important issues and the most significant gaps of the offered caregiver services which is needed to create further parts that will be devoted to designing and deploying UX and UI redesigns of Badacare portal for the caregiving services.

The redesigned platform intends to enhance the overall caregiving experience for both patients and caregivers by improving the matching process, communication and service accessibility to ensure equal treatment of everyone [11].

Chapter 3

Research Methodology

3.1 Quantitative Research Methods

The mix-method technique was adopted to both capture the user needs and expectations as well as service challenges within caregiver services alongside their quantitatively measurable aspects. So as to provide adequate context towards the redesign of the Badacare portal, this approach would ensure that all facets of the present caregiver platform realm are captured, thus facilitating a balanced approach. Statistical information was gathered using structured questionnaires given to patients, caregivers, and hiring managers. These questionnaires were designed to obtain relevant information about their issues and preferences in such a manner that would enable statistical examination of caregiver services utilization patterns. Some of the issues explored in the survey included; user friendliness of existing platforms, how often users seek caregivers, user satisfaction levels with currently available digital solutions, and significant problems encountered by users.

On the other hand, qualitative information was obtained from focus groups and semi-structured interviews. Such methods made it possible to explore deeply the participants' views, emotions, and experiences, which were beyond the scope of survey-based approaches. The interviews allowed participants to elaborate on their frustrations, expectations, and features they wished to be incorporated into a caregiver-matching interface.

The focus groups allowed participation of various stakeholders, such as hiring managers, patients, and caregivers, and allowed sharing of several perspectives along with collaborative problem-solving suggestions.

To ensure confidence in the validity and reliability of the findings, interviews and focus groups were conducted with a varied subset of carefully selected participants representing various demographics, care needs, and digital literacy levels. In this manner, an overall picture of various user groups' needs and expectations was

obtained. Data triangulation was also employed by cross-referencing survey data with interview findings to identify emerging themes and validate main findings.

Data gathered was then analyzed in a systematic manner using statistical analysis for quantitative data and thematic coding for qualitative data. The patterns and correlations were determined to bring out the most salient issues for the users and most urgent areas of improvement in caregiver-matching services. The findings of this research work provided a solid basis for the next UX/UI improvement phases in the Badacare portal so that the redesign is directly targeted at actual users' needs and interests.[12].

The primary objectives of the interviews were to:

- Understand the filter options required for effectively matching caregivers and patients, such as city, gender, start time, and other specific needs.
- Identify the criteria for finding the best caregiver for patients based on individual needs.
- Ensure that the matching process is as fast and efficient as possible. Determine the preferred methods for categorizing notifications by type, such as emails, WhatsApp, and forms.

3.2 Qualitative Research Methods

Heuristic evaluation is a well-known usability inspection technique in which evaluators, usually User Experience design experts, review a user interface in the light of a pre-established list of usability principles, or heuristics. Heuristics, usually developed from User-Centered Design principles and extensive usability guidelines, provide a standard by which various components of an interface are evaluated. Some of the typical heuristics are visibility of system status, user control and freedom, consistency, prevention of errors, and consistency between system and the real world.

The major aim of heuristic evaluation is to reveal possible usability problems early in the design process, much earlier than the interface is near the end of development. By finding problems early, designers can fix them before they are difficult and expensive to repair. The method uses several evaluators who examine the interface independently versus the heuristics, and the results are compiled to rank the issues by severity and effect on the user experience.

Heuristic evaluation is similarly an economical and effective approach since it requires fewer resources compared to large-scale user testing. Heuristic evaluation provides the ability for rapid feedback and iterative design. Nevertheless, while heuristic evaluations can be very good at finding most common usability issues,

they are meant to augment, not replace, user testing.They can be used as a complementary approach. Heuristic evaluations and empirical user testing, when combined, provide a more complete strategy for making an interface usable and user-friendly in theory and in reality.

By indicating basic principles of usability, heuristic evaluation aims to enhance the general quality of user interfaces and helps to develop intuitive digital products that fulfill user expectations and needs. [13].

The heuristic evaluation identified several critical usability issues within the interface design. These included:

- Lack of clarity in progression
- Overload of information without categorization
- Unorganized visual design
- Shortage of information to match
- No obvious entry in navigation

Solutions for identified usability issues:

- Create a recruiter-focused dashboard that is highly accessible to required steps and tasks.
- Incorporate an Orivo design element to alert users immediately of the newest customer information, providing timely updates.
- Employ a breadcrumb design pattern to give self-explanatory information regarding the steps involved, enabling user navigation and comprehension.
- Defined some colors to allow for easy visual groupings and identification, enabling simpler recognition of pertinent information.
- Provide filter options based on the requirements of the recruiters, so that they can open straight away and filter their search for needed options or information.

Chapter 4

Data Analysis Procedures

4.1 Affinity Diagram

Affinity diagram proved a useful qualitative research tool, organizing and making sense of voluminous interview information through gathering same or similar data under theme-driven categories. Affinity diagram aided to present evident stark visual expressions of salient concepts and occurring ideas in caregiving services as well as allow the researchers to discern patterns and links between responders. Using the data clustering into similarities, affinity diagram facilitated systematic study of the qualitative findings in order to provide raw data to be interpretable information. Through this, the researchers were capable of gathering such common problems and opportunities that came forth from participants as the urgency of timely care provider-patient matching, need for open communications during the whole process, and need for specialty-specific care provision according to specified patient needs.

One of the most beneficial uses of implementing the affinity diagram was that it was able to synthesize and deal with gigantic amounts of qualitative data. The diagram was a great instrument employed to slice the information into small chunks in order to make analysis and interpretation less complicated. Consequently, the research team would then be able to identify and prioritize the key issues, to inform the construction of a caregiver-patient matching system that can tackle them. Organizing the findings in such a manner also served to foreground specific areas of interest, whereby every participant had their voice heard and their experience represented fairly throughout the design process.

Also, the process of affinity diagram established a foundation for future research. The thematic clusters not only caught up with the current findings but also defined areas requiring more detailed research. The model will assist in the direction of future studies and the design of the caregiver matching system as more information

are collected to continue improving the platform based on feedback. In essence, the affinity diagram ensured that the research process was optimized, and the results were more precise, original, and representative, thus advancing towards the development of a quality caregiving solution[14].

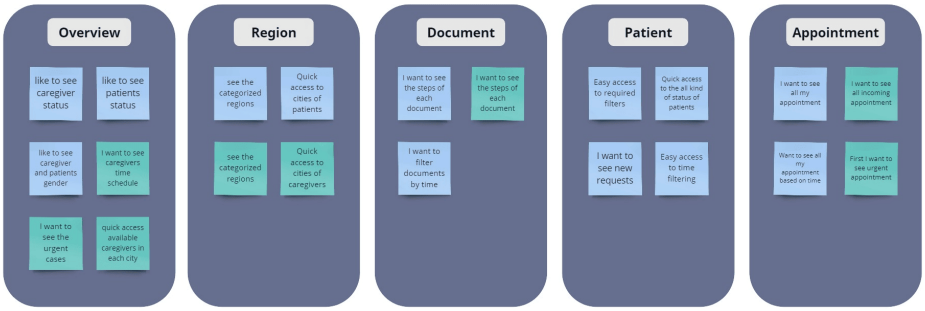

Figure 4.1: Affinity diagram

Quantitative information collected from interviews and surveys was subjected to statistical software to uncover patterns, trends, and correlations among the variables. Descriptive statistics, such as frequencies, means, and standard deviations, were computed to offer summaries of the survey responses. Inferential statistics, such as chi-square tests and correlation analysis, were applied to examine relationships among variables and hypotheses.

Qualitative information collected throughout the focus group and interview responses was tape-recorded and subjected to the thematic analysis guidelines. Data classification and coding were carried out to roll out typical themes, patterns, and outcomes from that which has been stated by the interviewees. An affinity diagram approach was taken to categorize and synthesize this qualitative data, which placed similar ideas and themes into different categories to arrive at key findings. This helped to identify key issues and areas of improvement for the caregiver service platform[15].

Constant comparative analysis was employed to ensure rigor and credibility in the process of analyzing the qualitative data. Processes of data analysis were iterative and systematic, and multiple steps were undertaken to lend validity and reliability to the findings. Data source and method triangulation were employed to give depth and exhaustiveness to the analysis. The integration of quantitative and qualitative findings allowed for an in-depth understanding of user needs and aspirations for caregiver services, informing the design and development of UX/UI enhancements for the Badacare portal.

4.2 Personas

Personas were developed based on findings from aggregated interviews and heuristic reviews in order to represent unique user profiles in the context of care services. Each persona represented prevalent user behavior, goal, preference, and pain points achieved through research. By encompassing these, personas provided real-world representation of different user visions, enabling an understanding of user needs and informing decision-making in regard to design with a focus towards enhancing user experience. This approach enabled caregiver service platforms to be modified to be able to meet the varied needs and expectations of various types of users effectively.
Two personas were created for this project: caregiver recruiter and patient recruiter,through the use of these personas,UX/UI design and development of enhancements to the Badacare portal was guided by a deep understanding of the discrete needs and expectations of each of the user segments. This allowed the site to be able to deliver a more intuitive, effective, and rewarding user experience, ultimately driving overall caregiver service quality.

Figure 4.2: Persona

Figure 4.3: Persona

4.3 Card sorting

Card sorting is a common usability method that enables designers to sort information based on user needs and mental models. Users categorize content cards, pieces of individual information or functionality, into meaningful categories for them. The method is used to uncover how users instinctively classify and conceptualize information and offers ensuing patterns and priorities hard to understand with other research methods. Understanding how people categorize things, designers receive an insight into their minds and are able to design interfaces closer to user expectation.

This technique proves particularly useful for caregiver service websites, in which consumers would be looking for certain information, such as caregiver details, services provided, or fees. Card sorting may assist designers in understanding how the users expect they can navigate such sites, and this can directly translate into creating simple navigation systems. The results of card sorting exercises may detect disorientation or ineffectiveness in structuring information so that the user can access what they need more effectively.

Moreover, card sorting promotes user-centric design since it involves the users themselves as active stakeholders in determining how information must be organized and classified. Such a user-led process minimizes cognitive load required for platform interaction as well as restricts the possibility of frustration due to messy content. Lastly, through the incorporation of card sorting results, designers are able to create improved, more streamlined, and wonderful experiences for their users [16].

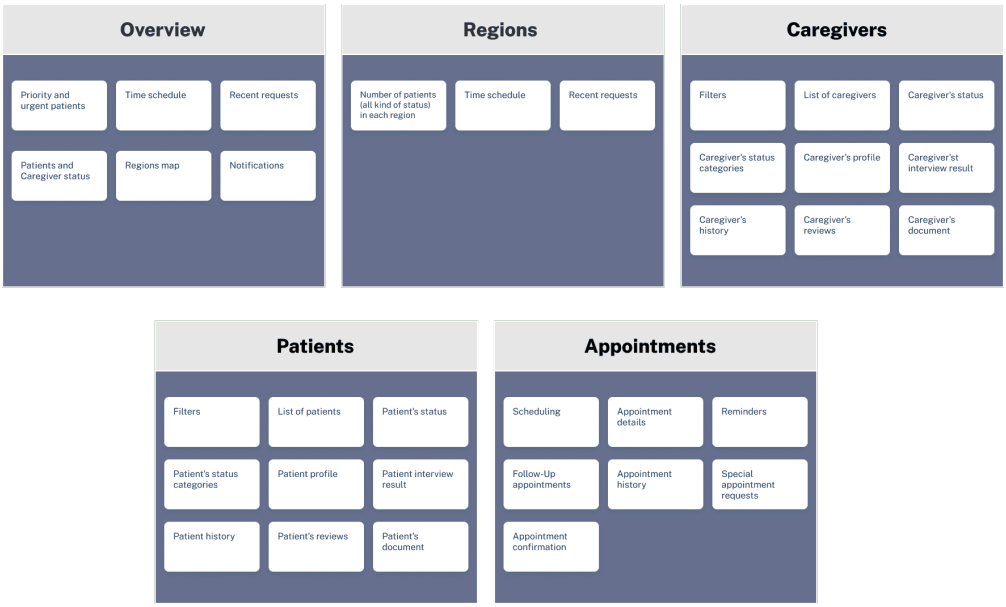

Figure 4.4: Card sorting

4.4 Site Map

Site map is a crucial aspect of the design of caregiver service platforms as a visual display of the general arrangement and organization of the whole platform. Created based on the information gathered from heuristic analysis, interview, and other research activities with the users, the site map is a navigation aid that indicates the interconnectedness of the different sections, features, and content. By providing a holistic, bird's-eye perspective of the platform's structure, the site map allows stakeholders to visualize how the various elements relate to one another, which is essential to understanding the user path and identifying areas of potential design challenge.

One of the primary benefits of a site map is its ability to differentiate the information hierarchy and user flow. It assists designers and researchers in measuring the usability of the users as they move through the platform, and determining areas where the users get stuck in navigation or understanding. Having the user paths mapped, the designers can foresee pitfalls like redundant pages, complicated navigation, or unnecessary steps to make sure that the users can navigate smoothly through the platform. This comprehensive map of the architecture of the platform allows for a thorough analysis of the user experience, simplifying processes and reducing cognitive load[17].

Site map is one other significant utility in the usability testing of the site. It can be used to review the content structuring and where restructuring or

further emphasis is needed. In understanding this, designers are able to make content structuring and presentation simpler in meeting users' requirements and expectations. Secondly, the site map is also very important in giving clarity to the inter-relation of various sections and pages, giving information about how content can be organized in such a manner that will enhance the understanding of the user as well as efficiency. For instance, it can indicate redundancies that are not necessary and can be removed, thus cutting down user frustration as well as enhancing the user interface design.

By creating a visual representation of the structure of the platform, the site map is central to the iterative design process. Not only does it assist in identifying areas for improvement but also informs strategic decisions to make the platform more usable and to deliver a seamless, intuitive user experience. As a visual tool, it allows for the explanation of the platform's design to the stakeholders in a project to enable collaboration and all the people who work on the project comprehend the vision of the design. This then inspires well-informed decision-making and ensures that every stage of the design process is executed efficiently[18].

Lastly, the site map serves as a launching pad for optimizing caregiver service platforms in a way that more accessible, efficient, and user-friendly systems are developed to meet the needs of caregivers and patients. It is a dynamic tool allowing constant design adjustments, making it a gem in designing a user-friendly and functional platform.

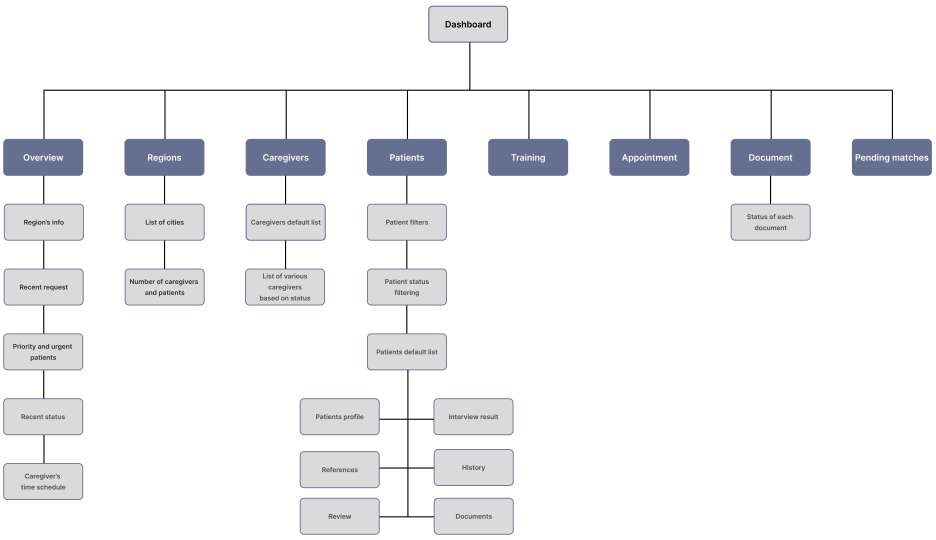

Figure 4.5: Site map

Chapter 5

Design and Implementation

5.1 User flow and task flow

To ensure the user flow design project goal-oriented and persona-driven, a systematic and rational process was established to simplify the recruitment process. The flow considers the most critical things recruiters have to do and incorporates them into a seamless process, where every decision point is simple and straightforward. This not only guides the recruiters in their activity but also reduces the likelihood of delay and mistake, thereby becoming a more efficient and effective process of caregiver-patient matching.

The user journey begins right from the first login to the system by the recruiter and is welcomed to a user-friendly dashboard. The dashboard is an information source point, providing recruiters with an overview of their outstanding tasks, recent activity, updates or notifications. This interface is designed to keep all of the information that is available in one place, reducing the amount of screen switching that recruiters have to do and allowing them to view the most important information at the same time.

As part of recruiting the caregivers, recruiters have a detailed process where they input patient-specific requirements like health conditions, needed skills, language, and schedule. They have also advanced filtering where they are able to query by caregiver's experience, licensure, and location so as to pick out only the right candidates. The website has profiles of caregivers with all the relevant details such as qualifications, past reviews, and work history so that recruiters can compare fairly before proceeding with the recruitment process.

In addition, inbuilt communication tools make it easy to interact with recruiters and caregivers, with easy interview scheduling, contract signing, and scheduling without any hassle. With enhanced structuring of search results and selection, the site makes the process more efficient and ensures that patients are matched with

the best possible care. The structured format makes recruitment not only easy but also brings transparency and credibility into the process of caregiver selection [19].

Caregiver profiles have detailed information such as qualifications, number of years of working experience, certification, and ratings by the former employer or patient. This enables the recruiters to make the optimal decisions based on the entire range of a caregiver's skills and past experience. User flow allows the recruiters to narrow down their search by adding extra filters or even sorting, thus making it easier for them to filter the applicant pool to reach the best candidate.

After the recruiters spot the appropriate caregivers, they are able to conveniently reach them through the messaging feature of the platform.This allows for easy communication and ensures quick response. The site also allows for easy scheduling of an interview or test session by the two parties agreeing on convenient times such that scheduling conflict is prevented.

Overall, the user flow streamlines the recruiting process so that it can be achieved quicker and with reduced effort. With better communication and scheduling, it allows recruiters to make better decisions, reducing manual effort process, and enhancing overall user experience[20].

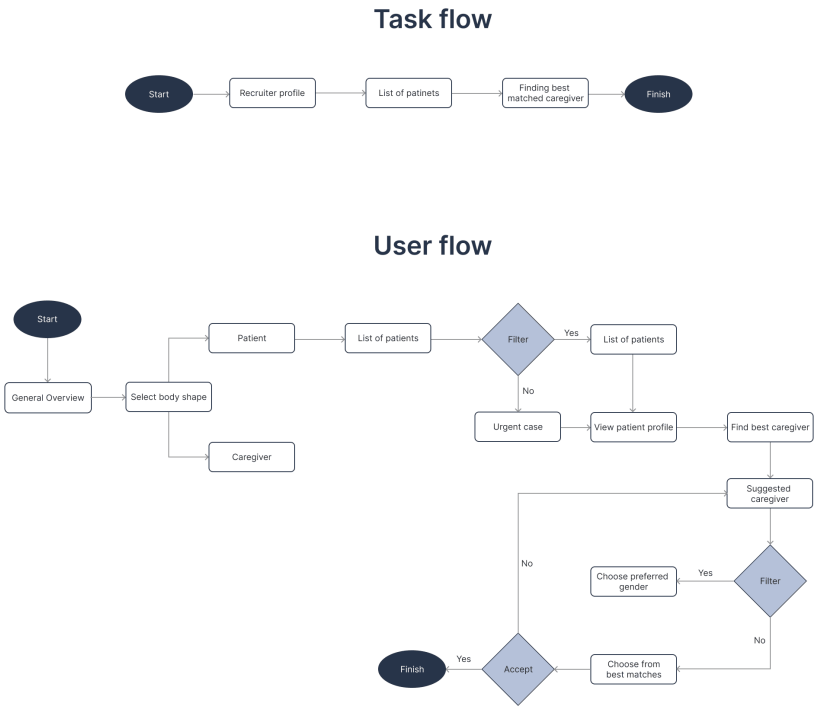

Figure 5.1: User flow and Task flow

5.2 Sketch

Once they locate the caregivers that they require, the recruiters can engage in discussion via the messaging option on the platform. The option allows the recruiters to question, address issues, and discuss working conditions with caregivers in a face-to-face manner. The platform also includes reminders that inform both parties that there is a message, such that they respond accordingly and timely. Recruiters are able to view the caregiver's profiles, verify prior employer ratings and reviews, and compare applicants before selecting someone.

To further streamline the recruitment process, the platform also offers scheduling features that allow recruiters and caregivers to schedule interview sessions. This eliminates scheduling conflicts and allows both parties to agree on a convenient time. By automating some of the most critical stages in the recruitment process, the platform minimizes manual effort and allows recruiters to focus on selecting

the most appropriate candidate. Lastly, user experience facilitates effectiveness through the offer of a smooth and seamless experience with better recruitment outcomes and increased caregiver-patient matching[21].

Sketching allowed designers to visually represent and share ideas and was simple to coordinate and polish amongst team members. By being graphical, sketching covered up communication gaps that existed amongst team members, and it was simple to criticize and understand ideas amongst team members. The informal nature of sketches encouraged open discussion and criticism, and it provided a favorable environment for creativity where ideas could be shared freely and developed. These coarse wireframes helped to establish fundamental interface layouts, essential functionalities, and initial user flows before making more polished design commitments. By laying out the underlying elements and their relationships in advance, the design team could flush out trouble spots and improvement areas. This initial effort played a crucial role in developing a solid foundation for the platform's design, upon which subsequent development phases were built on well-conceived concepts.

Figure 5.2: Sketch

5.3 Mid-Fidelity Prototype

The Mid-Fidelity prototype was created as part of the design process necessary to be able to see the overall structure and functionality of the caregiver service platform quickly. The prototype was kept simple, using basic materials or digital assets that highlighted the primary features, organization, and navigation of the platform.The simplicity of the Mid-Fidelity prototype gave the design team a chance to concentrate on checking user flows and necessary interactions rather than being distracted by sophisticated visual design details. Without eliminating those extra design elements, simplifying the design as much as possible, the design team was able to progress easily, hear feedback earlier, and implement any changes necessary earlier on.

One of the strengths of the Mid-Fidelity prototype was the early user testing. Simulation of primary user interactions enabled the team to test assumptions regarding functionality, information sequencing, and user navigation paths. The prototype was used in usability test sessions where users were able to use the interface and provide feedback on their experience.This rapid iteration allowed the design team to discover potential usability issues, simplify workflows, and make architectural changes to the platform founded on real user feedback. This way, the team would be capable of addressing major usability issues prior to spending a lot of time and money on high-fidelity design details with the assurance that the final product would be one that would be able to fulfill the needs and expectations of the users [22].

The prototype provided a physical expression of the functioning of the platform, which became the focus of discussion and critique by the stakeholders and design team. It allowed for immediate change and adjustment through an interactive process, which ensured an iterative development process. It also allowed for prioritization of features and functionalities based on user needs and feedback so that the most important ones were developed first. Apart from this, Mid-Fidelity prototype acted as a go-between for sketches and very detailed high-fidelity prototypes to allow seamless transition from one stage of design to another. This helped in developing a user-centric platform that could easily accommodate caregivers, patients, and recruiters [23].

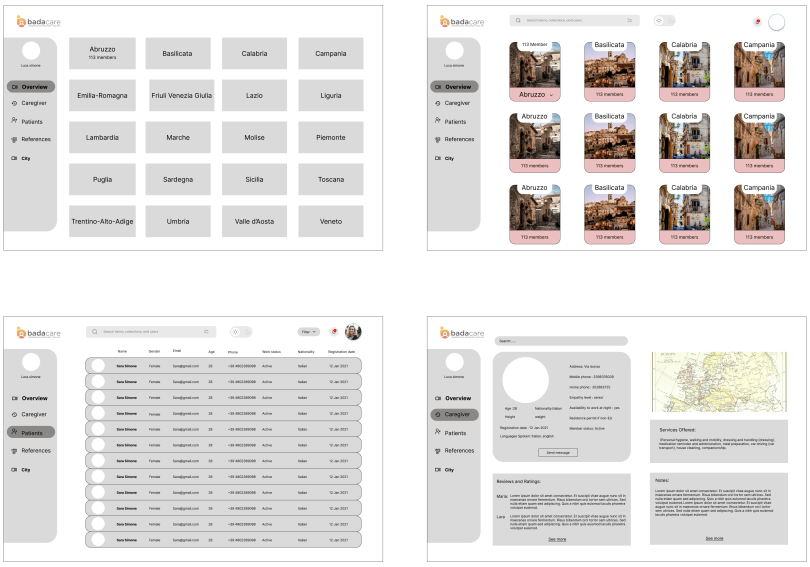

Figure 5.3: Mid-Fidelity Prototype

5.4 UI kit

Caregiver service platform UI kit is an orderly set of pieces of design in the spirit of consistency and user experience improvement overall. By producing a set of styles and pieces, the UI kit brings onto the same page all the components of the interface with the brand and usability norms of the platform. Design and development are simplified, as designers and developers can collaborate seamlessly without having to redefine properties of visual and behavioral nature repeatedly.

The key elements of the UI kit include a well-composed color scheme, widely adopted icons, interactive components such as buttons and modals, and typography. All of them help so much to improve usability, accessibility, and beauty. Typography is employed for maximizing readability and hierarchy, while colors are utilized to evoke the right emotions and maximize visual identification. Interactive elements enable effortless interactions by the users, resulting in an intuitive and effortless experience. The UI kit not only encourages design consistency but also enables quicker prototyping and iterative enhancements, thus making it a highly indispensable component in developing an intuitive caregiver service platform [24].

Typography: Typography is one of the most critical elements of managing the overall appearance and feel of the platform in such a way that readability and

usability are sustained. Well-established typography system supports the creation of visual hierarchy that can effectively guide users through different areas of the application.UI kit offers pre-defined font, font size, font weight, and font style that support the establishment of a corporate and standard look for all the elements of the interface.

Through typography consistency, the site is more usable in such a way that the user can scan for content more easily, process information, and interact more effectively with the interface. Readable fonts and appropriate text size are especially important in caregiver service sites, where the users may range from elderly adults to visually impaired individuals. Proper alignment, spacing, and contrast are likewise essential in making the site easy to use and intuitive, and in facilitating the platform's inclusivity and accessibility [25].

Color Palette: The UI kit possesses a color scheme developed with utmost attention to accomplish branding and usability goals. There are main, secondary, and highlight colors that make the interface become a consistent and stunning one. Aside from design, color plays other practical jobs like directing focus, showing primary action, and providing easy navigation. Contrast color is also very crucial, with contrast levels set with precision to be readable and usable to the visually impaired.

Modals: Modals on the platform are a way of showing important information or requesting the user to do something without interrupting the view of the page that they just so happen to be viewing. The UI kit specifies in gigantic detail how they are to look and act, with details from size to positioning, overlay effects, and animation. Outside of those specifications, modals become visually more in harmony and more useful, depicting interactions as normal and smooth to the user.

Icons: Icons are part of the UI kit that serves as a visual indicator that can be easily followed by the users as they navigate through the site. Icons make interaction easy by minimizing the text needed, hence making it easy and accessible for the users. Relying on globally accepted icons enables the main actions—like messaging, searching, or reserving a caregiver—to be recognizable with a glance and hence simple and effective for the user to carry out without doubt [26].

The UI kit includes a well-considered set of standardized icons that are used consistently across different areas of the platform. The icons are simple in terms of visuals yet effective and are legible even at tiny sizes. Sufficient spacing, contrast, and alignment also render them more readable, allowing interactions to be more seamless and the overall user experience to be better. Properly designed icons not only allow navigation to be more effective but also make the interface aesthetically consistent, modern, and easy to navigate.

Buttons: Buttons are the major interactive elements of the caregiver service platform, guiding users to execute primary actions such as form submission, page transition, and starting conversation. The UI kit implements a rulebook for the

appearance of buttons to make them look visually and functionally homogeneous on the platform. This includes shapes, sizes, color tones, and states (default, hover, active, disabled). Standardized buttons make it easier for users to readily recognize interactive objects and become aware of their purposes at first sight [27].

Additionally, the UI kit delivers usability and accessibility of buttons by considering contrast, padding, and text issues. Improved contrast colors and legible text labels enhance the readability to make it easier for the users, especially people with disabilities, to recognize and respond to buttons. Having similar button designs on the platform not only makes it easier to use but also results in a clean and coherent appearance, which propagates the professional and trustworthy look of the platform as well.

With inclusion in an organized UI kit, the caregiver service platform has a professional and balanced appearance that improves usability and joy.The UI kit not only provides ease of design and development operations but also maintains the platform ready, intuitive, and visually engaging to any form of user interaction. The systemic process is effective in playing an essential role in maintaining high-quality user interaction while the platform transforms and grows.

Figure 5.4: UI kit

5.5 Components

The caregiver service platform has a variety of core features that enhance functionality, usability, and general user experience. These include the header, filters, map guide, quick patient profile, filtering of caregivers, and caregiver's header, which are all intended to make various aspects of the platform easier to use.

Header: The header is a central feature that provides persistent navigation to every page. It includes such elements as the platform logo, search field, links to user profiles, and notifications. It allows the user to have instant access to vital features and easily navigate the platform.

Filters: Filters are a necessary part of the platform, in which hiring managers can limit their search for caregivers based on some factors such as status, gender, special care needs, daily activity, time schedule, country, city, and zipcode. This aspect provides users with a means to look for caregivers appropriate for specific requirements easily, maximizing the matching aspect.

Map Guide: The map guide feature visually illustrates different areas and allows users to identify caregivers and find them via geographical locations. This is greatly useful in the coordination of caregivers who provide home-based services and need to be at a set distance from the patients.

Quick Patient Profile: The fast patient profile field provides an overview of critical information about the patients, such as name, start date, date of birth, country, city, and care requirement (e.g., night stay). This enables hiring managers to assess the requirements of each patient in real-time and make intelligent decisions in placing them with caregivers.

Caregiver Filtering: The caregiver filter element is designed to limit the search results to meet the filtered criteria. More than one criterion can be used at a time, enabling the caregivers shown in the search results to exactly meet the needs of the patients. This feature is vital to enhance the effectiveness and accuracy of the caregiver matching process.

Caregiver's Header: The caregiver's header section contains detailed information about caregivers under various tabs, i.e., profile, interview result, references, history, reviews, documents, and certification. This organized way of presenting information ensures all information is at hand, enabling hiring managers to make valid and well-informed decisions based on complete caregiver profiles.

These elements, combined with the components of the UI kit such as typography, color scheme, modals, icons, and buttons, form a robust and welcoming platform. Focusing on the interests of particular users and enhancing functionality, these elements are critically responsible for facilitating a more efficient and effective caregiver-patient matching process, and ultimately leading to better care results and user experience.

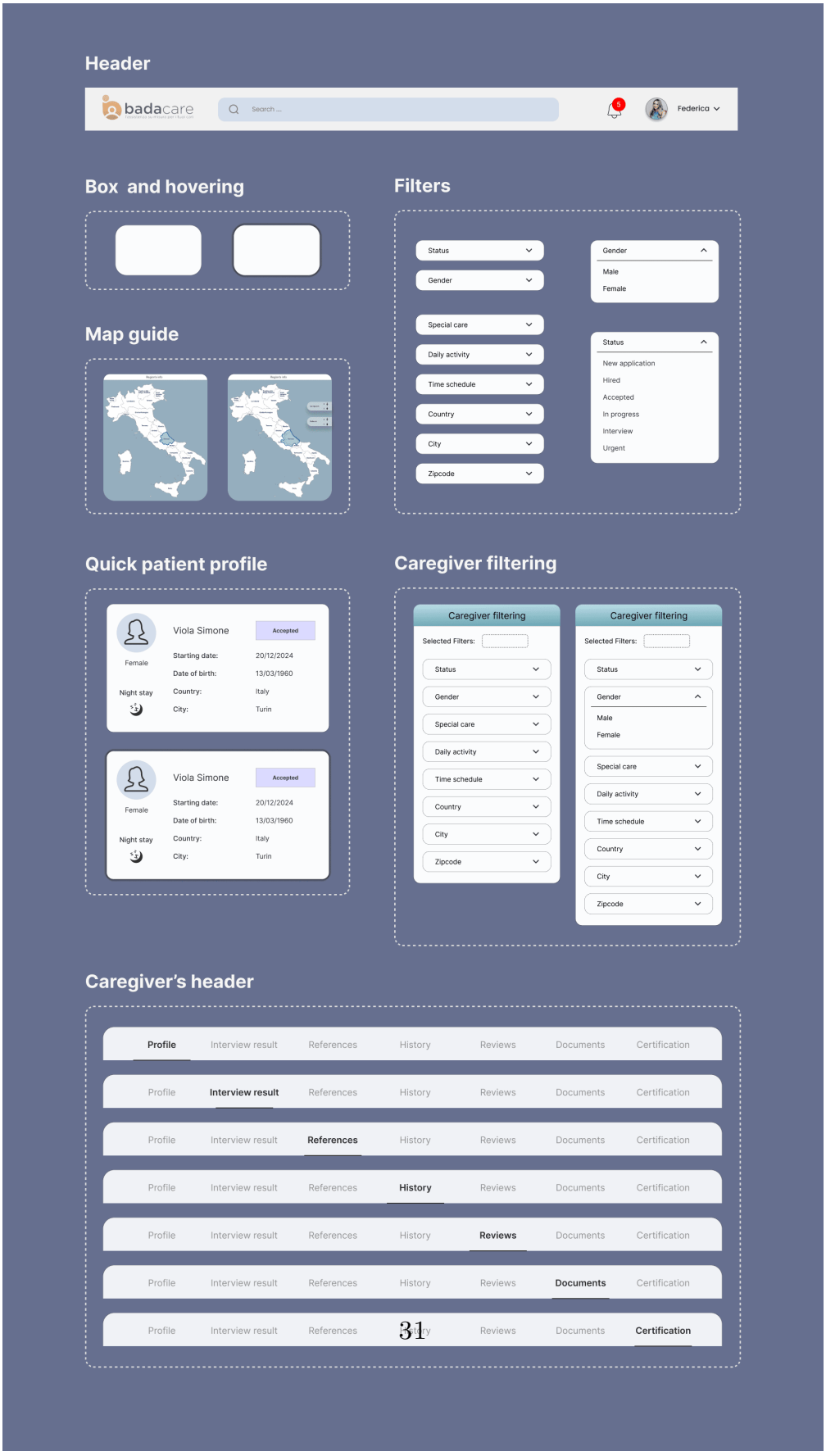

Figure 5.5: Components

Chapter 6

Results and Findings

6.1 Usability Test

Usability testing is a crucial stage in caregiver service platform development to evaluate its effectiveness, efficiency, and user satisfaction. It involves real users using the platform to identify any usability issues and offer feedback on their experience. The primary goal of usability testing is to measure how well users can perform tasks on the platform and identify any glitches or points of confusion. By watching users go through the platform, valuable insight is obtained as to how design and functionality meet the user needs and expectations.

This information is then used to identify patterns and general themes and, more precisely, to identify usability problems such as difficult-to-use features, confusing instructions, or ambiguous navigation patterns. The findings are compiled into a detailed report with improvement areas and explicit change recommendations. Based on these findings, iterative changes are made on the platform, including rearranging the layout, incorporating functionality, and solving issues identified. Repeat testing cycles can be conducted to ensure that the changes have favorably addressed issues and that the platform has attained the degree of usability necessary.

Usability testing is an essential part of the development process, and therefore the caregiver service platform functions and is user-friendly. Using real user feedback and continuous optimization of the platform, a solution that meets the needs of its users and also runs smoothly and is delightful is created. Such rigorous usability testing literally means the usability of the platform and quality of care delivered with its use.

6.2 First Iteration

- In the first design, we treated one page independently for regions and cities But upon conducting the usability test, we understood that recruiters should be able to view general information regarding cities and regions on the first page. So, in the second redesign that we conducted after the second usability test, we placed a map on the first page under the overview section, and in the map, the recruiter is able to view important information by clicking on each region.
- Sidebar: According to the present information structure of the website, the sidebar was initially developed with the things you see now. After usability testing, the needed things were developed in the final sidebar based on the recruiters' needs.
- Notification: As you can see in the new design, we have added a notification icon in the page header to inform recruiters of the recently received information. With this design, recruiters will be able to access the registered requests in the portal faster.

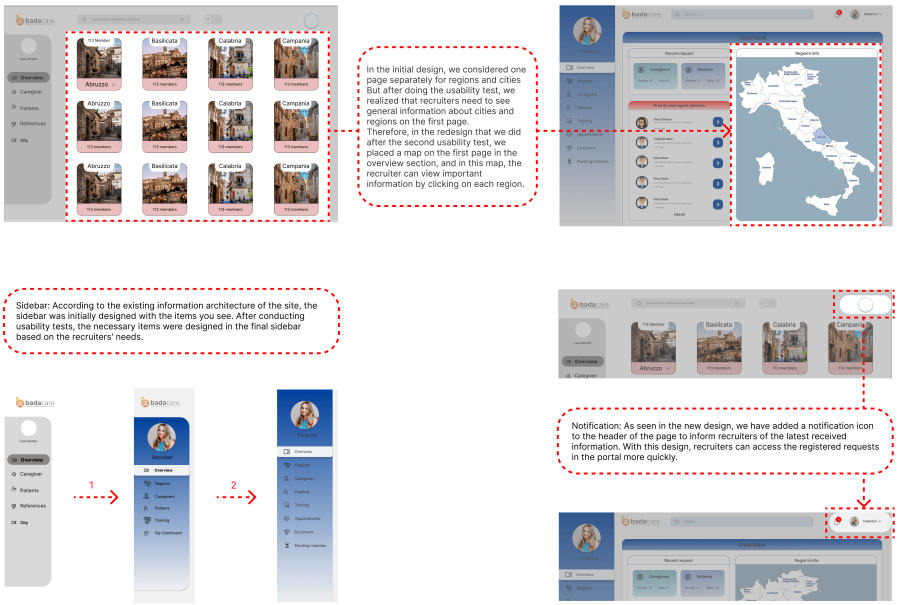

Figure 6.1: First Iteration

6.3 Second Iteration

- In this design phase, we initially permitted recruiters to select patients and caregivers but usability testing revealed that this was not presenting important information to compare. In an improvement, we added filtering options for sorting caregivers by major criteria. On re-testing, however, we noted that filtering was inadequate. Therefore, we further improved the design with additional important information and a percentage match per caregiver and brought all the recruiter needs for informed decisions.

- In the first design, we allowed recruiters to select favored patients and caregivers but discovered via usability testing that this hindered meaningful comparison. In response, we introduced filters to sort caregivers by important criteria. While helpful, further testing revealed that filters were insufficient. We then enhanced the design to incorporate all important information and a matching percentage feature so recruiters can have an informed perspective to make informed choices.

Figure 6.2: Second Iteration

6.4 Third Iteration

- In this section, based on the data obtained by conducting usability tests, we realized that the recruiters should view more information of the candidates at first glance. Therefore, we displayed various statuses based on various conditions of individual candidates and included more information such as start dates and gender on the new page.
- In the second step, according to the requirements of recruiters, we added an individual filter section for filtering statuses at the right-hand side of the page and a universal filter at the top of the page for selecting the city, gender, or any other conditions to make it more easily accessible.

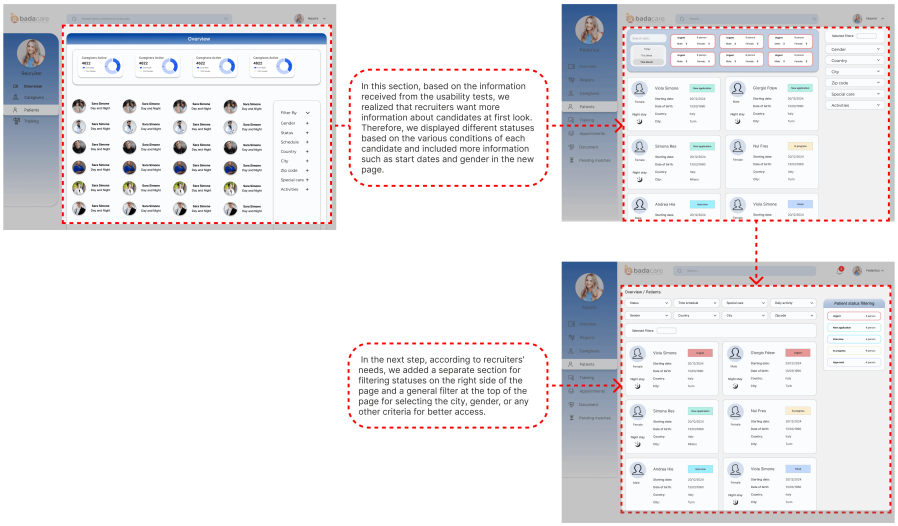

Figure 6.3: Third Iteration

6.5 High-Fidelity Prototype

High-fidelity prototype: This was a finer and better quality version of the caregiver service platform design. Having been developed based on top-line design tools and techniques such as prototyping software or front-end dev frameworks, the high-fidelity prototype had been developed above visual design, interaction, and live content level comparable to final output. The high-fidelity prototype provided a more realistic and immersive user experience for evaluation and testing. It allowed stakeholders to visualize the platform's visual identity, judge its usability more intuitively, and implement some design modifications according to user feedback and usability testing results. The high-fidelity prototype was a necessary step in bridging the gap between design concepts and actual production of the caregiver service platform so that the end product benefited the user as much as the usability requirements warranted.

6.5.1 Overview

- This Badacare dashboard layout is a good display for monitoring caregiver and patient information. It consists of the following major elements:

  Overview Section: Recent Requests: Displays recent requests placed by patients and care givers by gender.

Region's Info: Serves different regions of Italy, facilitating geographic control.

Priority and Urgent Patients: List of priority patients for urgent attention, with explanations and times.

Recent Status: Pie charts show gender breakdown and status (active, inactive, pending) of caregivers and patients for easy assessment.

Caregiver's Time Schedule: Shows caregiver workload and availability.

Side Panel: Provides quick access to pages like Regions, Caregivers, Patients, Training, Appointments, Documents, and Pending Matches.

User Experience Enhancements: Provides informative data and related percentages to make informed decisions.

Visual Design: Simple visual elements improve usability and information intake.

This design simplifies matching caregivers with patients by bringing important data into a single easy-to-use dashboard.

6.5.2 Patient list

- Badacare Patients Dashboard Design

  This Badacare dashboard efficiently manages patient information and caregiver assignments. Key features include:

  Filter Options:Filters for Status, Time Schedule, Special Care, Daily Activity, Gender, Country, City, and Zipcode.

  Patient Information: Patient cards indicate gender, start date, birth date, country, city, and special notes.

  Status Tags:Tags indicate patient status (e.g., Urgent, New Application, In Progress, Interview, Approved). Sidebar displays the number of patients by each status category for immediate prioritization.

  User Experience Enhancements: Clear, brief patient information to guide informed decisions.

  Intuitive Navigation: Easy navigation to pages like Overview, Regions, Caregivers, Patients, Training, Appointments, Documents, and Pending Matches.

  This structure eases handling patients and caregivers in a complete, user-friendly interface.

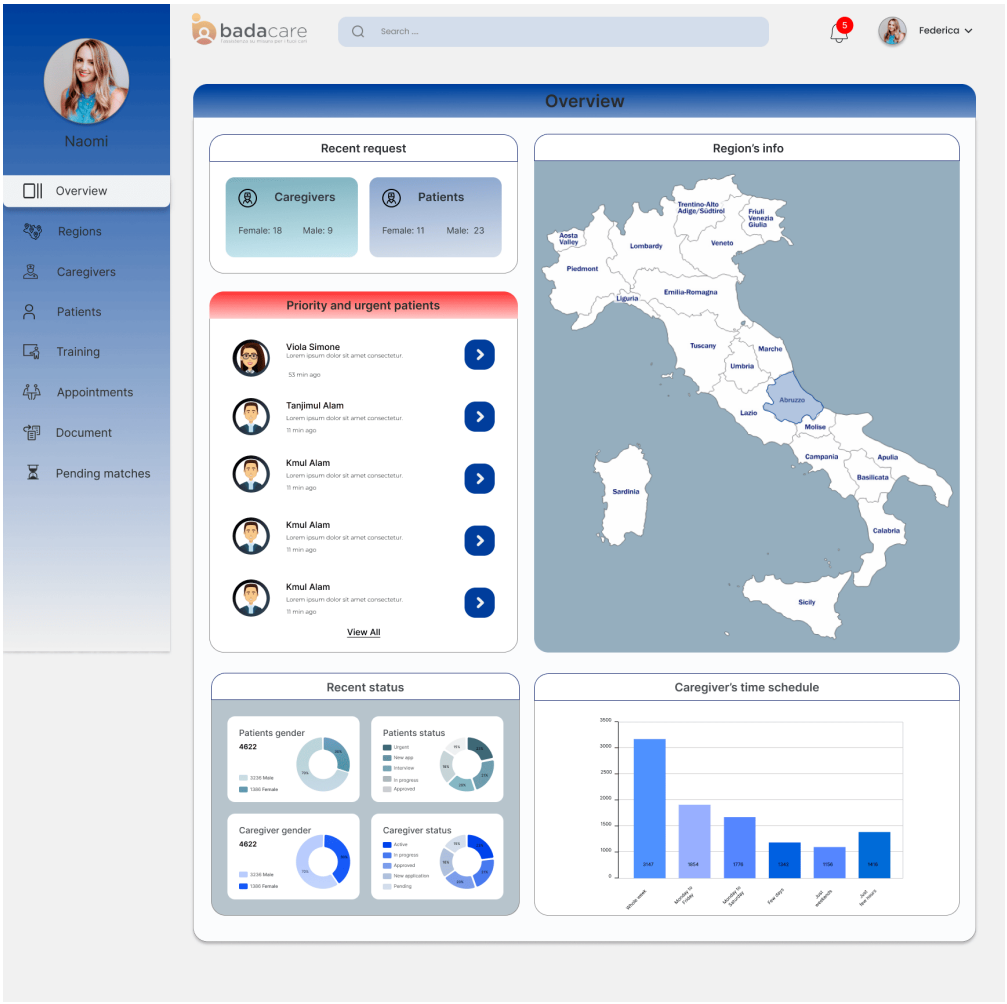

Figure 6.4: Overview

6.5.3 Document Approval

- This Badacare dashboard is managing document approvals, which are three in total: New, In Process, and Approved. The main features are:

  New Requests: New document viewing requests to be shown. In Process: Documents in the process of viewing. Approved: Documents viewed.

  Document Information: Detailed Cards: Cards show important information like night stay required, start date, date of birth, country, and city. Status Tags: Cards also show statuses like "New Application."

  This kind of design minimizes paper approvals via a sequenced and organized interface.

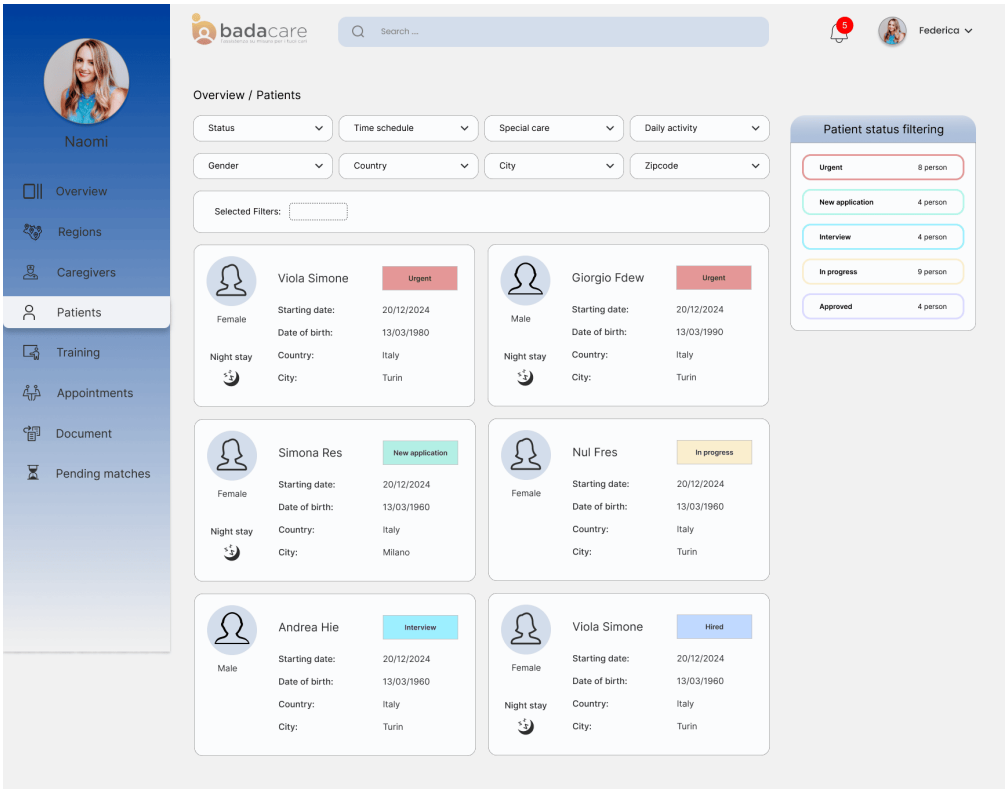

Figure 6.5: Patient list

6.5.4 Patient Profile Dashboard

- This Badacare dashboard efficiently manages individual patient profiles. Key features include:

  Profile Details: Displays essential patient information, including name, gender, city, date of birth, address, family situation, and pet companions.

  Health Information: Shows starting and ending dates, weight, height, specific pathologies, and health conditions.

  Status Indicators: Includes urgency status and countdown to start date.

  Caregiver Preferences: Specifies desired caregiver attributes and responsibilities, aiding in matching the best caregiver.

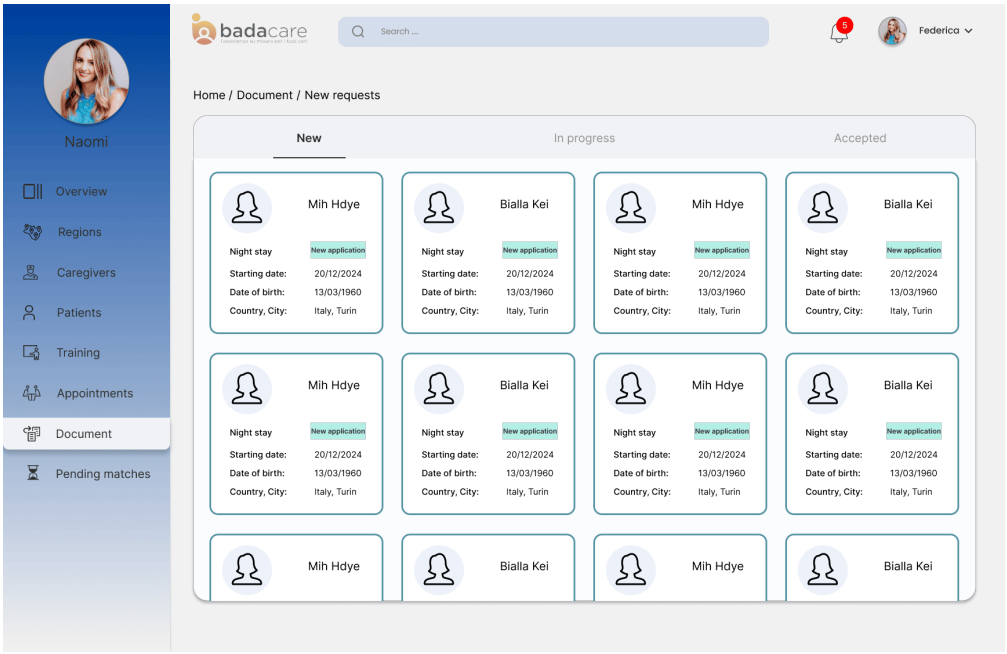

Figure 6.6: Document Approval

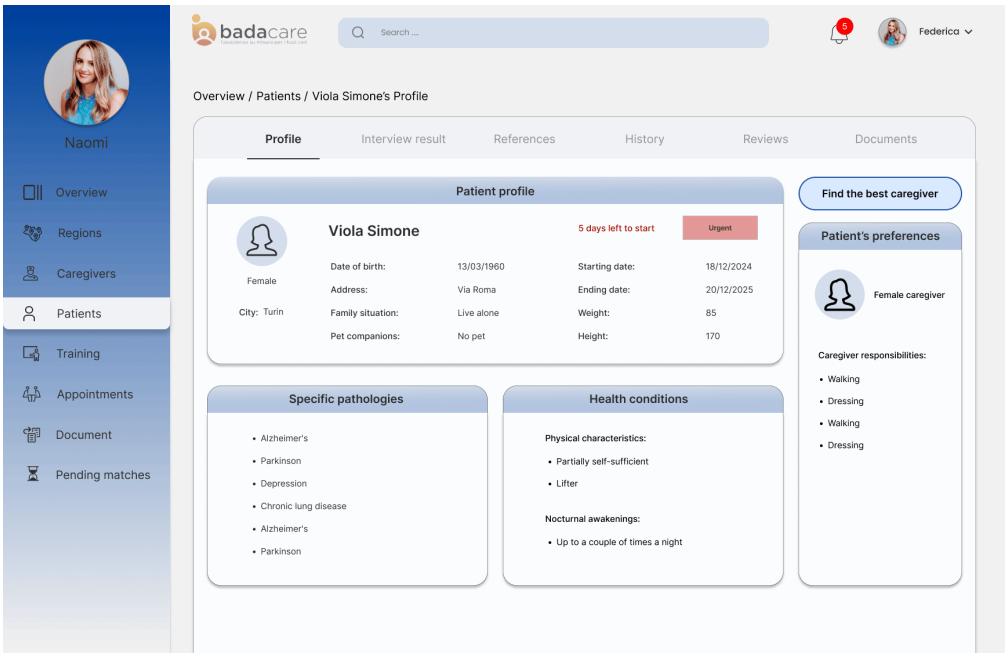

Figure 6.7: Patient Profile

6.5.5 Patient Interview Results

- Interview Result Section

  General Information: Displays detailed interview notes and findings, ensuring comprehensive patient profiles.

  Medicine: Lists medication details and any relevant medical information from the interview.

  Special Needs: Highlights specific requirements such as assistance with bathroom use, night stay, walking support, and chronic conditions.

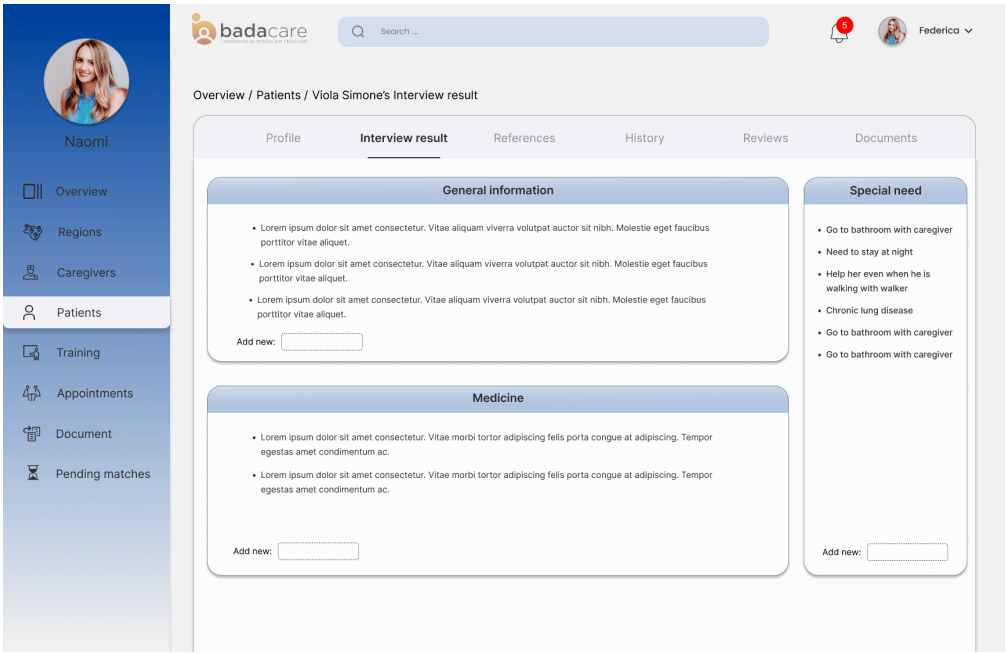

Figure 6.8: Interview Result

6.5.6 Patient History

- Patient History: This section provides a comprehensive view of all past interactions between recruiters and patients.

  Each entry includes detailed records of conversations, ensuring that all communications are documented thoroughly.

  The records display essential information such as the date of each conversation, ensuring chronological tracking of interactions.

  Search Functionality: The search functionality is designed to help users efficiently navigate through extensive conversation histories. Users can quickly locate specific conversations by entering keywords or phrases related to the interaction they are searching for.

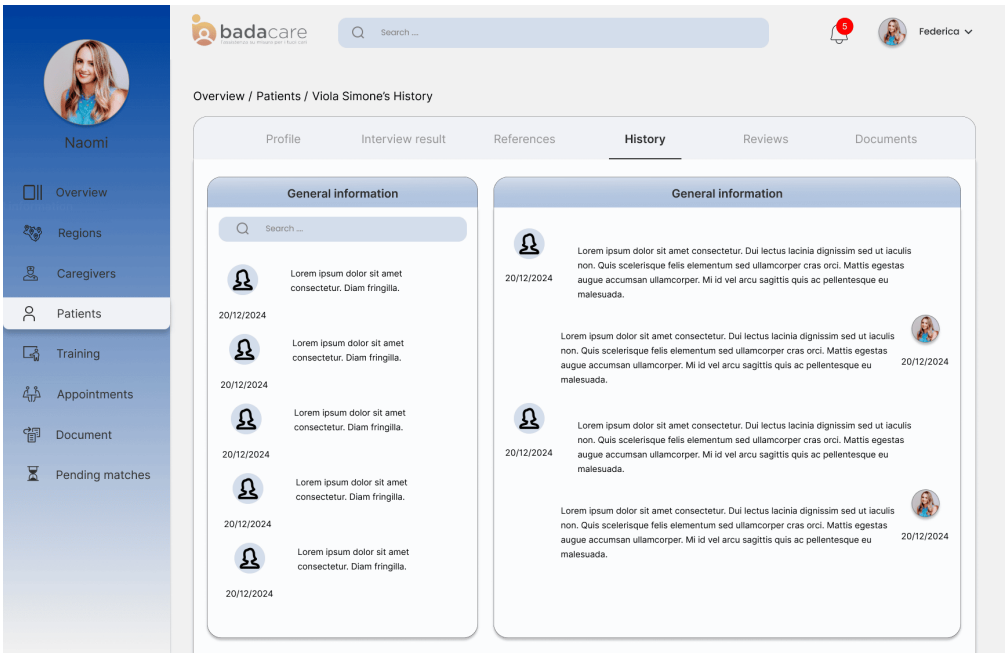

Figure 6.9: Patient's History

6.5.7 Matching Patients and Caregiver

- Badacare Patient-Caregiver Matching Dashboard

  Profile Details: Displays essential patient information such as name, gender, city, date of birth, address, family situation, pet companions, start and end dates, weight, height, and urgency status.

  Suggested Caregivers : -Caregiver Profiles: Shows detailed profiles of suggested caregivers, including: Match Percentage: Indicates how well the caregiver meets the patient's needs (e.g., 75

  Basic Information: Displays caregiver's name, gender, city, residence permit status, empathy level, and nationality.

  Time Schedule: Highlights the caregiver's availability (e.g., Night Stay, Monday to Friday).

  Activities: Lists the services provided by the caregiver, such as helping with showers, making food, toilet assistance, dressing, companionship, grocery shopping, and transfer and mobility support.

  Filtering Options: Allows users to filter caregivers by various criteria, including Status, Gender, Special Care, Daily Activity, Time Schedule, Country, City, and Zipcode, ensuring the best match for the patient's needs.

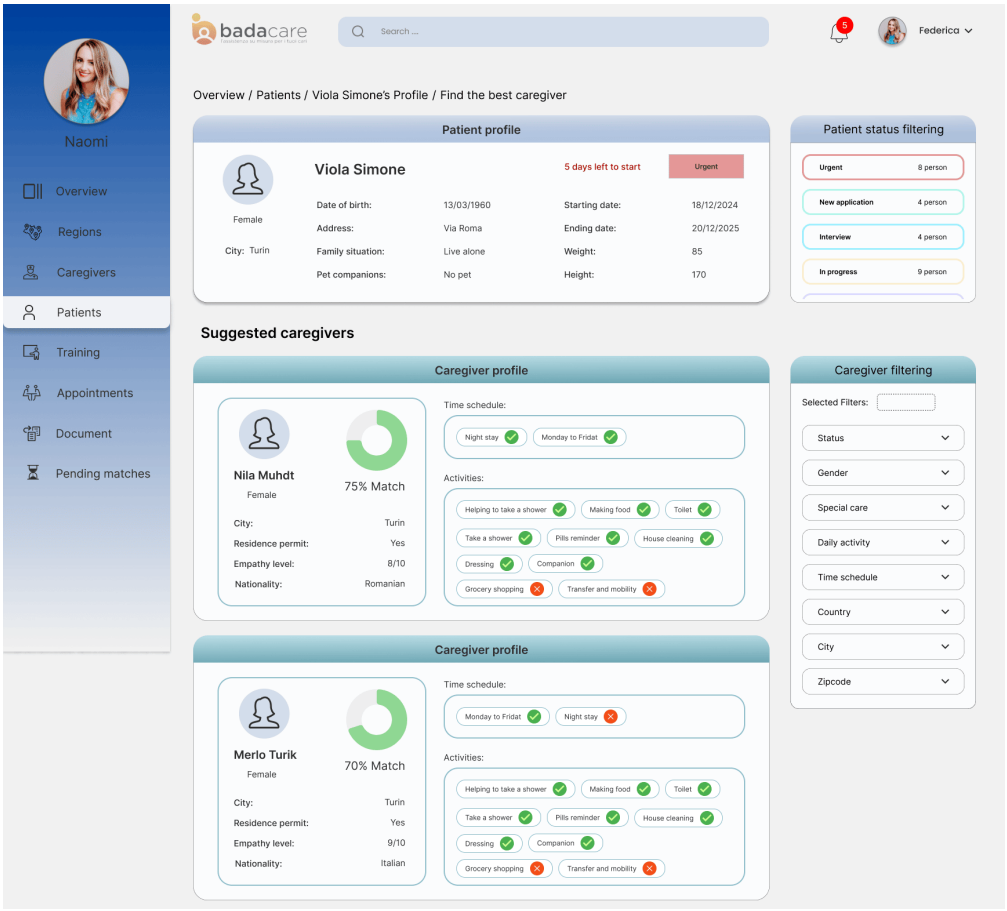

Figure 6.10: Matching page

6.5.8 Caregiver Profile

- Caregiver Profile Profile Details: Displays comprehensive information about the caregiver, including: Name, gender, city, date of birth, address, mobile number, and nationality. Residency permit status, empathy level, confidence level, and night availability. Current status indicator (e.g., Accepted).

  Work Experience: Describes the caregiver's experience, including the number of years and specific details about their work history.

  Pathologies Treated: Lists the specific medical conditions the caregiver has experience treating, such as Alzheimer's, Parkinson's, depression, and chronic lung disease.

  Responsibilities and Activities: Outlines the caregiver's responsibilities and the activities they perform, such as walking and mobility assistance, dressing, helping with showers, making food, giving pills reminders, house cleaning, and providing companionship.

  Accept/Reject Buttons: Provides options to accept or reject the caregiver based on the profile review, allowing for quick decision-making.

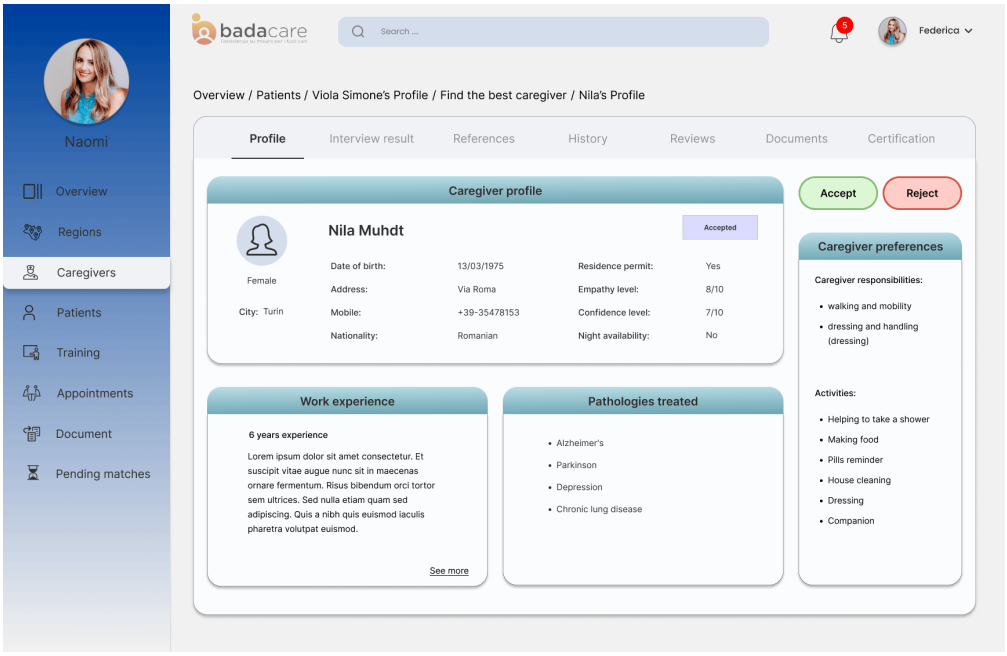

Figure 6.11: Caregiver Profile

6.5.9 Matched Caregiver

- Badacare Final Caregiver Matching Dashboard

  Profile Details: Displays essential patient information such as name, gender, city, date of birth, address, family situation, pet companions, start and end dates, weight, height, and urgency status.

  Match Percentage: Indicates the suitability of the caregiver based on the patient's needs (e.g., 75

  Basic Information: Provides details about the caregiver, including name, gender, city, residence permit status, empathy level, and nationality.

  Availability and Activities: Highlights the caregiver's time schedule and the specific services they offer, such as helping with showers, making food, toilet assistance, dressing, companionship, grocery shopping, and mobility support.

  Alternate Options: Lists additional suggested caregivers with their match percentage, basic information, and services offered, allowing recruiters to compare and select the best fit.

  Final Matching: Match Button:Allows recruiters to finalize the selection of the caregiver by clicking the "Match" button.

  Communication Options: Provides options to send messages via WhatsApp and email to communicate with the selected caregiver.

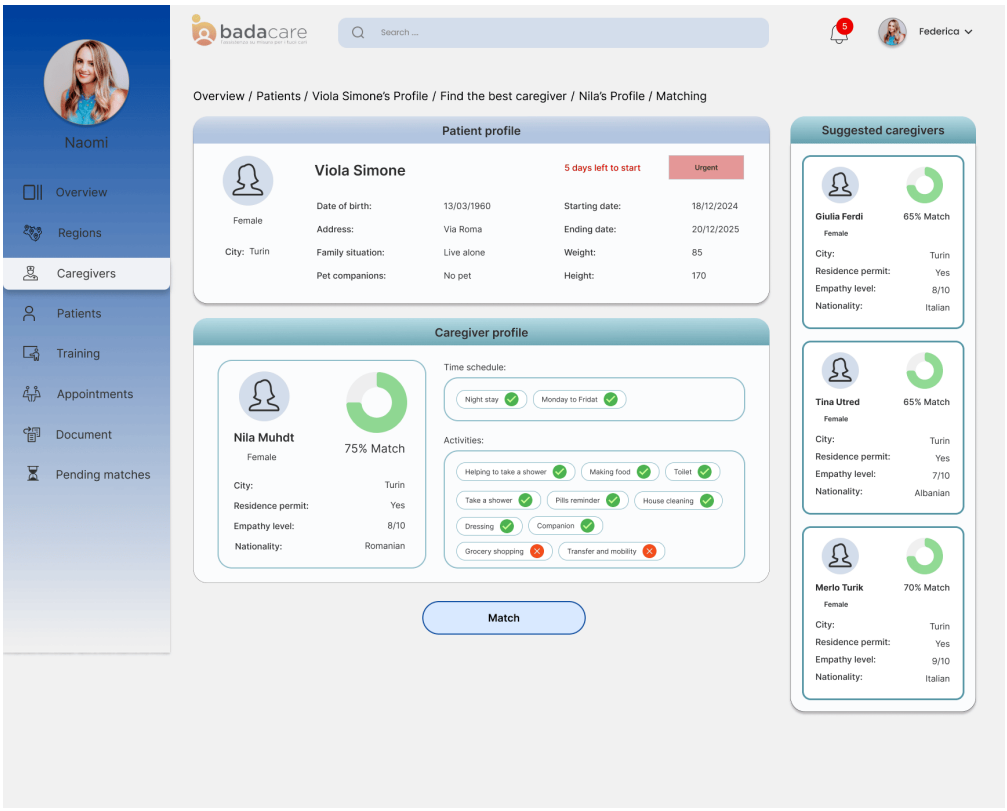

Figure 6.12: Matched Caregiver

Chapter 7

Conclusion

7.1 Summary of Key Findings

The subsequent thesis was capable of improving the user experience (UX) and user interface (UI) of Badacare, an application of patient and caregiver communication. The said issue in the existing system like the arduous effort of manual matching, limited update status information, and having accurate records were recognized by heuristic evaluation, interviews, and questionnaires.

Hence, the new Badacare portal itself is integrated with advanced search capabilities that allow recruitment managers to shortlist caregiver options based on criteria such as location, gender, age, skill, and availability. Introducing AI-based matching algorithms has increased efficiency and precision and even the quality of matches between caregivers and patients.

Portal also contains current status information, improving user interaction and coordination. Also featured is a priority feature for processing the requests that optimizes and meets key needs within time limits.

Generally, the improvements have streamlined processes, minimized lag, and enhanced user experience immensely on the Badacare portal. The site is now an improved, faster, and more convenient means of connecting patients and caregivers with good quality care and satisfaction.

The re-engineered Badacare portal uses advanced search functions and AI-based matching processes with real-time status updates and a priority request handling system. These automate workflows, reduce wait time, and enhance the caregiver user, patient, and hiring manager experience.

7.1.1 Recommendations for Future Research

The future operations will include use of advanced AI algorithms for additional matching, adequate user feedback systems, mobile application creation, providing

personalized services, and additional data security measures. These measures will also position the Badacare portal to be better prepared to deal with evolving users' requirements more efficiently as well as maximize the quality and efficiency of carer services.

Appendix A

Figma

A.1 Useful Link

- Project figma link

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