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ENSE 374 – Software Engineering Management

MediLocate

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- Proof read the text for typing and grammar mistakes.
- Follow the IEEE Bibliography style for the references by selecting "References/ Citations & Bibliography/ Style".

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1 Introduction

Imagine a world where booking a medical appointment is as easy as ordering your favorite meal online—no more endless phone calls, no more waiting for days just to get a simple appointment. MediLocate brings this vision to life by developing a web-based application designed to revolutionize how Canadians book medical appointments.

The current process of scheduling appointments can be overwhelming and frustrating. Patients often face long wait times, struggle to connect with clinics, and find it difficult to secure an available slot. MediLocate is here to change that narrative. Our solution cuts through these challenges by offering a simple, intuitive platform where users can effortlessly book appointments online, anytime, anywhere. No more busy signals, no more stress—just a few clicks, and you're set.

With MediLocate, clinics can easily upload their addresses and share their schedules on a weekly, biweekly, or monthly basis, giving patients a clear and comprehensive view of available options. Imagine being able to see the availability of clinics near you at a glance—compare schedules, select the best fit for your needs, and book instantly. Users can log in, browse clinics by location, specialty, or even user reviews, making the process of finding healthcare as personalized as possible.

Our platform supports two types of logins: one for patients who want to schedule appointments and another for medical staff who need to manage their clinic's availability, update their schedules, and share important information with patients. This dual functionality ensures that clinics stay organized, and patients stay informed, all in real time.

MediLocate aims to create a seamless experience that benefits both patients and healthcare providers. By reducing wait times, eliminating communication barriers, and simplifying the entire appointment process, we're making healthcare more accessible, efficient, and stress-free for everyone involved. Whether you're a busy professional, a parent with a hectic schedule, or simply someone seeking timely healthcare, MediLocate is your partner in connecting you to quality care without the hassle.

The following sections will explore the design problem, potential solutions, our final approach, and the overall project management plan.

2 Design Problem

This section has the following two subsections:

Accessing healthcare should be a straightforward process, yet for many Canadians, it is anything but. Despite Canada's universal healthcare system, accessing timely medical care remains a significant challenge. Long wait times, difficulties in booking appointments, and limited clinic

availability often mean that patients cannot receive the care they need when they need it. This issue is not just an inconvenience—it can have serious health implications, delaying diagnosis and treatment for many individuals.

2.1 Problem Definition

Link to the 'Business Case.'

The healthcare system in Canada is often plagued by accessibility issues. According to recent statistics, there are approximately 2.6 physicians per 1,000 people in Canada, which creates significant pressure on healthcare providers and makes accessing timely care a challenge. Studies show that nearly 30% of Canadians report difficulties in getting healthcare when they need it, and around 20% of patients experience delays that can exceed a week just to see a family doctor. This mismatch between the supply of healthcare services and the demand from patients leaves many people frustrated and, at times, unable to access essential care.

These accessibility issues have far-reaching effects on the health and well-being of Canadians. Long delays in obtaining healthcare can result in the worsening of medical conditions, increased anxiety, and decreased quality of life. People in rural and remote areas face even greater challenges due to the scarcity of healthcare facilities nearby, making it difficult to access even basic medical care without extensive travel. Additionally, the administrative burden placed on clinics by managing appointments manually adds inefficiencies and increases the likelihood of scheduling errors, further complicating the situation.

The lack of efficient scheduling also means that clinics face challenges in managing patient loads, leading to overbooked or underutilized resources. This inefficient system impacts not only patients but also healthcare providers who struggle to organize their time and offer timely services, which can ultimately lead to burnout and reduced quality of care.

2.2 Project Charter

Link to 'Project Charter'

3 Solution

An engineering design is iterative in nature!

In this section, we provide an account of some of the solutions our team brainstormed to implement the project. During our brainstorming sessions, we considered multiple approaches, each with different features and potential constraints. Some solutions lacked specific desired features, while others did not fully satisfy all the identified constraints. The iterative nature of engineering design helped us refine these ideas until we reached the final solution that best balanced all requirements.

MediLocate was conceived to bridge the gap in healthcare accessibility by providing a comprehensive platform where clinics can efficiently manage their availability while allowing patients to book appointments with ease. By offering a centralized system for clinic schedules, MediLocate will help reduce wait times, improve the efficiency of healthcare services, and ensure patients have access to the care they need when they need it.

3.1 Solution 1

One of the first ideas we explored as part of our brainstorming process was to create a platform that would allow clinics to upload and manage their schedules with a high degree of flexibility. This meant clinics could choose to update their availability on a weekly, biweekly, or monthly basis, depending on their preferences and operational needs. The aim was to offer patients an accurate and up-to-date view of appointment slots, thereby providing them with a clear and transparent picture of availability. This level of visibility would enable patients to proactively find open appointments that fit into their schedules, ultimately giving them more control over their healthcare journey.

From the patient's perspective, this solution seemed highly beneficial because it empowered them to take charge of their healthcare needs, reducing the hassle of calling clinics or dealing with inconsistent information. However, upon closer examination, we realized that this approach, while promising, was lacking some essential features that are crucial for providing a comprehensive and streamlined healthcare experience. One major shortcoming was the absence of automated reminders, which play a critical role in minimizing missed appointments and ensuring that patients do not overlook their scheduled visits. This feature is particularly important in healthcare, where missed appointments can lead to delays in treatment and impact patient outcomes.

Additionally, our initial solution did not include integration with electronic health records (EHR). EHR integration is vital because it allows healthcare providers to have immediate access to patient histories, which helps them make informed decisions quickly and enhances the overall quality of care. For patients, having their appointment bookings integrated with their health records means a smoother, more cohesive experience, where their healthcare journey feels interconnected rather than fragmented. Without these features—automated reminders and EHR integration—the platform would fall short of delivering the kind of seamless, efficient experience that both patients and clinics require. Thus, while our initial concept was strong in its transparency and user empowerment aspects, it ultimately needed additional functionality to truly meet the needs of a modern healthcare system.

3.2 Solution 2

As our team continued to brainstorm potential solutions, we identified another approach that could significantly improve the user experience of finding and booking clinic appointments. This solution involves leveraging the Google Maps API to display clinics around the user's current location. Instead of presenting users with a simple list of clinics one by one, our idea is to use an interactive map that provides a visual overview of all nearby clinics. This approach would make it easier for users to quickly see what options are available around them, enabling them to make informed decisions based on proximity and convenience.

The interactive map would allow users to view multiple clinics at once, along with details such as address, operating hours, and available services. By integrating this functionality, we aim to offer a more intuitive, visual method for finding healthcare services, catering to the diverse needs of our users. Users can zoom in and out to see various areas, click on clinic markers for more information, and even get directions—making the entire experience more efficient and user-friendly.

Another key aspect of this solution is our focus on future accessibility improvements. Our vision is to make healthcare accessible to all, regardless of physical ability. To achieve this, we are planning to incorporate features such as text-to-speech, which would read aloud clinic details for users who have visual impairments or reading difficulties. Additionally, we are considering other assistive functionalities designed for individuals with different accessibility needs. These features would help us ensure that the platform is inclusive and welcoming to everyone.

While this solution presents a promising step forward in enhancing usability, it comes with its own set of challenges. Integrating the Google Maps API will require managing data dynamically to reflect real-time availability and precise location information, which could introduce complexities in terms of maintaining accuracy and reliability. Furthermore, the accessibility features we envision, such as text-to-speech and other assistive technologies, will require additional development time and resources, and may need specialized testing to ensure their effectiveness.

3.3 Final Solution

This is the final solution. Explain why it is better than other solutions. You may use a table for comparison purposes. After providing the reason for selecting this solution, detail it below.

3.3.1 Components

What components you used in the solution? What is the main purpose of using individual component? Provide a block diagram (with a numbered caption, such as Fig. 1) representing the connectivity and interaction between all the components.

3.3.2 Features

Give an account of all the features your solution has. These features may be tabulated (with a title) for improved comprehension.

3.3.3 Environmental, Societal, Safety, and Economic Considerations

Explain how your engineering design took into account environmental, societal, economic and other constraints into consideration. It may include how your design has positive contributions to the environment and society? What type of economic decisions you made? How did you make sure that the design is reliable and safe to use?

3.3.4 Limitations

Every product has some limitations, and so is the case with your design product. Highlight some of the limitations of your solution here.

4 Team Work

Since this is a group project, you must have a fair distribution of tasks among yourselves. To this end, you must hold meetings to discuss the distribution of tasks and to keep a track of the project progress.

Meeting 1

Provide Links to ‘Meeting Agenda, Meeting Minutes, Change Request, Project Status Report, Issue Log’ documents.

Meeting 2

Provide Links to ‘Meeting Agenda, Meeting Minutes, Change Request, Project Status Report, Issue Log’ documents.

Meeting 3

Provide a similar description here.

Meeting n

Provide a similar description here.

5 Project Management

Provide the link to ‘Milestone-based Schedule’ document. Use Gantt chart as well to show the progress of your work here. Mention all the tasks along with their predecessors. Provide the slack time of each task and identify the critical path.

6 Conclusion and Future Work

- A summary of what you achieved.
- Provide Link to ‘Lessons Learned Report’ document.
- While keeping the limitations of your solution, provide recommendations for future design improvements.

7 References

- Use the IEEE reference style.
- Do not put any reference if it is not cited in the text.

8 Appendix

If you want to provide an additional information, use this appendix.