DocCare

Vision Document

Version 1.0

Revision History

| **Date** | **Version** | **Description** | **Author** |
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| 27/10/2023 | <1.0> | The first ever vision document | DocCare Team |
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Vision (Small Project)

# Introduction

## Purposes

The purpose of this document is to define high-level requirements for functions of the DocCare Android application in terms of the needs of end users.

## Scopes

The Vision Document applies to the DocCare application, which will be developed by group 07 of the course Elements of Software Engineering (IT). The IT department will develop this mobile application to provide end users with a platform of booking and tracking medical prescriptions.

## References

Applicable references are:

1. Lecture Notes for the Elements of Software Engineering course (CS300), Assoc. Prof. Nguyen Van Vu, 2023, VNU-HCM
2. Step-guide project assignment 1 video for the Elements of Software Engineering course (CS300), T.A Ho Tuan Thanh, 2023, VNU-HCM
3. Software Engineering (Global Edition), 10th edition, Ian Sommerville
4. [HealthPlix SPOT Analyst](https://analyticsindiamag.com/bengaluru-based-healthcare-startup-healthplix-is-leveraging-ai-and-ml/)
5. [Doctor on Demand, Forbes Review](https://www.forbes.com/health/mind/doctor-on-demand-review/)
6. [Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/#:~:text=Web%20Content%20Accessibility%20Guidelines%20(WCAG)%202.1%20defines%20how%20to%20make,%2C%20learning%2C%20and%20neurological%20disabilities.)

# Positioning

## Business Opportunity

This project will be an innovative virtual platform that serves as an alternative to the current manual booking system employed by private clinics. Moreover, the application will provide an easily accessible and user-friendly interface for patients, doctors, and medical receptionists via smartphones.

Mobile phones are ubiquitous to the point that a majority of people are able to access the Internet through smartphones. In addition, the conventional booking process can be particularly burdensome for the health-impaired. Another point to consider is that patients suffering from mental illnesses or dementia sometimes experience a period of unconsciousness and irrationality, thus may miss appointments, prescriptions, and medical instructions from the doctors. Our application seeks to establish a platform whereby patients can easily view their prescriptions, track and book available appointment slots. Additionally, physicians will be able to track their appointments as well as communicate with their patients.

The new application will be a cutting-edge technology for any private clinic in appointments and patients management; therefore improving the reputation and standing of the clinic.

## Problem Statement

| The problem of | The need for a convenient method for booking appointments, with doctors at medical centers. Also provides helpful tools to support the patient during treatment. |
| --- | --- |
| Affects | Patients, doctors, and receptionists. |
| The impact of which is | The difficulty in booking or scheduling with a doctor, and ineffective communication between doctor and patient during the treatment process. |
| A successful solution would be | To improve the productivity of medical staff, improve the reputation of the centre, attract more customers, and streamline booking appointment functions, making the process easier for users of all ages. |

## Product Position Statement

| For | Doctors, Patients, Receptionists |
| --- | --- |
| Who | Go to or work at the medical centre.  Health-checkup, scheduling, contact doctor/patient, diagnosis, prescription. |
| The Doctor booking system | Is a mobile app |
| That | Enable online booking system and get diagnosis, prescription and track the intakes usage |
| Unlike | The existing outdated mainframe booking system |
| Our product | Provides users online access, real-time updates and automated scheduling, allows users to schedule appointments outside regular office hours with the perfect data security and flexibility from any mobile phone connected to the internet. |

# Stakeholder and User Descriptions

This section describes the users of the application DocCare. There are 3 types of users: the Customers, the Doctors and the Receptionists.

## Market Demographics

DocCare’s primary target are adults, both female and male, aged 20 to 65 with various health conditions, and from urban and suburban areas where private clinics are prevalent.

The clinic’s patients that require regular medical appointments and prescriptions have basic to intermediate technological proficiency. The ability to register an account, book an appointment, and keep track of prescriptions through any smartphone. Own smartphones or tablets and have regular access to the Internet.

Physicians and medical receptionists who are working for the clinic which uses the application.

The initial release of DocCare will only be limited to only one private clinic. Marketing subsequent releases to multiple private clinics and hospitals is under consideration by the DocCare IT Department.

## Stakeholder Summary

| **Name** | **Represents** | **Responsibilities** |
| --- | --- | --- |
| Prof. Vu Nguyen | Lecturer | Provide base knowledge, templates and orientation |
| Teacher Thanh Ho  Teacher Hoang Tran  Teacher Thao Tran | Mentor, Grader, Supervisor | In charge of supervising the development process, giving advice, evaluating the results |
| Development Team | The members contributed to the formation of this project. | Responsible for developing the application, ensuring that the application will meet the expectations of the parties involved in the using of the application. |
| Le Bao Hiep | Receptionists | Ensure that the system will meet the needs of receptionists who are in charge of managing the bookings and hold the Doctors and Patients data for scheduling. |
| Ho Ngoc Vinh Phat | Patients | Ensure that the system will meet the needs of patients. |
| Nguyen Vu Dang Huy | Doctors | Ensure that the system will meet the needs of doctors. |
| Le Minh Hoang | Admins | Ensure that the system will meet the needs of admins who are in charge of creating important roles’ accounts: Receptionists and Doctors |

## User Summary

| **Name** | **Description** | **Stakeholder** |
| --- | --- | --- |
| Patient | Manually book a doctor, or send a booking request to the receptionist.  Open chat with a doctor.  Check health statistics, medicines consuming schedule, appointments, intakes, …  Update personal information | self-represented |
| Doctor | Check working schedule  Send absent request  Chat with patients  Update intake informations for patients | self-represented |
| Receptionist | Assign doctor to patient.  Approve/Reject absent request  Export reports | self-represented |

## User Environment

DocCare’s primary target are adults, both female and male, mainly aged from 20 to 65 with various health conditions, and from urban and suburban areas where private clinics are prevalent.

The clinic’s patients who need regular medical appointments and prescriptions possess basic to intermediate technological proficiency, so they can easily register an account, schedule appointments, and monitor prescriptions using any smartphone connected to the Internet, with the app downloaded on their device.

Future plan is to have a website that shares data with the mobile app, so users can access their needs anywhere with the Internet connection.

Physicians and medical receptionists who are working for the clinic enjoy a clean, user-friendly interface. With it, they can quickly finish the tedious errand (scheduling, reports, …) in just a few taps, to focus on more important work.

The initial release of DocCare will only be limited to only one private clinic. Marketing subsequent releases to multiple private clinics and hospitals is under consideration by the DocCare Development Team.

## Summary of Key Stakeholder or User Needs

A representative of sampling patients, doctors, receptionists, as well as the current doctor booking system completed a user survey to determine the user problems with the existing booking system and to solicit user feedback on improvements. A summary of results is listed below in order of relative importance from highest to lowest.

| **Need** | **Priority** | **Concerns** | **Current Solution** | **Proposed Solutions** | |
| --- | --- | --- | --- | --- | --- |
| Appointment booking | High | The current booking method is slow and insufficient. | Currently, patients have to book an appointment directly at the receptionist or via phone, which is time consuming, especially for people that work in office hours. | | Patients demand a quick and easy to use application so that they can view the open slots as well as the doctors available and can therefore make an appointment of their liking. |
| Patient treatment process | High | The current treatment process based on document is insufficient | Doctors can only keep track of the patient treatment process each time they revisit the clinic. | | Doctors demand a quick and easy to use application so that they can follow their patients’ treatment process anywhere, anywhen. |
| Absent request | Medium | The doctors have to go through tedious paperwork before being allowed to be absent. | Doctors have to manually contact their clinic through manual paperwork, and can take a long time to respond. | | Doctors demand a quick but informative way to announce the clinic about their absence, and also quickly get a response if any problem arises. |
| Report | High | The admin has to manually collect data processed by receptionists to create a report, which is sometimes lacking information or incorrect. | Admin have to keep track of every appointment made in that month, through means like transcript, receipt,... This information will be turned into useful statistics in the report. | | Admin demands a way to passively collect information of each appointment. The report will be automatically constructed by just a press of a button, and in a printable format. |
| Low clerical cost | Medium | Clerical effort is time-consuming and costly | A receptionist spends 150-200 hours each month processing the appointment paperwork. Much of this time is for entering information of patients and doctors into the database, and re-scheduling those conflict appointments | | Resolving appointment conflicts and information entering are automated, effectively reducing those efforts to zero. |

## Alternatives and Competition

Currently, in the technology industry, there have been similar solutions:

1. [HealthPlix SPOT](https://healthplix.com/)

The smartphone application from India identifies itself as the smartest doctor-first EMR (Electronic Medical Records) solution, which provides an easy way to launch a virtual clinic.

The application supports sending digital prescriptions to patients via SMS or WhatsApp together with face-to-face low latency video and audio calls for patients and doctors. Other similar features with DocCare also have been developed such as: following up reminders and prescriptions update, appointment schedulers.

One major feature that this application outweighs DocCare is that it leverages assistive AI algorithms for chronic patient management. Additionally, HealthPlix SPOT ensures patient data security and regional language support. Last but not least, the application supports both Android and iOS platforms while DocCare’s main platform is limited to Android.

Nevertheless, one major difference between DocCare and this application is market demographics. That is to say, HealthPlix SPOT provides a virtual clinic for 10,000+ doctors of 16 specialities in 370 cities with optional shared clinics whereas DocCare’s primary goal is to provide a medium for all medical staff in a particular clinic only.

1. [Doctor on Demand](https://doctorondemand.com/)

The American mobile application Doctor on Demand provides 24/7 access “to online doctors, psychiatrists, psychologists, therapists and other medical experts, care is always available, anytime and anywhere”.

The application offers some similar features with DocCare: schedule appointments, prescription viewing. However, Doctor on Demand also provides face-to-face consultations.

The strengths which Doctor on Demand have are:

1. Easy to use, clear and simple interface
2. Chat functions work well
3. Physicians and therapists are highly qualified and experienced
4. Various options are available when it comes to scheduling appointments: pick a therapist or go with the first available therapist.

The drawbacks of it are:

1. Lack of clinician availability

The difference between DocCare and Doctor on Demand is that DocCare only limits to in-network appointments schedulers and offline therapy while the latter offers online therapy with either cash-based or in-network care option.

# Product Overview

This section provides a high level view of the DocCare application capabilities, interfaces to the external open source Firebase, and The Database System in an open source Firebase alternative, Supabase, and the system configuration.

## Product Perspective

## Assumptions and Dependencies

The following assumptions and dependencies relate to the capabilities of the DocCare as outlined in this Vision Document:

* The usage lifetime of DocCare will last as much as possible whenever the Database Server of Supabase and Firebase is available and consistent
* The external interfaces of DocCare are definitely for Mobile environments and might be expanded to a Web based application depending on time consumed.
* It is assumed that Private Hospitals and Clinics will continue to use DocCare until 2055.
* It is assumed that additional funding will diminish the dependency on limited resources and providers.

# Product Features

This section defines and describes the features of the DocCare app. Features are the high-level capabilities of the system that are necessary to deliver benefits to the users.

1. Authentication

An administrative account shall be provided to the clinic’s owner with a distinctive account name and password to enter the system. Doctors and medical receptionists shall be provided their own working accounts from the owner’s account to enter the application. Patients shall either login using a registered account with email and password or use Google authentication to enter the application. New patients will have the option to create new accounts. Except admin, other users like patients, doctors and receptionists can change their temporary password and receive a reset password if forgotten.

1. Scheduling Doctor's Appointments

Patients can search for doctors based on specialties, views, and ratings. Detailed profiles of doctors, including specialisations, and patient reviews, are available for informed decision-making. Real-time availability of doctors is displayed, allowing patients to book appointments at their convenience without conflicting with others.The app provides instant confirmation of appointments, along with appointment reminders to reduce no-shows.

1. Automatically Handling Cancelled Appointments

The system shall help the patient, whose appointment has been cancelled, and assign to the next-best and suitable time before notifying one about the cancellation. The patient then can either accept the proposed appointment or cancel it.

1. Electronic Medical Records

Doctors can give out intake details and medical instructions within electronic prescriptions as well as track the completion progress of their patients.

Patients, on the other hand, can easily find their prescriptions, and follow the medical instructions and update the progress of the prescription.

1. Manage Appointments

Patients can view, or cancel their appointments through the app in advance. Appointment history and upcoming schedules are accessible, promoting better organisation and management.

Doctors can see the next appointment and cancel it in advance. Any cancellations from doctors will be handled using the subsection 3 strategy.

1. Doctor Availability

Doctors can request for absence in advance. The requests are handled by medical receptionists. If accepted, all scheduled appointments shall be cancelled and handled using subsection 3 strategies.

1. User Reviews and Rating

Patients can leave reviews and ratings for doctors, helping other patients make informed choices. Authentic feedback builds trust and assists patients in selecting the right healthcare provider. More importantly, it helps the clinic to employ only experienced and dedicated physicians.

1. Notifications and Reminders:

Patients receive notifications for upcoming appointments and regularly are reminded to take the medicine, ensuring they don’t miss their scheduled visits as well as their prescriptions.

Doctors are notified of new appointment requests, cancellations, and confirmation of absent requests; thus allowing them to manage their schedules effectively.

1. Monthly Report

Receptionists and administrators can generate monthly reports summarising key metrics, such as the number of doctors in the clinic, number of patients and number of appointments booked each month. Reports can be exported in PDF format for other usage.

1. Communication between doctor and patient

Patients can establish a private chat space with a doctor and vice versa. This will help the patient have a better understanding of their problems, or simply ask for a solution if anything went wrong during the treatment.

# Non-Functional Requirements

The application is expected to meet the following requirements:

**Performance:**

* The application should be able to send and return the result of a booking in less than 10 seconds.
* The latency of the application shall lie in the acceptance range, which is at most 5 seconds, when used concurrently with a huge number of users.
* Use minimum network resources to operate the application.

**Reliability**:

* The app must be reliable and available 24/9, ensuring users can access it whenever they need to book appointments.
* It should have backup and recovery mechanisms to prevent data loss in case of unexpected failures.

**Security**:

* Patient data must be encrypted and stored securely to maintain patient confidentiality and comply with data protection regulations.
* Secure authentication methods (such as two-factor authentication) should be implemented to prevent unauthorised access.
* The app will be immune to threats such as SQL injection, cross-site scripting, and data breaches.

**Compatibility**:

* The app should be compatible with a wide range of Android devices, including smartphones and tablets, across various screen sizes and resolutions.
* It should be available for different types of Android phones, ranging from old models like Pixel 3A to the newest models like Z Flip 5, Z Fold 5.
* It should also support different Android versions to ensure a consistent user experience.

**Usability**:

* The app should have an intuitive and user-friendly interface, following Android's Material Design guidelines for seamless navigation.
* It should provide appropriate feedback to users, such as loading indicators and confirmation messages, to enhance usability.

**Accessibility**:

* The app should be accessible to users with disabilities, following accessibility guidelines (such as WCAG) to ensure equal access for all users.

**Performance Metrics:**

* App loading time cannot exceed 10 seconds. Patients should not wait more than 10 seconds to receive the result of their booking requests.
* The server response time should lie in an acceptable range, which is at most 5 seconds.

**Network Connectivity:**

* The application should only work with stable Internet connections for user experience and to prevent risks of transaction errors.
* The app should be able to notify users when there is an error in network connectivity.

**Compliance:**

* Ensure that the app complies with relevant healthcare regulations and standards, ensuring the secure handling of patient data and adherence to medical ethics.

**Updates and Maintenance:**

* Plan for regular app updates to introduce new features, fix bugs, and enhance security.
* Provide a mechanism for users to easily update the app on their Android devices.
* Plan for regular system maintenance to keep the data secured.

**Documentation and Support:**

* Provide comprehensive documentation for users and healthcare providers on how to use the app effectively.
* Offer customer support channels, such as email or in-app chat, to assist users with any issues or inquiries.

**Space requirements**

* Guarantee that the releasing application must be lightweight and take up a small amount of memory (less than 200 megabytes)
* Minimum extra spaces needed to download extra information while using the app.