Book Your Dentist: A Mobile application for "Smart Booking" to the regional Dental Clinics in Sultanate of Oman

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Abstract

All of us face dental issues in our day to day lives. Booking an appointment with the dentist can be a cumbersome task as first you have to search for a nearest dentist that provides the needed services and then find a free slot with them to book. In today's COVID -19 pandemic, physically going to the dentists and making the bookings, or waiting for your turn to come might not be preferred. Hence this research work will address the following gaps with the existing applications in the same domain. Firstly, there are many Dental clinics spread across the Sultanate of Oman. This application will bring all the dental clinics under one umbrella. Secondly, most of the clinics are till date recording bookings manually, leading to human errors in the booking details and other inaccuracies. Thirdly, unawareness about the nearby clinics may lead to a long waiting time, travelling to far off clinics will not be feasible every time. Fourthly, the clinics might face a lot of pressure in serving the patients due to COVID-19 restrictions and guidelines and reaching out to the patients through advertisements. Lastly, the patients might forget their appointments, or the doctor might be busy and unavailable due to emergency cases etc., thereby leading to wastage of resources and time in the clinic. Book Your Dentist comes to help! This real-time, mobile scheduling platform will bridge the gap between the patients and the dental clinics, thereby being an economical resort for advertising their services as well as identifying the potential patients. This application will enable scheduling anywhere and anytime. The work aspires to develop and design app for organization of appointments in dental clinics using mobile applications targeting the needs of both dental clinics and patients. The basic features of the application are to provide an easy and smooth integrated application in dental clinics that is characterized by the doctor's choice, and introducing information about diseases already suffering, presentation of services, and provides an integrated advertising platform, and a platform to capture user comments. The questionnaire is used to review opinions about the application of appointment booking in the clinics. The technology for developing a booking appointments app in dental clinics is Android Studio and link with Firebase to store data.

Keywords –Smart health care, Mobile application, dental services, dentist.

Introduction

Dental clinics are an integral part of human medicine. It was established for the purpose of examination, diagnosis and study of diseases related to the mouth, jaws, face, teeth, nerves and tissues associated with them.

Dental clinics in the Sultanate of Oman have expanded greatly. The establishment of dental clinics requires permission from the competent government agencies. According to what was decided in the Royal Decree (8/80) February 12, 1980. The application of "Smart Booking" to create it, there are many goals and motives, due to the great expansion of the spread of dental clinics in the Sultanate of Oman, and there is no application that includes all dental clinics in one place. Most clinics have a web page system or a manual reservation system. The application will include dental clinics in one place, according to the governorate. This will facilitate access to dental clinics, which results in benefits for patients and dental clinics. Where it meets all the interests of dental clinics and their patients: Choose the right clinic, Book appointments, Schedule appointments, publish ads, add comments and Offer services. The application aims to facilitate and make the process of booking appointments and managing them ideally smoother and more flexible, to avoid any pressure faced by dental clinics in increasing patients and so on, and it also contributes to managing the time the patient spends waiting to meet the dentist. also, through which services are presented Provided by dental clinics and a platform in which advertisements and comments about the application and clinics are published. It also encourages dental clinics to provide appropriate services to all clients. It will be ideal and modern to keep pace with modern developments in society and to avoid the use of papers and the accumulation of data and so on.

Methodology:

The current work uses a combination of both the quantitative and qualitative methods to get the data for the related work. Online questionnaire was used for the quantitative analysis to analyze the problem and frame the objectives. The qualitative research was used for the literature review related to the technology in this domain and to identify the gaps in the existing work of similar area.

Literature Review

The presence of applications for booking appointments in dental clinics has become very important for what is happening nowadays about the spread of Covid 19 disease. Emily Esposito defines reservation apps as "are business tools that allow clients to book, reschedule, and cancel appointments through a web interface." This is evident from this that the existence of applications and reservation systems facilitate the customers' access to the institution and manage their appointments in an integrated and ideal manner. The world has significantly developed in the field of smart phone applications that make it easier for people to have the requirements of daily life. It is often used in establishments that provide services to the customer. Remote services also appeared significantly during the period of the spread of COVID 19 virus. Where a group of reservation systems and applications appeared at the present time, some of them are shown below:

Square Appointments application: The solution to business management and its difficulty lies in the Square Appointments app as published in Capterra. It is suitable for organizations that work in different fields as they manage the time for preparing and organizing the business .It is a free website in which sales are organized, scheduled and payment management to make it easier for customers to complete all their work in record time. It is considered a general application that can be used in different places such as barbershops, salons, health services and others. Despite the functionality provided by the application, it suffers from technical problems that lead people to distrust it because it appears unprofessional. One of the most prominent technical problems is that the appointment that was booked by the clients does not reach the institution correctly, which leads to effects such as accumulating data, overlapping appointments in some of them, or losing the entire appointment This increases the responsibility of the application administrators as they reschedule, arrange and organize the appointments well and this consumes an amount of time.

GP system appointments and booking: A specific system for GP clinics, where you work on scheduling and arranging appointment reservations with his doctor. As mentioned on the nhs.uk website. The system contributes to managing patient data and managing their appointments. Reservations are made in the system by calling supervisors or visiting clinics; and talking with employees to book an appointment. Among the services provided by the system are urgent appointment requests, consultations, frequent medical prescriptions, and treatment for children. Despite the features it provides, it suffers from technical problems that make it unprofessional, frustrating and complicated for the user, as users of a system have difficulty understanding the system and the requirements that must be completed, which leads to a negative reflection and wasting time in vain, and the appointment that the patient took may conflict with another appointment In another clinic

TabeebOman app: It is a platform that includes doctors in the Sultanate of Oman. It contains a different health centers, such as clinics, hospitals, etc., along with the services it provides as published in TabeebOman website. Where the platform works according to the specialty of a doctor and the region in which he/she is located. One of the technical problems that the platform suffers from a permanent failure and does not work with high efficiency and also requires the user to restart the platform how many times to work well a little, resulting in damage to some devices. The platform also suffers from an inability to store user and doctor data, which leads to data accumulation and scheduling conflicts.

The Bookafy application : It is an application used to book and schedule appointments on the platform. Set up a reservation for a user's presentation on the Internet. as published in downdetector.com. An application mostly used in organizations that provide external calls and meetings over the Internet as well as has alerts and reminders notifications. Despite the features that the application possesses, users may suffer from technical problems that make the application unprofessional and unsafe. One of the technical problems that the application suffers from is that the users' data does not have privacy, and any user can see the appointments of others. The application does not provide data to communicate with people or the institution. The lack of a direct response between the clients and the establishment, and it requires rescheduling of the appointment by paying large sums of money

Reservation application: Emily Esposito published in a scientific article about the programs, and she explained during her article that appointment booking and scheduling programs are the best. She also explained that the applications are a means by which the appointment of the client in the institution is determined. app helps in managing the business better and remotely. It can be modified and deleted easily and more flexibly to avoid any congestion that hinders the workflow and causes the spread of disease. (Esposito, E., 2020).

Appointment management: Dixie Thamrin has published in one of his scientific articles about managing appointments through smartphone applications, saying app is "integrated with a customer journey management system". Through the study, it becomes clear to me that managing appointments via the Internet is an important matter in our time to manage appointments in an integrated manner and with greater ease. This will also contribute to the establishment of new clients. Also, having applications will encourage establishments to keep pace with community developments and strive to provide the best services (Chung, L., & do Prado Leite, J. C. S. 2009).

Create applications appointments: Applications are essential and important at the present time, as the world is witnessing a great expansion in the field of programming. Accordingly, the project will be created by using the IOS operating system, which is used in Android systems. It is an application dedicated to meeting the needs of dental clinics and patients, and this is done through easy online appointment booking**.** The IOS operating system is the easiest to use for initial programmers, and for linking the application to a database file. Designing and creating smart phones app as published in one of its scientific articles is" The stage where you iteratively implement any remaining features and prepare for deployment." From this it becomes clear to me that smart phone programming needs time and multiple stages and it is desirable for it to have a well thought out plan. Implementation is always the important stage on which the work is based, following the designs and studies prepared for implementation in advance. Applications differ in the languages used to implement them, there are many of them are Java, C ++, Python, etc. Frank Ableson, Android Studio is "a mobile phone platform," From that the program is considered as an area for building and developing the application (Ableson, F., 2018)

Problem definition

The lack of an integrated platform that collects dental clinics in one place, which results in severe consequences such as wasting time and increasing effort in searching for a suitable clinic, manually booking appointments, as a result of which data is duplicated and accumulated or lost, resulting in excessive crowding in the clinic. Also, most clinics suffer from the lack of an ideal way to publish ads, which leads to the use of simple means such as publishing and printing papers. There is also no way to remind patients of their appointments, this results in the appointment being canceled or postponed. Reception staff do not ask about chronic diseases, which sometimes leads to coma, and so on.

Data collection

Questionnaire:

It is a tool used to study a specific topic by preparing a series of questions that are published to a target group and collecting the answers to take a realistic study based on the experiences of individuals. The questionnaire is part of the survey. Below appears a series of questions used in the "smart booking" application to collect realistic facts from individuals and the extent of their desire for an application such as this:
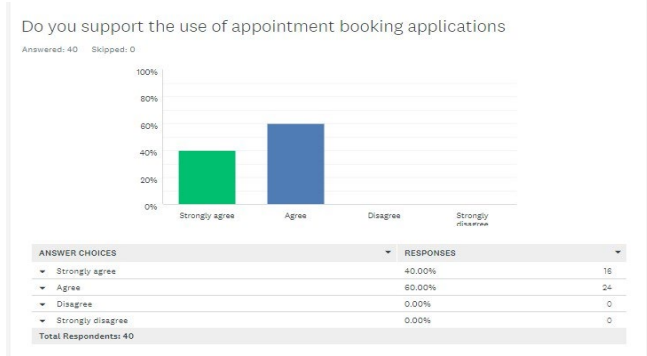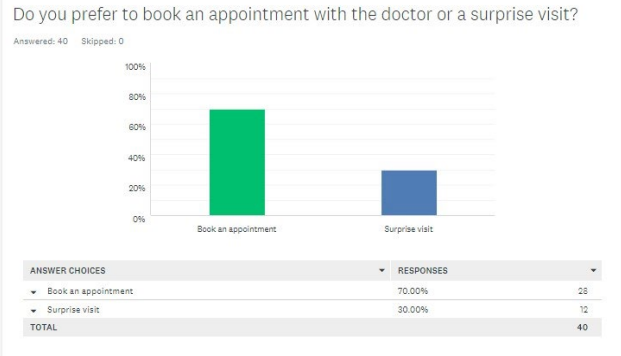
Figure 1 Q1 Results

Figure 2 Q2 Results

The above figure 1 shows the extent of the support of individuals in booking the appointment in the dental clinic through an application. This shows that manual booking leads to a long wait. Also, I did not find any objection to the idea during the survey and data analysis process. In short, the idea of booking appointments is desirable. The above figure 2 shows the best way for individuals to book appointments. The chart shows that the method is recommended for individuals during a visit to the dentist. As it appears that the percentage of individuals who prefer to book an appointment in the dental clinic that was visited is 70%. While other people prefer a surprise visit by 30%. In short, prebooking in dental clinics is an interesting matter to avoid losing the time the patient spends looking for an interview with the dentist.
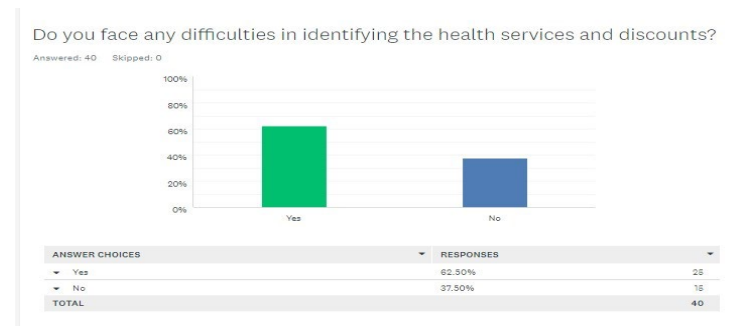

Figure 3 Q3 Results

Figure 4 Open ended question

The above figure 3 shows the difficulties that the patient faces in getting to know the services and discounts offered by dental clinics. The chart above shows that individuals do not have complete knowledge about services and discounts in dental clinics at a rate of 62.50%. While others do not have any difficulty knowing the services and discounts offered by dental clinics, at a rate of 37.50. In short, based on the results, knowledge about dental clinics and discounts is almost lost, as there is no ideal way to spread ads. From the suggestions that were included in the results, there should be a dedicated area for the patient to book an appointment easily, an application must work throughout the day without any delay or obstruction to storing data, the application must have privacy to avoid any access to others' files by unauthorized persons, it must To provide a domain application for advertisements and to publish discounts offers, it must store an easy-to-use and uncomplicated application and set up a method in the event of an emergency situation.
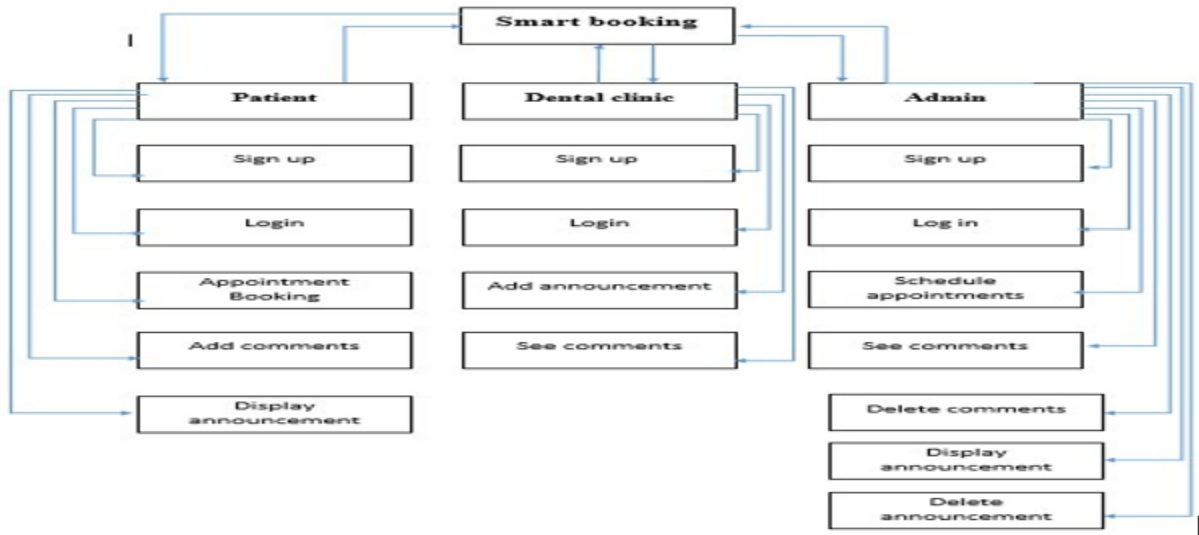
Block Diagram

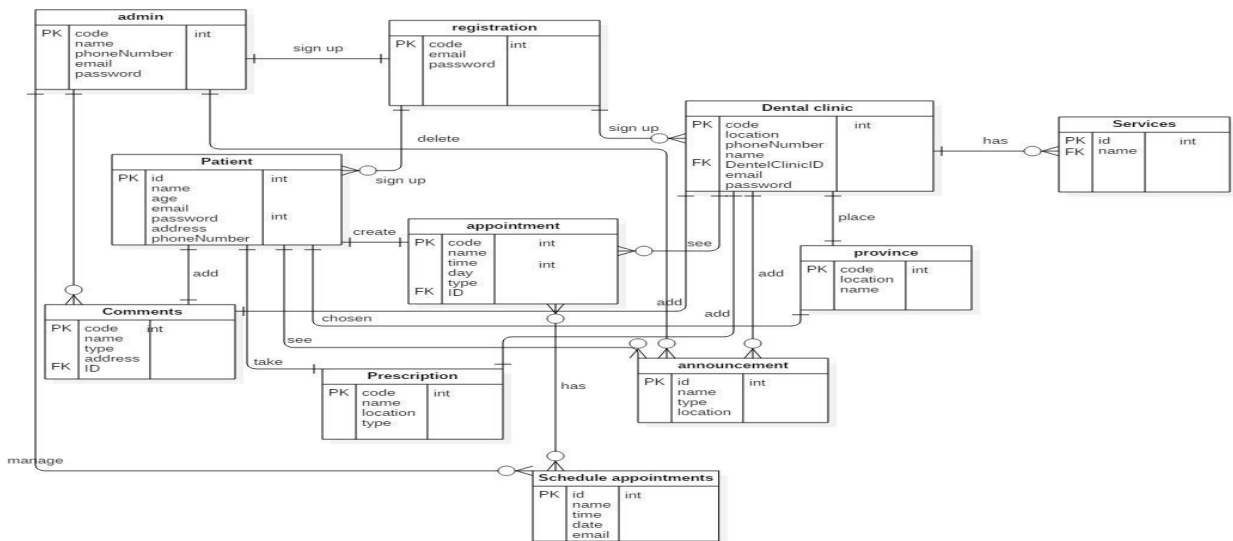*Figure 5 Block Diagram*

Entity relationship diagram (ERD

Figure 5 Entity Relationship Diagram
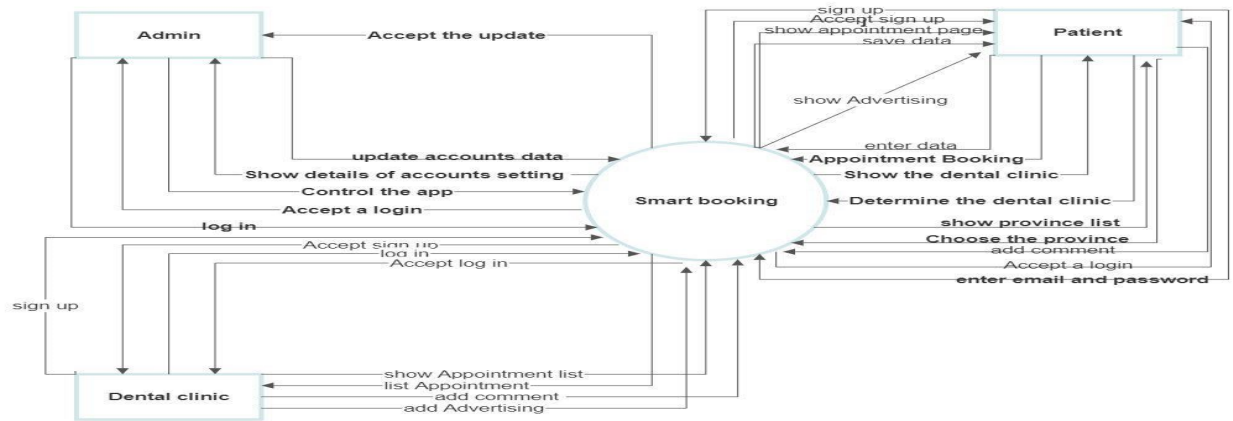
Context Diagram

Figure 7 Context Diagram
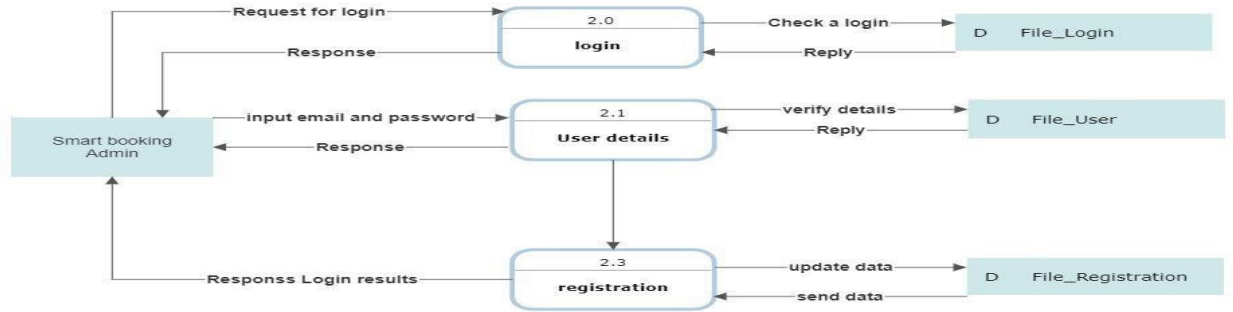
Data flow diagram (DFD) level 1

Figure 8 Data Flow Diagram

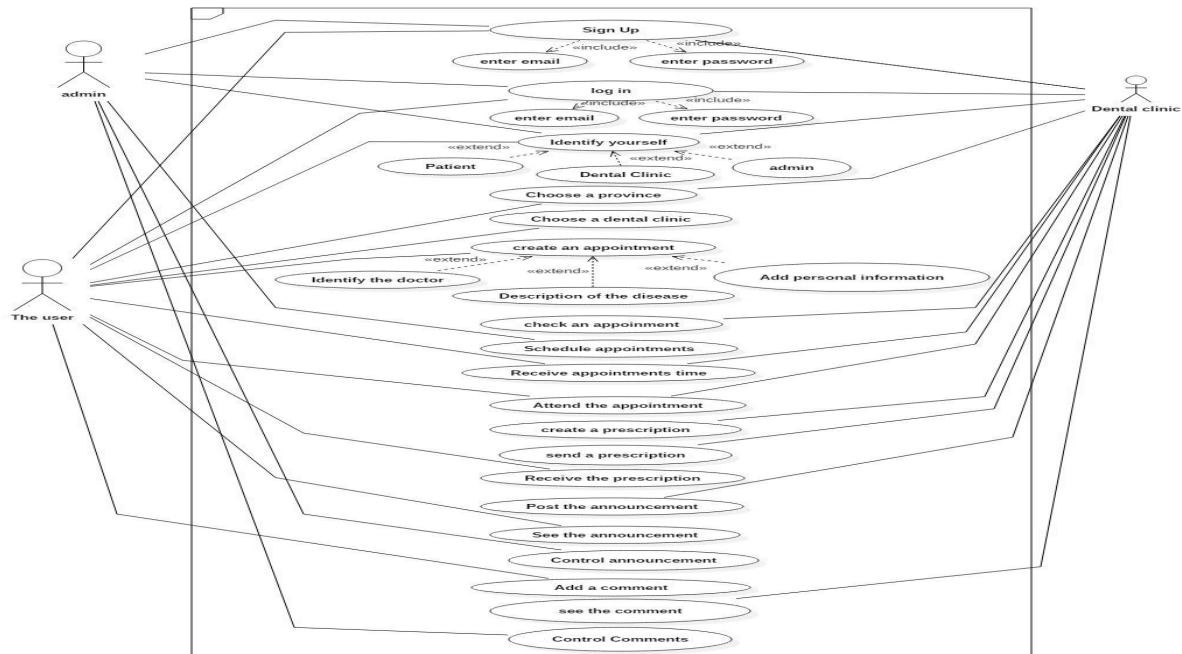## Illustrating the design Use case diagram

Figure 9 Use case Diagram

Conclusion:

 In conclusion, it is expected that the application will be an integrated platform for dental clinics in the Sultanate of Oman and serve all residents and citizens. It will facilitate the process of booking appointments, posting advertisements and comments, viewing services, and more. It is also an opportunity and encourages dental clinics to provide better services at reasonable prices. It is recommended for deployment to make the facilities better for dental patients, in-line with the smart health initiative of the Sultanate of Oman.

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