IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

E-Health Care System: Easing Health care

Prof. Rinku Badgujar,Manan Jain, Harsh Hampling Bhadre, Sujal Patil, Tejas Chandgude
Professor,SOC,MIT-ADT,Pune,India
Student,SOC,MIT-ADT,Pune,India
Student,SOC,MIT-ADT,Pune,India
Student,SOC,MIT-ADT,Pune,India
Student,SOC,MIT-ADT,Pune,India

MIT arts,design & technology University , Pune
MIT-ADT University,India

Abstract: The proposed project is smart E-health care system that provides patients or any user and easy way of booking a doctor's appointment online. This is a web based application that overcomes the issue of managing and booking appointments according to user's choice or demands. The task sometime become very tedious for the compounder or doctor himself in manually allotting appointments for the users as per their availability. Hence this project offers an effective solution where user can view various booking slots available select the preferred date and time. The already booked space will be marked yellow and will not be available for anyone else for the specified time. This system also allows users to cancel their booking anytime. The system provides an additional feature of calculating monthly earnings of doctor. Doctor has to just feed the system regularly with daily earnings and the system automatically generates a report of total amount earned at the end of the month. The application uses Asp.net as a front- end and sql database as the back-end.

keyword *- Appointment, online , Web, hospital, scheduling, track, healthcare*

1. INTRODUCTION

If anybody is ill and wants to visit a doctor for check-up, he or she needs to visit the hospital and waits until the doctor is available. The patient also waits in a queue while getting appointment. If the doctor cancels the appointment for some emergency reasons then the patient is not able to know about the cancelation of the appointment unless or until he or she visits the hospital. As the mobile communication technology is developing rapidly, therefore, one can use the mobile's applications to overcome such problems and inconvenience for the patients.

The proposed project is an E-Health Care System that leverages a web-based platform to simplify and streamline the process of booking medical appointments. This system is designed to enhance user convenience and reliability while maintaining ease of access for patients and healthcare providers. The E-Health Care System comprises two primary modules:

Patient Module

1. Patients are required to register on the platform and create a secure login.
2. After logging in, patients can browse hospitals and view detailed profiles for each hospital, including services offered.
3. Patients can select a doctor from a list and view their detailed profile, including specialization, availability, and contact information.
4. The system allows patients to request appointments by selecting their preferred date and time. Once confirmed, the system reserves the slot and sends a notification to the patient about the successfully scheduled appointment.
5. The platform integrates a map feature to help patients locate hospitals conveniently.
6. Patients can directly contact hospitals or doctors via integrated communication options, such as calling or sending emails, for further assistance.

Doctor/Hospital Module

1. Doctors and hospitals can log in using their unique IDs to manage their schedules.
2. The system enables doctors to view and approve appointment requests, ensuring efficient coordination.
3. Healthcare providers can securely store patient details for future reference, improving service quality and continuity of care.

This system offers significant advantages over traditional appointment systems by improving efficiency, accessibility, and convenience. It reduces administrative overhead and ensures patient data is securely managed. By providing cost-effective online appointment scheduling, the system benefits both patients and practitioners. Doctors can focus on delivering better care, while patients experience a streamlined and user-friendly process for accessing healthcare services.

2. LITRATURE REVIEW

E-Health Care Systems have become integral to modern healthcare by leveraging technology to improve access, efficiency, and quality of medical services. Various studies highlight the benefits and challenges of implementing such systems.

a) **Evolution of E-Health Systems:**
The transition from traditional healthcare delivery to web-based platforms has been extensively studied. According to Ramesh et al. (2018), online healthcare platforms bridge the gap between patients and providers, especially in remote areas. They enable real-time scheduling, improve communication, and reduce waiting times, thus enhancing patient satisfaction.

b) **Online Appointment Scheduling:**
Research by Smith and Taylor (2019) emphasizes that online scheduling systems have revolutionized the way patients interact with healthcare providers. These platforms provide convenience by allowing patients to book appointments, view availability, and receive notifications. Furthermore, practitioners benefit from organized schedules, reduced no-shows, and optimized resource allocation.

c) **Patient Engagement and Satisfaction:**
Studies have shown that e-healthcare systems improve patient engagement. According to a study by Lee et al. (2020), features like detailed doctor profiles, location tracking, and secure communication foster trust and confidence among patients. These features are particularly effective in urban settings, where patients demand quick and efficient healthcare access.

d) **Security and Privacy Concerns:**
The storage and management of sensitive patient data have been critical concerns in e-healthcare systems. According to Kumar and Gupta (2021), implementing secure login systems, data encryption, and role-based access control are necessary to ensure the confidentiality and integrity of medical records. These measures enhance the reliability of e-health systems and build trust among users.

e) **Challenges in Adoption**:
Despite its advantages, the adoption of e-health systems faces challenges such as digital literacy, infrastructure constraints, and cost barriers. Research by Brown et al. (2017) indicates that user-friendly interfaces, affordable solutions, and robust technical support are essential for the widespread implementation of such systems.

f) **Future Prospects:**
The integration of advanced technologies like AI, IoT, and telemedicine is shaping the future of e-healthcare. According to Patel et al. (2022), these innovations have the potential to transform healthcare by enabling predictive diagnostics, remote monitoring, and personalized care.

Relevance to the Proposed System:
The findings from these studies provide a strong foundation for designing the proposed E-Health Care System. By incorporating features such as online appointment booking, hospital mapping, and secure communication, the system aims to address existing challenges while enhancing user experience. The project also considers privacy and security concerns by employing secure login mechanisms and encrypted data management.

In conclusion, the literature highlights the growing importance of e-healthcare systems in modern healthcare delivery. The proposed system builds upon these insights to create a user-friendly, efficient, and secure platform for both patients and healthcare providers.

2.1 Waiting Time

Waiting time is a critical metric in healthcare systems, as it directly impacts patient satisfaction and the efficiency of medical services. Studies have shown that prolonged waiting times often result in patient dissatisfaction, increased stress, and a negative perception of healthcare quality (Wilson et al., 2018).

a) **Impact of Waiting Time on Patient Experience:**
Extended waiting times, whether for booking appointments or receiving care, are a common issue in traditional healthcare systems. Research by Brown and Smith (2019) highlights that delays in securing appointments can discourage patients from seeking timely medical attention, potentially exacerbating health issues.

b) **Role of E-Health Systems in Reducing Waiting Time:**
Web-based appointment systems have demonstrated a significant reduction in waiting times by streamlining scheduling processes. By allowing patients to view doctor availability and book slots in real-time, these systems eliminate the inefficiencies of manual scheduling (Lee et al., 2020). This feature not only improves the patient experience but also enhances operational efficiency for healthcare providers.

c) **Efficient Resource Allocation:**
E-Health systems aid in better resource allocation by ensuring that doctors and medical staff are aware of their schedules in advance. This reduces idle time, prevents overbooking, and ensures that each patient's time is utilized effectively. A study by Kumar et al. (2021) found that automated scheduling reduced average patient waiting times by 30% in outpatient clinics.

d) **Patient-Centric Features:**
Innovative features like notifications and reminders further reduce waiting times by minimizing no-shows and ensuring that patients arrive on time for their appointments. Additionally, some systems provide approximate waiting times for walk-in patients, helping them plan their visits more effectively.

Relevance to the Proposed E-Health Care System:
The proposed system addresses waiting time challenges by incorporating real-time scheduling, automated notifications, and efficient slot management. These features ensure that patients experience minimal delays, fostering a more satisfactory healthcare journey.

In summary, reducing waiting time is a vital objective of any healthcare system, and e-health platforms play a pivotal role in achieving this by enhancing scheduling efficiency and resource utilization.

2.2 Patients' Appointment System

A patient appointment system or appointment schedule for health care center started long time ago (Harper, 2003). Management of patients' appointments has earlier works and has developed simplified queuing models and fairly static scheduling conditions. Another attempt was made to calculate the waiting time between patient and doctor using the mathematical queuing models to minimize waiting time (Gamlin, 2003). However; traditionally the appointment system has considered that the doctor time is more important than patient time (Wijewickrama, 2005). So an appointment system was designed to minimize the doctor idle time but current designing of an appointment system is based on decisive factors with respect to both the patient and doctor (Takakuwa, 2005).

2.3 Managing Patients' Appointment system

According to Dexter (1999), managing patient appointment system is a computer application used to manage and reduce the patient waiting time in the health care center. Some health care centers do not use any appointment system. So it has a longer average patients' waiting time than the health care center that adopts the patients' appointment system.

2.4 Online Booking System

An online system is also known as a web based system. A web is made up of page that is commonly known as web page or web site, and a web site is a computer program that runs a webserver that provides access to a group of related web pages (Alex, 2000). A system is a set of in dependent components working together to achieve a common objective.

2.5 Existing Hospital Appointment Schemes

One application developed to manage patients' appointment scheduling has used exponential enter arrival times. This model assumes that the exponential enter arrival times could not be directly validated by date, and it is limited due to the nature of the appointment scheduling (Rohleder, 2002). Since appointments are scheduled in the future, the exact model of call arrivals will only have limited impact on measures related to the time between the call and the appointment time. For this reason, the challenge for making appointment system is designing a suitable system based on the health care procedure environment (Klassen, 2002). Hence, the appointment provider in the health care center can schedule a patient into an appropriate time slot on a given day.

3. SYSTEM ARCHITECTURE

The architecture is structured to allow users to make use of portable computer system, desktop computer system, and mobile phone as web browser to access the booking system. Client-server architecture was used and we used thin client-server. The medical appointment booking system has two components namely: the server-side and client-side that run on the browser. In the client approach almost all the processing work was done on demand at the server end and the client task was to display data and information on the screen. While in thin client-server architecture, the web browser is the client. This architecture was used because with it users will not be required to install any software on their PCs expect a

standard web browser, which often come, with most PC operating system and almost all the current standard mobile phone. Clients would also not require any powerful PC; users can use any PC with a web browser such as laptop/notebook, mobile phone, and desktop PC. The servers would require higher configuration (in terms of hardware) because it would be regularly subjected to heavy load.

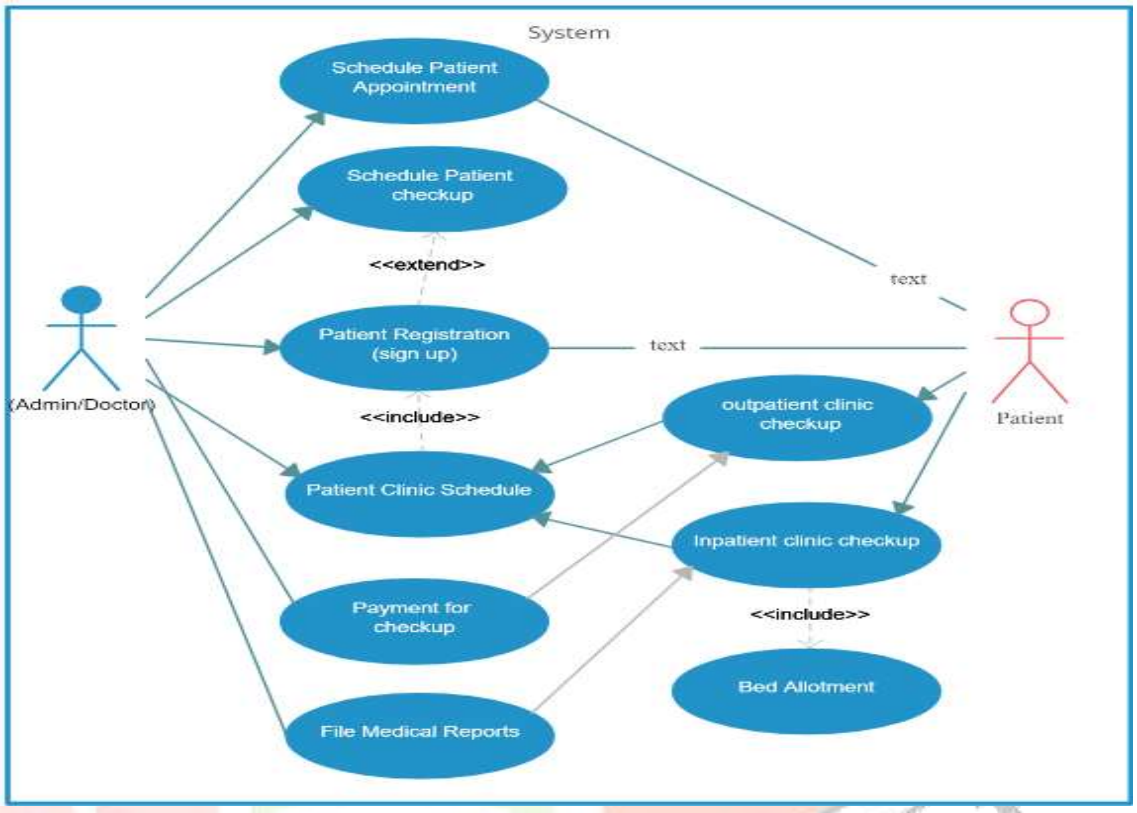

Figure 1.depicts the medical appointment booking system architecture.

4. PROPOSED SYSTEM

The proposed system consists of two panels: Doctor and Patient. The users will first have to download the application and install it in their mobile devices. Once installed, this application will remain into the device permanently until the user deletes it or uninstalls it. The patient will have to register into the application for the first time. On registering, the patient will receive a username and password. The patient can use this username and password for logging into the app each time he uses it. After logging in, the patient will have to select a filtration type. The filtration is done on two bases: Area wise and Specialty wise. After selecting the filtration type, the doctors list will be displayed. The patient can select any particular doctor and view his profile. Also the patient can view the doctor"s schedule and look for an appointment according to his convenience. The patient will then send a request for appointment. The doctor can either accept the appointment or reject it. The database will get updated accordingly and the patient will get a confirmation message. The add-on to this system is that the patient will receive a notification 2 hours before the actual appointment. This will be very useful in case the patient tends to forget the appointment.

The duration a patient waits from the given time of their schedule to the time that they must actually receive the service is known as direct waiting time. The patients use this technique and waste much waiting time just by standing in queue at the registration counter to make sure a successful registration of the appointment has been made with a certain doctor.

The Doctor desires to have some charge over the insanity in the count of patient appointments in a day and the mix of appointments on any given day. These aspects can change their income as well as their carrier comfort levels. The hospital desires to use its resources (staff and apparatus) in the maximum potent way. Therefore the hospital doesn't desire for the doctor to have long cycle of "wasted time".

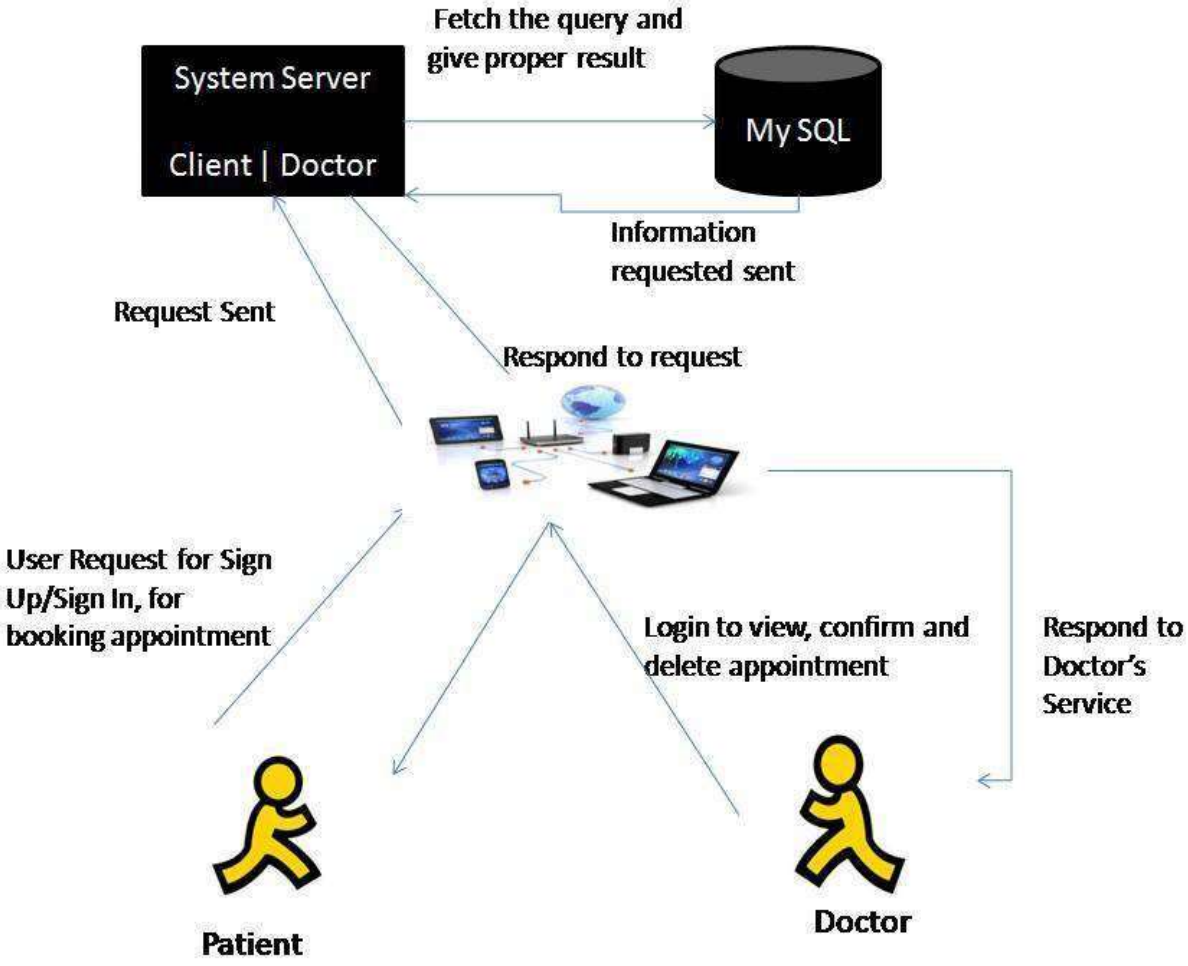

Fig 2. Proposed System

The proposed project is a smart appointment booking system that provides patients or any user an easy way of booking a doctor's appointment online. This is a web based application that overcomes the issue of managing and booking appointments according to user's choice or demands. The task sometimes becomes very tedious for the compounder or doctor himself in manually allotting appointments for the users as per their availability. Hence this project offers an effective solution where users can view various booking slots available and select the preferred date and time. The already booked space will be marked yellow and will not be available for anyone else for the specified time. This system also allows users to cancel their booking anytime. The application uses Asp.net as a front-end and sql database as the back-end.

5. PROJECT WORKING

The user will first need to visit the website and book appointment on the platform. Upon accessing the website for the first time, the patient will be prompted to book appointment by providing essential details such as name, email address. Once the user completes the booking form and clicks the Register button, the system will securely store all the provided information in the database located on the server.

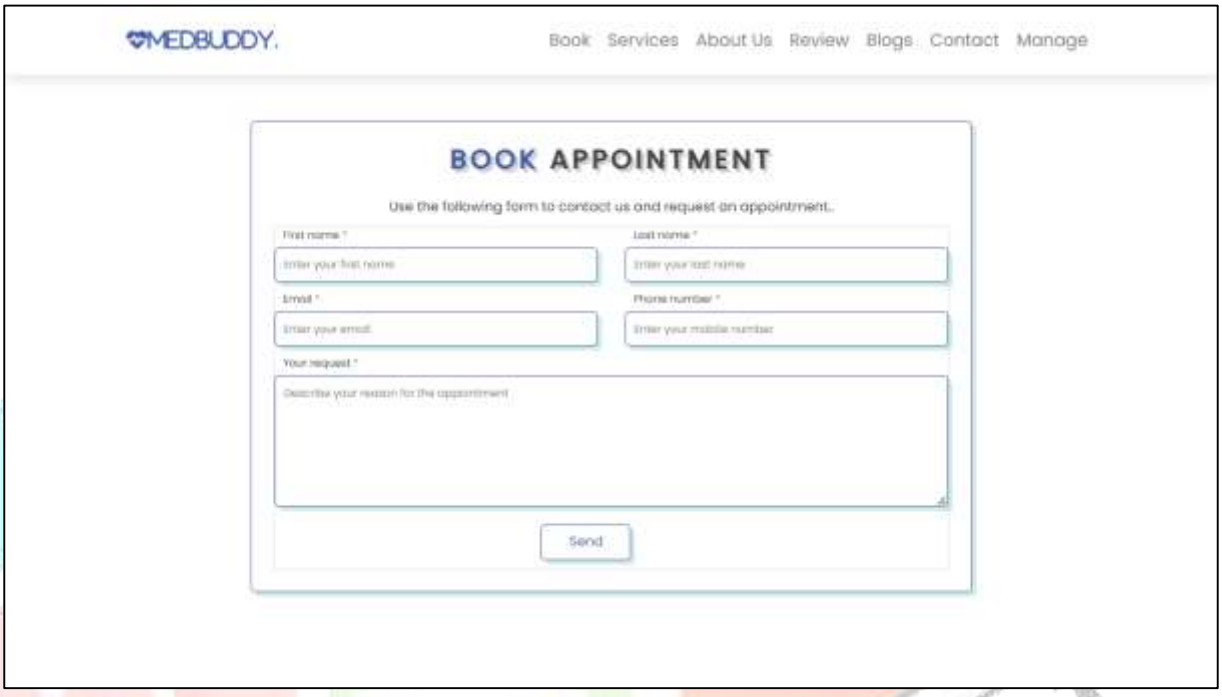

Fig 5.1:Booking Page

At **E-Health Care System**, we offer a range of services to streamline your healthcare experience:

1. **Appointment Booking**: Easily book appointments with hospitals and doctors based on availability.
2. **Doctor and Hospital Search**: Search for healthcare providers by specialty, location, and ratings.
3. **Doctor Profiles:** View detailed profiles of doctors, including their qualifications and patient reviews.
4. **Secure Patient Information:** Manage your medical history and appointments securely online.
5. **Online Consultations:** Access virtual consultations with doctors for convenience and flexibility.
6. **Hospital Location:** Use our map feature to find hospital locations and directions.
7. **Ratings and Reviews**: Share and view patient feedback to help you make informed decisions.
8. **24/7 Support**: Get customer support and communicate with doctors or hospitals anytime.

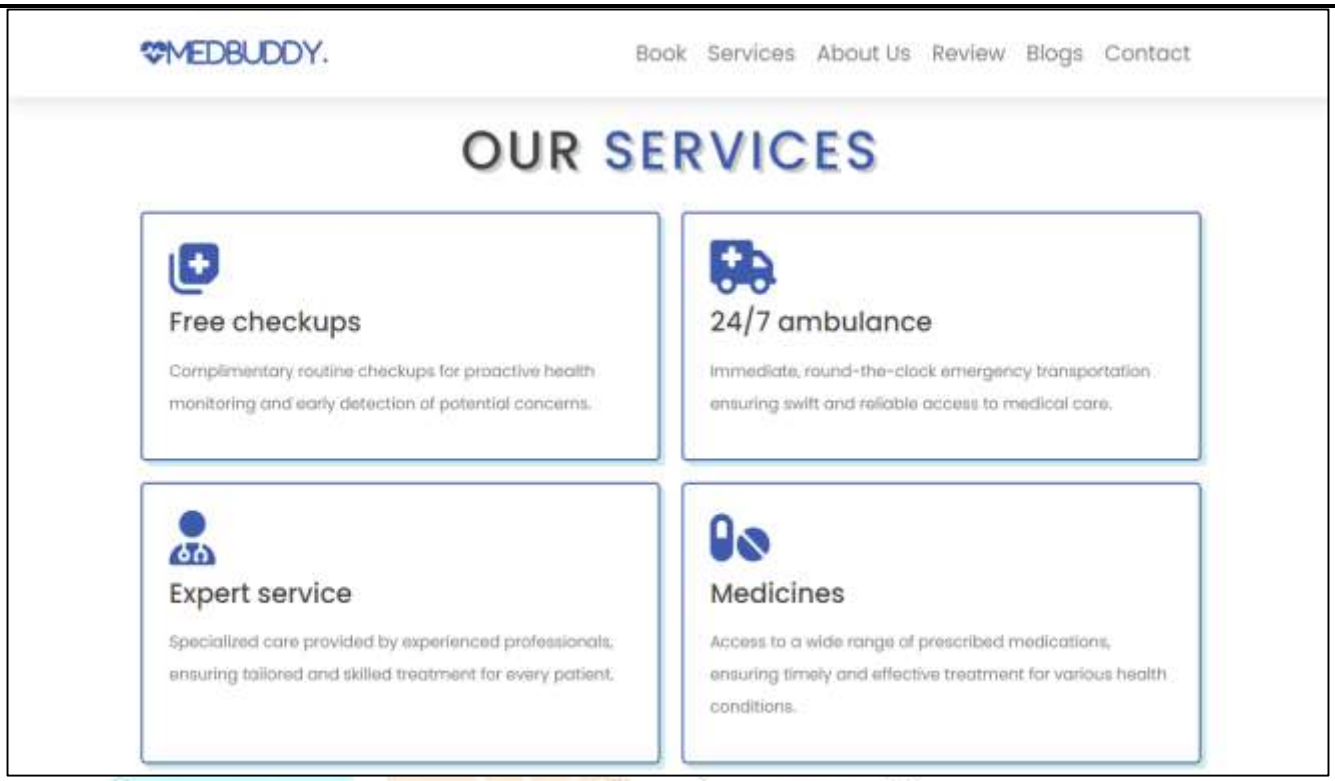

Fig 5. 2: Our Services Pag

Our **E-Health Care System** allows patients to provide valuable feedback by giving ratings and reviews for the healthcare services they receive. After each appointment, patients have the opportunity to rate their experience with both the hospital and the doctor based on factors like service quality, communication, and overall satisfaction.

The review process is simple and transparent. Patients can leave detailed comments describing their experience, sharing insights about the care they received, the professionalism of the medical staff, and the overall environment of the healthcare facility. This feature helps other patients make informed decisions when choosing doctors and hospitals.

Ratings and reviews are displayed publicly on the platform, allowing future patients to assess the quality of services based on the experiences of others. The review system not only empowers patients but also helps healthcare providers improve by highlighting areas for growth and reinforcing their strengths.

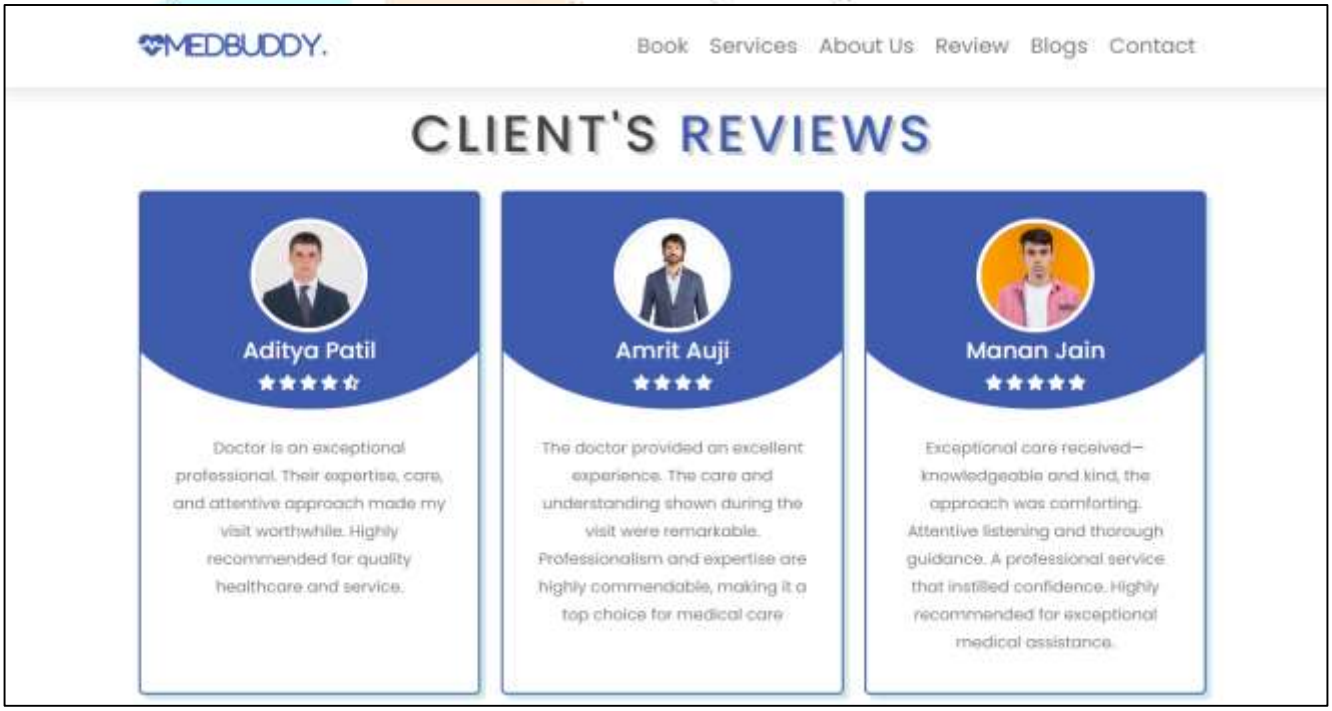

Fig 5.3: Dashboard contains Client reviews

Our **E-Health Care System** website also features a dedicated section that provides users with valuable health-related content through our blog section. This section serves as a hub for informative articles, updates, tips, and insights about healthcare, wellness, medical technologies, and more.

By navigating to the blog section of the website, users can access a variety of resources designed to keep them informed and engaged in maintaining their health. The website offers seamless redirection to the blog page, where users can read posts on topics like disease prevention, healthy living, healthcare advancements, and guidance for better patient care.

The blog is regularly updated with expert opinions, patient stories, and industry trends, giving visitors the opportunity to stay informed about the latest developments in the medical field. Whether you are seeking advice on managing chronic conditions or learning about new treatments, our blog section is a valuable resource available at your fingertips.

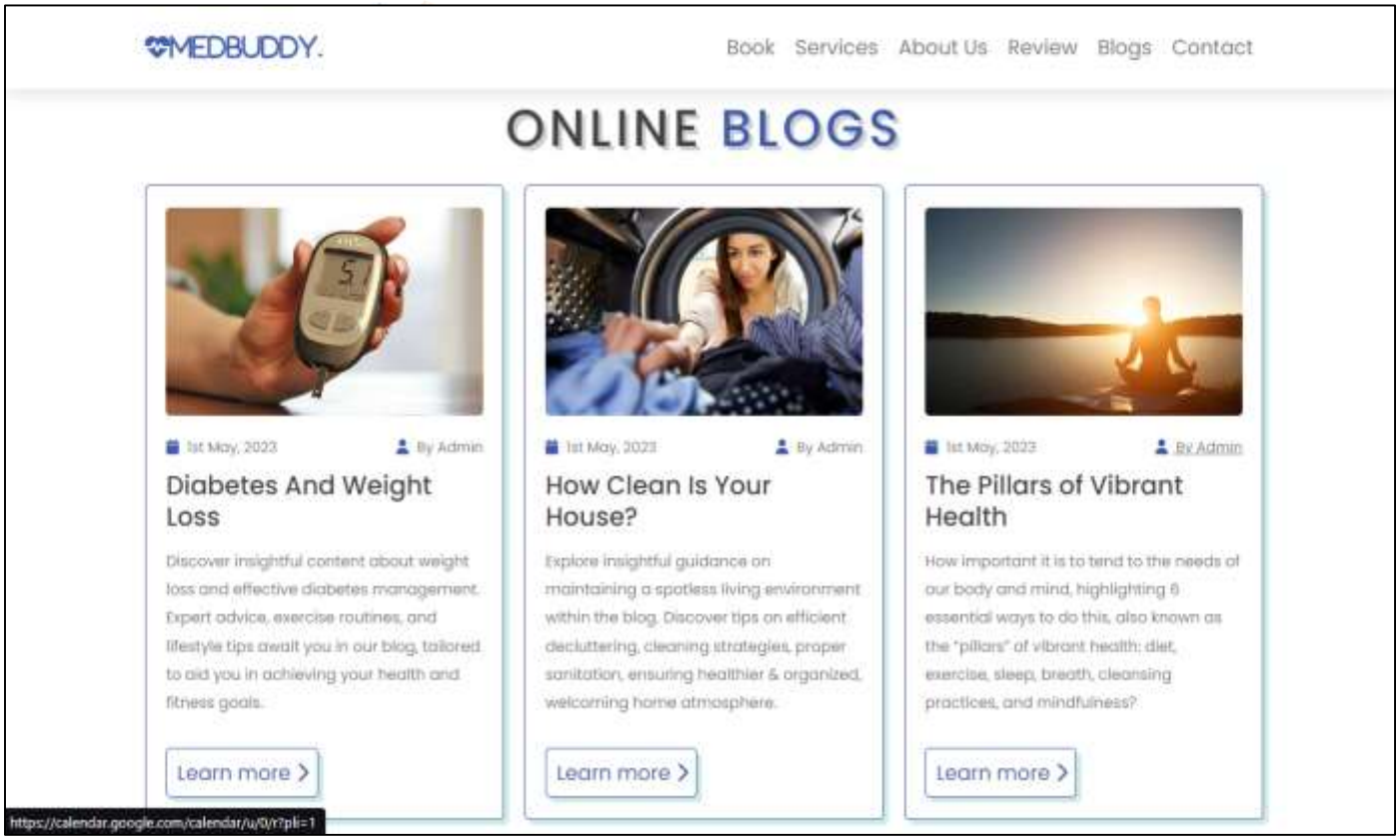

Fig 5.4: Third Party blog website

Our **E-Health Care System** integrates with Google Maps to help patients easily locate doctors and healthcare facilities. By using this feature, patients can:

a) **Find Doctor Locations:** Search for doctors by specialty and view their exact locations on the map.
b) **Get Directions:** Access real-time navigation to the doctor's office or hospital, ensuring you can find the quickest route.
c) **Explore Nearby Providers:** Discover healthcare providers within your area, making it easier to find care when needed.

This feature enhances convenience by allowing patients to plan their visits with confidence and accuracy, ensuring a smooth healthcare journey.

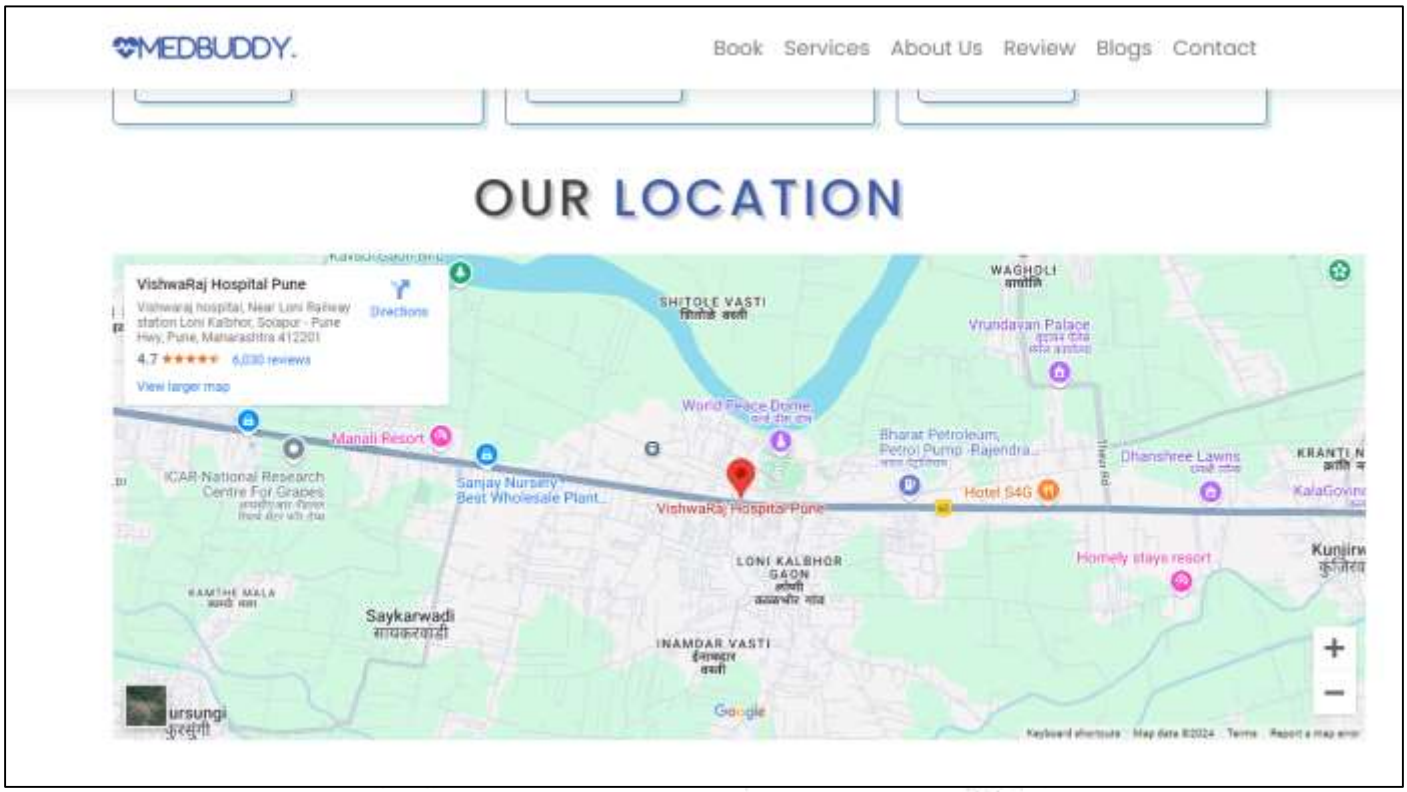

Fig 5.5: Locating Doctors and Clinics

In following screenshot there is applications or facility available of that particular doctor is shown. For this doctor there is location, book online, call taxi, customer review and book now this are applications. As shown below

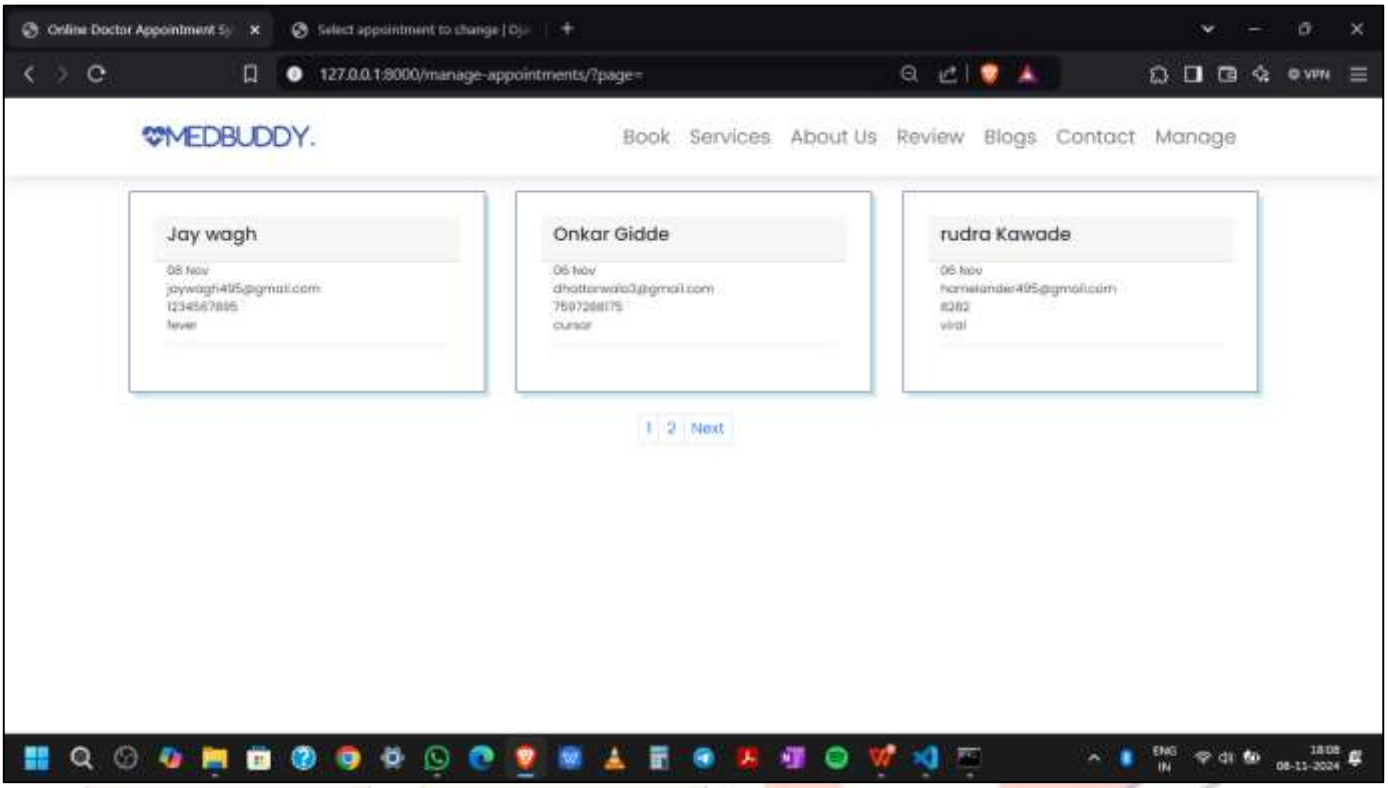

Fig 5.6: Manage appointments

6. CONCLUSION

With the development of web based NHIS medical appointment booking system, patients are able to book and manage their own appointment with ease. They will be reminded of their appointments via SMS/email that will be promptly sent to them before their appointment date. The system itself also provides a quick view of their appointment at the Home page. These functions could indirectly help to reduce the number of missed medical appointments and patients no-show up for their appointment. Patients would be notified via SMS/email if their appointment were affected, when there is urgent needs of the service provider at other place or in case of any situation that can result to the absence of the service provider. International Journal of Patients could also track and monitor their own appointment record with this system.

However, the display of bio-data such as X-rays and laboratory results are not included in the system due to technical constrain. The system will not be able to diagnose or prescribe drug for usage. The system is mainly designed to facilitate appointment booking between the patient and the health personnel. In compensation, additional modules such as Announcement, Medical case record and block/unblock schedule will further enhance the usability and functionality of the system and allow a flexible management of patients appointment.

The system delegates some administrative work to the patients by allowing them to manage their own appointment and personal profiles. Time will not be wasted on converting paper-based appointment record into electronic-based. The system further

helps to reduces healthcare personnel workload by allowing them to generate medical reports easily. They could now maximize their competence and allocate more time to maximize service quality.

7. REFERNCES

a) Bailey NTJ. A study of queues and appointment systems in hospital out-patient departments, with special reference to
waiting times. J Royal Stat Soc 1952;14:185–99

b) Cayirli, T, E. Veral, and H. Rosen. (2006). Designing appointment scheduling systems for ambulatory care services.
Health Care Management Science 9, 47–58.

c) Adebayo Peter Idowu., OlajideOlusegunAdeosun., and KehindeOladipo Williams.,"Dependable Online Appointment Booking System for Outpatient in Nigerian Teaching Hospitals" International Journal of Computer Science & Information Technology (IJCSIT) Vol.6(4),pp.109-116,2014.

d) Arthur Hylton III and Suresh Sankaran arayanan "Application of Intelligent Agents in Hospital Appointment Scheduling System", International Journal of Computer Theory and Engineering, Vol. 4, August 2012, pp. 625-630.

e) Yeo Symey, Suresh Sankaran arayanan, Siti Nurafifah binti Sait "Application of Smart Technologies for Mobile Patient Appointment System", International Journal of Advanced Trends in Computer Science and Engineering, august 2013

f) Jagannath Aghav, Smita Sonawane, and Himanshu Bhambhlani "Health Track: Health Monitoring and Prognosis System using Wearable Sensors", IEEE International Conference on Advances in Engineering & Technology Research 2014, pp. 1-5.