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RESEARCH ARTICLE OPEN ACCESS

Online Doctor Appointment System

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ABSTRACT -
Nowadays many people are facing different types of medical problems. The pandemic has not only brought the COVID-19 virus, but also many major and minor diseases as well. Due to the lockdowns, booking doctor appointments physically has become almost impossible. Also, most people don't know who the best doctor they can go to and they cannot communicate directly with the doctor for consultation.
Efficiency and patient satisfaction are the main criteria for optimal performance but the medical institutions in many developing countries are faced with issues like:
1. Overtime for doctors and nurses.
2. Patients having to wait longer.
3.Increased workload for administrative personnel.
Keeping in mind these issues, a web- based doctor appointment system has been developed.

Both doctors and patients can register themselves which is monitored by the receptionist(admin).
Doctors can sign up by giving necessary details like Name, Qualifications, Specializations, Work History etc. The doctors can login using their username and password and check for any appointment requests by patients. If the appointment is available, a notification is sent to the patient about the same. They can also prescribe medicines after consultation and view feedback given by the patient. The patient must also be a registered user and they can select the particular doctor they want to book an appointment with.
This system focuses on improving the efficiency and quality of delivering a web-based appointment system.

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I. INTRODUCTION

Globally, the health care sector plays a pivotal role and is an integral part of human life. Even the slightest errors could prove to be really dangerous and cause fatal injuries. Extensive use of technology has been made to improve quality , efficiency , and delivery of health care services. Doctor appointment for patients is one of the major clinical services that has been automated. Due to this healthcare providers are constantly looking to reduce operation costs while improving the quality of service. This has led to the rise of preventive medicine in order to avoid diseases, minor complications etc. while the hospital stays open for sick people. A web-based system can save the precious time of the patients and decrease the physical gap between doctors and patients thereby providing fast and adequate medical services. Through the connection between web terminals and specific services, both doctors and patients are able to obtain required data to achieve a better interaction. Also, the pandemic has brought a lot of inconveniences along with it. It is difficult to get appointments by direct contact to the hospital or by standing in a queue. Keeping in mind these issues, an Online Doctor Appointment System has been created. The main concept of this project is to get easy appointments through an online application which resolves the patient's problems. It allows the patient to book appointments through online registration. With this application, the effort to the patients will be reduced as they can view doctor details, their timings, specializations etc. and make an appointment accordingly. This way both doctors and patients can save their valuable time.

This research presents our work on an online doctor appointment website for enabling users to book appointments quickly and effortlessly, making the process less tedious and less time consuming.

II. LITERATURE SURVEY

(**Mr. Doc: A Doctor Appointment Application System**.Malik, Shafaq & Bibi, Nargis & Khan, Sehrish & Sultana, Razia & Rauf, Sadaf)
This paper focuses on an android application called Mr.Doc which acts as the client whereas the database containing the doctor's details, patient's details and appointment details is maintained by a website that acts as a server.The objective here is to provide ease and comfort to patients while taking appointments from doctors.

(**Design and Implementation of a Patient Appointment and Scheduling System.** John Lekan, Akinode.)
Here a system has been developed to improve upon the efficiency and quality of delivering a web based appointment system to reduce waiting time. In this paper, a patient appointment and scheduling system is designed using AngularJS for the frontend, Ajax framework for handling client-server requests and Sqlite3 and MYSQL for the backend.

(**Effective Online Medical Appointment System.** S.Hema Kumar, J.Uday Kiran, V.D.Ambeth Kumar, G.Saranya, Ramalakshmi V.)
This project focuses on a web based application, in which the admin allows registration and login for both doctors and patients.The system is divided into 3 parts, 1.Patient Registration System , 2.Doctor, 3.DocSys Administration
With this application the effort to both doctors and patients will be reduced. Also the doctor can schedule his own time based on the appointments booked.

(**Web-Based Medical Appointment Systems: A Systematic Review**. Peng Zhao, Illhoi Yoo, Jaie Lavoie,James Lavoie, Eduardo Simoes.)
Health care is changing with a new emphasis on patient-centeredness. Fundamental to this transformation is the increasing recognition of patients' role in health care delivery and design. Medical appointment scheduling, as the starting point of most non-urgent health care services, is undergoing major developments to support active involvement of patients. By using the Internet as a medium, patients are given more freedom in decision making about their preferences for appointments and have improved access.

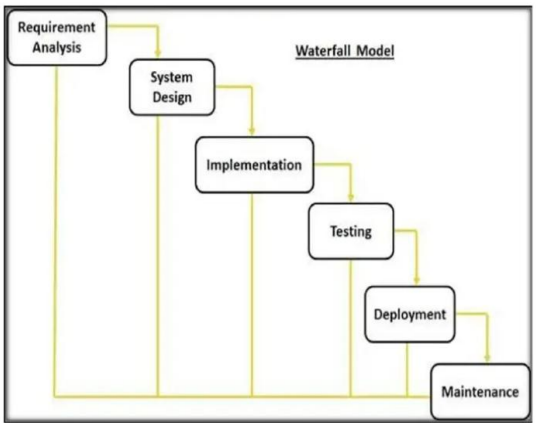
(**A Literature review of Measurement of Health Literacy in India**. Samir Barve)
This study was undertaken to study the scenario of HL (Health Literacy) research conducted on Indian Population in the last 5 years. This systematic review was conducted with the objectives as follows:
What is the percentage of use of pre-validated HL Measurement scales?
What types of aspects were studied for measurement of HL

(**Consultation Paper on Unified Health Interface (UHI).** The National Health Authority (NHA))
The key objective of this consultation paper is to elicit feedback from the public and concerned stakeholders on the functional and technical design of UHI, to ensure that UHI caters to the diverse needs of healthcare ecosystem players.UHI aims at streamlining the digital health service experience for the providers of health service and the patient by establishing and standardizing the technology pathways that enable such services to be given

Software and Tools Used:
1. HTML
2. CSS
3. JAVASCRIPT
4. BOOTSTRAP
5. PHP
6. PYTHON
7. Windows 7 (with .NET Framework 4.5.2), 8.0, 8.1 and 10 (32-bit and 64-bit)

III. PROPOSED WORK

The proposed work focuses on implementing an Online Doctor Appointment Website. The basic function of this website is to help patients book appointments easily and also allow doctors to keep a track of these appointments.. The Waterfall Model has been used here for implementation.



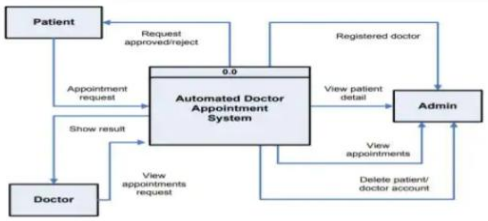
The system is implemented by using HTML and CSS for the frontend , which creates a dynamic UI which is easy to understand and can be navigated without any hassle.Here, PHP (Hypertext

Preprocessor) acts as the server side for managing the databases and session tracking related to patients , doctors, their details, the various appointments booked, prescriptions etc. An object-oriented programming language, i.e, JavaScript is used to enable dynamic interactivity so that the user can interact with the web pages without having to reload every time. The whole framework has been developed using the Windows 7 operating system. Here the system is divided into three parts.

1. Doctors
2. Patients
3. Receptionist (Admin)

3.1 Doctors:

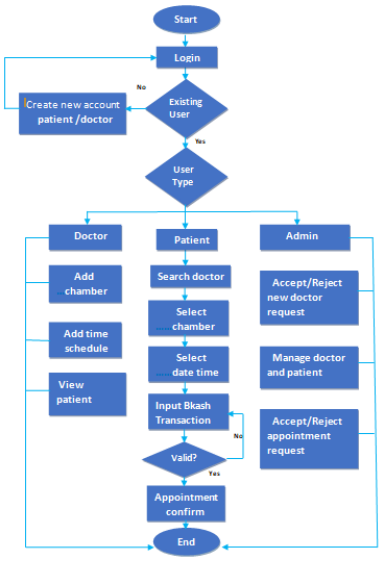
Doctors can register by giving necessary details like Name, Qualifications, Specializations, Work History etc. After successful registration, the doctor can log in by giving their username and password. The doctor can see the patient requests and send the notification to the patients if the appointment is available. They can prescribe medicines after consultation and also view the feedback given by the patient.



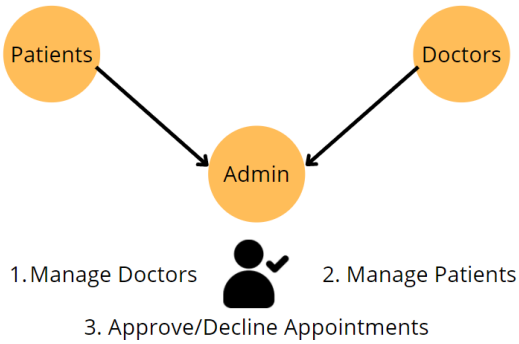
(System Overview)

3.2 Patients:

The patients should also be registered users. If the user is new to the website they can register themselves by providing basic details such as name, email-id , password etc. Once they login, they can see the dashboard (overview of their profile) , doctors, top doctors, etc. Depending upon the problem they face, they can book an appointment with the particular doctor. Depending upon the availability , the admin will approve or decline the appointment requests. They can also see medication prescribed to them by the doctor after consultation.The flow of the website is as follows:



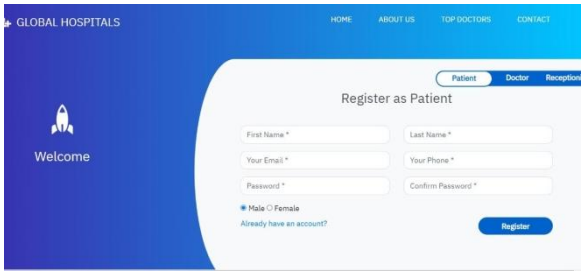
3.3 Receptionist (Admin):



The admin acts as a bridge between doctors and patients. Its primary task is to manage doctors and patients and make sure the appointment process is smoothly carried out. The admin can also add new doctors in the database after thorough verification. In the admin section all the appointments booked, by what patient, to which doctor , can be seen. The receptionist has the power to approve or decline appointment requests based on a doctor's schedule.

3.4 User Interface:

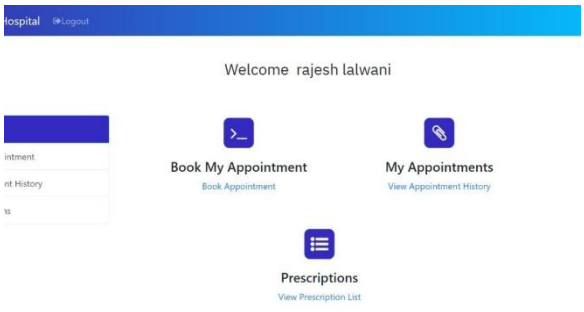
We have designed a simple and user-friendly interface. By using this interface, users can login and book an appointment, doctors can check requests and schedule accordingly, and the admin can approve or decline the appointment requests. A top doctors list with all the top experts in a particular field of medicine can also be seen here.



(Homepage)

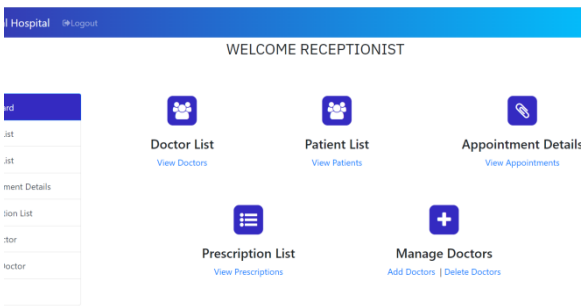
(Top Doctors)

IV. RESULTS AND ANALYSIS



(Patients)

(Doctors)

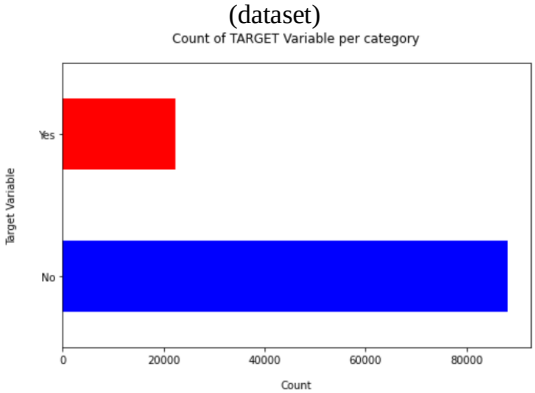


(Admin)

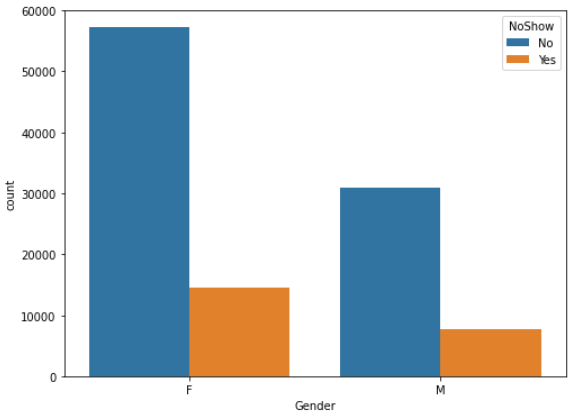
Analysis:
Healthcare data has been analyzed using Python. Interactive Python notebooks (Jupyter Notebook) have been used here to perform Exploratory Data Analysis (EDA) on the dataset. The dataset consists of fields like:
PatientId, ScheduledDay, AppointmentDay, Gender , various health issues like Hypertension, Diabetes, Alcoholism etc. which have been used to explore and understand :
how many people have actually shown up for appointments, 'NoShow' Customers, Category Wise Distribution of patients etc.
Further In-depth analysis has been done.

	PatientId	AppointmentID	Gender	ScheduledDay	AppointmentDay	Age	Neighbourhood	Scholarship	Hipertension	Diabetes	Alcoholism	Handcap	SM
0	2.987250e+13	5642903	F	2016-04-29	2016-04-29	62	JARDIM DA PENHA	0	1	0	0	0	
1	5.589978e+14	5642503	M	2016-04-29	2016-04-29	56	JARDIM DA PENHA	0	0	0	0	0	
2	4.262962e+12	5642549	F	2016-04-29	2016-04-29	62	MATA DA PRAIA	0	0	0	0	0	
3	8.679512e+11	5642828	F	2016-04-29	2016-04-29	8	PONTAL DE CAMBURI	0	0	0	0	0	
4	8.841186e+12	5642494	F	2016-04-29	2016-04-29	56	JARDIM DA PENHA	0	1	1	0	0	

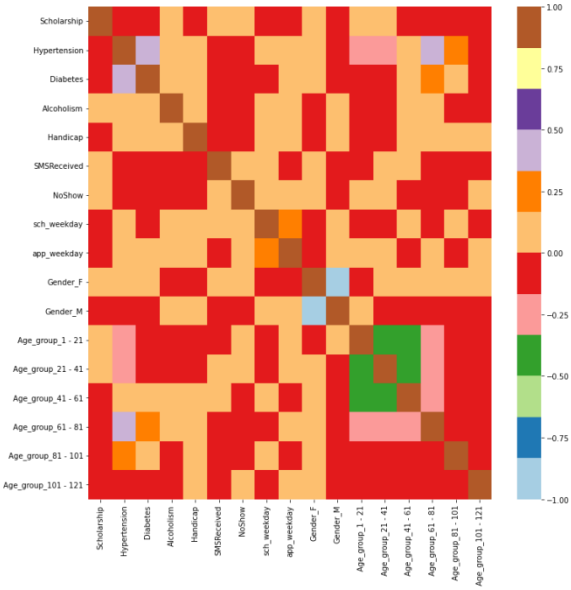
(dataset)



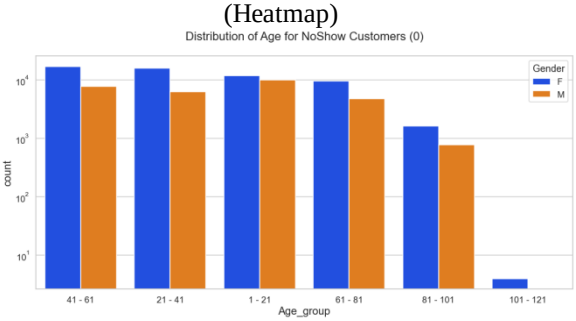
(Count of TARGET variable - NoShow per category)



(Distribution of NoShow Customers w.r.t Gender)



(Heatmap)



(Distribution of noShow customers in different age groups w.r.t Gender)

V. CONCLUSION

This is a web-based system that deals with the issue of managing and booking appointments according to user's choice/necessity. Patients can select doctors based on their medical needs and they can look at their details and reviews to learn more. Hence this project offers an effective solution where users can view various booking slots available and select the preferred date and time. This reduces physical waiting time and not only saves time for the users but also makes the appointment process more efficient. With this application the doctor can alert his own schedule. Hospitals can easily manage their registration and appointment process and monitor the flow of patients to the doctors. The admin manages both the doctors and patients and creates a seamless experience for all the people involved. This reduces fatigue and frustration and is a convenient way to book appointments in the modern day world.

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