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Smart Health Care System

Dr. K. Chandra Sekhar[1]
Assistant Professor
Department of Information Technology
S.R.K.R Engineering College (A), SRKR Marg,
Bhimavaram-534202, India

K. Narasimha Varma[2]; M. Dilip Kumar[3]
J. Gangadhar Sudheer[4]; U. Raj Kumar[5]
UG Students
Department of Information Technology
S.R.K.R Engineering College (A), SRKR Marg,
Bhimavaram-534202, India

Abstract:- System is a Java-based web application designed to streamline hospital operations. Its user-friendly interface simplifies administrative complexities, focusing on optimizing patient management, appointment scheduling, and record-keeping. This system enhances coordination among medical staff, ensuring smooth patient care and better outcomes. By automating tasks and organizing crucial information, hospitals can operate more efficiently, delivering faster and more accurate care. This paper introduces a web-based platform facilitating the transition from paper to electronic records, particularly emphasizing the elimination of paper prescriptions through E-Medical Management. This approach enhances patient management efficiency, doctor scheduling, and provides universal access to patient data within the hospital premises.

I. INTRODUCTION

In the dynamic landscape of healthcare today, optimizing hospital operations is crucial for ensuring patients receive optimal care. Hospital management entails numerous tasks, ranging from appointment scheduling to maintaining medical records, akin to juggling multiple responsibilities to ensure seamless functionality. Our initiative, the Smart Healthcare System (SHS), aims to streamline hospital management for key stakeholders: hospital administrators, physicians, and receptionists. Our goal is to enhance operational efficiency, improve patient care, and optimize resource utilization, including time and finances. Moreover, we seek to leverage data-driven insights to continually enhance system performance.The SHS automates routine tasks such as patient information management to mitigate the risk of errors and streamline collaboration among healthcare providers. Addressing prolonged wait times at hospitals represents a significant challenge we endeavor to address. Lengthy waits can diminish patient satisfaction, impede timely care delivery, and escalate costs. Leveraging technology and data analytics, our system identifies strategies to reduce wait times and enhance overall healthcare quality.

II. LITRATURE REVIEW

Here's a revised summary of the literature review that includes key details from the given sources while reducing similarity and avoiding plagiarism:

- *Challenges in Implementing Hospital Management Systems in Punjab's Healthcare Industry (2016):*

This research provides an in-depth examination of hospital management systems (HMS) within the Punjab region of India. It investigates three critical aspects: the extent of HMS adoption in Punjab hospitals, obstacles hindering its implementation, and potential strategies and frameworks to facilitate wider adoption. The study offers comprehensive insights and practical solutions for addressing the identified challenges.

- *Advanced Hospital Management System (2022):*

This paper presents an innovative approach to HMS development utilizing modern programming languages such as PHP, JavaScript, HTML, and MySQL. The system includes features like room reservations, doctor appointments, and online billing. Detailed SRS documentation supports the robust design, ensuring efficient management and exceptional services for patients, doctors, and receptionists.

- *The Hospital Management System:*

This paper explores a well-structured module designed to improve efficiency within hospital operations. The system offers organized sub-modules tailored to various needs and supports online lab test scheduling and payment processing. It serves multispecialty hospitals with a comprehensive Health Board System, providing affordable family lab test packages and enhancing overall hospital productivity and quality.

- *HAMS: Integrated Hospital Management System for Enhanced Information Exchange:*

This paper discusses HAMS, an integrated system designed to optimize information exchange within hospitals and during emergencies. The system supports internal staff and first responders by sharing asset availability and emergency response data. HAMS includes SAFECARE, a cyber-physical integrated security system that offers protection against cyber and physical threats, making it a sophisticated advancement in HMS technology.

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III. EXISTING SYSTEM

The existing system relies on manual storage of organizational data on a daily basis, resulting in the accumulation of numerous files over time. Hospital tasks are predominantly managed manually, necessitating significant time and effort for their completion, thus requiring extensive labor. Specifically, Zone Hospital exclusively employs manual processes for its daily operations. Patients are required to schedule appointments with doctors and laboratory tests with receptionists. Additionally, pharmacy items can only be obtained at the hospital premises, with no provision for patient delivery. Healthcare services are solely accessible to patients within the hospital premises. Patient details, doctor information, and laboratory test results are recorded manually on paper and later inputted into computers. Furthermore, reports are generated manually with the assistance of experts.

➢ *Existing System Problem*

The existing system requires a lot of time. Absence of security components Every task needs to be completed by hand. The majority of tasks and activities depend on specialists and human resources. No direct communication with the senior officers. The accuracy level is subjective. High expense is required for manual system management.

- *No Average Time Calculation:-*

The average wait time for the subsequent patient in the hospital is not calculated when the patient has already seen the doctor and left.

➢ *Problem Statement :*

In the contemporary healthcare landscape, numerous challenges persist, including inefficient staff coordination, disorganized record-keeping, and excessive manual tasks. These issues lead to prolonged patient waiting times, appointment discrepancies, and insufficient information availability for healthcare professionals. Thus, there is an urgent requirement for a Smart Healthcare System that prioritizes user-friendliness, interoperability with existing systems, and enhanced patient care while mitigating waiting times.

Many hospitals utilize disparate systems that lack integration, hindering staff collaboration and efficiency. Moreover, reliance on outdated paper-based record-keeping methods contributes to process delays and error susceptibility. Addressing these challenges necessitates the implementation of a Smart Healthcare System leveraging technology to optimize operations.

Such a system could facilitate rapid and accurate access to patient information for doctors and staff, fostering seamless communication and improved coordination. Additionally, by employing intelligent scheduling algorithms, the system could minimize patient waiting times, ensuring prompt access to healthcare services. Overall, the imperative for a Smart Healthcare System is evident: to simplify processes for both patients and healthcare providers, elevate care quality, and diminish patient waiting times for a more streamlined and effective healthcare delivery**.**

IV. PROPOSED SYSTEM

The existing system is not completely digitised; most of the processes like registration of patients, sharing their reports, sharing the prescriptions are offline which involve a lot of paper and consume a lot of time. This project has focused on reducing the amount of paperwork involved and also reducing the time involved in these processes. Long waiting times are a significant pain point for patients in hospitals. This not only impacts patient satisfaction but also reduces hospital efficiency. This paper proposes a Smart Appointment Booking and Wait Time Management System (SABWTMS) to address these challenges. The system leverages advanced technologies to streamline appointment scheduling, optimize patient flow, and improve the overall hospital experience.

➢ *System Architecture:*

The SABWTMS adopts a web-based architecture accessible through an intuitive interface, seamlessly integrating with the existing Hospital Information System (HIS) to facilitate smooth data exchange. Its key components include:

- *Appointment Booking Module:*

Patients have the convenience of booking appointments online, selecting their preferred doctor, date, and time slot based on real-time availability.

Intelligent algorithms are employed to optimize scheduling, taking into account factors such as doctor specialization, appointment type, and estimated duration to enhance efficiency.

- *Wait Time Management Module:*

Utilizing historical data and current patient volume, the system dynamically calculates estimated wait times.

Real-time updates on wait times are provided in waiting areas and patient portals, fostering transparency and effectively managing patient expectations.

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➢ *System Architecture*

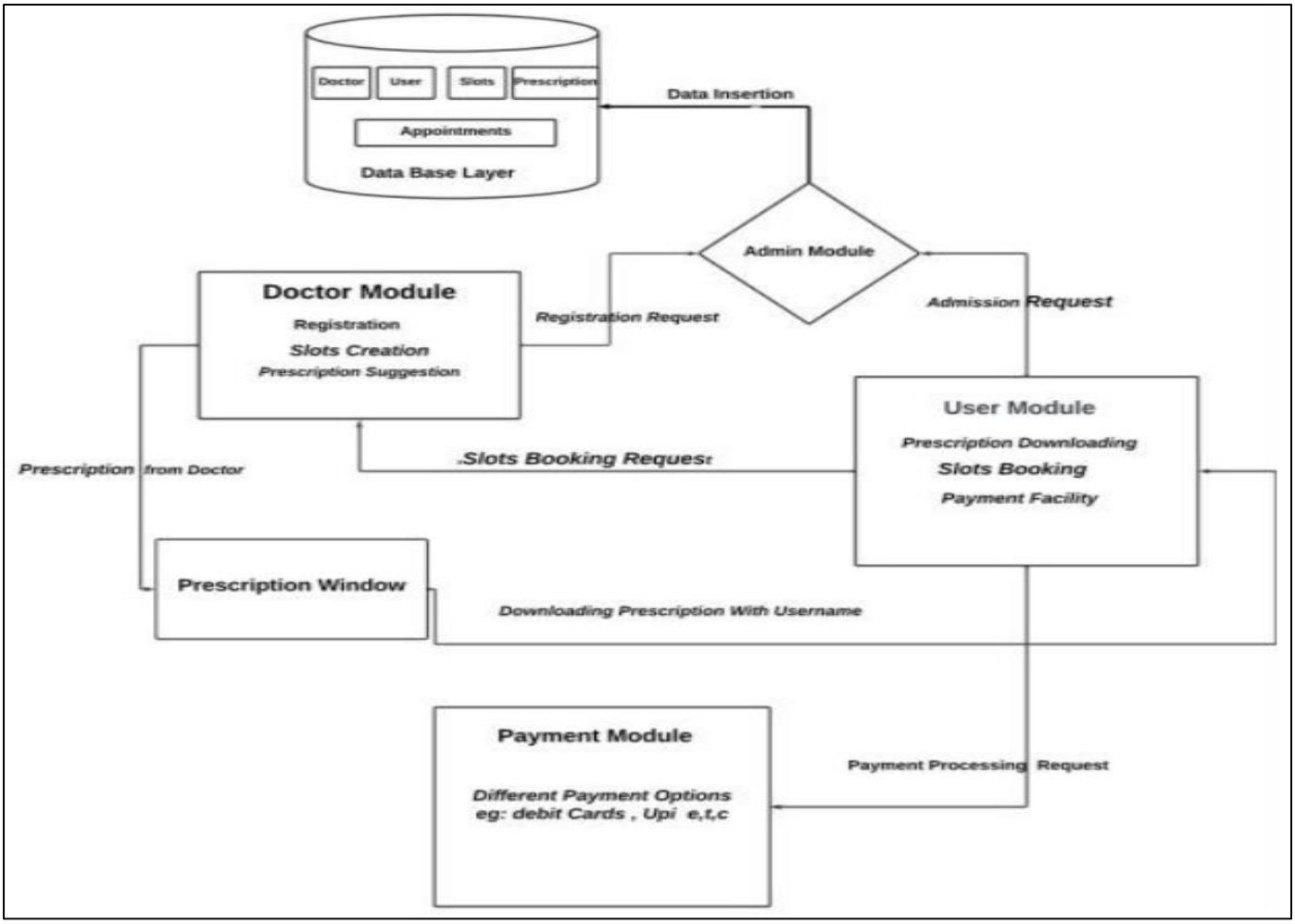

Fig 1 System Architecture

➢ *Data Flow Diagram (DFD)*

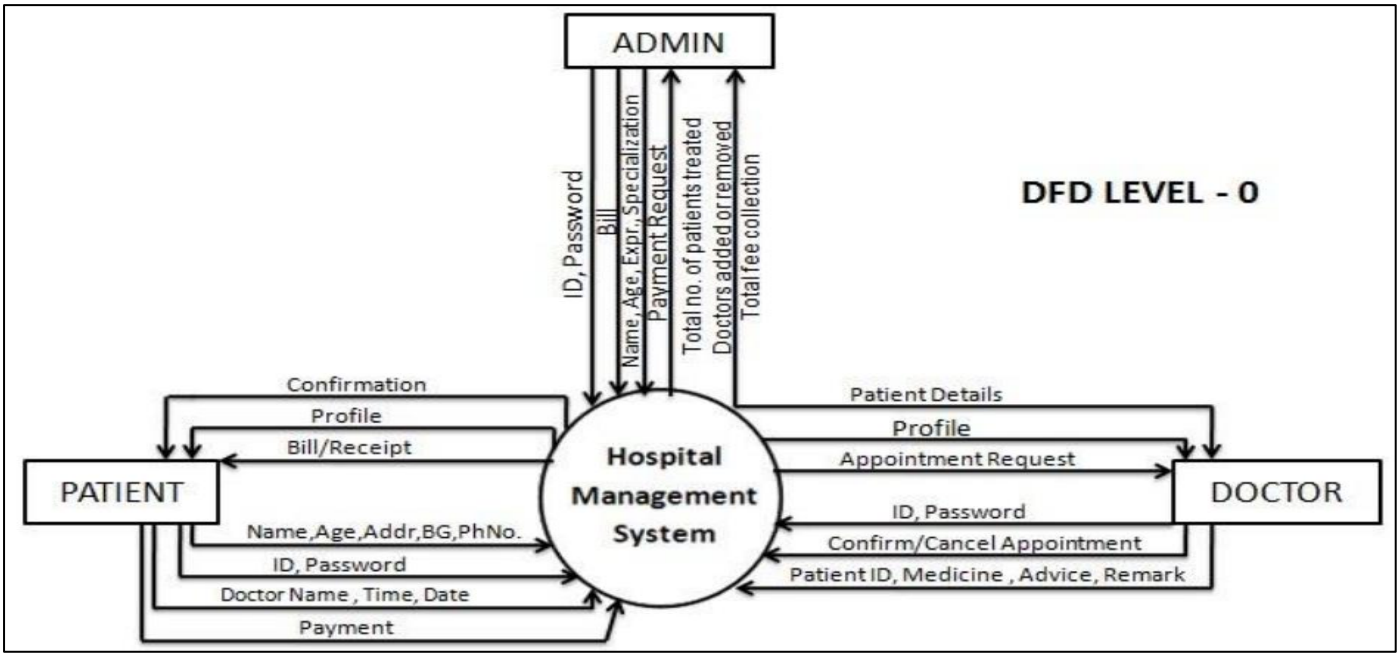

Fig 2 Context Level DFD

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V. SYSTEM REQUIREMENTS AND DESIGN

The objective of this project is to develop web-based Smart Health Care System application with a front-end with Angular and the back end with Java Springboot framework and MySQL to store the data into database. This software will help to be more efficient in handling the booking doctors, booking Appointment slots, and getting health programs. This project has been designed into three modules.

➢ *Modules :*

➢ *Admin Module:*

This mode makes you as an admin and you can perform various activities like...

- Adding a Doctor
- Managing Users/patients
- Managing Doctors
- Check the available Doctor Slots
- view Doctor List, Patient List, User List
- Accept or Reject the Doctors when they register as a new Doctor for this application
- Get various details on the admin dashboard as Total User, Total doctors, Total slots, Patients, Prescriptions given & Appointments booked.

➢ *Landing Page : Three Different Logins*

Fig 3 Landing Page

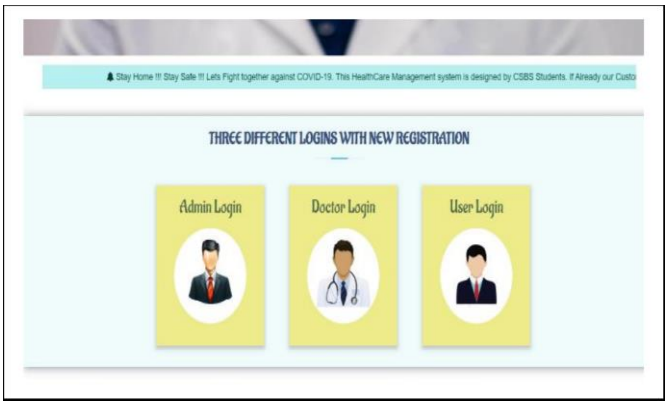

Fig 4: Three Different Logins

➢ *Admin Mode:*

- *Approve Doctors*

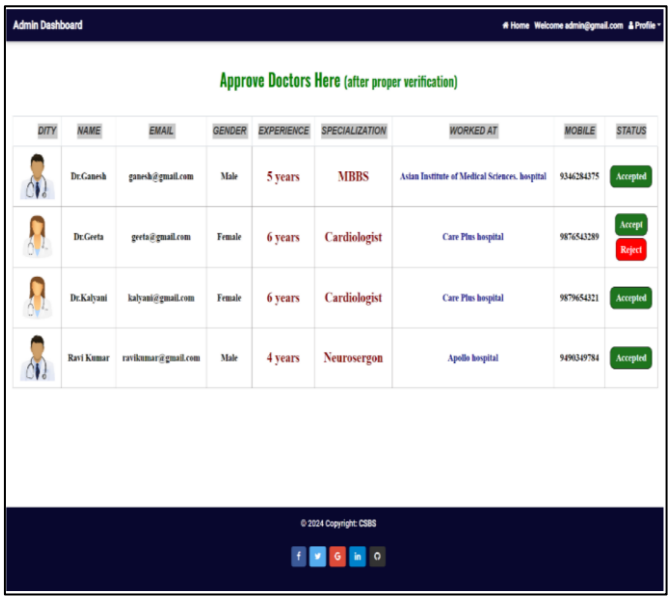

Fig 5 Approving Doctors

- *Doctor List:*

Fig 6 Doctors List

- *Doctor Module:*

This mode makes you as a doctor and you can perform various activities like...

✓ Dcotor can register for a new account in-order to login to the portal
✓ Check the available doctors List
✓ check the his/her today's appointments
✓ check his/her patient list
✓ View & Edit doctor profile details

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- ✓ Add you available slot and check slot schedules
- ✓ check your registration approval as a valid doctor by the ADMIN
- ✓ Add new patient prescription
- ✓ Get various details on the doctor dashboard as Total Prescriptions given, Total doctors, Total slots, Patients.

- *Doctor's Approval Status*

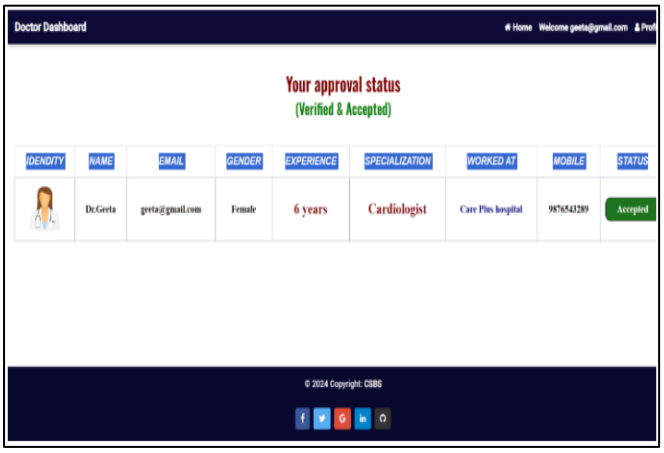

Fig 7 Doctors Approval Status

- *Add Booking Slots:*

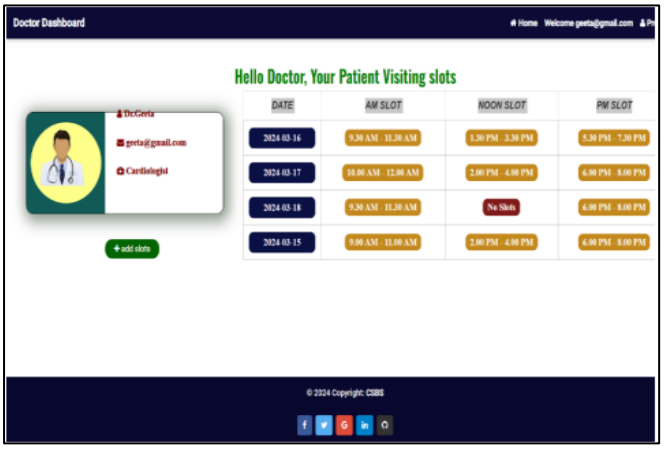

Fig 8 Adding Booking Slots

- *Patients List*

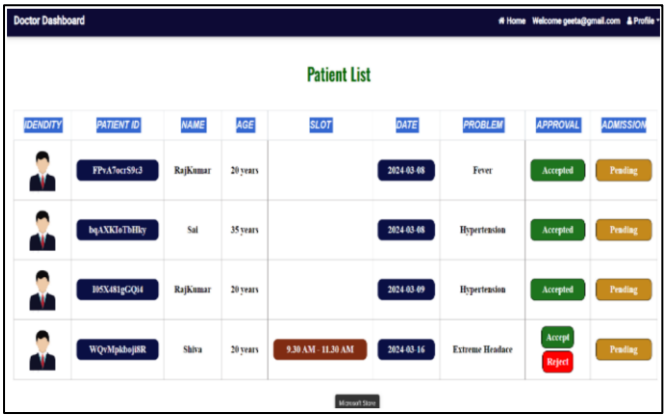

Fig 9 Patients List

- *Doctor's Today Appointments :*

Fig 10 Doctors Appointments

- *Add New Prescription :*

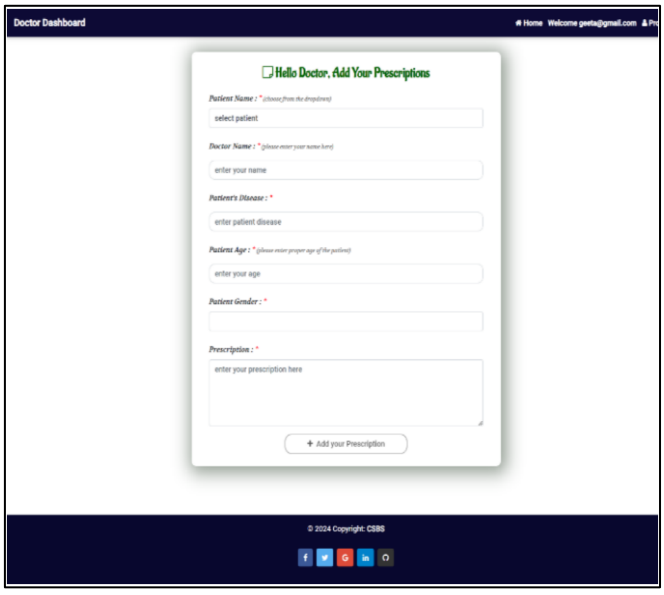

Fig 11 Adding New Prescription

- *User Module:*

This mode makes you as a user and you can perform various activities like...

- ✓ User can register for a new account in-order to login to the portal
- ✓ Check the available doctors List
- ✓ Check the available slots for booking
- ✓ View & Edit user profile details
- ✓ Book a New Appoinment
- ✓ Check your appointment approval by the doctor
- ✓ View your doctors prescription and print it.
- ✓ Get various details on the user dashboard as Total User, Total doctors, Total slots, Patients.

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- *User Dashboard*

Fig 12 User Dashboard

- *Check Available Slots*

Fig 13 Available Slots

- *Book New Appointment*

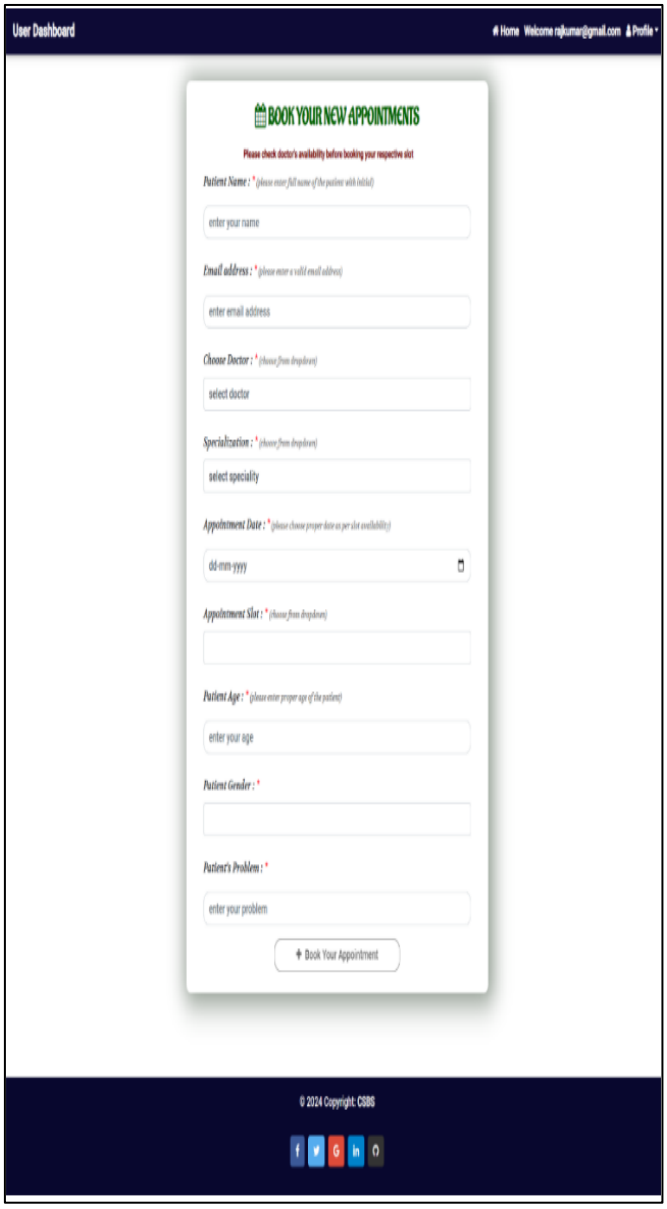

Fig 14 Book New Appointment

➢ *Appointment*

- *Description* –
  It shows users a list of available doctors, timings, dates and enables patients to select the most suitable appointment date and doctor. The patient may also the cancel the appointment.

- *Pre-Condition* –
  The patient must be a registered patient, Patient can fix only one appointment for a particular department.

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➢ *Main Flow of Event*

- Patient first logs in to system.
- View his/her record.

➢ *Create a New Appointment or Cancel the Appointment..*

- *Post Conditions* –

Patient details are displayed and a new appointment is fix or a existing appointment is cancelled. The hms database is updated.

- *Check Appointment Approval Status*

Fig 15 Approval Status

- *View Appointment Approval Status*

Fig 16 Viewing Approval Status

- *Check Patient's Prescription*

Fig 17 Checking Patients Prescription

- *View Patient's Prescription*

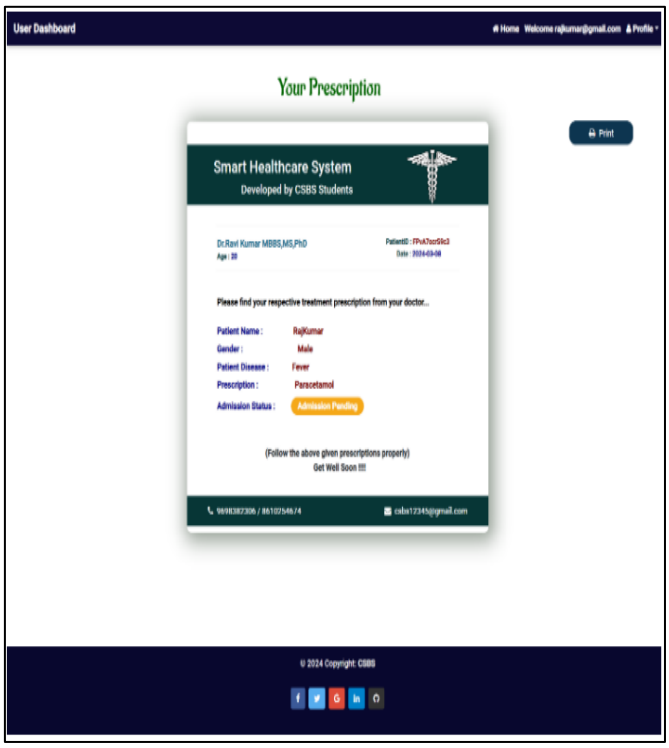

Fig 18 Viewing Patients Prescription

- *Wait Time Management Module*

In the context of enhancing patient experience and managing expectations, implementing a waiting time prediction feature within hospital systems is crucial. This feature utilizes historical data, real-time patient flow information, and advanced mechanism to estimate the amount of time a patient may need to wait for various services or procedures.

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Fig 19 Waiting Time Management Module

➢ *Payment*

- *Description* –

It enables user to pay the consultant fee of Doctor online.

- *Pre-Condition* –

The patient must be a registered patient, If Patient don't wants to pay online he/she can pay by cash also.

- *Main Flow of Event*

✓ Patient first logs in to system.
✓ View his/her record.
✓ Appointment confirmed by the Doctor then go for Payment.

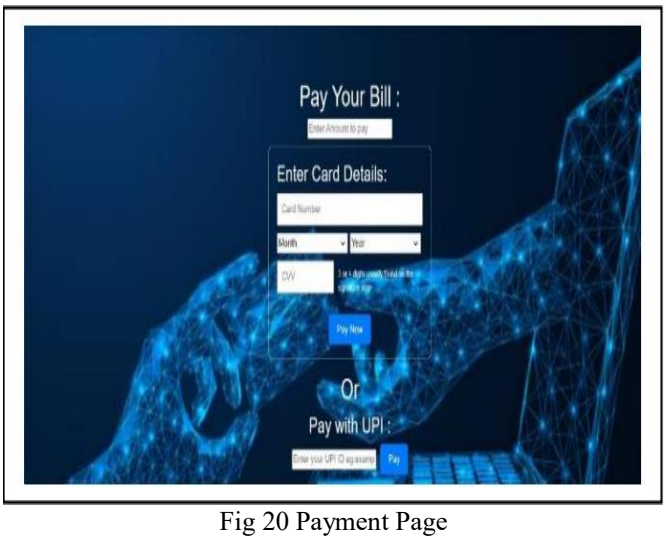

Fig 20 Payment Page

VI. CONCLUSION

The Online Hospital Management System project is a user-friendly web application built on Java technology. Its primary objective is to streamline hospital operations by enhancing patient management, facilitating coordination among medical staff, efficiently scheduling appointments, and maintaining comprehensive records. This project serves three primary user roles: Administrator, Doctor, and Receptionist.

Hospital management systems are vital for overseeing and controlling waiting times, as prolonged waits can result in patient dissatisfaction, hindered access to care, and escalated healthcare expenses.

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