OPTIMIZING DOCTOR AVAILABILITY AND APPOINTMENT ALLOCATION IN HOSPITALS THROUGH DIGITAL TECHNOLOGY AND AI INTEGRATION

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project "**TITLE OF THE PROJECT"** is the bonafide work of "**STUDENT NAME (REGISTER NUMBER), STUDENT NAME (REGISTER NUMBER), STUDENT NAME (REGISTER NUMBER) and STUDENT NAME (REGISTER NUMBER)"** who carried out the project work under my supervision.

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INTERNAL EXAMINER

ABSTRACT

In healthcare, efficient appointment scheduling is crucial to ensure patients receive timely care while maximizing the utilization of doctor resources. This project proposes a digital solution that leverages advanced technologies to automate the process of identifying doctor availability and allocate appointment slots accordingly. The primary goal is to reduce patient wait times and improve the overall efficiency of the appointment scheduling process in hospitals.

The goal of a well designed appointment system is to deliver timely and convenient access to health services for all patients. Appointment systems also smooth work flow, reduce crowding in waiting rooms and allow health systems to honor patient and provider preferences while matching supply and demand.

This research addresses the critical challenge of enhancing healthcare efficiency by leveraging digital technology and artificial intelligence (AI) to optimize doctor availability and appointment allocation in hospitals. Traditional appointment systems often result in suboptimal utilization of healthcare resources, leading to longer patient wait times and decreased overall system effectiveness. Telemedicine integration further enhances accessibility, offering virtual consultations and reducing the need for physical appointments.

The implementation includes a user-friendly mobile application with chatbot functionality, empowering patients to schedule appointments, receive reminders, and access relevant health information seamlessly.

THEME OF THE PROJECT

Health Low-cost Indigenous Digital Healthcare System

PROBLEM STATEMENT

Define the Problem

Optimizing Doctor Availability and Appointment Allocation in Hospitals through Digital Technology and Al Integration.

What core problem does your product / Service solve?

A long waiting period for a treatment negatively impacts the patient's experience and may diminish the quality of care.

Is your product/ service – (Address the want / need of the potential user)

Appointment scheduling aims to build an appointment system that optimizes a specific quality standard in a healthcare application of scheduling tasks under uncertainty. The primary function of healthcare management programs is to minimize patient waiting times in public hospitals and increase patient satisfaction.

Problem Statement/ Proposed Idea

To develop a digital system that streamlines the appointment scheduling process in hospitals by automating the process of identifying doctor availability and appointment slot allocation. The system will utilize advanced technologies such as RFID, face detection, proximity of Mobile phone, or any other relevant technology to detect the presence of doctors in the hospital. The system will use Artificial Intelligence (AI) to allocate appointment slots based on the doctor's presence and the number of waitlisted patients. This will improve the overall patient experience by reducing the wait time. In conclusion, the proposed digital system will improve the efficiency and convenience of the appointment scheduling process in hospitals; the patients will benefit with reduced waiting time.

OVERVIEW OF THE IDEA

Explain your idea (Product/Service)

A proof of concept project called Doctor Appointment aims to demonstrate how advanced digital technology and AI integration can streamline the appointment scheduling process in hospitals. By automating the identification of doctor availability and optimizing appointment slot allocation. This project aims to enhance the overall patient experience and reduce waiting times. The primary goal is to reduce patient wait times and improve the overall efficiency of the appointment scheduling process in hospitals.

What type of product/service is yours?

Software Management system

Explain with Use Case – (A use case is a methodology used in system analysis to identify, clarify and organize system requirements).

The primary function of healthcare management programs is to minimize patient waiting times in public hospitals and increase patient satisfaction. Healthcare services coping with a large number of outpatients may have several obstacles to address. For instance, a long waiting period for a treatment negatively impacts the patient's experience and may diminish the quality of care. In general, healthcare centers such as hospitals and clinics accumulate an increasing number of patients needing their services. Hospitals have to implement quick and effective healthcare facilities to accommodate new patients and keep people patronizing them.

What stage (TRL level) is your idea now? (Ref: Reference Details)

TRL 2

SOLUTION FOR THE PROBLEM STATEMENT

Solution to the problem

The solution involves creating a AI integrated digital technology for optimizing doctor availability and appointment allocation.

The solution is a new one or an improvement on an existing one.

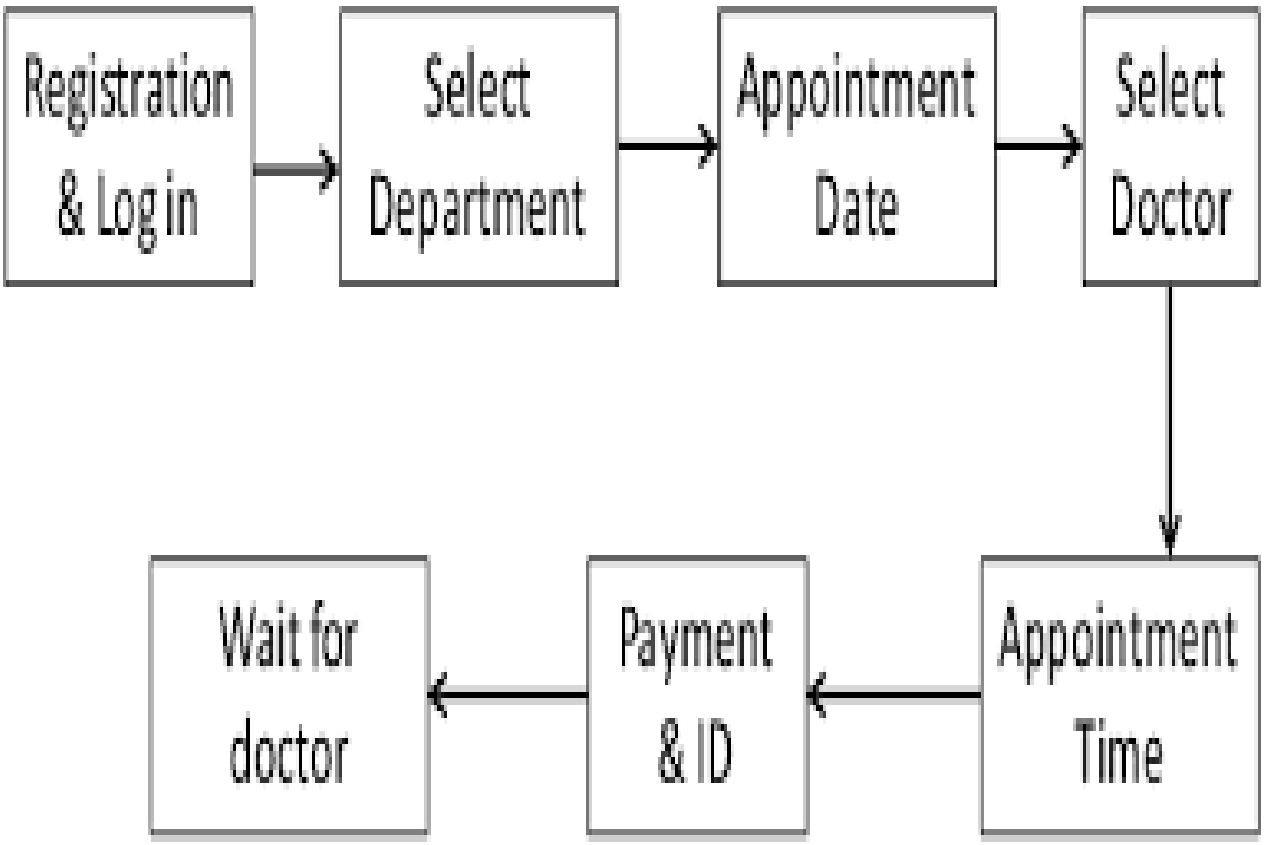
The solution described is an improvement and innovation upon existing appointment allocation systems in both rural and urban infrastructures.

Explain the novelty of your solution.

The novelty of the solution lies in its integration of advanced features, including precise technologies of AWS, Generative AI which is used to predict doctor availability, helping optimize appointment slots and Web development for the user interface and for managing user data, appointments, and doctor attendance. Visit the website and use the user dashboard to find doctors based on disease, availability, and fees. Doctors can log in to mark their attendance manually or use the face detection system for automatic attendance tracking. AI plays a crucial role in predicting doctor availability. By analyzing historical data and real-time inputs, the system can allocate appointment slots efficiently, considering factors like doctor availability and patient preferences.

FLOWCHART/PRODUCT WORKFLOW

Draw a simple flowchart showing how your product/business will work



The flowchart should explain "How to implement your idea".

IDEA – CURRENT STATUS/ FUTURE PLAN

The Development status of the Idea

Technology Formulation – Concept and application have been formulated.

Time period in months required for the idea to move to the next stages – PoC / Prototype / Trial Production/ Product Launch

It might take up to 3 months to create a trial prototype and move our idea to the next stage. However, it might take an even longer time for implementing it in real life.

Component Details of the Prototype.

Components of our prototype are

AWS

- Amazon Rekognition: Used for face detection and recognition.
- EC2 Instance: Provides scalable and secure hosting.
- S3 Bucket: Used for data storage and retrieval.

Generative AI

- AI algorithms are used to predict doctor availability, helping optimize appointment slots.

Web

- HTML, CSS (Tailwind CSS), JavaScript: Frontend development for the user interface.
- Django, SQL: Backend development for managing user data, appointments, and doctor attendance.

AI Integration

- AI plays a crucial role in predicting doctor availability. By analyzing historical data and real-time inputs, the system can allocate appointment slots efficiently, considering factors like doctor availability and patient preferences.

CUSTOMER SEGMENT

Who is facing the problem that you are solving?

Physically challenged persons, Elderly people and Private Hospitals

Who is your target customer / Sector?

Patients who cannot move to seek appointments physically in hospitals. Also patients with communicable diseases and patients with chronic diseases who needs frequent visits and diagnosis.

Who will pay for your product/ service?

Multispeciality Hospitals and Healthcare centers

VALUE PROPOSITION

Why should they buy your product/service than the existing one or similar one in the market, if any?

This project aims to demonstrate how advanced digital technology and AI integration can streamline the appointment scheduling process in hospitals. By automating the identification of doctor availability and optimizing appointment slot allocation, we aim to enhance the overall patient experience and reduce waiting times.

Why should customers choose you?

We provide a range of more user friendly system where there are more options with sorted filters such as Disease selection, Doctor availability, Slot description where users can view detailed slot information for each doctor, including availability and description of available slots, Sorting options: Doctors can be sorted based on appointment time or fees, allowing patients to choose the most convenient option. Booking and Registration: When a patient selects a doctor and appointment time, a login/register popup appears for user authentication. Time and Fee Adjustments: Booking time intervals are customizable (e.g., 5 or 10 minutes), with fees adjusted accordingly**.**

REFERENCE DETAILS

TRL 0: Idea - Unproven concept, no testing has been performed.

TRL 1: Basic Research- Principles postulated and observed but no experimental proof available.

TRL 2: Technology Formulation – Concept and application have been formulated.

TRL 3: Applied Research – First laboratory tests completed, proof of concept.

TRL 4: Small scale prototype – Built in a laboratory environment (ugly prototype)

TRL 5: Large scale prototype – Tested in intended environment

TRL 6: Prototype system – Tested in intended environment close to expected performance.

TRL 7: Demonstration system – Operating in operational environment at pre-commercial scale.

TRL 8: First of a kind commercial system- Manufacturing issues solved

TRL 9: Full commercial application – Technology available for consumers.