

# **Predictive Maintenance with Chatbot Integration**

**TEAM : MCS3562**

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# Data Ingestion and Processing

## Sensor Data Collection

Collect real-time data from equipment sensors, such as temperature, vibration, and pressure, to monitor the health and performance of industrial assets.

1

2

3

## Scalable Data Infrastructure

Deploy the data pipeline in a scalable environment, such as Kubernetes, to handle the growing volume and velocity of sensor data.

## Data Streaming and Preprocessing

Utilize tools like Apache Kafka and Apache Spark to stream, aggregate, and preprocess the sensor data for data for real-time analysis and predictive modeling.

# Predictive Maintenance Modeling

## Data Structures

Use graph-based data structures to model the relationships and dependencies between equipment, components, components, and systems, enabling enabling more accurate failure predictions.

## Anomaly Detection

Leverage machine learning algorithms, such as Random Forest, SVM, or deep learning models, to detect anomalies in equipment behavior and identify potential issues before they escalate.

## Failure Prediction

Employ time-series analysis techniques, like LSTM and ARIMA, to ARIMA, to forecast when equipment equipment is likely to fail, allowing allowing for proactive maintenance maintenance planning.

# Natural Language Processing and Chatbot Integration

1

## Intent Recognition

Use advanced NLP models, such as BERT and GPT, to understand maintenance personnel's queries and responses, enabling more natural and intuitive interactions.

2

## Entity Extraction

Extract key information, like equipment names, names, failure types, and suggested actions, from conversational data to provide personalized and relevant maintenance recommendations.

3

## Conversational Flow

Design a user-friendly chatbot interface that guides maintenance personnel through receiving alerts, accessing equipment status, and responding to predicted failures.

4

## Alert Generation

Leverage the predictive maintenance model to automatically generate chatbot alerts, providing details and suggested actions to maintenance personnel.

# Backend Integration

1

## API Layer

Develop RESTful APIs to seamlessly integrate the predictive maintenance and chatbot system with existing Maintenance Management Systems (MMS), such as IBM Maximo or SAP PM.

2

## Task Automation

Automatically create and assign maintenance tasks based on the predictions generated by the predictive maintenance model, streamlining the workflow and reducing manual effort.

3

## Database Management

Utilize a combination of relational and NoSQL databases to store structured equipment information, maintenance schedules, and unstructured chatbot conversation logs.

impending maintenance and carry it out before the equipment in service actually wears or breaks down.

# User Interface and Visualization

## Dashboard

Provide a comprehensive dashboard to visualize the status of all equipment, upcoming maintenance tasks, tasks, and alert history, enabling maintenance personnel to quickly identify and address issues.

## Chatbot Interface

Develop a user-friendly chatbot interface that is accessible across multiple platforms, allowing maintenance personnel to interact with the system and receive personalized maintenance recommendations.

## Report Generation

Generate detailed reports on equipment health, predictive maintenance insights, and maintenance activities to support data-driven decision-making and continuous improvement.



# Security and Authentication



## Access Control

Implement role-based access control (RBAC) to ensure that only authorized personnel can interact with the predictive maintenance and chatbot system.



## Data Encryption

Utilize encryption techniques to protect sensitive data, both in transit and at rest, ensuring the confidentiality and integrity of the system.



## Authentication

Establish robust authentication mechanisms to verify the identity of users and prevent unauthorized access to the system.

# Evaluation and Metrics

- Measuring the Effectiveness of the Predictive Maintenance and Chatbot System







# Implementation Roadmap

1

## Data Collection and Model Development

Gather historical sensor data and maintenance logs, develop the predictive maintenance model, and refine it through cross-validation.

2

## NLP Model and Chatbot Design

Design the conversation flow and intents for the chatbot, integrate NLP models, and develop the user interface for the chatbot.

3

## Backend Integration

Develop the API layer to connect with existing maintenance management systems, and systems, and implement the necessary database management solutions.

4

## Deployment and Testing

Deploy the predictive maintenance model, chatbot, and backend on a cloud platform, and platform, and perform end-to-end testing to ensure the system's functionality and reliability.

# Required Skills and Tools

Data Structures	Knowledge of graphs, trees, and time-series series data structures
Algorithms	Machine learning (e.g., anomaly detection, time-series forecasting) and NLP techniques
Backend Development	Experience with APIs, database management, and cloud deployment
Frontend Development	UI/UX design for chatbot and dashboard dashboard interfaces
Security	Understanding of cybersecurity practices, including encryption and access control



# Home Page

📍 Coimbatore, Tamil Nadu-641105    ✉ kadersahib36@gmail.com



 **Doctor Appointment S/Y**

[HOME](#)   [ADMIN](#)   [DOCTOR REG](#)   [DOCTOR LOGIN](#)   [SEARCH APPOINTMENT](#)

## Good Health Is The Root Of All Heppiness

**123**

Expert Doctors

**1234**

Medical Stuff

**12345**

Total Patients

[Search Appointment](#)



About Us

There are around 60 medical specialties and 30 subspecialties that make it harder for doctors to choose their specialization. Based on interest, doctors can choose their medical specialties. However, there are aspects like demand, scope, salary, and availability of the PG medical seat. In such a situation, decision-making would be a tougher job. However, your decision is crucial to can set up a rewarding or dismaying career. Thus, be careful while choosing your medical specialties. The medical courses listed below are in high demand and have a greater scope in India.

Hey! I'm here to help you 



# Search Appointment

[HOME](#) / [SEARCH APPOINTMENT](#)


## Search Appointment

Search(By Fullname/Appointment Number)

Search




Hey! I'm here to help you







# Search Appointment

[HOME](#) / [SEARCH APPOINTMENT](#)

 Hii there!

Hii can you please  
book an appointment  
for Dr susila at 11am



 Sure ! The appointment has  
been scheduled have a Happy  
day 😊

Text messege to send

## Search Appointment

Search(By Fullname/Appointment Number)

Search




Doctor Appointment System

Google Password Manager

127.0.0.1:8000/userappointment/

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 Doctor Appointment S/Y


HOMEADMINDOCTOR REGDOCTOR LOGINSEARCH APPOINTMENT

Appointment →

# Make An Appointment To Visit Our Doctor

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 Call Us Now  
**+787155031**


 Mail Us Now  
**kadersahib36@gmail.com**


Your Name

Your Email

Your Mobile

Choose Doctor ▾

dd-mm-yyyy 

--:-- 

Describe your problem

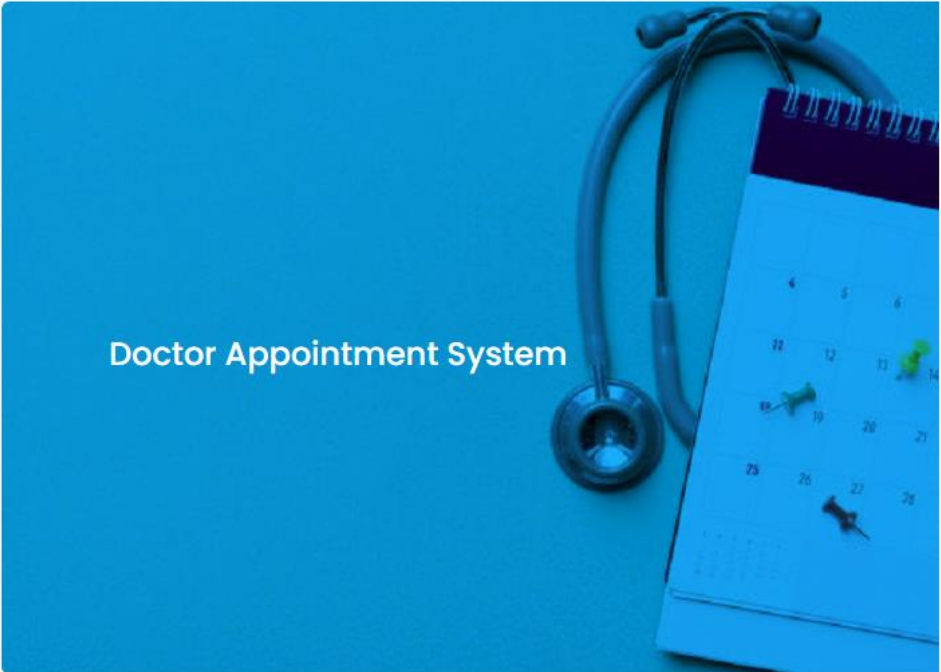
Book Appointment

↑

Hey! I'm here to help you 🤖



# Admin - Sign in Page



Doctor Appointment System

**Login**  
Access to our dashboard


Your Email Address

Password

Login

Doctor Signup


Home Page

 **DAS**

Main Menu


- Dashboard
- Specialization >
- Doctor List
- Search Doctor
- Doctor Reg Report
- Website Page

# Doctor Appointment System


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## Welcome Kadar Meera Sahib!!!!

Dashboard




5  
Total Doctor



5  
Total Specialization

Doctor Appointment System.

Hey! I'm here to help you 




Doctor Appointment System - [x]

Google Password Manager [x] +

127.0.0.1:8000/Profile

☆ | [k] Paused | ⋮

 **DAS**

Main Menu

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Doctor List

Search Doctor

Doctor Reg Report

Website Page

Doctor Appointment System

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Profile Details

Dashboard / Profile Details

Profile Details

Profile Pic

Choose File

No file chosen

First Name

Kadar Meera

Last Name

Sahib


Email

kadar@gmail.com


Username

Kadar\_Meera

Update

Hey! I'm here to help you 


# Admin - Change Password Page

DAS

Main Menu

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Doctor Appointment System



## Change Password

Dashboard / Change Password

Change Password


Current Password

New Password

Change

[Doctor Appointment System.](#)

# Admin - Add Specialization Page

DAS

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Doctor Appointment System

Admin Profile

Logout

Add Specialization

Dashboard / Add Specialization


Add Specialization

Specialization Name


Add


Doctor Appointment System.


# Admin - Manage Specialization Page


DAS


Main Menu


Dashboard

Specialization >

Doctor List

Search Doctor



























Doctor Reg Report



Website Page

Doctor Appointment System


Manage Specialization

Dashboard / Manage Specialization

S.No	Specialization	Creation Date	Action
1	Orthopedics	Feb. 26, 2024, 6:24 a.m.	 
2	Internal Medicine	Feb. 26, 2024, 6:24 a.m.	 
3	Obstetrics and Gynecology	Feb. 26, 2024, 6:24 a.m.	 
4	Dermatology	Feb. 26, 2024, 6:24 a.m.	 
5	Pediatrics	Feb. 26, 2024, 6:24 a.m.	 
6	Radiology	Feb. 26, 2024, 6:25 a.m.	 
7	General Surgery	Feb. 26, 2024, 6:25 a.m.	 
8	Ophthalmology	Feb. 26, 2024, 6:25 a.m.	 
9	Family Medicine	Feb. 26, 2024, 6:25 a.m.	 
10	Chest Medicine	Feb. 26, 2024, 6:25 a.m.	 
11	Anesthesia	Feb. 26, 2024, 6:25 a.m.	 
12	Pathology	Feb. 26, 2024, 6:25 a.m.	 
13	ENT	Feb. 26, 2024, 6:26 a.m.	 


 

# Admin - Update Specialization Page

DAS

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Doctor Appointment System

## Update Specialization

Dashboard / Update Specialization

Update Specialization

Specialization Name

Orthopedics

Update

Doctor Appointment System.

Doctor Appointment System - [x]

Google Password Manager [x] +


127.0.0.1:8000/Admin/DoctorList

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DAS

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Specialization >


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Registered Doctor List

Dashboard / Doctor List

S.No	Fullname	Mobile Number	Email	Registration Date		
7	Rubina banu	9898778787	rubina@gmail.com	Aug. 15, 2024, 5:58 a.m.	View	Appointr
8	bala krishnan	9868798797	bala@gmail.com	Aug. 15, 2024, 5:59 a.m.	View	Appointr
9	maicle khan	9876576767	maicle@gmail.com	Aug. 15, 2024, 6:01 a.m.	View	Appointr
10	david ashis	7787878787	david@gmail.com	Aug. 15, 2024, 6:02 a.m.	View	Appointr
11	raveena basker	9977889789	raveena@gmail.com	Aug. 15, 2024, 6:03 a.m.	View	Appointr

 **DAS**

Main Menu

Dashboard

Specialization >

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Search Doctor

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Website Page

Doctor Details

Dashboard / Doctor Details

Name of Doctor	Rubina banu	Contact Number	9898778787
Email Address	rubina@gmail.com	Doctor Specialization	Dermatology
Profile Pic		Date of Registrations	Aug. 15, 2024, 5:58 a.m.


Back

Doctor Appointment System - [x]

Google Password Manager [x] +

127.0.0.1:8000/SearchDoctor?csrfmiddlewaretoken=Lo6QBC18245A2mrvuj6GamOqu7Xo80hTcBHtxmjhhC3PZYuNRnvddYlcrGf3KI&query=raveena

☆ | [k] Paused | ⋮

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Search Doctor

Dashboard / Search Doctor

Search Doctor

Search(By Mobilenumber/Name)


Search

Search against raveena ✕

S.No	Fullname	Mobile Number	Email	Registration Date	
11	raveena basker	9977889789	raveena@gmail.com	Aug. 15, 2024, 6:03 a.m.	<div>View</div> <div>Appointr</div>



# Admin - Doctor Reports Page

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Website Page

Doctor Appointment System

Reports

Dashboard / Between Dates Reports

Between Dates Report

From Date

dd/mm/yyyy

To Date

dd/mm/yyyy

Submit

Data Between: "Jan. 20, 2023 to May 20, 2024"

S.No	Fullname	Mobile Number	Email	Registration Date	Action
1	Garima Singh	7871550318	garima@gmail.com	Feb. 26, 2024, 6:29 a.m.	<div>View</div> <div>Appointment List</div>
2	Abir Kumar	7871550318	abir@gmail.com	Feb. 26, 2024, 6:30 a.m.	<div>View</div> <div>Appointment List</div>
3	Soumya Yadav	7871550318	som@gmail.com	Feb. 26, 2024, 6:30 a.m.	<div>View</div> <div>Appointment List</div>
4	Harishankar Singh	7871550318	har@gmail.com	Feb. 26, 2024, 6:31 a.m.	<div>View</div> <div>Appointment List</div>
5	Renu Gupta	7871550318	renu@gmail.com	Feb. 26, 2024, 6:32 a.m.	<div>View</div> <div>Appointment List</div>
6	Anuj Kumar	7871550318	ak@gmail.com	March 6, 2024, 4:56 p.m.	<div>View</div> <div>Appointment List</div>
7	John Doe	7871550318	johndoe12@gmail.com	March 6, 2024, 5:22 p.m.	<div>View</div> <div>Appointment List</div>

Doctor Appointment System.


Doctor Appointment System - [X]

Google Password Manager [X] +

← → ↻

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☆ 🗂️ [k] Paused ⋮

 **DAS**

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Doctor Appointment System

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Update Website Details

Dashboard / Update Website Details

Update Website Details

Page Title

Webpage Details

Address

41, EK street, ukkadam, coimbatore.

About Us

There are around 60 medical specialties and 30 subspecialties that make it harder for doctors to choose their specialization. Based on interest, doctors can choose their medical specialties.

Email

kadersahib36@gmail.com

Mobile Number

787155031

Update

# Doctor Sign up Page

Doctor Appointment System

## Sign Up

Access to our dashboard

Profile Pic

No file chosen

First Name

Last Name

Email

Username

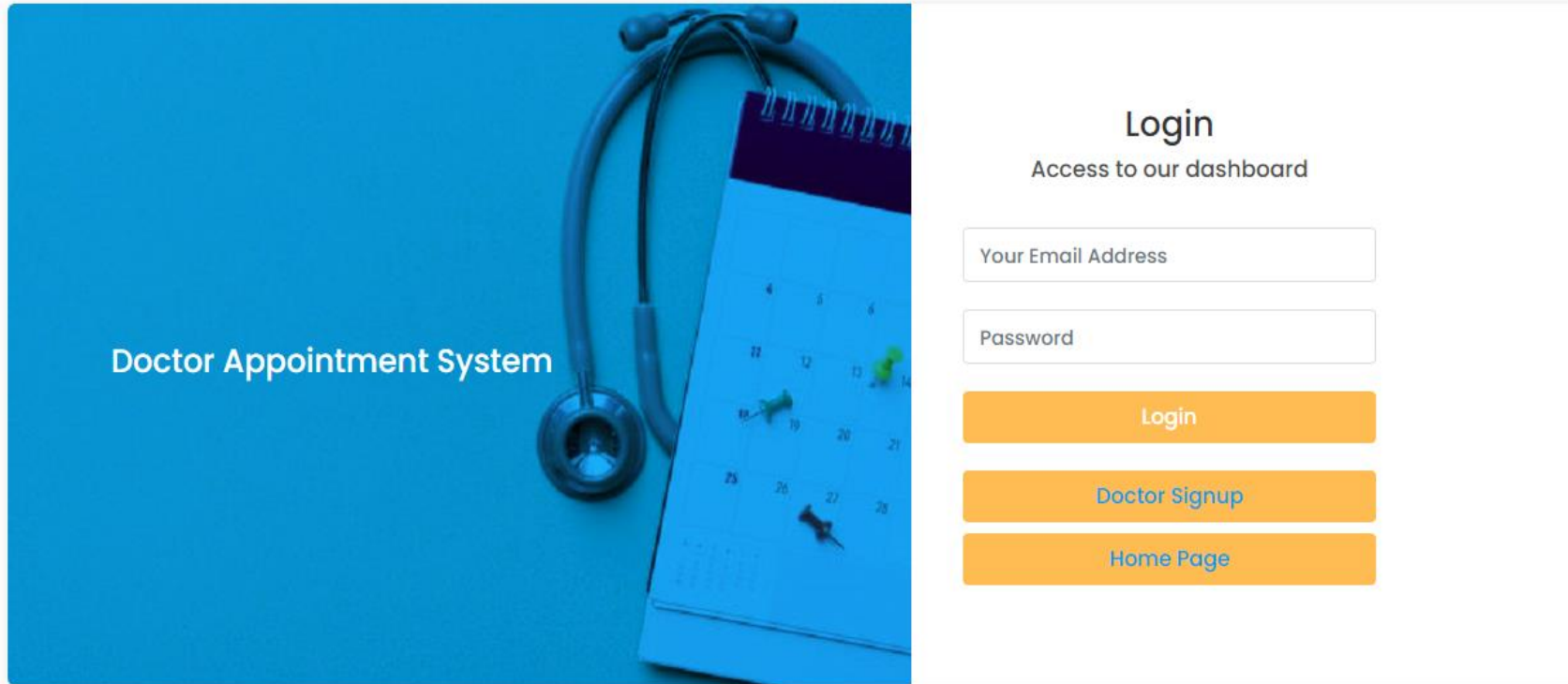
Mobile Number

Specialization

Password

[Do you have an account ?](#)

# Doctor Login in Page



The image shows a login page for a 'Doctor Appointment System'. On the left, there is a blue banner with a stethoscope and a calendar, and the text 'Doctor Appointment System'. On the right, there is a white login form with the title 'Login' and the subtitle 'Access to our dashboard'. The form contains two input fields for 'Your Email Address' and 'Password', followed by three orange buttons: 'Login', 'Doctor Signup', and 'Home Page'.

Doctor Appointment System

## Login

Access to our dashboard

Your Email Address


Password

Login

Doctor Signup


Home Page


# Doctor – Home Page





DAS


Main Menu


 Dashboard

 Appointment >



 Patient List

 Appointment Completed

 B/D Appointment Report


 Search Appointment

Doctor Appointment System


Welcome Doctor Abir Kumar!

Dashboard




1

All Appointment




1

New Appointment




0

Approved Appointment



0

Cancelled Appointment




0


Completed Appointment


Doctor Appointment System.


# Doctor - Profile Details Page


DAS


Main Menu


Dashboard

Appointment >


Patient List

Appointment Completed

B/D Appointment Report

Search Appointment

Doctor Appointment System

▼

Profile Details

Dashboard / Profile Details

Profile Details

Profile Pic

Choose File

No file chosen

First Name

Abir

Last Name

Kumar

Email

som1@gmail.com


Username

Abir\_\_

Update

Doctor Appointment System.

# Doctor - Change Password Page

DAS

Main Menu

- Dashboard
- Appointment >
- Patient List
- Appointment Completed
- B/D Appointment Report
- Search Appointment

Doctor Appointment System

Change Password

Dashboard / Profile Details

Change Password


Current Password

New Password


Change


Doctor Appointment System.


# Doctor – Appointments


DAS


Main Menu


Dashboard

Appointment >


Patient List

Appointment Completed

B/D Appointment Report

Search Appointment

Doctor Appointment System

▼

## Appointments

Dashboard / View Appointment


Appointment Number	Patient Name	Date of Appointment	Time of Appointment	Creation Date	Status	Action
727246666	sami	2024-05-24	11:00	May 20, 2024, 4:42 p.m.	Not Updated Yet	<div>View</div>

Page of .

Doctor Appointment System.




# Doctor – View Appointments

DAS

Main Menu

- Dashboard
- Appointment >
- Patient List
- Appointment Completed
- B/D Appointment Report
- Search Appointment

Doctor Appointment System

## Appointments


Dashboard / View Appointment

Appointment Number: 727246666

Patient Name	sami	Patient Contact Number	7871550318
Patient Email	sami@gmail.com	Date of Appointment	2024-05-24
Date of Time	11:00	Message	None
Doctor Remark	Not Updatet Yet	Staus	Not Updatet Yet
Prescribed Medicine	Not Prescribed Yet		
Recommended Test	Not Recommended Yet		

Take Action

# Doctor Reports Page

DAS

Main Menu

Dashboard

Appointment >

Patient List

Appointment Completed

B/D Appointment Report

Search Appointment

Doctor Appointment System

Appointment Report

Dashboard / Between Dates Report of Appointment

Between Dates Report

From Date

dd/mm/yyyy

To Date

dd/mm/yyyy


Submit

Data Between: "May 6, 2024 to May 31, 2024"

Appointment Number	Patient Name	Date of Appointment	Time of Appointment	Creation Date	Status	Action
727246666	sami	2024-05-24	11:00	May 20, 2024, 4:42 p.m.	Not Updated Yet	<div>View</div>

Doctor Appointment System.

# Doctor - Search Appointment Page

DAS

Main Menu

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Appointment


Patient List

Appointment Completed

B/D Appointment Report

Search Appointment

Doctor Appointment System

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## Search Appointments

Dashboard / Search Appointment

### Search Appointment

Search(By Fullname/Appointment Number)

Search

Search against s

Appointment Number	Patient Name	Date of Appointment	Time of Appointment	Creation Date	Status	Action
925833328	Harish Kumar	2024-02-26	11:44	Feb. 26, 2024, 6:44 a.m.	Completed	<a href="#">View</a>
566162414	Rakesh Sharma	2024-02-28	14:49	Feb. 26, 2024, 6:45 a.m.	Approved	<a href="#">View</a>
288217941	Tanu Sharma	2024-02-29	22:46	Feb. 26, 2024, 6:47 a.m.	Not Updated Yet	<a href="#">View</a>
749133529	Garima Singh	2024-03-10	15:05	March 6, 2024, 5:24 p.m.	Completed	<a href="#">View</a>
727246666	sami	2024-05-24	11:00	May 20, 2024, 4:42 p.m.	Not Updated Yet	<a href="#">View</a>

Doctor Appointment System.

Thank You!