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FlowTask –Hospital Task Management Using AI

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Abstract: *The FLOWTASK – Hospital Task Management Using AI system is designed to improve hospital efficiency by automating important processes such as patient registration, token generation, queue management, and doctor assignment. Traditional hospital systems are often manual and time-consuming, which leads to long waiting times, poor coordination, and inefficient use of resources. To overcome these issues, the proposed system uses Artificial Intelligence to analyze patient details like symptoms, severity, and arrival time to predict priority levels and estimate waiting time accurately.*
Based on this analysis, the system dynamically manages patient queues and ensures that emergency patients receive faster treatment. It provides real-time updates to patients and helps admins assign patients to doctors based on priority and availability. Doctors can easily access patient information and provide treatment efficiently. Overall, the system reduces manual work, improves workflow, enhances patient satisfaction, and offers a smart and scalable solution for modern hospital management.

Keywords: Hospital Management System ,Artificial Intelligence (AI) ,Patient Registration ,Queue Management ,Token Generation ,Doctor Assignment, Priority Prediction ,Waiting Time Estimation ,Real-time Updates ,Database Management ,Smart Healthcare ,Workflow Automation ,Decision Making ,Patient Satisfaction

I. INTRODUCTION

The healthcare sector plays a vital role in ensuring the well-being of people, and efficient hospital management is essential for providing quality patient care. However, many hospitals still rely on traditional methods for managing patient registration, queue handling, and doctor assignment, which are often manual, time-consuming, and prone to errors. These limitations result in long waiting times, poor coordination, and reduced efficiency in handling patient flow, especially during peak hours and emergency situations.To address these challenges, the FLOWTASK – Hospital Task Management Using AI system is proposed as an intelligent solution that automates and optimizes hospital operations. The system uses Artificial Intelligence to analyze patient details such as symptoms, severity, and arrival time to predict priority levels and estimate waiting time. It enables dynamic queue management, real-time updates, and efficient doctor assignment, ensuring that critical patients receive timely treatment. Overall, the system improves workflow efficiency, reduces delays, and enhances patient satisfaction, making it suitable for modern smart healthcare environments.

II. RELATED WORK

Several research works have been carried out in the field of hospital management and healthcare systems to improve efficiency and patient care. Traditional hospital management systems mainly focus on digital record keeping, appointment scheduling, and basic queue management. Some systems use rule-based approaches to prioritize patients, but they lack flexibility and are not suitable for handling dynamic hospital environments. These methods often fail to provide real-time updates and intelligent decision-making, which leads to longer waiting times and inefficient resource utilization.In recent years, researchers have explored the use of Artificial Intelligence and machine learning techniques to enhance hospital workflow management. AI-based systems have been used for patient prioritization, waiting time

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prediction, and resource optimization. While these approaches improve accuracy and efficiency, many existing systems do not provide a complete integrated solution that includes real-time queue management, automated doctor assignment, and user-friendly interfaces. Therefore, there is a need for an advanced system like FLOWTASK that combines AI-based prediction with efficient task management to improve overall hospital performance and patient satisfaction.

III. METHODOLOGY

Data Collection

The process begins with data collection, where patient details such as name, age, symptoms, contact information, and arrival time are collected through a user-friendly web interface. This interface is designed to be simple and easy to use for patients and hospital staff. The collected data is securely stored in a structured database, which serves as the foundation for further processing and efficient hospital management.

Data Preprocessing

After data collection, preprocessing is carried out to ensure data quality and consistency. This includes removing duplicate entries, handling missing or incorrect data, validating user inputs, and organizing patient records in a standardized format. Proper preprocessing ensures that the system has accurate and reliable data for analysis, which improves the overall performance of the AI module and reduces errors.

AI-Based Priority Prediction

An AI-based module is used to intelligently analyze patient data and predict priority levels. The system considers factors such as symptoms, severity, and arrival time along with current hospital workload. Based on this analysis, patients are categorized into different priority levels such as emergency, high, medium, and low. This ensures that critical patients receive immediate attention while maintaining a balanced workflow. The model may use rule-based logic or machine learning techniques for accurate predictions.

Queue Management

Once the priority is determined, the queue management system automatically generates a unique token number for each patient. Patients are then arranged in an optimized queue based on their priority and arrival time. The system dynamically updates the queue in real time whenever new patients are added or existing patients are treated, ensuring smooth and efficient patient flow.

Doctor Assignment (Admin Module)

The admin module plays a key role in managing hospital operations. It continuously monitors the patient queue and assigns patients to available doctors based on their priority level and doctor availability. This helps in distributing workload evenly among doctors, reducing delays, and improving overall efficiency. The admin can also update patient status and manage system activities easily.

Treatment Process (Doctor Module)

Doctors can access patient details such as symptoms, priority level, and medical history through the system interface. Based on this information, doctors provide appropriate treatment. After consultation, the patient status is updated in the system (e.g., treated or completed), and the record is stored for future reference. This ensures proper documentation and continuity in patient care.

System Integration (Web Interface)

The entire system is integrated into a web-based platform that connects patients, admins, and doctors. The interface is designed to be user-friendly and responsive, allowing easy access from different devices. Patients can register and track

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their token status, admins can manage operations, and doctors can monitor and treat patients efficiently. This integration ensures smooth communication and coordination among all users.

. Output & Future Enhancements

Finally, the system provides real-time outputs such as token number, waiting time, patient status, and doctor assignment. It improves workflow efficiency, reduces manual effort, and enhances decision-making. The system is designed with scalability in mind, allowing future enhancements such as mobile app integration, emergency alert systems, online appointment booking, and advanced AI-based health predictions, making it suitable for modern smart healthcare environments.

IV. SYSTEM ARCHITECTURE

The FLOWTASK – Hospital Task Management Using AI system follows a multi-tier client–server architecture designed for efficient hospital workflow management and real-time processing. The system consists of three main layers: the user interface layer, the backend processing layer, and the data layer. The user interface layer provides a web-based platform for patients, admins, and doctors to interact with the system. Patients can register and view their token status, admins can manage queues and assign doctors, and doctors can access patient details and provide treatment. The backend layer handles data processing, queue management, and AI-based decision-making, while the data layer stores patient information and system records securely in a structured database.

The workflow begins when patient details are entered through the interface and sent to the backend server. The data is preprocessed and stored in the database, after which the AI module analyzes the information to predict patient priority and estimate waiting time. Based on this output, the system generates tokens and organizes the patient queue dynamically. The admin assigns patients to doctors based on priority and availability, and doctors update patient status after treatment. The system provides real-time updates and displays outputs such as token number, waiting time, and patient status. This architecture ensures scalability, reliability, and efficient hospital task management, making it suitable for modern healthcare environments.

V. RESULTS AND DISCUSSION

The proposed FLOWTASK system was evaluated using real-time patient data collected from hospital-like scenarios to analyze its performance in managing patient flow and hospital tasks. The system performance was measured based on parameters such as waiting time reduction, system responsiveness, and workflow efficiency. The evaluation shows that the system effectively manages patient registration, queue handling, and doctor assignment, ensuring smooth and organized hospital operations. The dashboard visualization provides an overview of patient details such as total patients, waiting cases, and treated cases.

Figure 1. Home Page For Hospital Task Management

This page represents the **welcome or home screen** of the FLOWTASK – Hospital Task Management System. It is designed with an attractive and visually appealing interface to provide a smooth user experience. The page acts as the entry point of the system, guiding users to proceed further into the application. It may include options such as login,

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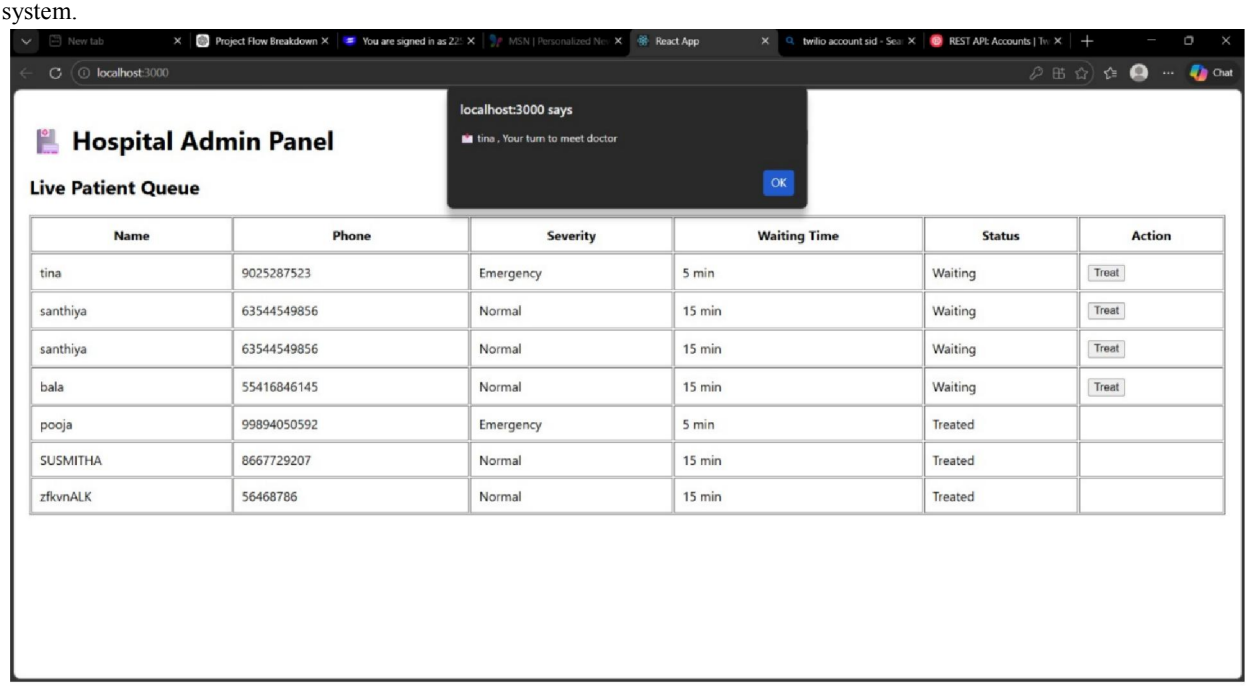
role selection, or navigation to different modules. The design highlights a modern and professional look, creating a positive first impression for users. Overall, this page ensures easy access and user-friendly interaction within the system.

Figure 7.2 – Super Admin Dashboard

This page represents the **welcome or home screen** of the FLOWTASK – Hospital Task Management System. It is designed with an attractive and visually appealing interface to provide a smooth user experience. The page acts as the entry point of the system, guiding users to proceed further into the application. It may include options such as login, role selection, or navigation to different modules. The design highlights a modern and professional look, creating a positive first impression for users. Overall, this page ensures easy access and user-friendly interaction within the system.



Name	Phone	Severity	Waiting Time	Status	Action
tina	9025287523	Emergency	5 min	Waiting	Treat
santhiya	63544549856	Normal	15 min	Waiting	Treat
santhiya	63544549856	Normal	15 min	Waiting	Treat
bala	55416846145	Normal	15 min	Waiting	Treat
pooja	99894050592	Emergency	5 min	Treated	
SUSMITHA	8667729207	Normal	15 min	Treated	
zfkvnALK	56468786	Normal	15 min	Treated	

Figure 7.3 – Admin panel Dashboard

Q1

This page represents the **Hospital Admin Panel** of the FLOWTASK system. It displays the **live patient queue**, allowing the admin to monitor and manage patient flow in real time. The table includes important details such as

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patient name, phone number, severity level (Emergency/Normal), estimated waiting time, and current status (Waiting/Treated).The admin can take action using the **"Treat"** button to update patient status after treatment. Emergency patients are prioritized with shorter waiting times, ensuring quick medical attention. The system also shows real-time notifications, helping the admin stay updated about patient turn alerts.Overall, this page helps in efficient queue management, reduces waiting time, and improves hospital workflow by providing a clear and organized view of all patient activities.

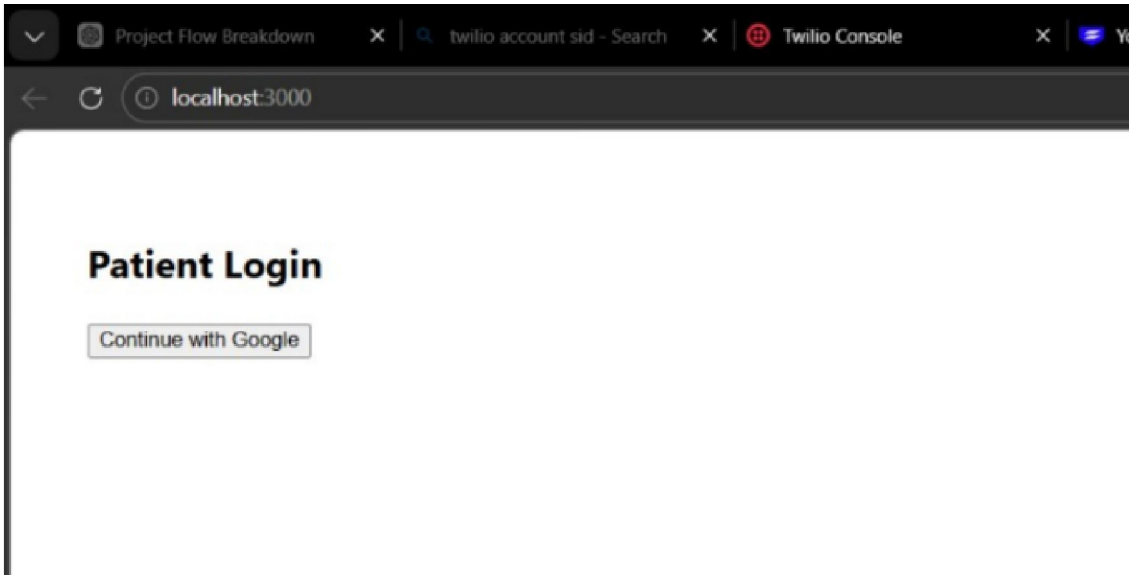

Figure 7.4 – Patient Login Dashboard

This page represents the mobile interface of the FLOWTASK system, designed for user interaction and data input. It allows users to enter or view essential details such as patient information or system responses in a simple and accessible format. The interface is optimized for mobile devices, ensuring easy navigation and smooth interaction. It may include input fields, options, or controls for performing specific tasks within the system. Overall, this page enhances user convenience by providing a responsive design and supports efficient operation of the hospital management system on mobile platforms.

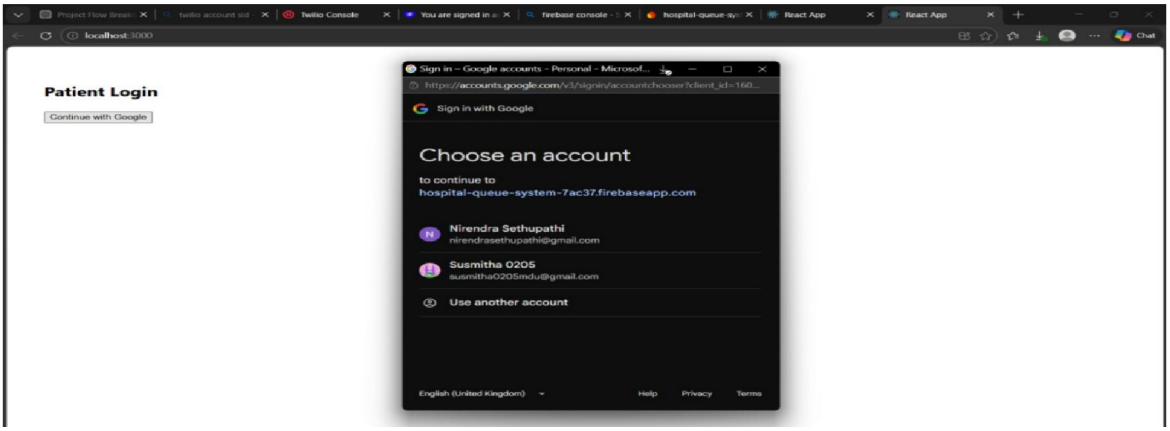

Figure 7.5 -Patient Continue Option

This page represents the **Patient Login interface** of the FLOWTASK system integrated with Google authentication. It allows patients to securely log in using their Google account by clicking the "Continue with Google" option. A pop-up

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window appears where users can choose their Google account or use another account to proceed. This authentication method ensures secure access, reduces the need for manual login credentials, and provides a quick and user-friendly login experience. Overall, this page enhances system security and simplifies the login process for patients.

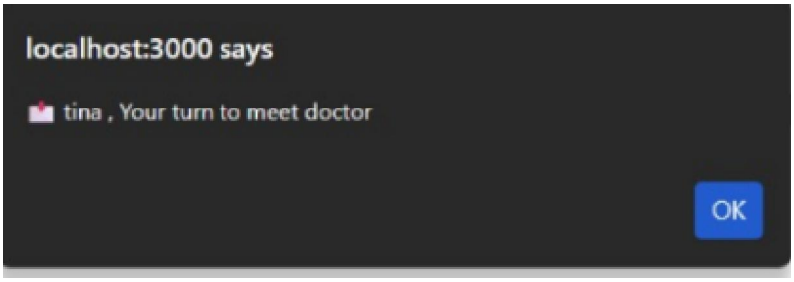

Figure 7.6 – Patient Alert Message

This page shows a **real-time notification alert** in the FLOWTASK system, informing the patient about their turn. The message "Your turn to meet doctor" is displayed along with the patient's name, indicating that the patient can proceed for consultation. This alert helps in maintaining an organized workflow by notifying patients at the right time, reducing confusion and waiting delays. The pop-up notification with an "OK" button ensures that the user acknowledges the message, making the system more interactive and user-friendly.The above results demonstrate that the SmartComplaint system effectively streamlines complaint management through structured workflows, role-based access, and real-time tracking. The user-friendly interface and dashboards provide clear insights into complaint status and system performance. Overall, the system improves efficiency, reduces response time, and enhances user satisfaction.

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