Infosys Springboard Internship 5.0

Voice Based Patient Call System

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Team
Batch 4

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Why is a Voice-Based Patient Call System Needed?

- Faster Response to Emergencies
- Hands-Free and Accessible Communication
- Reducing Nurse Workload and Burnout
- Improved Hospital Workflow
- Integration with Smart Health care Systems
- Enhanced Patient Experience and Satisfaction

PROBLEM STATEMENT

Problem 1

Delayed Nurse Response: Patients often experience delays in getting assistance due to manual call systems.

Problem 2

Lack of Prioritization: Current systems do not differentiate between urgent and non-urgent requests, resulting in inefficient resource utilization

Problem 3

Limited Communication Channels: Patients typically rely on a single-button system that lacks clarity and context about their needs

Problem 4

Inconsistent Monitoring: Administrators have limited visibility into response times and nurse workload, making it harder to track service quality

PROPOSED SOLUTION

Solution 1

Voice-Based Patient Requests: Patients can initiate requests using natural language through a voice-enabled interface

Solution 2

AI-Driven Prioritization: An AI engine classifies requests based on urgency (e.g., emergency, assistance, or routine).

Solution 3

Real-Time Mobile Notifications: Nurses receive real-time notifications with detailed information about the patient's request.

Solution 4

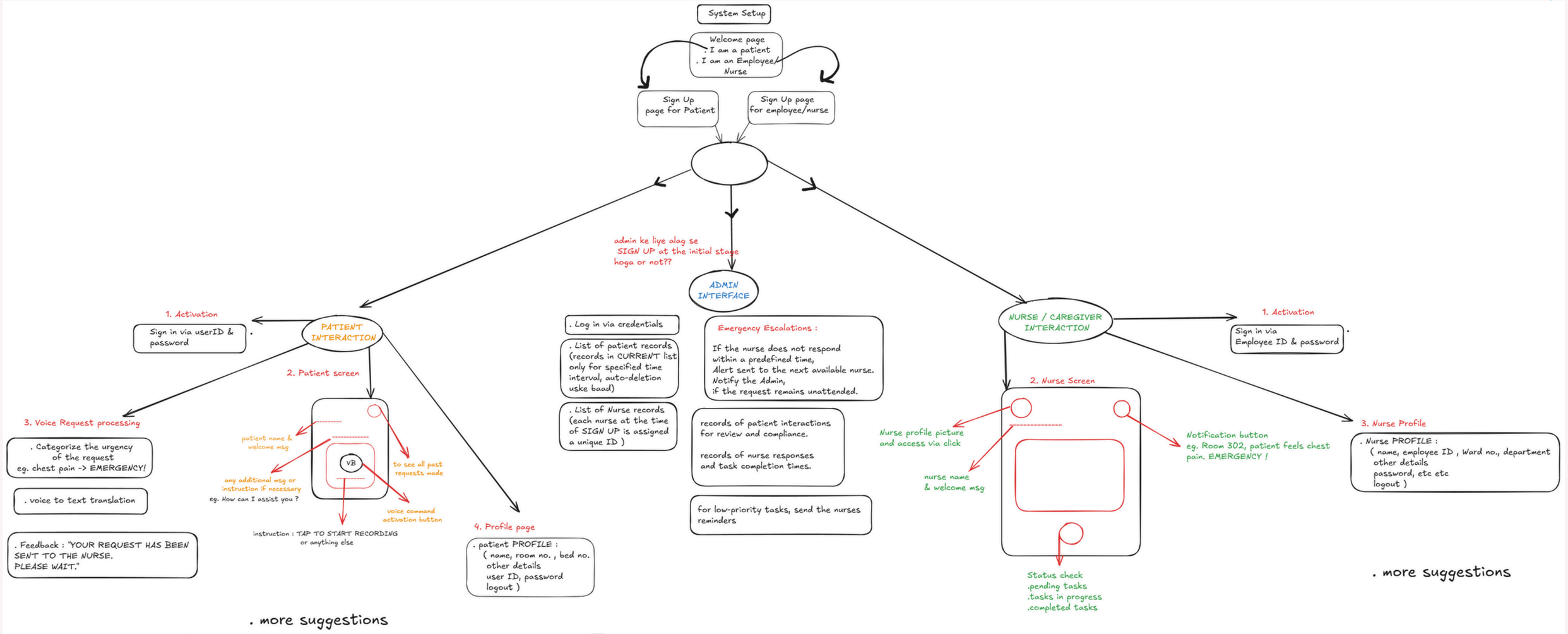
Inconsistent Monitoring: Administrators have limited visibility into response times and nurse workload, making it harder to track service quality.

SYSTEM WORKFLOW

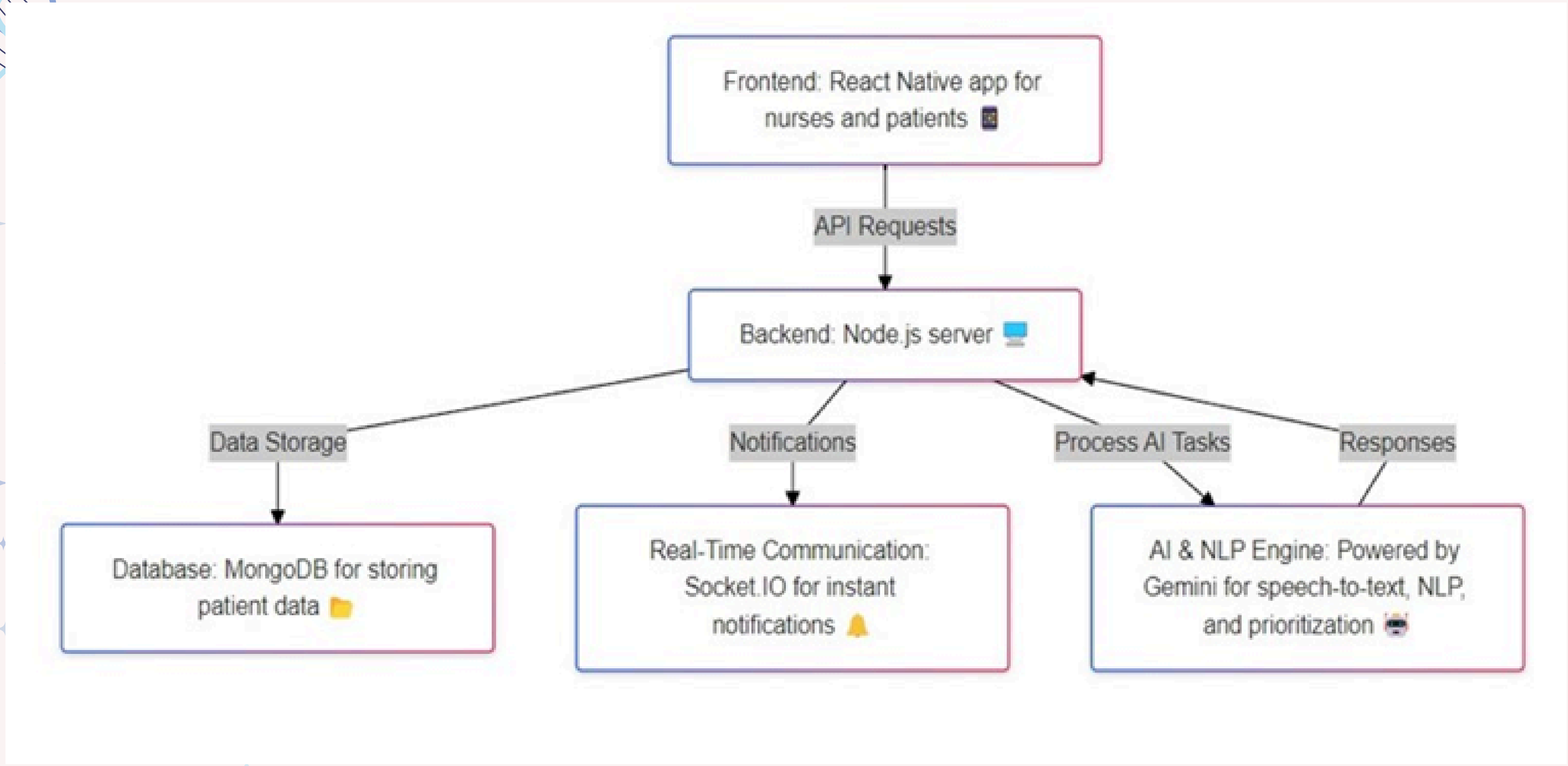
Step by Step :

- **Patient Request:** The patient speaks into the device to make a request (e.g., “I need water” or “I feel pain”).
- **Speech Recognition:** The request is converted from voice to text using Gemini Speech Services
- **Natural Language Processing:** The system processes the request using NLP to extract intent and context
- **Priority Assignment:** AI assigns a priority level to the request (Critical, Important, Normal).
- **Backend Processing:** The backend server handles the request, stores it in the database, and sends it to the appropriate nurse.
- **Real-Time Notification:** Nurses receive notifications on their mobile app with request details and priority.
- **Response and Status Update:** The nurse attends to the request and updates the status (Pending, In Progress, Resolved). The update is reflected in real-time across the system.

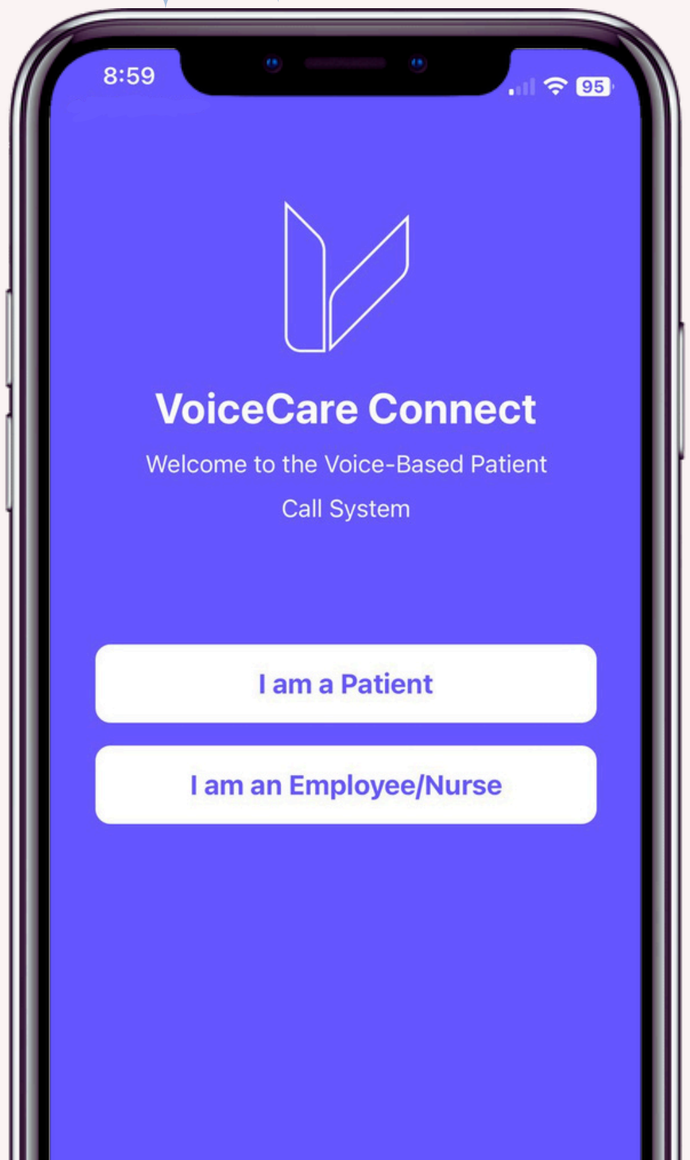
FLOWCHART


System Setup
Welcome page
. I am a patient
. I am an Employee/ Nurse
Sign Up page for Patient
Sign Up page for employee/nurse
admin ke liye alag se SIGN UP at the initial stage hoga or not??
ADMIN INTERFACE
. Log in via credentials
. List of patient records (records in CURRENT list only for specified time interval, auto-deletion uske baad)
. List of Nurse records (each nurse at the time of SIGN UP is assigned a unique ID)
Emergency Escalations :
If the nurse does not respond within a predefined time, Alert sent to the next available nurse. Notify the Admin, if the request remains unattended.
records of patient interactions for review and compliance.
records of nurse responses and task completion times.
for low-priority tasks, send the nurses reminders
PATIENT INTERACTION
1. Activation
Sign in via userID & password
2. Patient screen
patient name & welcome msg
any additional msg or instruction if necessary
eg. How can I assist you ?
VB
to see all past requests made
voice command activation button
instruction : TAP TO START RECORDING or anything else
3. Voice Request processing
. Categorize the urgency of the request
eg. chest pain -> EMERGENCY!
. voice to text translation
. Feedback : "YOUR REQUEST HAS BEEN SENT TO THE NURSE. PLEASE WAIT."
4. Profile page
. patient PROFILE :
(name, room no. , bed no.
other details
user ID, password
logout)
. more suggestions
NURSE / CAREGIVER INTERACTION
1. Activation
Sign in via Employee ID & password
2. Nurse Screen
Nurse profile picture and access via click
nurse name & welcome msg
Notification button eg. Room 302, patient feels chest pain. EMERGENCY !
Status check
.pending tasks
.tasks in progress
.completed tasks
3. Nurse Profile
. Nurse PROFILE :
(name, employee ID , Ward no., department
other details
password, etc etc
logout)
. more suggestions

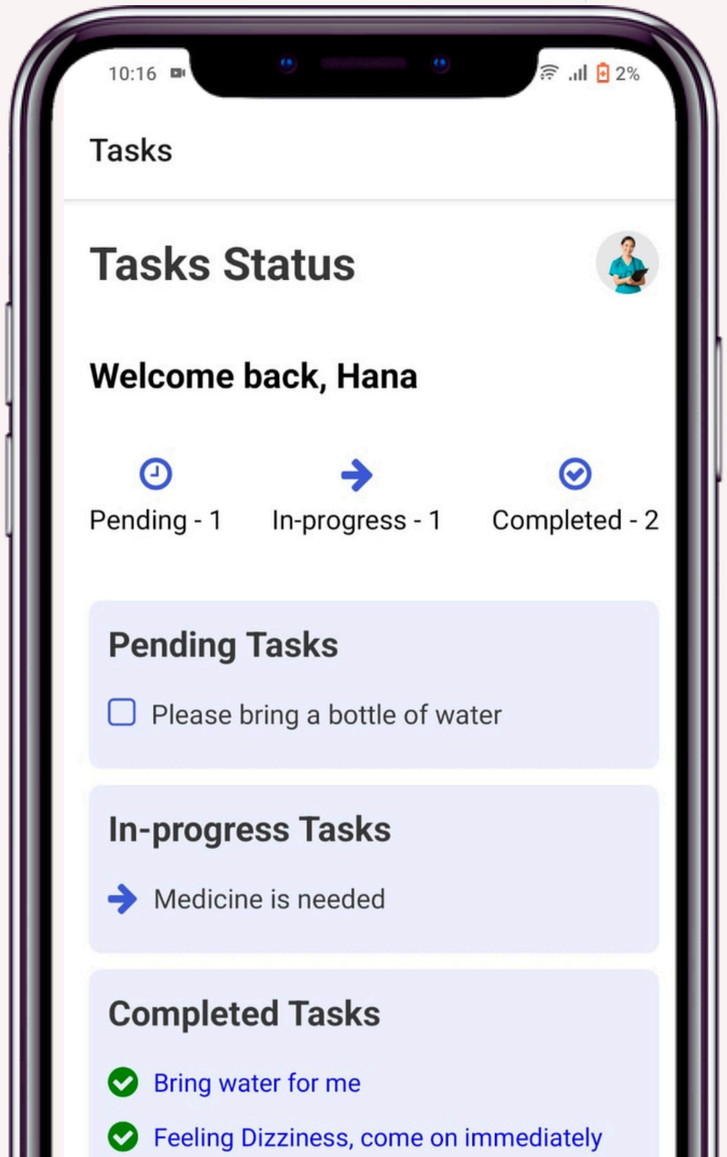
System Architecture



APP UI


8:59
95
VoiceCare Connect
Welcome to the Voice-Based Patient
Call System
I am a Patient
I am an Employee/Nurse


8:59
95
Voice Request
Press & Hold to Speak


10:16
2%
Tasks
Tasks Status
Welcome back, Hana
Pending - 1
In-progress - 1
Completed - 2
Pending Tasks
Please bring a bottle of water
In-progress Tasks
Medicine is needed
Completed Tasks
Bring water for me
Feeling Dizziness, come on immediately

TECHNOLOGY STACK

React Native: Cross-platform mobile UI framework.

Expo : Preview, test, and debug React Native.

Python : Implemented Python NLP for voice-based system.

Node.js: Scalable JavaScript server-side runtime.

Express.js: Web framework for HTTP routing.

MongoDB: NoSQL database for dynamic healthcare data storage

JWT (JSON Web Tokens): Ensures secure user authentication and session management.

KEY FEATURES

- **Voice-Based Interface:**
  Patients can use their voice to request assistance, eliminating the need for complex interactions.

- **AI & NLP-Driven Processing:**
  The AI engine interprets requests and assigns appropriate priority levels.

- **Role-Based Access Control:**
  Different interfaces and functionalities for patients, nurses, and administrators.

- **Real-Time Communication:**
  Socket.IO facilitates instant updates, ensuring nurses are always informed about pending requests.

CONCLUSION

The Voice-Based Patient Call System revolutionizes hospital communication by leveraging modern technologies like AI, NLP, and real-time notifications. It ensures timely responses, reduces nurse workload, and enhances patient satisfaction.

THANK YOU FOR YOUR ATTENTION