

# HEALTH CARE AGENTIC AI FOR DISCHARGE INSTRUCTION SIMPLIFIER AND FOLLOW UP AGENT

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## **ABSTRACT :**

The Healthcare Discharge Instruction Simplifier and Follow-Up Agent converts complex medical discharge instructions into simple, patient-friendly language. It highlights key care steps, medications, and warning signs, while a follow-up agent provides reminders and recovery check-ins. This improves patient understanding, supports safer recovery, and helps reduce hospital readmissions.

## **PROBLEM STATEMENT :**

Hospital discharge instructions are often written in complex medical language that many patients struggle to understand. This lack of clarity can lead to medication mistakes, missed follow-up care, and poor recovery outcomes. There is a need for a solution that simplifies discharge instructions and provides ongoing follow-up support to help patients safely manage their care after leaving the hospital.

## **PROPOSED SOLUTION :**

To address the challenges faced by patients in understanding discharge instructions and remembering follow-up appointments, we propose a Healthcare Discharge Instruction Simplifier and Follow-Up Agent.

- Simplified Prescription Instructions: Nurses select the patient's preferred language, and the system converts the prescription slip into easy-to-understand instructions, highlighting dosage, timing, and food requirements.
- Follow-Up Reminders: After discharge, patients receive notifications and appointment links to ensure timely checkups.
- Elderly Support (60+): The system makes automated hospital calls to help with booking appointments and sending reminders.

This solution improves medication adherence, reduces errors, and ensures better post-discharge care, especially for uneducated and elderly patients.

## **SYSTEM ARCHITECTURE**

Discharge Slip



Streamlit Frontend



Python Backend



Agent 1: Simplification



Agent 2: Understanding Simulation



Agent 3: Follow-Up Decision

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Agent 4: Orchestrator

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WhatsApp / SMS / Call

## 1. Overview

The system has **four main components**:

1. **User Interface (Frontend)**
  - Nurses and patients interact here.
  - Nurses input prescription slips and select patient's preferred language.
  - Patients receive simplified instructions, notifications, and appointment links.
2. **Simplification & Translation Engine (Backend)**
  - Converts prescription slip data into easy-to-understand instructions.
  - Focuses on dosage, timing, and food instructions.
  - Supports multiple languages for accessibility.
3. **Follow-Up & Notification Module**
  - Sends reminder notifications for follow-up appointments.
  - Generates appointment links.
  - For elderly patients (60+), triggers automated hospital calls for booking and reminders.
4. **Database**
  - Stores patient data, prescription details, language preference, and appointment schedules.
  - Maintains logs of notifications and calls for tracking.

## 2. Data Flow

1. Nurse scans or inputs the prescription slip → selects language.
2. Backend simplifies prescription → sends instructions to frontend for patient.
3. Backend schedules follow-up reminders → notifications sent via app/SMS.
4. For patients 60+, system triggers automated call to schedule appointment.
5. Database stores all patient interactions and appointments.

## AGENTIC AI IN OUR PROJECT

Agentic AI refers to AI systems that can autonomously perform tasks, make decisions, and interact with users to achieve specific goals, rather than just providing static responses. In your project, agentic AI can manage multiple tasks: simplifying prescriptions, sending reminders, and handling appointments.

### 1. Prescription Simplification Agent

Role: Converts complex medical prescriptions into easy-to-understand instructions.

- Reads the prescription slip (input from nurse).
- Extracts medicine name, dosage, timing, and food instructions.
- Translates into the patient's preferred language.
- Outputs simplified instructions for the frontend.

### 2. Follow-Up Notification Agent

Role: Ensures patients return for checkups.

- Tracks the discharge date and schedules follow-up reminders.
- Sends notifications or messages with appointment links.
- Ensures reminders are timely and persistent.

### 3. Elderly Assistance Agent

Role: Helps patients over 60 who may struggle with technology.

- Automatically calls the hospital to book appointments.
- Confirms the patient's availability and reminds them.
- Monitors if patients complete the follow-up or need additional assistance.

### 4. Patient Data Agent

Role: Manages all patient information securely.

- Stores prescription details, language preference, and follow-up schedule.
- Tracks notifications sent, calls made, and appointments booked.
- Provides logs for hospital staff to monitor patient adherence.

## TECHNOLOGY STACK

Layer	Technology	Purpose
<b>Frontend</b>	Tailwind CSS, react, React 18, vite, lucid	User interface, multi-language support
<b>Backend</b>	Python , REST API	Handles requests, prescription simplification, agent coordination
<b>Database</b>	SQL lite	Stores patient data, prescriptions, reminders, logs
<b>AI / NLP / Agent Logic</b>	GPT API ,LLM	Simplifies prescriptions, provides audio instructions, manages follow-up tasks
<b>Notifications &amp; Calls</b>	Twilio, Firebase Cloud Messaging, OneSignal	Sends reminders, notifications, and automated calls
<b>Deployment</b>	Heroku, Vercel, AWS, Docker	Hosts frontend, backend, and database

### Explanation:

- React.js + Bootstrap creates a simple, responsive UI for nurses and patients.
- Node.js handles backend logic, API requests, and communication between agents.
- MongoDB stores patient data flexibly.
- AI/NLP components simplify instructions and provide accessibility features.
- Twilio/Firebase/OneSignal handle notifications and automated calls.
- Deployment on cloud services ensures the system is accessible and scalable.

## STEP-BY-STEP PROCESS

## **STEP 1: Hospital Staff Opens the Application (Frontend)**

- A hospital staff member opens the Streamlit web app
- This app is only for hospital use, not for patients

## **STEP 2: Discharge Slip Is Entered**

- Staff pastes or uploads the discharge slip text
- Staff enters:
  - Patient age
  - Preferred language (Tamil / English / Hindi)

## **STEP 3: Data Is Sent to Backend (Python)**

- Streamlit sends the input to the Python backend
- Backend starts the AI processing

## **STEP 4: Agent 1 – Discharge Simplification Agent**

- Reads the medical discharge text
- Converts complex medical terms into simple language
- Breaks long instructions into step-by-step points
- Adapts tone based on:
  - Patient age
  - Language preference

This is where Agentic AI begins

## **STEP 5: Agent 2 – Patient Understanding Simulation Agent**

- Identifies critical instructions:
  - Medicines
  - Warning signs
  - Follow-up date
- Simulates patient understanding
- Assigns:
  - Understanding score
  - Risk level (Low / Medium / High)

This ensures clarity, not just delivery

## **STEP 6: Agent 3 – Follow-Up Decision Agent**

- Decides follow-up method:
  - WhatsApp + SMS → normal patients
  - Hospital voice call → patients aged 60+
- Adjusts reminder timing based on risk level

This is autonomous decision-making

## **STEP 7: Agent 4 – Orchestrator Agent**

- Coordinates all agents
- Finalizes:
  - Message content
  - Communication channel
  - Follow-up schedule
- Generates explainable decisions

## STEP 8: Follow-Up Communication (Simulated)

- System sends:
  - WhatsApp / SMS message with appointment booking link
  - OR hospital call for elderly patients
- For hackathon, message & call are simulated

## STEP 9: Results Displayed on Dashboard

- Streamlit shows:
  - Simplified discharge instructions
  - Risk level
  - Follow-up type
  - Message / call status

Discharge Slip

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Streamlit Frontend

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Python Backend

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## INNOVATION

This project introduces several innovative features that set it apart from existing healthcare solutions:

1. **Simplified Multilingual Prescription Instructions**
  - Instead of providing a direct or technical translation, the system focuses only on essential information: dosage, timing, and food instructions.
  - Supports multiple local languages, making medication instructions accessible to uneducated patients.
2. **Agentic AI for Patient Assistance**
  - Uses autonomous AI agents to simplify prescriptions, send reminders, and assist elderly patients.

- Agents can make automated calls, provide notifications, and track adherence, reducing the dependency on hospital staff.

### **3. Elderly-Friendly Follow-Up System**

- Patients above 60 automatically receive calls from the hospital to book appointments.
- Reduces missed checkups due to technology barriers or forgetfulness.

### **4. Integration of AI with Practical Healthcare Needs**

- Combines AI-based natural language processing with **real-world hospital workflows**.
- Focused on **enhancing patient outcomes**, not just automating tasks.

### **5. Potential for Accessibility Enhancements**

- Optional audio instructions for illiterate or visually impaired patients.
- Could later support **voice commands** to confirm medicine intake or follow-ups.

## **Overall Innovation:**

This system goes beyond traditional hospital apps by simplifying complex medical instructions, proactively managing patient follow-ups, and using AI to reduce errors, especially for vulnerable populations like the uneducated and elderly.

## **EXPECTED IMPACT**

### **1. Improved Medication Adherence**

- Patients understand exactly how, when, and how much medicine to take, reducing mistakes and complications.

### **2. Increased Follow-Up Compliance**

- Automated reminders and calls ensure patients attend post-discharge checkups, lowering readmission rates.

### **3. Support for Vulnerable Populations**

- Helps uneducated and elderly patients navigate prescriptions and appointments independently.

### **4. Reduced Hospital Workload**

- Nurses and staff spend less time explaining prescriptions and scheduling follow-ups.

### **5. Better Healthcare Outcomes**

- Clear instructions, timely follow-ups, and proactive monitoring improve overall patient health and safety.

Overall: The system bridges communication gaps in healthcare, making post-discharge care accessible, reliable, and efficient.

## **HOW SYSTEM WORKS**

### **1. Prescription Simplification**

- The patient gives their prescription slip to the nurse
- The nurse selects:
  - Patient's preferred language
- The system does simplified translation, not medical word-by-word translation

instead it focus on:

- How many tablets
- When to take them (morning / afternoon / night)
- Before or after food

Example:

"Take 1 tablet in the morning after food"

This simplified information is shown clearly on the frontend in the selected language.

### **2. Multi-Language Support**

- The system supports multiple local languages
- Designed for people with low literacy
- Uses:
  - Simple words
  - Clear time references

### **3. Follow-Up Reminder System**

After discharge:

- The patient needs to return **after one week** for a checkup
- our system will:
  -  Send **notification reminders**
  -  Provide an **appointment booking link**

### **4. Special Care for Elderly Patients (60+)**

For patients above 60 years:

The system automatically:

-  Makes a call from the hospital
-  Helps book the appointment
-  Reminds them about the checkup

This ensures elderly patients don't miss follow-ups due to:

- Technology issues
- Forgetfulness
- Lack of assistance

### **Key Benefits**

- ✓ Reduces medication errors
- ✓ Improves patient understanding
- ✓ Supports uneducated & elderly patients
- ✓ Increases follow-up visit compliance
- ✓ Reduces hospital readmissions

### **CONCLUSION**

The Healthcare Discharge Instruction Simplifier and Follow-Up Agent addresses critical challenges in post-discharge patient care. By simplifying prescriptions into easy-to-understand instructions, providing multi-language support, and using AI agents for reminders and elderly assistance, the system ensures medication adherence and timely follow-ups. This innovative solution reduces errors, supports vulnerable populations, and improves overall healthcare outcomes. Its combination of AI, accessibility, and hospital workflow integration makes it a practical and impactful tool for enhancing patient care and safety.