Build Your Advanced Agent With n8n

AI-Driven Multi-Agent Healthcare System

1. Introduction & Motivation

The integration of Generative AI (GenAI) and Large Language Models (LLMs) has significantly transformed the healthcare sector by enabling advanced natural language processing, improving access to medical information, and streamlining patient interactions. AI-powered solutions can assist in diagnosing conditions, providing health recommendations, and offering 24/7 support to patients.

Despite the abundance of medical knowledge, accessing personalised and reliable health information remains a challenge. Many existing healthcare systems provide generic responses and lack contextual awareness. **HealthSense AI** is designed to bridge this gap by leveraging **LLMs and no-code multi-agent orchestration in n8n** to offer intelligent, context-aware health information assistance.

---

2. Business Problem Overview and Potential Impact

Challenges in Healthcare Information Systems

- **Limited Personalisation** – Most healthcare information systems provide one-size-fits-all responses that lack user-specific relevance.
- **Lack of Context Awareness** – Many AI assistants struggle to maintain conversation history and context over multiple interactions.

- **Fragmented Information Sources** – Medical knowledge is scattered across multiple databases, making it difficult to consolidate accurate information efficiently. making it difficult to consolidate accurate information efficiently.

Who Can Benefit from HealthSense AI?

User	Use Case
Product Managers (PMs)	Prototype no-code AI solutions to improve healthcare decision-making.
TPMs	Coordinate AI system development using n8n workflows across departments.
Engineering Managers	Deploy scalable agentic architectures using modular no-code infrastructure.
Healthcare Providers	Automate FAQs, appointment handling, and patient guidance.
Insurance Teams	Build workflows for insurance bookings and medical claim triage.
Patients	Access instant medical support and personalised health insights.

Potential Impact

Startups such as **Babylon Health, Ada Health, and Buoy Health** are already leveraging AI to enhance healthcare delivery. **HealthSense AI** aims to build upon this trend by providing **context-aware, real-time, and interactive healthcare assistance**, improving patient outcomes and reducing the burden on healthcare professionals.

3. Key Problem Statement

"Develop an intelligent healthcare platform that streamlines medical service discovery and booking by analyzing hospital data, reviews, and healthcare metrics. The system will extract and compare key parameters to help users make informed healthcare decisions.
The solution will feature a comprehensive comparison engine for hospitals and diagnostic centers, an automated slot booking system, and detailed information about medical tests and procedures. The platform will incorporate a user-friendly chat interface to hospital comparisons, explore healthcare metrics, and facilitate seamless appointment scheduling."

4. Core Objectives

- **Understand Agentic AI concepts** and how multi-agent systems orchestrate healthcare workflows.
- **Build specialized healthcare AI agents u**sing n8n with no-code tools.
- Integrate structured healthcare datasets (doctors, hospitals, diagnostics) into intelligent agents.
- Automate doctor booking, hospital comparison, emergency routing, and diagnostics information retrieval.

- **Implement Natural Language Processing (NLP)** – Accurately interpret and process medical terminology.

- **Provide Real-Time Doctor and Hospital Recommendations** – Offer users relevant medical support.
- **Ensure Compliance and Ethical AI Usage** – Maintain HIPAA and GDPR compliance.

Scenario:

Patients interact with a HealthSense AI system through chat to:

- Find available doctors and book appointments.
- Compare hospitals based on specialization, services, and emergency availability.
- Retrieve recommended diagnostic tests and preparation guidelines.
- Automatically route their queries to the appropriate intelligent agent.

All tasks are to be handled by a modular AI agent system in **n8n**, without writing code.

---

5. System Features

Here's a structured breakdown of system features for HealthSense:

- **Data Processing & Analysis**
  - Load hospital, diagnostics, and doctor data using n8n Google Sheets/Airtable nodes.
  - Clean and transform data using JavaScript functions inside n8n.
- **Healthcare Provider Comparison & Recommendation**
  - Create workflows that compare hospitals based on location, specialty, and ratings.
  - Use OpenAI and custom logic to personalise responses.
- **Appointment Management System**
  - Automate slot checking and booking confirmation via Gmail or Slack.
  - Use calendar integrations for time-based triggers.
- **Diagnostic Services Information**
  - Map user symptoms to lab tests and send instructions automatically.
- **Interactive UI & Dashboards**
  - Use n8n Forms or webhook-triggered frontends to input patient queries.
  - Visualise outputs using QuickChart or HTML email formatting.

6. Key Learning Outcomes

Skill	How You Learn It in n8n
No-Code Agent Design	Design agents as separate workflows (Doctor Agent, Hospital Agent, etc.)
NLP Query Handling with OpenAI	Use OpenAI node to interpret user queries and map them to specific agents
Structured Data Integration	Use Google Sheets, Airtable, or MySQL nodes to work with real hospital data
Multi-Agent Orchestration	Route queries using a central **Coordinator Agent** workflow using Switch and IF logic
Booking Automation	Implement real-time appointment confirmations with Email, Google Calendar, or CRM integration
Compliance-Aware Design	Implement role-based flows, audit logs, and secure webhook interfaces
Healthcare Analytics	Build dashboards using n8n Reports, external charting APIs, or Notion/Google Sheets integration

---

7. Dataset Overview

To build an effective and reliable AI-driven healthcare assistant, **HealthSense AI** will use structured datasets stored in MySQL.

- Linked here - 🖼 HealthSense AI _ Data

Hospital General Information Dataset

- Contains hospital names, locations, specialties, capacity, and contact details.
- Used for hospital comparisons and providing relevant hospital recommendations.
- **Source:** Public healthcare directories and government datasets.

Hospital Information with Lab Tests Dataset

- Includes details about available lab tests, diagnostic packages, and pricing.
- Used for diagnostic services recommendations and health test comparisons.
- **Source:** Aggregated medical lab datasets and public health data.

Hospitals Emergency Data Dataset

- Contains hospital emergency department details, ambulance availability, and response times.
- Used for emergency assistance and directing users to the nearest available emergency services.
- **Source:** Public emergency response data and hospital records.

Doctor Availability Dataset

- Contains doctor schedules, specializations, consultation availability, and hospital affiliations.
- Used for doctor appointment recommendations and scheduling.
- **Source:** Medical institutions and clinic appointment systems.

These datasets enable **HealthSense AI** to deliver accurate, **data-driven healthcare recommendations**.

---

8. Example Queries & Outputs

User Query	System Response
"Find available doctors for a dermatology consultation this week."	Returns doctor availability schedules and booking links.

"What hospitals specialize in cardiology near me?"	Displays a list of nearby hospitals with cardiology departments.
"Where is the nearest 24/7 emergency hospital?"	Provides emergency hospital locations with estimated response times.
"What tests should I take for persistent headaches?"	Suggests relevant lab tests and possible causes.
"Which hospital has good medical imaging?"	Lists hospitals with top-rated medical imaging services.
"Show slots for Dr. Lee."	Displays available appointment slots for Dr. Lee.
"Any ambulance available at 94404?"	Provides real-time ambulance availability in the given zip code.
"What would be the preparation instructions for cancer screening?"	Doesn't return standard preparation guidelines instead refers to a doctor.

9. Agents Overviews

Hour	Focus Agent	Description
1	Coordinator Agent + Agentic AI Intro	Routing user queries to specialized healthcare agents intelligently.
2	Doctor Booking Agent	Find doctor availability and provide appointment options.
3	Hospital Comparison + Emergency Routing Agent	Compare hospitals and find the nearest emergency services.

4	Diagnostics Services Agent	Recommend lab tests and provide preparation instructions.

a. Intro Agentic AI + Overview of Agentic system

Topics:

- Introduce Agentic AI and multi-agent orchestration.
- Build a Main Coordinator Agent that receives user queries and routes them to the correct sub-agent.
- Introducing the System Agents

Sample User Queries:

- "Find a dermatologist available this week."
- "Show me hospitals with cardiology departments."

Output: User query routed to Doctor Booking, Hospital Comparison, or Diagnostic Services agent based on intent.

b. Doctor Booking Agent

Functionality:

- Fetch available doctors filtered by specialty and return appointment slots.

Key Nodes/Components:

- Google Sheets (Doctor Availability Dataset)
- OpenAI Chat (for interpreting input)
- Function (to filter slots)
- Google Gmail

Sample User Queries:

- **"Find an available dermatologist."**
- "Show me slots for Dr. Lee next Monday."

Output:

- List of available doctors and times based on user request
- Email confirmation sent with appointment details

---

c. Hospital Comparison + Emergency Routing Agent

Functionality:

- Compare hospitals based on specialties and emergency availability.
- Find nearest emergency hospitals.
- Visualize hospital rankings.

Key Nodes/Components:

- Google Sheets (Hospital General Information Dataset, Emergency Data Dataset)
- Function (to calculate proximity or emergency availability)
- OpenAI Chat (optional formatting of comparison output)
- QuickChart (Charts on hospital ratings)

Sample User Queries:

- "What hospitals specialize in cardiology near me?"
- "Where is the nearest 24/7 emergency hospital?"

Output:

- List of top hospitals sorted by specialty match.
- Nearest emergency facility based on user location.
- Visual chart showing ratings.

## d. Diagnostic Services Agent

Functionality:

- Suggest lab tests based on symptoms.
- Provide detailed descriptions and preparation instructions for lab tests.
- Email preparation guide to user.

Key Nodes/Components:

- Google Sheets (Hospital Information with Lab Tests Dataset)
- OpenAI Chat (for symptom-to-test mapping)

Sample User Queries:

- "What tests should I take for persistent headaches?"
- "What are the preparation instructions for a cancer screening?"

---
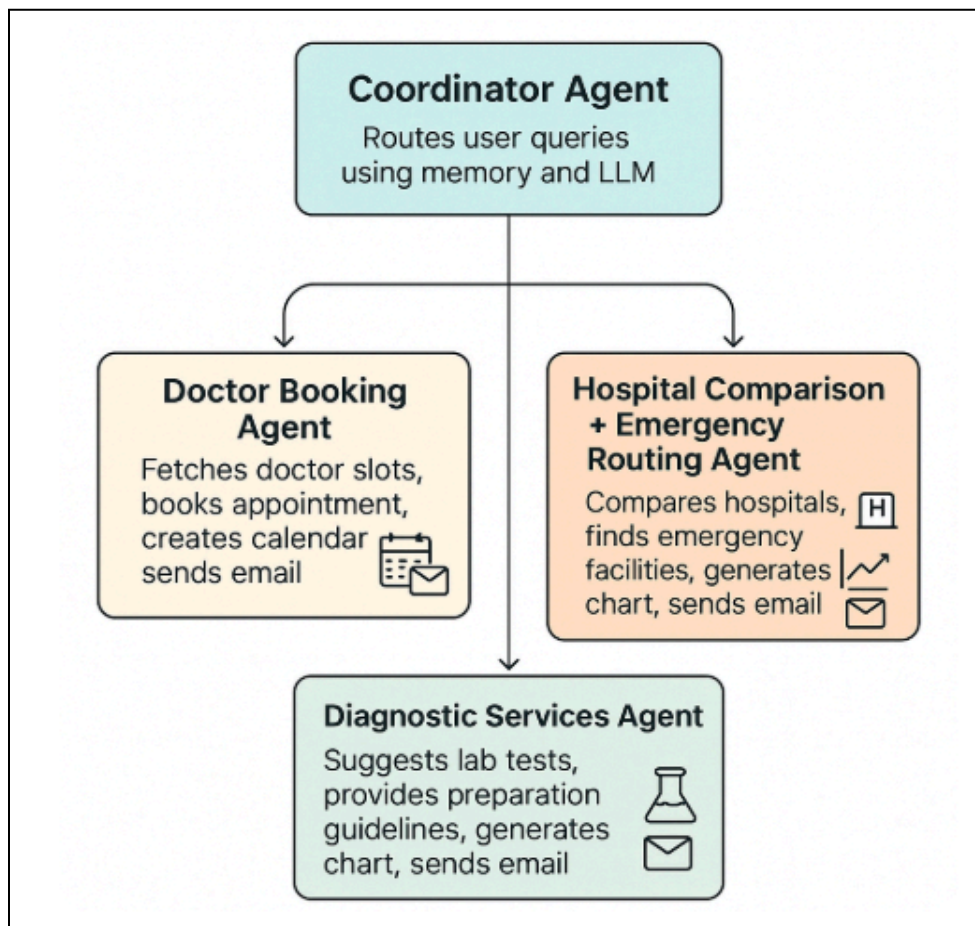
10. Technologies Used

Component	n8n Technology / Node
Query Understanding	OpenAI node (GPT-4, GPT-3.5, or Claude via HTTP Request node)
Multi-Agent Routing	IF / Switch nodes combined with JavaScript Function nodes for intelligent flow control
Data Handling	Google Sheets, Airtable, MySQL nodes for structured healthcare data ingestion and updates
Appointment System	Google Calendar, Gmail, and Slack integrations for slot availability and confirmations
Charts & Visuals	QuickChart node for dynamic chart generation; HTML Email node for formatted outputs
Deployment	Self-hosted n8n, n8n.cloud, or Docker containerised workflows on AWS / GCP / Azure

11. More Use-Cases in Healthcare

- Provide personalized health information based on patient demographics and medical history
- Provide information about medicinal side effects and dosage
- Guide patients to assess illness symptoms
- Streamline insurance booking, processing and settlement

👉 Start building **HealthSense AI** and revolutionize AI-driven healthcare today! 🚀