HealthCare Agentic AI Chatbot

Transforming Patient Care with Automation and AI

Overview

Our **HealthCare Agentic AI Chatbot** simplifies healthcare processes by interacting with patients, analyzing symptoms, and generating detailed medical reports. It offers a seamless and automated consultation experience.

Key Components

Agents

- **ReceptionistAgent**: Collects patient biodata, medical history, and symptoms.
- **ClinicalAIAgent**: Conducts in-depth symptom analysis and predicts diseases.
- **PostDischargeAgent**: Evaluates health post-discharge and provides care recommendations.
- **Report_Generator_Agent**: Creates detailed reports based on medical history and symptoms.
- **Mail_Trigger_Agent**: Sends notifications or reports via email..

Knowledge Base

- **Schemas**: Standardizes data for biodata, clinical assessments, and diagnostic evaluations.
- **Rag base:** Comprehensive clinical Nephrology(Link to book)

Workflow

1. **Initialization**:
   Set up agents and utilities.

2. **Patient Interaction**:
   ReceptionistAgent collects initial biodata and symptoms.

3. **Symptom Analysis**:
   ClinicalAIAgent retrieves medical knowledge and conducts structured questioning.

4. **Post-Discharge Care**:
   PostDischargeAgent assesses post-discharge health and provides advice.

5. **Report Generation**:
   Report Generator Agent creates a detailed medical report.

6. **Email Notification**:
   Mail Trigger Agent sends the report via email if needed.

Example Patient Journey

1. **Start Consultation**:
    1. Patient initiates interaction through the web interface.
    2. **ReceptionistAgent** collects initial information.

2. **Symptom Analysis**:
    ClinicalAIAgent conducts symptom analysis using AI-driven tools.

3. **Post-Discharge Care**:
    If applicable, **PostDischargeAgent** provides follow-up care recommendations.

4. **Report Generation**:
    Report_Generator_Agent produces a personalized medical report.

5. **Notification**:
    Mail_Trigger_Agent sends the report via email.

HealthCare Agentic AIChatbot Architecture

Backend

- **Programming Language**: Python
- **Framework**: Flask
  - **Extensions**:
    - **Flask-SocketIO**: WebSocket communication
    - **Eventlet**: Asynchronous operations

- **AI/ML Integration**:
  Crew Ai, qdrant, Langchain

- **FrontEnd**:
  HTML, CSS, JavaScript, Socket.IO

Competitive Analysis Highlights

Key Players in the Market

1.PlayBack Health:

1. Focuses on clinician-patient communication and empathy.
2. Generates clinical transcripts and summaries.

2.Ada Health:

1. Uses decision-tree-based disease diagnosis.
2. Provides a medical library (German-focused).

3.Sensely:

1. Wellness bot with a questionnaire-based approach.

4.Health Tap:

1. Offers virtual consultations with doctors.

5.Infermedica:

1. Symptom-based chatbot with a human body diagram interface.

6.Others (e.g., Nina, Florence, Buoy, Your MD, Tovie AI):

1. Questionnaire or text-based bots with limited capabilities like disease diagnosis, document search, or nutrition guidance.

What Makes Our Medical AI Chatbot Unique?

Key Differentiators

1.Real-Time Interaction:

1. Unlike text-based or questionnaire-driven systems, our chatbot supports **voice input/output** for dynamic, patient-centric conversations.

2.AI-Powered Agents:

1. Modular agents like **ReceptionistAgent** and **ClinicalAIAgent** ensure personalized, multi-stage care—from symptom collection to post-discharge assistance.

3.Advanced ML Integration:

1. Combines **LangChain** and **CrewAI** for orchestrating intelligent, agent-driven workflows.
2. Leverages **Azure OpenAI** for conversational LLM capabilities.
3. Offers tailored care and recommendations beyond the initial diagnosis, unlike competitors focused only on symptom analysis.

4. Comprehensive Reporting:

Generates detailed **PDF reports** and offers **Markdown support** for rich content delivery.

5. WebSocket-Based Architecture:

Enables **real-time, bidirectional communication**, ensuring a seamless user experience.

6. Scalable and Modular:

Uses a **vector database (Qdrant)** with compression for efficient data handling.

Adopts a modular design for easy updates and scalability.

7. Post-Discharge Support:

Offers tailored care and recommendations beyond the initial diagnosis, unlike competitors focused only on symptom analysis.

Value Proposition

Our **Medical AI Chatbot** redefines patient care by integrating **voice-based real-time interaction**, **intelligent multi-agent systems**, and **personalized post-discharge support**—going beyond traditional diagnosis to deliver a **holistic healthcare experience**.

Post-Discharge mortality Survey.

1. **Post-Discharge Mortality in Internal Medicine** (San Matteo Study):
    1. In-hospital mortality: **6.4%**; post-discharge mortality within 4 months: **15.9%**.
    2. Key risk factors: Older age, malnutrition (BMI < 18.5), high dependency (Barthel Index < 60), longer hospital stays.
    3. Sample: **1,451 patients** (53% female, median age: 80 years).
2. **Post-Discharge Mortality in Severe Acute Respiratory Infection (SARI)**:
    1. 30-day post-discharge mortality: **3.2%**.
    2. Risk factors for adults: Chronic diseases (e.g., COPD), ICU admission.
    3. Sample: **23,360 patients** (median age: 20 years, 65% male).
3. **HIV Post-Discharge Outcomes**:
    1. Mortality rate: **14%**; readmission rate: **18%**.
    2. Risk factors: Lack of ART, delayed linkage to care, longer hospital stays.
    3. Sample: **90,000+ individuals across 29 cohorts**, highlighting disparities in low-income regions.

Key Differentiator in Our Solution:

We address the **15.9% post-discharge mortality rate** by offering tailored post-discharge care and real-time AI-driven recommendations, reducing risks from factors like malnutrition and care discontinuity.

Medical AI Assistant

Clinical AI: 1. Considering your history of dialysis and stomach pain, do you experience any changes in urination habits, such as frequency or pain?

You: yes, frequency of urination has increased and the pain is also there while urinating

Clinical AI: 2. Have you noticed any changes in your hydration status, such as increased thirst or dry skin, that could be associated with possible kidney-related issues?

You: yes , thirst has also increased

Clinical AI: 3. Have you experienced any nausea or vomiting since your stomach pain begins, which might indicate systemic involvement related to kidney function?

Type your message here...

Send