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# CAPSTONE PROJECT

## AGENTIC AI HEALTH SYMPTOM CHECKER

**Presented By:**

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# OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach**
- **Algorithm & Deployment**
- **Result**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

Access to reliable health guidance is limited, leading many to rely on inaccurate online information for symptom checks. This can cause panic, misinformation, or delayed treatment. The challenge is to build an AI-powered Health Symptom Checker using IBM Cloud Lite and IBM Granite that allows users to input symptoms in natural language. It will analyze symptoms, suggest possible conditions, offer home remedies, recommend when to see a doctor, and support multiple languages—using only verified medical sources. This tool aims to promote early detection and informed health decisions while reducing self-diagnosis risks.

# PROPOSED SOLUTION

- The Agentic AI Health Symptom Checker is developed using the IBM watsonx platform, leveraging advanced language models and workflow architectures to provide intelligent, reliable, and educational health guidance to users. Building with **IBM watsonx Agent Lab** using **LangGraph** and **ReAct architecture**, with **LLaMA-3-70B-Instruct model**.**Data**
- **Agent Framework & Architecture:**
  - Used to create composable workflows with branching, which helps structure the symptom-to-response pipeline.
  - Allows the agent to reason about the user's symptoms and take actions (e.g., search, recommend, respond).
- **Model Configuration:**
  - This open-source LLM is responsible for understanding and generating natural language responses based on user symptom inputs.
  - You've left Temperature, Top-P, Presence Penalty as default or zero, indicating you are aiming for **more deterministic and factual responses**, which is ideal for health-related information..
- **User Interaction:**
  - The agent receives natural language inputs (e.g., *"I have sore throat and fever"*).
  - LLaMA model interprets symptoms and extracts key health indicators using prompt-instructed reasoning.
- **Medical Information Retrieval (Planned or Integrated):**

The agent can be connected to:

- **Custom Tools:** To retrieve from trusted sources (e.g., WHO, CDC, Indian MoHFW).
- **Knowledge Bases:** Using LangGraph, you can set up condition-action chains to answer:
  - What could be the cause?
  - When should the user consult a doctor?
  - Are home remedies safe here?

# PROPOSED SOLUTION

- **Deployment & Access:**

- After configuration and testing via the **Agent Preview**, the solution can be deployed using watsonx's native deployment tools.
- This allows the agent to be integrated with frontend platforms such as mobile apps, websites, or WhatsApp interfaces for broader reach.

- **Optional Multilingual Support:**

- The platform can be extended with **IBM Watson Language Translator** to support regional language inputs and outputs, increasing accessibility for non-English-speaking users.

- **Future Enhancements:**

- Integration with real-time symptom databases or telemedicine platforms
- Dashboard for tracking usage and common symptom patterns.
- Data anonymization and compliance with health data regulations.

# SYSTEM APPROACH

## ■ System Requirements

The Agentic AI Health Symptom Checker is developed using IBM watsonx tools to provide intelligent, educational, and multilingual symptom guidance. It uses large language models to interpret user input and respond with safe, informative health recommendations.

### **Platform:**

- IBM watsonx Agent Lab (Cloud-based)
- IBM Cloud Lite or Standard Tier

### **Compute & Deployment:**

- Model: LLaMA-3-70B-Instruct via watsonx
- Framework: LangGraph
- Architecture: ReAct (Reasoning + Acting)
- Deployment: Built-in watsonx Agent deploy (optionally extensible to IBM Cloud Code Engine)

### **Optional Services:**

- IBM Watson Language Translator (for multi-language support)
- IBM Cloudant or DB2 (for session data, logs, or knowledge base)

# SYSTEM APPROACH

- **Library required to build the model:**

Since the solution is being built primarily using IBM watsonx's no-code/low-code agent tools, most libraries are abstracted within the platform. However, if extending or deploying on a custom backend, the following libraries would be required

Purpose	Libraries / Tools
AI/NLP Models	transformers, torch, langchain, sentence-transformers
Data Processing	pandas, json, spacy ( <i>optional</i> )
API & Web Integration	Flask, FastAPI, requests, ibm-watson SDK
Health Data Access	WHO APIs, HealthData.gov, Watson Discovery ( <i>optional</i> )

# ALGORITHM & DEPLOYMENT

## Algorithm:

- **User Input**
  - Natural symptom input (e.g., *"I have sore throat and fever"*)
- **NLP Parsing (LLaMA-3)**
  - Extracts symptoms and understands intent
- **Symptom Analysis**
  - Matches with verified medical data
  - Assesses urgency (mild, moderate, critical)
- **Response Generation**
  - Suggests probable causes, home remedies, & when to consult a doctor
- **Multilingual Support (Optional)**
  - IBM Watson Language Translator for regional access
- **React Decision Logic**
  - Decide: ask more, escalate, or end session



# ALGORITHM & DEPLOYMENT

## Deployment:

The agent is deployed directly within **IBM watsonx Agent Lab**, which supports zero-code cloud deployment.

### ■ Steps

- Agent is built using LangGraph (workflow) and ReAct (architecture)
- LLM (LLaMA-3-70B-Instruct) is assigned to handle user prompts
- Model parameters (temperature, token limits) are configured
- Optional tools (translation, symptom APIs) are added
- The agent is tested in the preview window
- Click **Deploy** to publish the agent
- Optional: Integrated into external apps (e.g., website, mobile) using API or webhooks

# RESULT

The screenshot displays the IBM watsonx Agent Lab interface in a web browser. The browser's address bar shows the URL: `dataplatfom.cloud.ibm.com/wx/agents/e405b2e5-7a6f-48da-9f20-72824f9bd201?project_id=20754c0b-0932-4044-b7b6-fa1f3a6523c1&context=wx`. The interface is divided into several sections:

- Header:** Includes the IBM watsonx logo, an "Upgrade" button, a user profile for "surya bhiguvu's Account", and location settings for "Dallas".
- Breadcrumbs:** Shows the path "Projects / project\_work / watsonx Agent".
- Build Section:**
  - Model:** Set to "Llama-3-3-70b-instruct".
  - Configuration:** Includes "Framework" (LangGraph) and "Architecture" (ReAct).
  - Instructions:** A text box containing: "An Agentic AI Health Symptom Checker helps users understand their health conditions by analyzing symptoms and providing probable causes, preventive advice, and care recommendations. It retrieves verified medical".
  - Knowledge:** A section for adding or creating custom tools.
- Model parameters:** A panel with sliders and input fields for:
  - Presence penalty: -2 to 2 (set to 0)
  - Temperature: 0 to 2 (set to 0)
  - Top P (nucleus sampling): 0.01 to 1 (set to 1)
  - Max tokens: 5000
  - Random seed: (empty)
- Agent preview:** A chat window showing the interaction:
  - User (SB): "Hii"
  - Agent (watsonx Agent): "Based on the search results, it appears that Agentic AI is being used in various ways in the healthcare industry, including symptom checking, triage, and patient care navigation. Some examples of companies and organizations using Agentic AI in healthcare include Clearstep, Infermedica, and GE Healthcare. Additionally, there are various articles and research papers discussing the potential benefits and use cases of Agentic AI in healthcare, such as improving patient outcomes, reducing costs, and enhancing the overall quality of care. If you're looking for more information on Agentic AI in healthcare, I would recommend checking out some of the resources listed in the search results, such as the articles from GE Healthcare, Salesforce, and athenahealth, or exploring the websites of companies like Clearstep and Infermedica." followed by a link "How did I get this answer?".
  - User (SB): "I have a sore throat and fever"

The Windows taskbar at the bottom shows the date as 04-08-2025 and the time as 12:42.

# RESULT

The screenshot displays the IBM watsonx Agent Lab interface in a web browser. The browser's address bar shows the URL: `datapatform.cloud.ibm.com/wx/agents/e405b2e5-7a6f-48da-9f20-72824f9bd201?project_id=20754c0b-0932-4044-b7b6-fa1f3a6523c1&context=wx`. The interface is divided into three main sections:

- Build:** This section on the left contains a sidebar with 'Setup', 'Configuration', 'Instructions', 'Knowledge', and 'Tools'. The 'Configuration' section is expanded, showing 'Framework' set to 'LangGraph' and 'Architecture' set to 'ReAct'. The 'Instructions' section contains the text: 'An Agentic AI Health Symptom Checker helps users understand their health conditions by analyzing symptoms and providing probable causes, preventive advice, and care recommendations. It retrieves verified medical...'. The 'Tools' section has buttons for 'Add a tool' and 'Create custom tool'.
- Model parameters:** This middle section shows the 'Model: llama-3-3-70b-instruct'. It includes a warning: 'You can edit parameters only when the conversation has been cleared in chat mode.' and a 'Clear chat' button. Below this, several parameters are adjustable with sliders and input fields: 'Presence penalty' (range -2 to 2, value 0), 'Temperature' (range 0 to 2, value 0), 'Top P (nucleus sampling)' (range 0.01 to 1, value 1), and 'Max tokens' (input field with value 5000). There is also a 'Random seed' field.
- Agent preview:** This section on the right shows a chat conversation. The user's message is: 'My head has been hurting for two days now. give step by step points'. The agent's response is: 'Based on the search results, it appears that a headache that lasts for two days can be caused by a variety of factors, including tension headaches, migraines, and other underlying medical conditions. Here are some step-by-step points to consider:'. The response includes a list of six points: 1. **Identify the type of headache:** Try to determine if your headache is a tension headache, migraine, or something else. Tension headaches are often described as a band or a squeezing sensation around the forehead, while migraines are typically more severe and can be accompanied by nausea, vomiting, and sensitivity to light and sound. 2. **Keep a headache diary:** Keeping a diary of when your headaches occur, how long they last, and any potential triggers can help you identify patterns and potential causes. 3. **Stay hydrated:** Dehydration can exacerbate headaches, so make sure to drink plenty of water throughout the day. 4. **Get enough sleep:** Lack of sleep or poor sleep quality can trigger headaches, so aim for 7-8 hours of sleep per night. 5. **Manage stress:** Stress can trigger tension headaches and migraines, so try to find ways to manage your stress levels, such as through exercise, meditation, or deep breathing. 6. **Try over-the-counter pain relievers:** Over-the-counter pain relievers such as ibuprofen or... The chat interface includes a 'Type something...' input field at the bottom.

# RESULT

The screenshot displays the IBM watsonx Agent Lab interface in a web browser. The browser's address bar shows the URL: `datapatform.cloud.ibm.com/wx/agents/e405b2e5-7a6f-48da-9f20-72824f9bd201?project_id=20754c0b-0932-4044-b7b6-fa1f3a6523c1&context=wx`. The interface is divided into three main sections:

- Build:** Contains a sidebar with 'Setup', 'Configuration', 'Instructions', 'Knowledge', and 'Tools'. The 'Configuration' section is expanded, showing 'Framework' set to 'LangGraph' and 'Architecture' set to 'ReAct'. The 'Instructions' section contains the text: 'An Agentic AI Health Symptom Checker helps users understand their health conditions by analyzing symptoms and providing probable causes, preventive advice, and care recommendations. It retrieves verified medical...'. The 'Tools' section has buttons for 'Add a tool' and 'Create custom tool'.
- Model parameters:** A central panel for configuring the model. It includes a warning: 'You can edit parameters only when the conversation has been cleared in chat mode.' and a 'Clear chat' button. Parameters shown include:
  - Presence penalty: -2 to 2 (set to 0)
  - Temperature: 0 to 2 (set to 0)
  - Top P (nucleus sampling): 0.01 to 1 (set to 1)
  - Max tokens: 5000
  - Random seed: (empty)
- Agent preview:** A chat window showing the interaction. The user (SB) says: 'I have a sore throat and fever'. The watsonx Agent (12:39 PM) responds with a detailed analysis and treatment advice:

Based on the search results, it appears that a sore throat and fever can be caused by a variety of factors, including viral infections such as the common cold or flu, bacterial infections such as strep throat, and other conditions such as glandular fever.

Treatment for a sore throat and fever typically depends on the underlying cause, but may include rest, hydration, over-the-counter pain relievers, and antibiotics if the cause is bacterial.

It's important to consult with a healthcare professional for an accurate diagnosis and treatment plan. They can help determine the cause of the sore throat and fever and provide guidance on the best course of treatment.

In the meantime, there are some home remedies that may help alleviate symptoms, such as gargling with salt water, using a humidifier to add moisture to the air, and staying hydrated by drinking plenty of fluids.

If you're experiencing severe symptoms, such as difficulty swallowing, breathing, or speaking, or if you have a high fever that lasts for an extended period, it's important to seek medical attention right away.

The bottom of the screen shows a Windows taskbar with the date and time: 13:37, 04-08-2025.

# CONCLUSION

- The Agentic AI Health Symptom Checker, developed using IBM Watsonx, demonstrates the effective use of large language models and agentic workflows in the healthcare domain. By combining the LangGraph framework with the ReAct architecture, the system dynamically interprets user inputs and delivers medically relevant responses, helping users better understand their symptoms. It retrieves trusted medical information and offers personalized advice, including probable causes, preventive tips, and care recommendations. This approach not only enhances healthcare accessibility but also reduces the burden on initial clinical consultations. The project highlights how Agentic AI can play a significant role in early diagnosis support and symptom triage, paving the way for intelligent, AI-assisted healthcare solutions.

# FUTURE SCOPE

- The Agentic AI Health Symptom Checker has promising potential for future development and integration in various areas of digital healthcare. In the future, the system can be enhanced to support multi-language capabilities, allowing it to serve users from diverse linguistic backgrounds. It can also be integrated with wearable devices and electronic health records (EHRs) to provide more personalized and real-time insights based on a user's medical history and vitals. Advanced machine learning models can be incorporated for better accuracy in diagnosis and recommendation. Additionally, integrating telemedicine services would enable users to instantly connect with healthcare professionals based on the AI's triage. The platform can also expand its scope to include mental health assessment, chronic disease tracking, and AI-powered prescription suggestions, making it a comprehensive virtual health assistant.

# REFERENCES

- IBM Watsonx Documentation – <https://www.ibm.com/products/watsonx>
- IBM Agent Lab (beta) – <https://dataplatfom.cloud.ibm.com>
- LangGraph Framework – <https://docs.langchain.com/docs/langgraph>
- ReAct Architecture for LLMs – Yao et al., “ReAct: Synergizing Reasoning and Acting in Language Models”
- GE Healthcare AI Use Cases – <https://www.gehealthcare.com>
- Athenahealth Symptom Checker Insights – <https://www.athenahealth.com>
- WHO – Symptom-based Diagnosis and Digital Health Tools – <https://www.who.int>

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This certificate is presented to

B Surya Teja

for the completion of

**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 29 Jul 2025 (GMT)

**Learning hours:** 20 mins



**THANK YOU**