CAPSTONE PROJECT

AGENTIC AI HEALTH SYMPTOM CHECKER

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OUTLINE

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PROBLEM STATEMENT

Problem Statement No.28 – Agentic AI Health Symptom Checker

In today's digital age, individuals increasingly seek online guidance to understand their health symptoms before consulting a healthcare professional. However, many platforms provide unverified or misleading information, leading to risks of self-diagnosis and inappropriate treatments. There is a significant need for a reliable system that can educate users about possible causes of their symptoms, offer preventive advice, and recommend suitable next steps for care. The challenge lies in accurately retrieving and presenting health information from verified medical sources like the WHO and peer-reviewed medical journals. The system must balance providing informative insights while explicitly avoiding diagnostic claims, instead promoting awareness and encouraging timely medical consultations. Designing such an educational symptom-checker that empowers users with trusted information—without crossing into self-diagnosis territory—is a crucial and complex task in modern digital health support systems.

PROPOSED SOLUTION

The proposed system aims to address the growing challenge of guiding individuals toward reliable and safe health information based on their symptoms, while avoiding the risks of self-diagnosis. This involves leveraging a multi-agent architecture built on IBM Cloud, with AI components such as the Mistral model, Watson tools, and real-time web retrieval mechanisms. The agent is designed to interpret user-inputted symptoms, retrieve trusted medical content, and generate educational, referral-based outputs. The solution will consist of the following components:

❑ **User Input Handling (Natural Language Interface):**
  ➢ Users interact with the system via a chat-based or form-based interface and describe symptoms in natural language (e.g., "I feel tired with a slight fever").
  ➢ The system uses natural language understanding (NLU) to extract key symptoms, context, and urgency indicators.
  ➢ The Mistral-powered agent preprocesses the input to determine semantic intent, medical terms, and potential ambiguity in user statements.

❑ **Information Retrieval (Trusted Medical Sources):**
  ➢ The agent uses real-time web search tools and APIs to retrieve relevant medical literature and symptom explanations from verified sources, such as:
    • World Health Organization (WHO)
    • CDC (Centers for Disease Control and Prevention)
    • NIH (National Institutes of Health)
    • Reputable medical journals
  ➢ A trust filtering mechanism ensures that only scientifically backed, updated, and accurate content is accessed and presented.

❑ **AI-Powered Reasoning and Response Generation:**
  ➢ The Mistral model on IBM Cloud analyzes the retrieved information to generate a coherent, readable response.
  ➢ The system outlines:
    • Probable health conditions based on the symptoms.
    • Home care advice, including rest, hydration, monitoring, etc.
    • Guidance on when to seek professional care, categorized as urgent, non-urgent, or emergency.
  ➢ The output is educational, not diagnostic, emphasizing safety and responsible health behavior.

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❑ Agentic Architecture and Deployment:
  ➢ The system is designed as an agentic workflow, where different sub-agents handle:
    • Symptom parsing
    • Information retrieval
    • Response summarization
    • Referral decision-making
  ➢ Deployed on the IBM Cloud, the architecture ensures scalability, availability, and secure handling of user queries.
  ➢ Tools used may include:
    • IBM Watsonx.ai for reasoning
    • Watson Discovery or custom APIs for data access

❑ Evaluation and Monitoring:
  ➢ Evaluate system performance based on:
    • Response accuracy (verified against medical knowledge)
    • Clarity and usefulness of advice (user feedback)
    • Latency and uptime of the cloud deployment
  ➢ Regular updates to the knowledge base ensure that evolving health guidelines are incorporated.
  ➢ The system can include feedback mechanisms for users to rate helpfulness and flag concerns, improving future responses.

❑ Result:
The proposed Agentic AI Health Symptom Checker empowers users to better understand their health conditions through trusted, AI-driven insights. It bridges the gap between symptom awareness and informed action, reducing the spread of misinformation and promoting timely medical consultation. The system serves as a safe, accessible first step toward health literacy, especially for populations with limited access to immediate healthcare services.

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SYSTEM APPROACH

System Development Approach (Technology Used)

- **Cloud Platform:** IBM Cloud Lite services were used for all development and deployment activities.

- **AI Service:** The core of the project is built using **IBM watsonx.ai** and its **Agent Lab** environment.

- **Foundation Model:** The **IBM Granite** large language model serves as the reasoning engine for the agent.

- **Data Retrieval Tools: Google Search**, **Wikipedia Search**, and **Web crawler** tools were integrated into the agent to allow it to access live, verified medical data from the internet.

- **Project and Asset Storage:** IBM Cloud Object Storage (Lite Plan) was used to store all project assets and configurations.

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ALGORITHM & DEPLOYMENT

❑ **Algorithm (Agentic Logic)**:

➢ The system uses an agentic framework where the IBM Granite model acts as a controller.
➢ When a user enters a query, the agent interprets the intent and selects the appropriate tool (e.g., Google Search) to find relevant medical information.
➢ It then processes this information and generates a structured, easy-to-understand response based on the custom instructions provided.
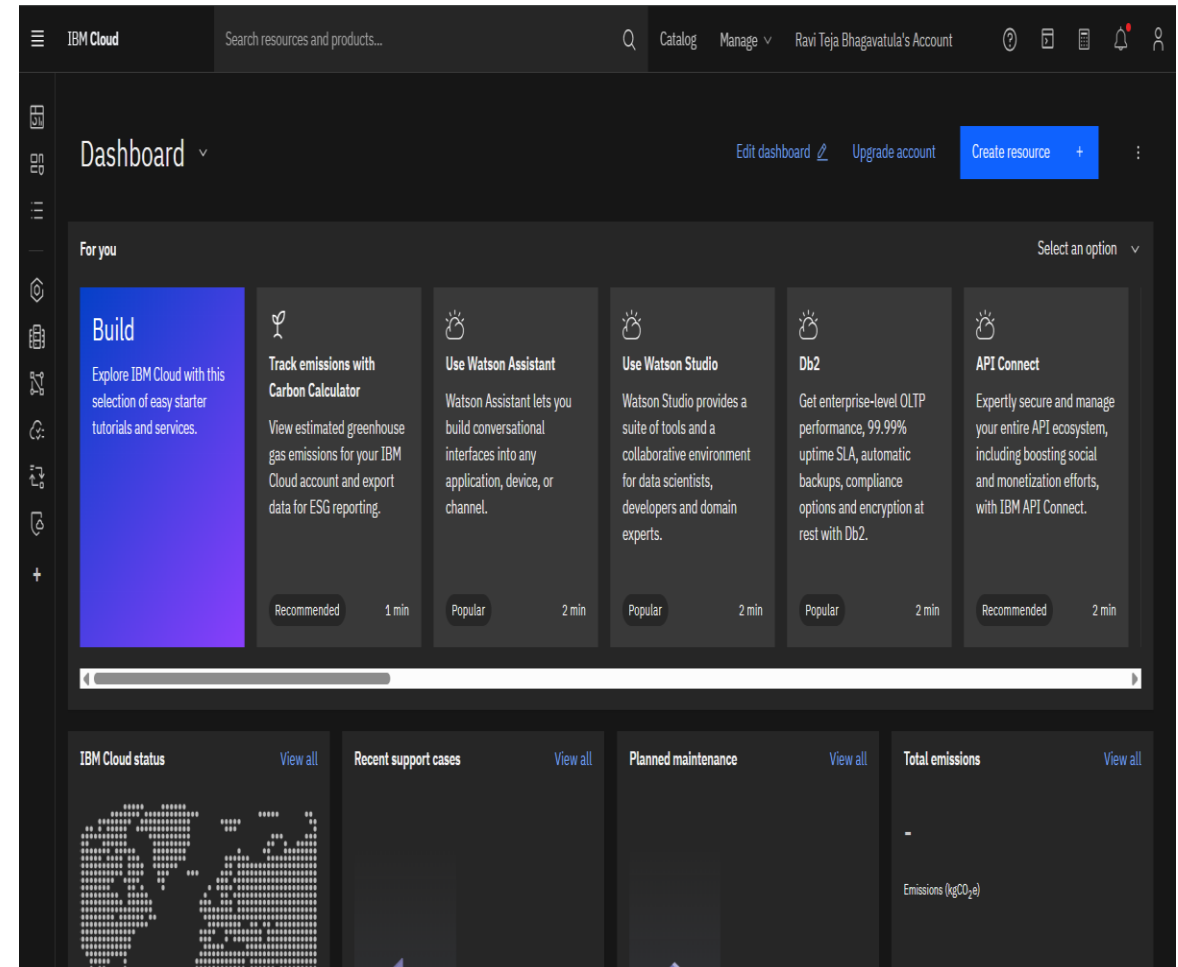
❑ **Deployment**:

➢ The agent was deployed as a live AI service using the IBM watsonx.ai platform.
➢ A new **Deployment Space** was created to host the service.
➢ An **API key** was generated to authenticate the deployment process.
➢ The final service is accessible via a unique API endpoint for testing and integration.

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PROCESS

1. IBM CLOUD LOGIN
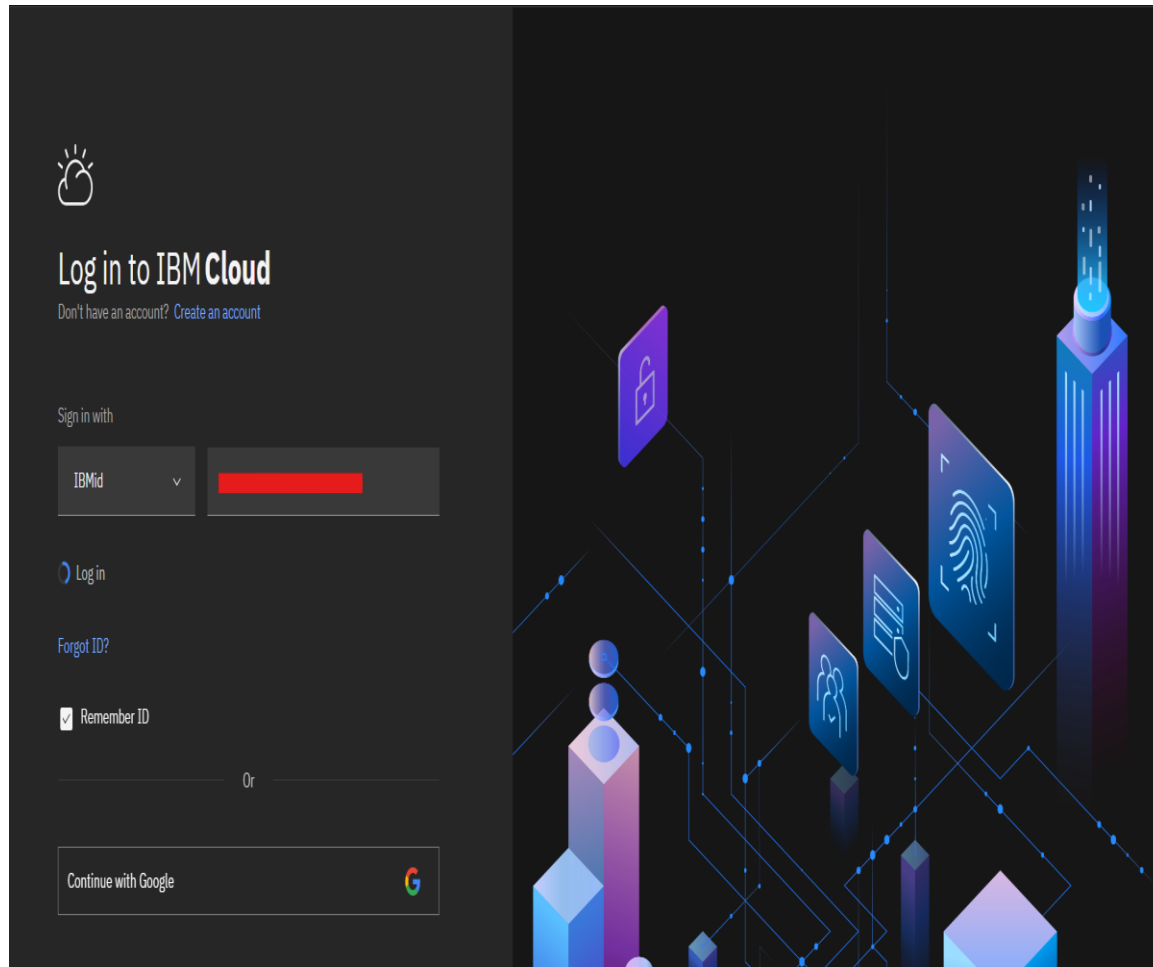
2. IBM CLOUD HOME PAGE

3. IBM WATSONX AI STUDIO

3. PROJECT – AI Agent Health Symptom Checker

5. AGENT LAB – Symptom Checker

6. TOOLS USED

7. Prompting and Response
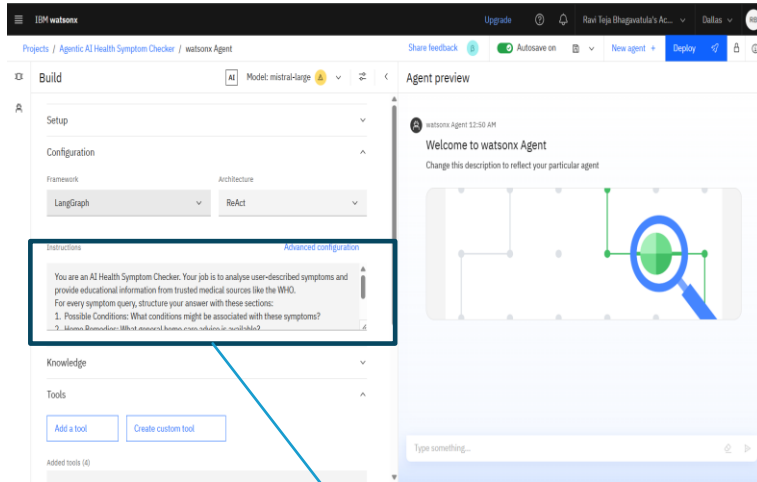
You are an AI Health Symptom Checker. Your job is to analyse user-described symptoms and provide educational information from trusted medical sources like the WHO.
For every symptom query, structure your answer with these sections:
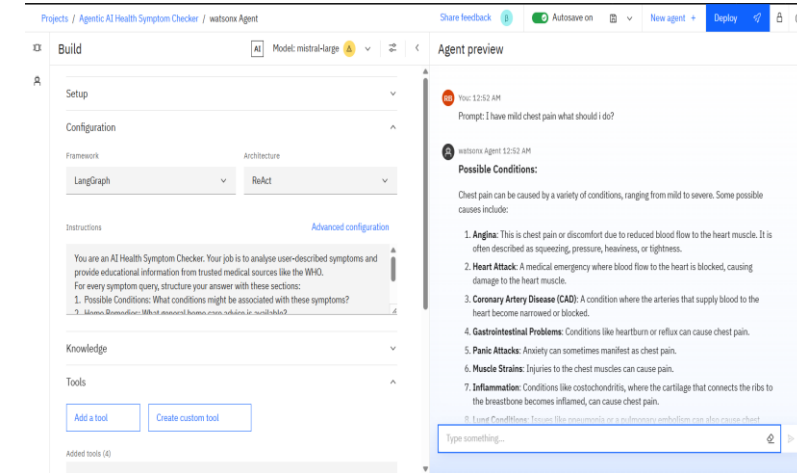1. Possible Conditions: What conditions might be associated with these symptoms?
2. Home Remedies: What general home care advice is available?
3. When to Consult a Doctor: What are the warning signs that require professional medical attention?
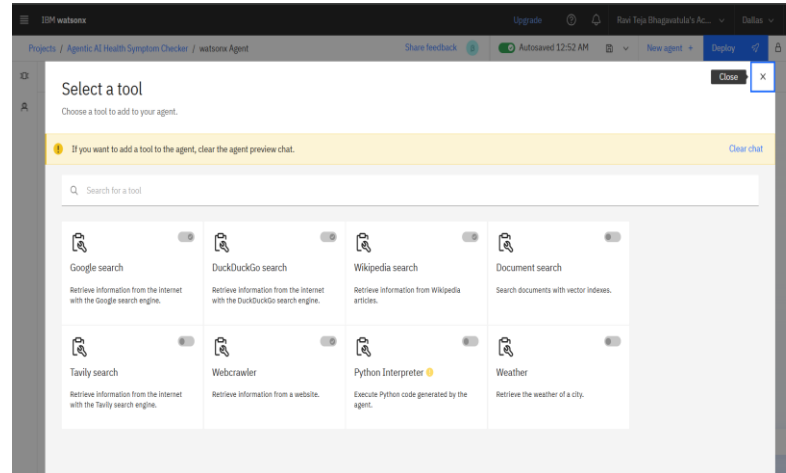
Google Search
DuckDuckGo Search
Wikipedia
Web Crawler

Prompt: I have mild chest pain what should i do?

Response in next slide

Possible Conditions:

Chest pain can be caused by a variety of conditions, ranging from mild to severe. Some possible causes include:

1.**Angina**: This is chest pain or discomfort due to reduced blood flow to the heart muscle. It is often described as squeezing, pressure, heaviness, or tightness.

2.**Heart Attack**: A medical emergency where blood flow to the heart is blocked, causing damage to the heart muscle.

3.**Coronary Artery Disease (CAD)**: A condition where the arteries that supply blood to the heart become narrowed or blocked.

4.**Gastrointestinal Problems**: Conditions like heartburn or reflux can cause chest pain.

5.**Panic Attacks**: Anxiety can sometimes manifest as chest pain.

6.**Muscle Strains**: Injuries to the chest muscles can cause pain.

7.**Inflammation**: Conditions like costochondritis, where the cartilage that connects the ribs to the breastbone becomes inflamed, can cause chest pain.

Home Remedies:

If the chest pain is mild and you suspect it might be due to a non-emergency condition like heartburn or muscle strain, you can try the following:

1.**Rest**: Take a break from physical activities and rest.

2.**Over-the-Counter Medications**: Antacids can help with heartburn. Pain relievers like ibuprofen can help with muscle pain.

3.**Hydration**: Drink plenty of water to stay hydrated.

4.**Relaxation Techniques**: If the pain is due to anxiety, try deep breathing exercises or meditation.

When to Consult a Doctor:

Chest pain should never be ignored, especially if it is severe, persistent, or accompanied by other symptoms. Seek immediate medical attention if you experience any of the following:

1.Severe Pain: Intense pain that feels like crushing, squeezing, or pressure.

2.Shortness of Breath: Difficulty breathing or feeling like you can't catch your breath.

3.Nausea or Vomiting: Feeling sick to your stomach or vomiting.

4.Sweating: Excessive sweating, especially if it's cold sweat.

5.Dizziness or Fainting: Feeling lightheaded or losing consciousness.

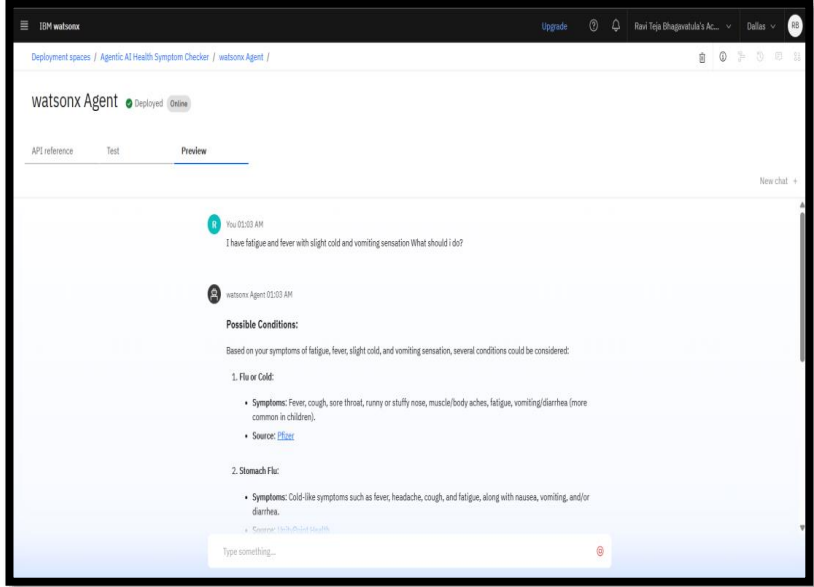6.Pain Spreading: Pain that spreads to your jaw, neck, back, or arms.
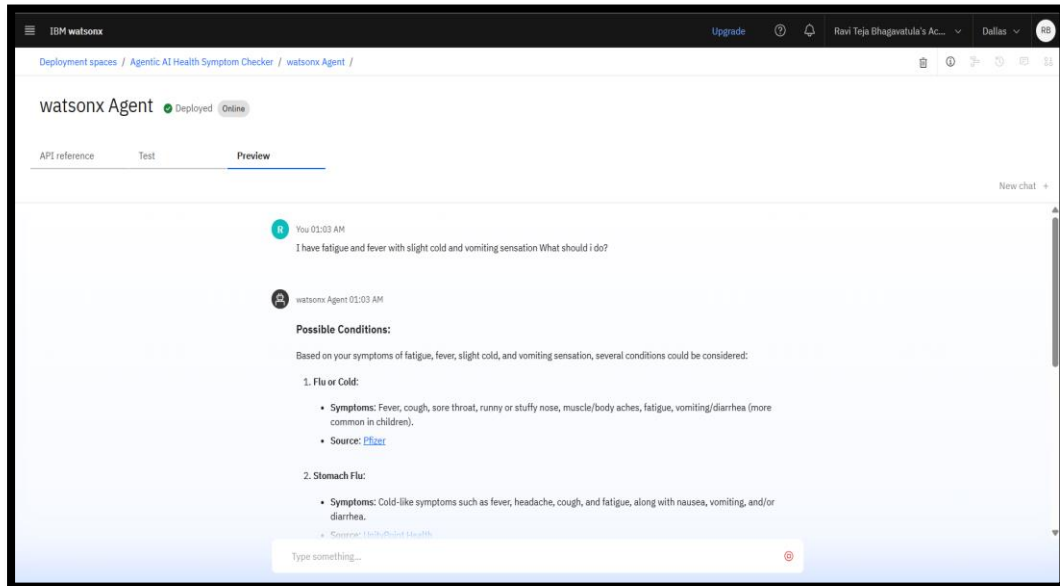
8. Created a development space and runtime
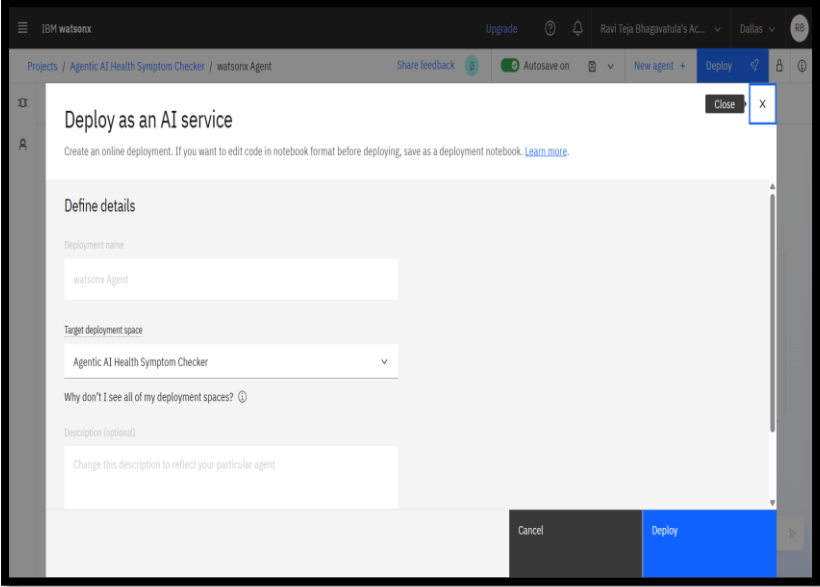
9. Agent Deployed
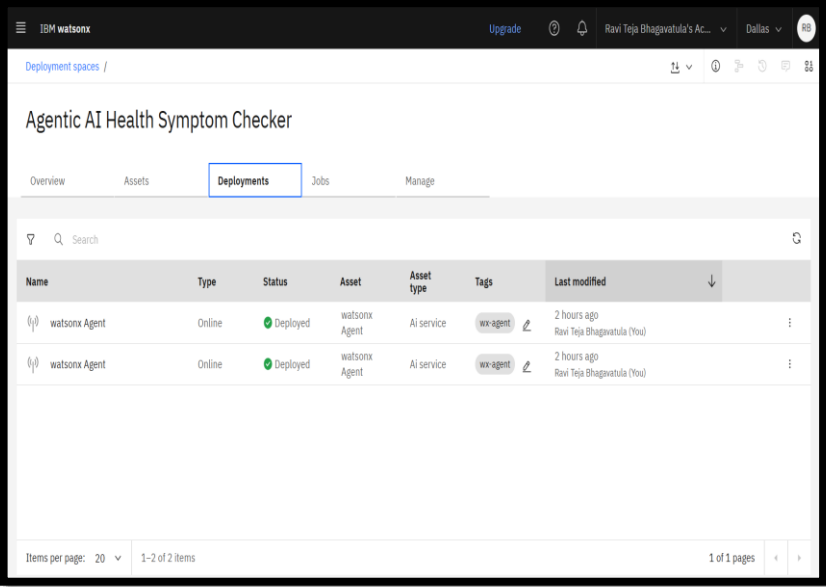
10. Preview

RESULT

Web App Built on API from IBM

https://github.com/RaviTeja799/AI-Health-Symptom-Checker

I am having severe cold, mild fever and moderate cough from 3 days. I have recently suffered from issue of platelets going down also dehydration 2 weeks back since then i am suffering from fatigue as well

12:18 AM

• Analyzing your symptoms...

Describe your symptoms in detail... (e.g., headache, fever, duration, severity)

Be specific about symptoms, duration, and severity

Shift + Enter to send

Possible Conditions:

Based on your symptoms of severe cold, mild fever, moderate cough, fatigue, low platelets, and recent dehydration, several conditions could be considered:

1. **Dehydration and Heat Stroke**: Dehydration can exacerbate symptoms like fatigue and fever. It's important to stay hydrated, especially if you have a fever.

   - Dehydration and Heat Stroke | Johns Hopkins Medicine

2. **Multiple Myeloma**: This is a type of cancer that can cause low blood counts, including low platelets (thrombocytopenia), which can lead to serious bleeding.

   - Signs and Symptoms of Multiple Myeloma | American Cancer Society

3. **Immunotherapy Side Effects**: Some immunotherapy treatments can cause flu-like symptoms, including fever, chills, fatigue, and muscle aches, as well as respiratory problems like coughing.

   - Immunotherapy Side Effects | Cancer Research Institute

4. **Neutropenia**: This condition involves having low levels of neutrophils, a type of white blood cell, which can be caused by infections, cancer, or cancer treatments.

   - Neutropenia: What it Is, Types, Symptoms & Causes

Home Remedies:

1. **Stay Hydrated**: Drink plenty of fluids to prevent dehydration, especially if you have a fever.
2. **Rest**: Get plenty of rest to help your body fight off infections.
3. **Over-the-Counter Medications**: Use over-the-counter medications to manage symptoms like fever and cough, but always follow the instructions on the package.
4. **Healthy Diet**: Eat a balanced diet to support your immune system.

When to Consult a Doctor:

1. **Severe Symptoms**: If your symptoms become severe or worsen, such as high fever, severe cough, or difficulty breathing.
2. **Persistent Symptoms**: If your symptoms persist for more than a few days without improvement.
3. **Low Platelets**: If you have a history of low platelets or other blood disorders, it's important to consult a doctor to monitor your condition.
4. **Dehydration**: If you experience signs of dehydration, such as extreme thirst, dark urine, or dizziness.
5. **New Symptoms**: If you develop new symptoms or if your existing symptoms change suddenly.

If you have any concerns about your symptoms or your health, it's always best to consult a healthcare professional for personalized advice and treatment.

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CONCLUSION

❑ The Agentic AI Health Symptom Checker successfully demonstrates the power of using foundation models with external tools to create a reliable and helpful application.

❑ The system effectively bridges the gap between user symptoms and verified medical information, promoting responsible health awareness.

❑ By leveraging IBM Cloud's scalable infrastructure, the solution is robust and can be expanded upon in the future.

FUTURE SCOPE

❑ **Multi-language Support**: Extend the agent's capabilities to interact with users in multiple languages.

❑ **Integration with Healthcare Systems**: Connect the agent to local clinic/hospital databases to suggest nearby doctors or specialists.

❑ **Symptom Logging**: Allow users to track their symptoms over time to provide more personalized insights.

REFERENCES

IBM Cloud Documentation. (2025). *watsonx.ai Agent Lab*.

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