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# CAPSTONE PROJECT

## AGENTIC AI HEALTH SYMPTOM CHECKER

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# OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

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 data, symptom databases, and guidelines from trusted sources like WHO, government health portals, and medical journals. Users can input symptoms in natural language such as “I have a sore throat and fever,” and the agent provides possible conditions, urgency level, home remedies, and when to consult a doctor. It supports multi-language interaction and avoids self-diagnosis risks by offering educational and referral-based suggestions. This AI-driven assistant promotes early detection, reduces misinformation, and empowers users to take informed health actions.

# PROPOSED SOLUTION

- The proposed system aims to address the challenge of empowering users with early and informed health insights by analyzing natural language symptom inputs using an Agentic AI Health Symptom Checker. This involves leveraging natural language processing, medical knowledge bases, and ethical AI principles to offer educational, multilingual, and non-diagnostic support. The solution will consist of the following components:
- Data Collection:
  - Gather medical data from trusted sources like WHO guideline, national health portals and peer reviewed medical journals.
  - RAG based data retrieval by the AI Agent
- Data Preprocessing:
  - Normalize and annotate medical terms for multi-language support using standard vocabularies and translation models.
- Machine Learning & NLP Algorithm:
  - The agent uses the granite-3-3-8b-instruct model
  - It incorporates other factors like weather condition.
- Deployment:
  - Since it's developed on the IBM cloud platform it's highly scalable and has a user friendly design.
- Evaluation:
  - Assess the model's performance using appropriate metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), or other relevant metrics.
  - The model uses ReACT architecture to learn.
  - Result:

# SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the rental bike prediction system. Here's a suggested structure for this section:

- IBM Cloud Lite services
- IBM Granite

# ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**
  - The Granite Large Language Model (LLM) that is hosted on IBM cloud was used
- **Data Input:**
  - Text based input by the user describing their medical issues.
- **Training Process:**
  - The Granite model was pre-trained on medical and general text data and fine-tuned using symptom-based conversations to optimize its response accuracy without additional hyperparameter tuning.
- **Prediction Process:**
  - The trained Granite model predicts possible medical conditions by analyzing user symptoms in real time and generating follow-up questions for improved accuracy.

# RESULT

The screenshot displays the IBM Watsonx user interface. At the top, a dark navigation bar contains the 'IBM watsonx' logo, an 'Upgrade' button, and user account information for 'Chirag Keshav's Account' in 'Dallas'. Below this, a breadcrumb trail shows the path: 'Deployment spaces / Personal Health Agent / Personal Health Agent'. The main content area is titled 'Personal Health Agent' with a green 'Deployed' status indicator and an 'Online' button. Three tabs are visible: 'API reference', 'Test', and 'Preview', with the 'Preview' tab being the active one. The chat interface shows a message from the 'Personal Health Agent' at 04:13 PM. The message content is: 'Some home remedies for an upset stomach include: 1. Drinking water, 2. Avoiding lying down, 3. Ginger, 4. BRAT diet (bananas, rice, applesauce, and toast), 5. Avoiding smoking and drinking alcohol, 6. Peppermint oil, 7. Eucalyptus oil, 8. Chamomile tea, 9. Apple cider vinegar, 10. Carbonated drinks. It's also important to note that if your symptoms persist or worsen, you should seek medical attention. Additionally, if you experience severe abdominal pain, vomiting blood, or difficulty breathing, you should go to the hospital immediately.' At the bottom of the chat window is a text input field with the placeholder 'Type something...' and a send button.

IBM watsonx Upgrade ? Chirag Keshav's Account Dallas CK

Deployment spaces / Personal Health Agent / Personal Health Agent

Personal Health Agent Deployed Online

API reference Test **Preview**

New chat +

Personal Health Agent 04:13 PM

Some home remedies for an upset stomach include:




1. Drinking water
2. Avoiding lying down
3. Ginger
4. BRAT diet (bananas, rice, applesauce, and toast)
5. Avoiding smoking and drinking alcohol
6. Peppermint oil
7. Eucalyptus oil
8. Chamomile tea
9. Apple cider vinegar
10. Carbonated drinks

It's also important to note that if your symptoms persist or worsen, you should seek medical attention. Additionally, if you experience severe abdominal pain, vomiting blood, or difficulty breathing, you should go to the hospital immediately.

Type something...

# Ground gen AI with vectorized documents

Add documents to vectorize and create a vector index in memory. Otherwise, select your vector database and specify index details.

- Vector stores
-  **In memory**
-  watsonx.data Milvus
-  Elasticsearch

## Add files

### Drop data files or browse to upload

Add PPTX, DOCX, PDF, or TXT files or select from project.

Add up to 300 MB with PPTX files, 50 MB of PDF files, 50 MB of DOCX files, or 5 MB with TXT and other files.

Browse

Select from project

9789241549684\_eng.pdf  
6.3MB



Medicaljournals.pdf  
186.2KB



## Define details

Name

WHO Guidelines and Medical Journals

Description (optional)

What's the purpose of this vector index?

Advanced settings



Cancel

Create



# RESULT

Deployment spaces / Personal Health Agent / Personal Health Agent /

## Personal Health Agent

Deployed Online

API reference Test Preview

New chat +

Personal Health Agent 04:24 PM

You should see a doctor for a persistent headache if it:

- Occurs more often than usual
- Is more severe than usual
- Worsens or doesn't improve with appropriate use of over-the-counter drugs
- Keeps you from doing daily activities
- Is accompanied by other symptoms such as fever, confusion, or weakness
- Lasts for an unusually long time
- Wakes you up from sleep or makes it difficult for you to fall asleep

It's also a good idea to see a doctor if you're experiencing frequent or severe headaches, or if you're concerned about your headaches. Your doctor can help determine the cause of your headaches and recommend appropriate treatment.

▼ How did I get this answer?

- 1: ("q") "when to see a doctor for persistent headache"
- 2: Generating final answer



Personal Health Agent 04:24 PM

Based on the search results, it appears that the burning sensation in your stomach and throat could be caused by several factors, including:

- Heartburn and acid reflux: This is a common condition where stomach acid flows back up into the esophagus, causing a burning sensation in the chest and throat.
- Gastroesophageal reflux disease (GERD): This is a more severe form of acid reflux that can cause symptoms such as heartburn, regurgitation, and difficulty swallowing.
- Spicy or acidic foods: Eating foods that are high in acidity or spice can irritate the esophagus and cause a burning sensation.
- Allergies: Food allergies or intolerances can cause inflammation and irritation in the esophagus, leading to a burning sensation.
- Dry or scratchy throat: This can be caused by a variety of factors, including dry air, allergies, or infections.
- Infections: Certain infections, such as strep throat or esophagitis, can cause a burning sensation in the throat.
- Medications: Certain medications, such as antibiotics or anti-inflammatory drugs, can cause stomach upset and a burning sensation in the throat.
- Underlying health conditions: Certain health conditions, such as gastritis or ulcers, can cause a burning sensation in the stomach and throat.

# CONCLUSION

- The Personal Health Agent bot demonstrates a promising solution for providing initial medical guidance using AI-driven symptom analysis. By leveraging the Granite model on IBM Watsonx, the system effectively interprets user inputs, asks follow-up questions, and offers relevant health insights while maintaining a safety-first approach. Challenges such as handling ambiguous symptom descriptions and ensuring ethical, non-diagnostic responses were addressed through prompt engineering and constraint-based design. Future improvements include incorporating wearable device data, expanding language support, and enhancing real-time responsiveness. Overall, this solution shows strong potential in supporting healthcare accessibility and early triage, especially in underserved regions.

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# FUTURE SCOPE

To enhance the Personal Health Agent system, additional data sources like wearable device APIs and local health advisories can be integrated for richer context. The algorithm can be optimized using advanced NLP models fine-tuned on regional languages and symptom-specific datasets. Expansion to multiple cities can leverage geolocation for localized advice. Incorporating edge computing ensures low-latency responses, while federated learning enhances privacy-aware personalization.

# IBM CERTIFICATIONS



# IBM CERTIFICATIONS



# IBM CERTIFICATIONS





**THANK YOU**