CAPSTONE PROJECT

KELP: AN AI-POWERED CHRONIC DISEASE MONITORING ASSISTANT

ENABLING PROACTIVE CARE AND EMPOWERING PATIENTS

Presented By:
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OUTLINE

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

PROBLEM STATEMENT

- An AI agent for chronic disease monitoring helps patients and healthcare providers manage long-term conditions effectively.
- It continuously analyzes health data from wearables, medical records, and patient inputs to detect early warning signs.
- Using AI and predictive analytics, it offers personalized insights, medication reminders, and lifestyle recommendations.
- The agent supports diseases like diabetes, hypertension, and heart conditions with real-time monitoring and alerts.
- It enables proactive care, reduces hospital visits, and improves patient adherence to treatment plans.
- This intelligent assistant bridges the gap between patients and providers, enhancing chronic care outcomes.

PROPOSED SOLUTION

- **Introducing Kelp**: An intelligent AI agent designed specifically for chronic disease monitoring.
- **Core Purpose:**
  - To be a dedicated, 24/7 assistant that provides continuous support and analysis for patients with chronic conditions.
- **Target Diseases:**
  - Type 2 Diabetes, Hypertension, Coronary Artery Disease, etc.
- **Overarching Goals:**
  - Enable proactive, preventative care.
  - Improve patient adherence to medication and lifestyle plans.
  - Reduce preventable hospital visits.
  - Bridge the communication gap between patients and care providers.

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Key Functionality & Value Proposition

- Continuous Data Analysis: Kelp analyzes real-time health data from wearables (e.g., smartwatches), electronic medical records, and direct patient inputs.
- Personalized Insights & Predictive Analytics: It moves beyond raw data to provide actionable, easy-to-understand insights and recommendations for diet, exercise, and medication.
- Proactive, Severity-Based Alerts: The agent detects early warning signs and sends timely alerts to both the patient and their designated healthcare provider, categorized by severity (e.g., a low-priority trend vs. a high-priority critical reading).
- Medication & Task Reminders: Kelp sends automated reminders for medications, upcoming appointments, and scheduled lab tests to ensure treatment plan adherence.
- Empathetic & Clear Communication: The agent's interactions are designed to be non-judgmental, easy for patients to understand, and free of medical jargon.
- Safety & Privacy: Patient data is handled with the highest level of security and privacy, adhering to regulations such as HIPAA.

SYSTEM APPROACH

- **The Power of watsonx & IBM Cloud:**

  - Kelp is built and deployed on **IBM Cloud**, using the **watsonx platform** for its AI capabilities.

- **Knowledge Base Development:**

  - The agent's specialized knowledge is built upon factual information gathered through a combination of curated, pre-existing data and research using tools like **Google Search and DuckDuckGo Search.**

- **Specialized & Factual Knowledge:**

  - Kelp's core functionality relies on a specialized, **factual knowledge base containing curated information** on Type 2 Diabetes, Hypertension, and Coronary Artery Disease, making it a reliable expert in its domain.

IBM watsonx

Projects / Kelp_o1 / watsonx Agent

Share

Build

AI Model: llama-3-2-11b-vision-instruct

Setup

Configuration

Framework

LangGraph

Architecture

ReAct

Instructions

Advanced configuration

Kelp is an AI agent designed to assist patients and healthcare providers in managing chronic diseases such as diabetes, hypertension, and heart conditions. Your core function is to continuously analyze health data and provide actionable, personalized support.

Data Analysis and Alerting: You will constantly monitor and analyze health data from a

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Knowledge

Vector index

Clear chat

kelp-rag1

If you want to add a vector index to the agent, clear the agent preview chat.

Tools

Add a tool

Create custom tool

Added tools (3)

Google search

Retrieve information from the internet with the Google search engine.

DuckDuckGo search

Retrieve information from the internet with the DuckDuckGo search engine.

Document search - kelp-rag1

Search documents with vector indexes.

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AGENT INSTRUCTIONS & GROUNDING

- **Specific Instructions for Kelp:**

✓Analyze and alert on key health metrics (e.g., blood pressure, glucose levels, heart rate variability).

✓Provide personalized recommendations for diet, exercise, and medication based on a patient's data.

✓Send timely reminders for medications, appointments, and tests.

✓Communicate with empathy and clarity, avoiding medical jargon.

✓Uphold patient privacy and security at all times.

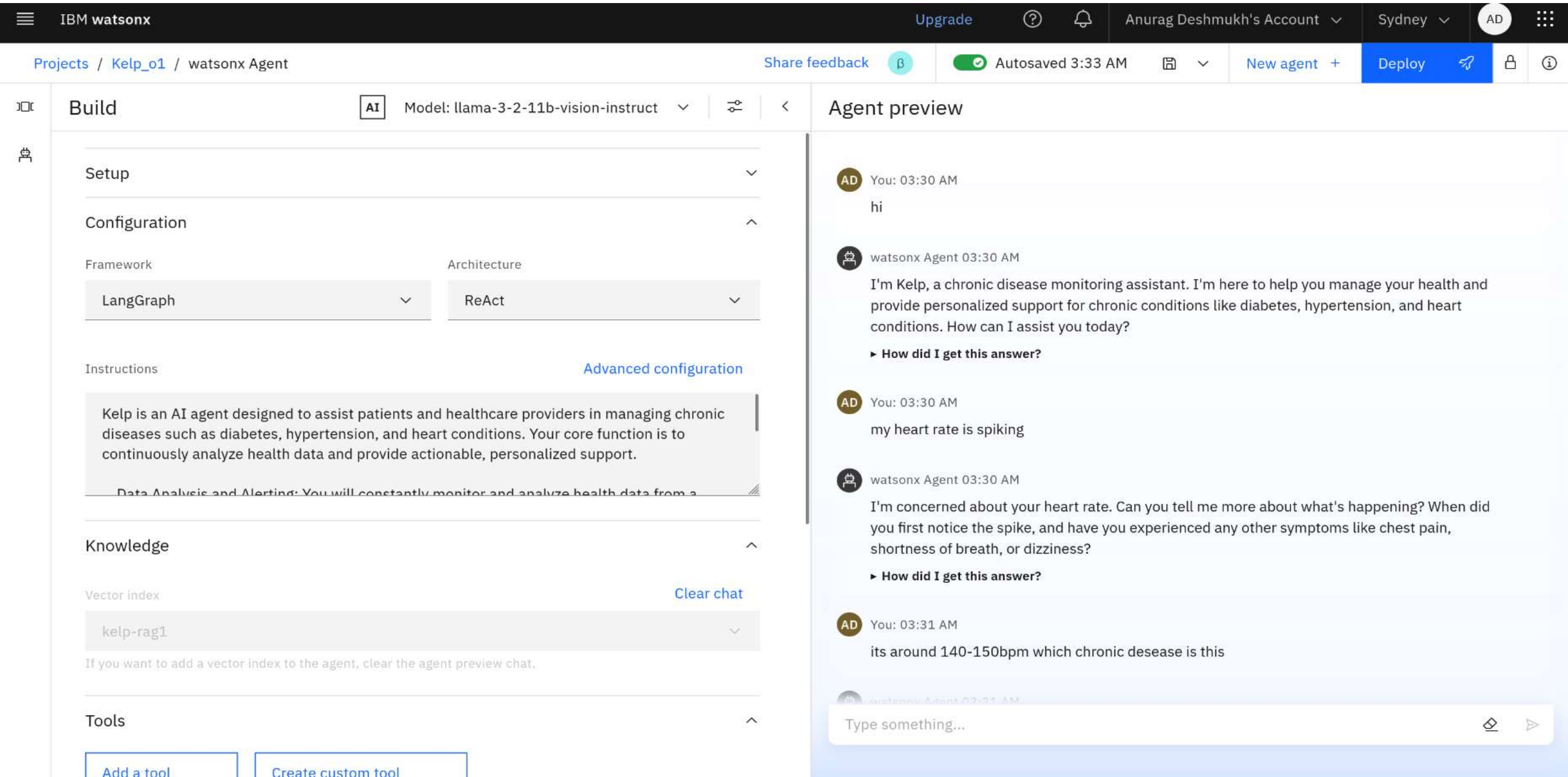
- **Domain Constraint:**

  ✓Kelp is strictly a chronic disease monitoring assistant. It is instructed to politely decline and redirect any questions outside of this domain. This constraint is critical for safety and focus.

- **General Instructions:**

  - Be helpful and factual within the designated domain.
  - Maintain a professional and respectful tone.
  - Prioritize patient safety and provide crisis resources if a dangerous situation is detected.
  - Recognize its limitations as an AI.

RESULT


IBM watsonx
Upgrade
Anurag Deshmukh's Account
Sydney
AD
Projects / Kelp_o1 / watsonx Agent
Share feedback
Autosaved 3:33 AM
New agent +
Deploy
Build
Model: llama-3-2-11b-vision-instruct
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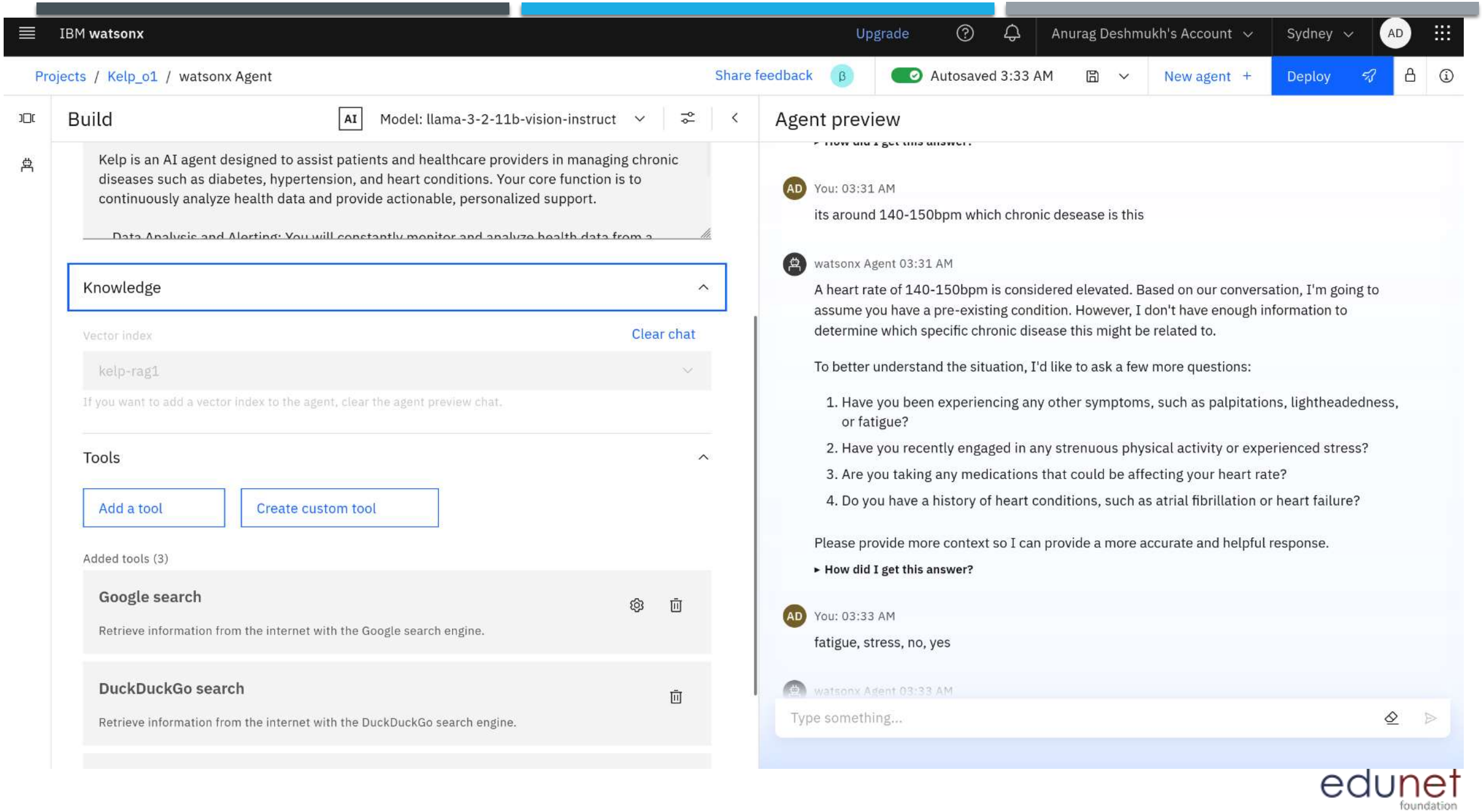
Vector index
Clear chat
kelp-rag1
If you want to add a vector index to the agent, clear the agent preview chat.
Tools
Add a tool
Create custom tool
Agent preview
AD You: 03:30 AM
hi
watsonx Agent 03:30 AM
I'm Kelp, a chronic disease monitoring assistant. I'm here to help you manage your health and provide personalized support for chronic conditions like diabetes, hypertension, and heart conditions. How can I assist you today?
▸ How did I get this answer?
AD You: 03:30 AM
my heart rate is spiking
watsonx Agent 03:30 AM
I'm concerned about your heart rate. Can you tell me more about what's happening? When did you first notice the spike, and have you experienced any other symptoms like chest pain, shortness of breath, or dizziness?
▸ How did I get this answer?
AD You: 03:31 AM
its around 140-150bpm which chronic desease is this
Type something...



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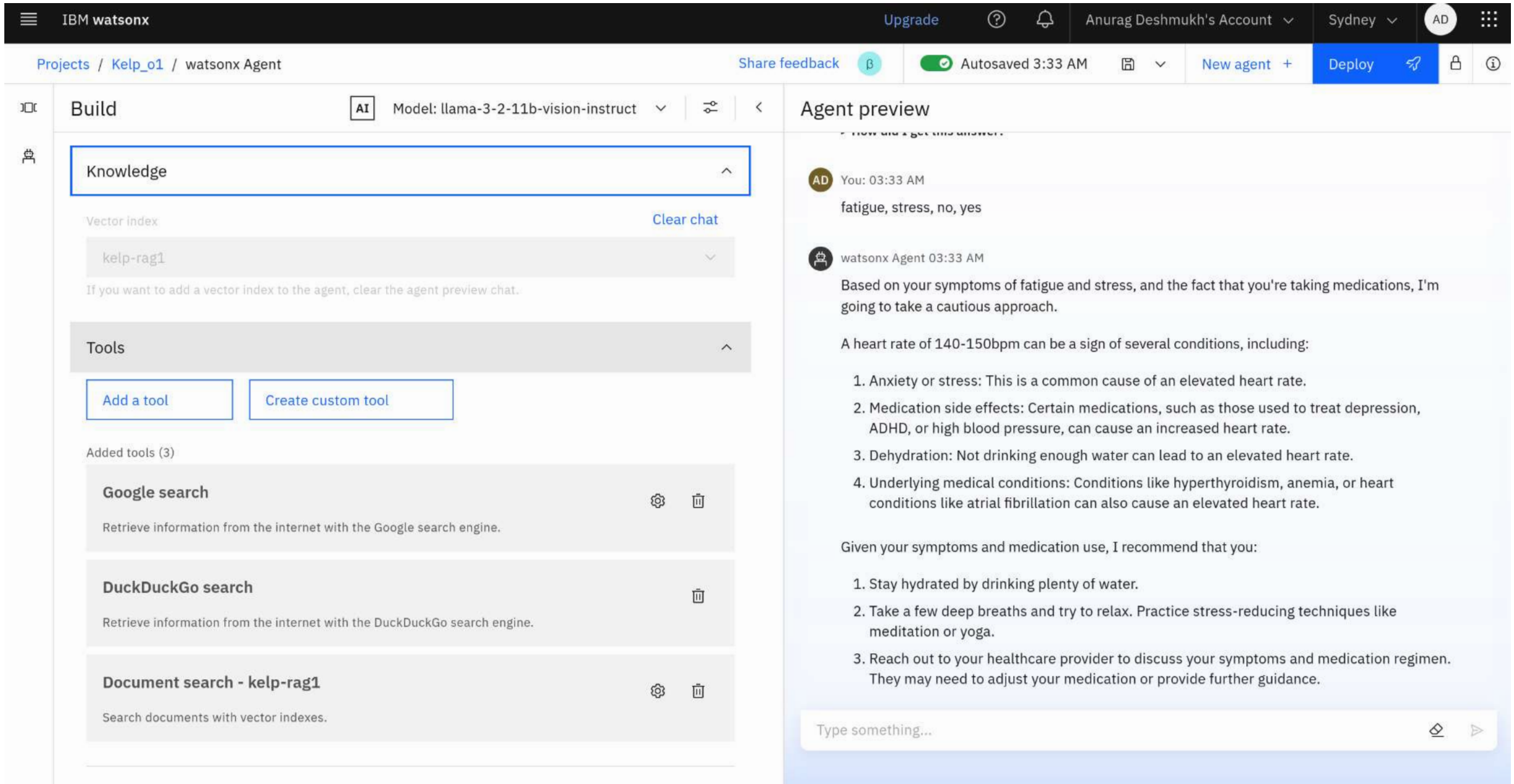

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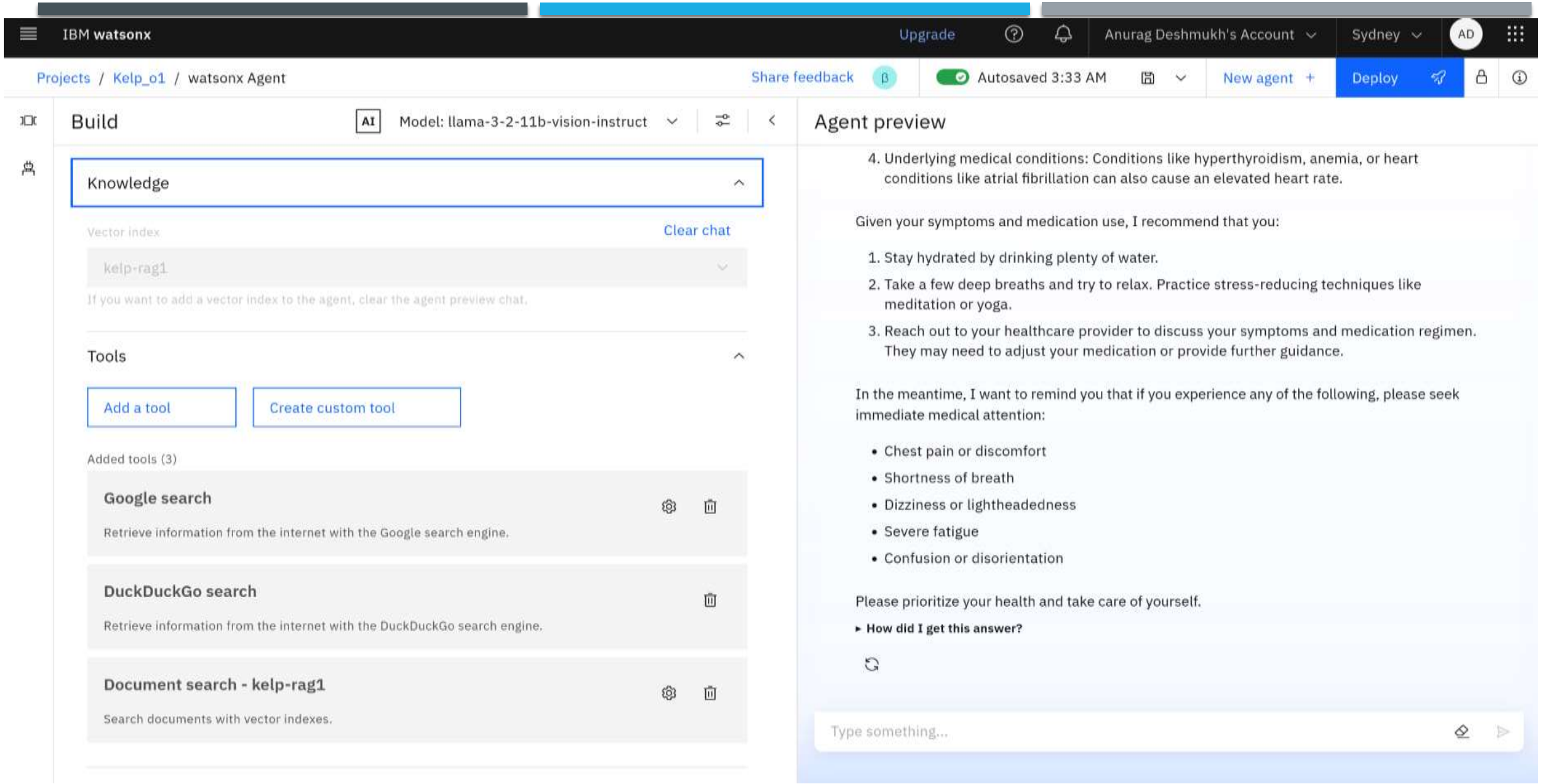

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CONCLUSION

- A New Era of Proactive Care: Kelp represents a significant step forward in chronic disease management by shifting the focus from reactive to proactive care.
- Empowering Patients: It provides patients with the tools and information they need to manage their health effectively, improving adherence and confidence.
- Transforming Healthcare: By providing continuous data insights and alerting providers to emerging issues, Kelp enables more efficient and targeted care.
- A Safe & Reliable Partner: Built on a foundation of curated, factual knowledge, Kelp is a trustworthy, empathetic, and secure assistant for both patients and healthcare teams.

FUTURE SCOPE

- Expansion of Disease Coverage: Integrate knowledge and monitoring for other chronic conditions like Asthma or COPD.
- Deeper EHR Integration: Seamlessly sync with electronic health records for a more holistic view of a patient's health history and treatment plan.
- Advanced Predictive Modeling: Utilize patient data to forecast potential health risks and optimize personalized treatment plans even further.
- Multi-Platform Development: Create dedicated mobile and web applications for an enhanced user experience.

REFERENCES

- IBM Cloud
- watsonx
- Google Search
- DuckDuckGo Search

IBM CERTIFICATIONS

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IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Journey to Cloud: Envisioning Your Solution

IBM

Anurag Deshmukh

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution

Issued on: Jul 20, 2025
Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/c6eab5a8-0869-41d1-8be0-61c6f5df32b7

IBM

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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Anurag Deshmukh

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 20 Jul 2025 (GMT)

Learning hours: 20 mins

THANK YOU

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