CAPSTONE PROJECT

AGENTIC AI HEALTH SYMPTOM CHECKER

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OUTLINE

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- Algorithm & Deployment
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PROBLEM STATEMENT

With the rapid adoption of AI in healthcare, there is a growing need for accessible, accurate, and reliable health information systems that empower individuals to make informed decisions without promoting self-diagnosis.
Millions of people, especially in rural and underserved areas, lack immediate access to healthcare professionals and often rely on unverified online sources, leading to misinformation and delayed treatment.

The challenge is to develop an **Agentic AI Health Symptom Checker** using **IBM Cloud Lite** and **IBM Granite LLM** with a RAG pipeline to provide **safe, multilingual, and verified** health guidance, promoting early awareness and timely medical consultation.

PROPOSED SOLUTION

- The proposed system is an **Agentic AI Health Symptom Checker** that allows users to describe their symptoms in natural language and receive educational, non-diagnostic health information.
- It uses RAG (Retrieval-Augmented Generation) to fetch trusted content from WHO, Government Health Portals, and verified medical databases.
- Supports multilingual conversations for inclusivity.
- Provides:
  - Probable conditions (with disclaimers)
  - Preventive advice
  - Urgency level
  - When to consult a doctor
  - Home remedies (if applicable)
- Powered by IBM Granite LLM for natural conversation.
- Hosted and deployed on IBM Cloud Lite Services for free-tier accessibility.

SYSTEM APPROACH

System Requirements

- a. Hardware Requirements
- **Processor:** Intel i5/i7 or AMD equivalent
- **RAM:** Minimum 8 GB (Recommended 16 GB)
- **Storage:** 20 GB free space

- b. Software Requirements
- **Operating System:** Windows 10/11, macOS, or Linux
- **IBM Cloud Lite Account** with access to:
  - IBM Granite LLM
  - IBM Watson Discovery
  - IBM Watson Assistant
  - IBM Cloud Object Storage
- **Web Browser:** Chrome / Edge / Firefox

SYSTEM APPROACH

Libraries / Tools Required

- **Watson Discovery**
  - Used for RAG (Retrieval-Augmented Generation) by ingesting verified health documents.
  - Provides search and retrieval capabilities via natural language queries.
- **Watson Assistant**
  - Creates the conversational interface (chatbot) for users.
  - Manages intents, entities, and dialog flows.
- **IBM Granite LLM**
  - Generates contextual and natural-sounding responses.
  - Works with retrieved data to provide safe educational guidance.
- **Cloud Object Storage**
  - Stores source documents and datasets.
  - Used by Watson Discovery for ingestion.
- **Language Translator Service (Optional)**
  - Adds multilingual support to handle queries in multiple languages.

ALGORITHM & DEPLOYMENT

Algorithm Steps:

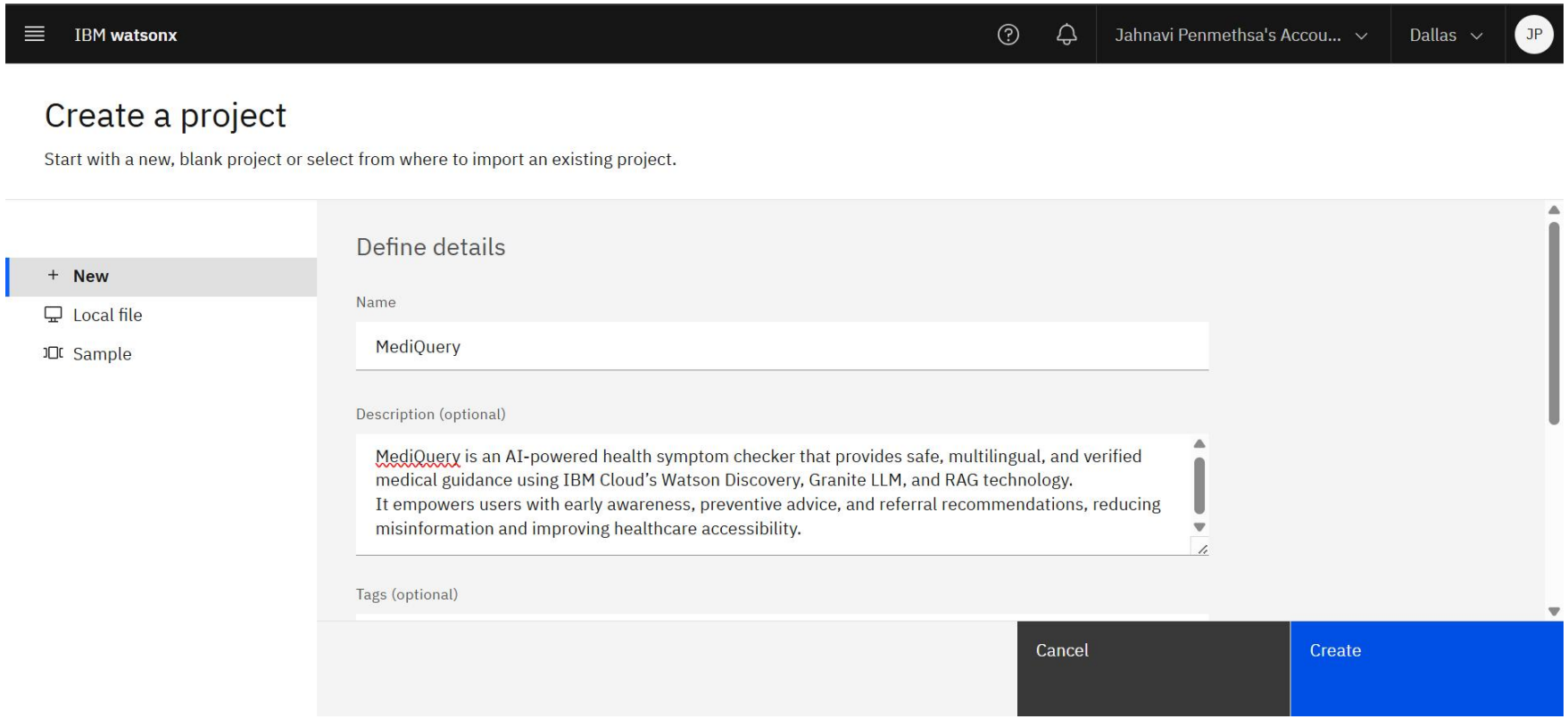
- **Input Acquisition** – User describes symptoms via chatbot interface.
- **Language Processing** – Detect language → Translate to English if required.
- **Information Retrieval (RAG)**
  - Query sent to IBM Watson Discovery with vector similarity search.
  - Retrieve relevant documents from WHO / government health portals.
- **LLM Processing (Granite)**
  - Retrieved context is fed to Granite for summarization and generation.
  - Ensure medical disclaimers are appended automatically.
- **Urgency Detection** – Simple symptom severity scoring using predefined rules (e.g., high fever + chest pain = urgent).
- **Output Generation** – Conditions, preventive advice, home remedies, referral recommendations.
- **Output Delivery** – Return to frontend in multilingual format.

ALGORITHM & DEPLOYMENT

Deployment Steps

- Create **Watson Discovery** instance → upload verified datasets.
- Create **Watson Assistant** → integrate with Granite API.
- Host Flask backend on **IBM Cloud Code Engine**.
- Serve frontend from **IBM Cloud Object Storage (Static Website)**.
- Connect Watson Assistant to frontend via WebSocket or REST API.

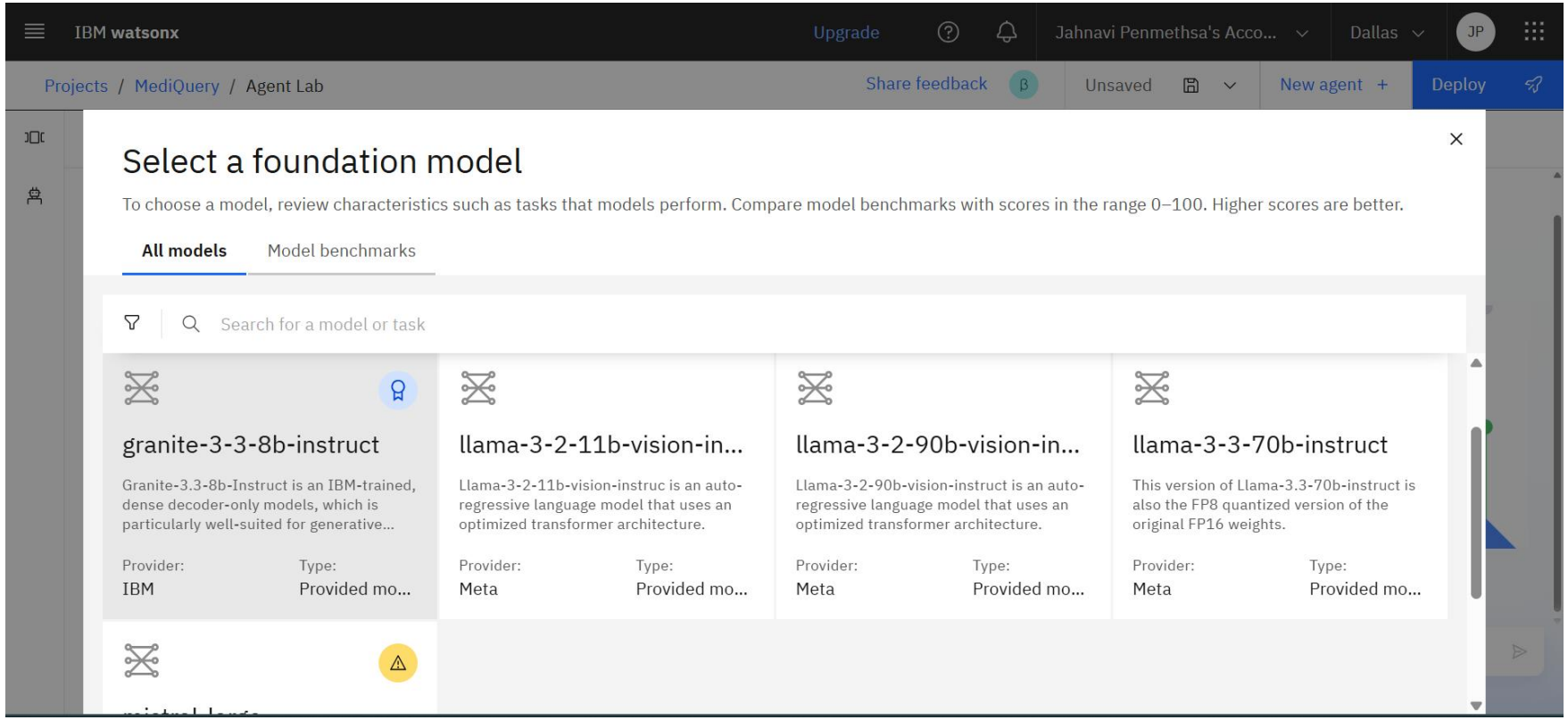
RESULT



Project Definition and Overview

Introduces the project title "MediQuery" and outlines its purpose, scope, and objectives

RESULT



Foundation Model Selection

Selection of IBM Granite model granite-3-3-8b-instruct to power the conversational AI capabilities

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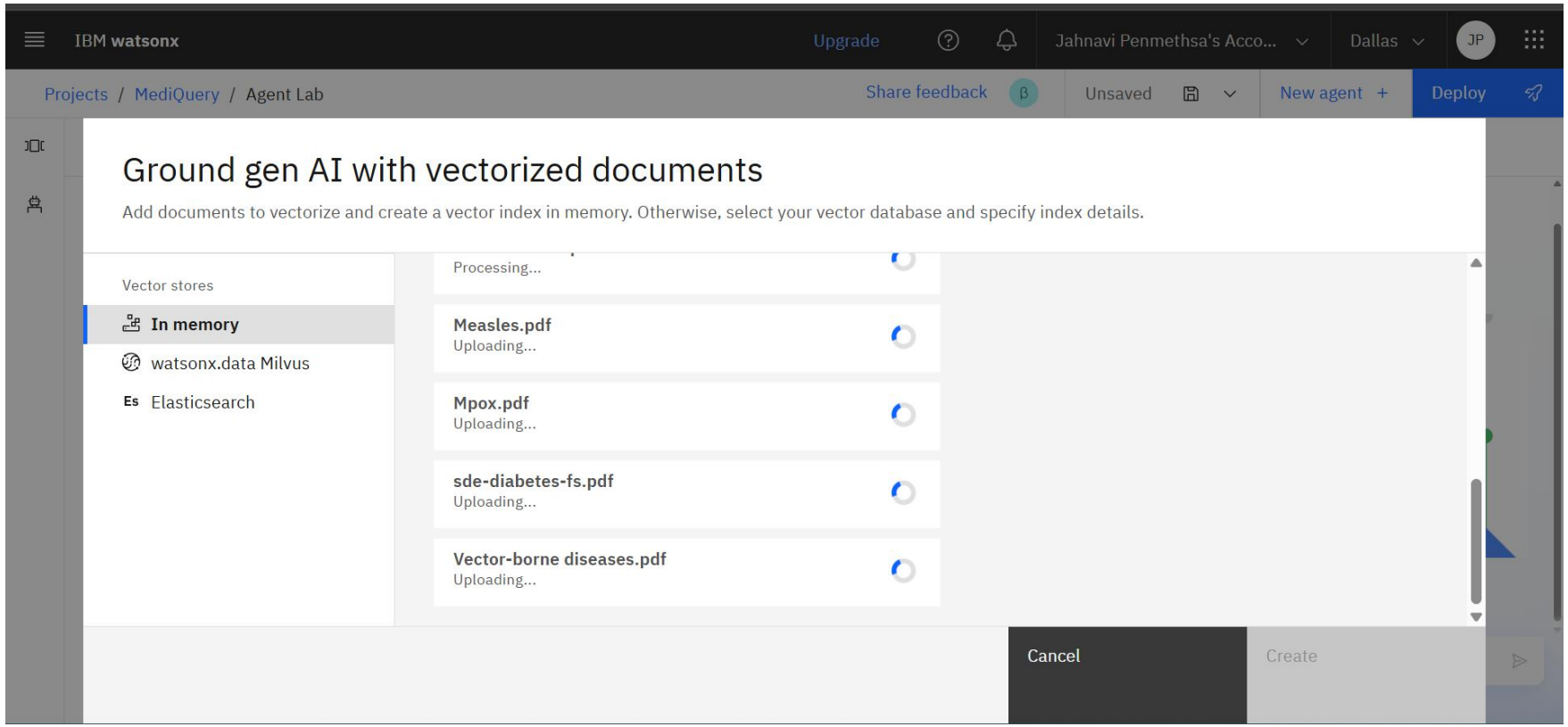
RESULT



Knowledge Base Preparation

Uploading verified WHO and government health documents to enable Retrieval-Augmented Generation

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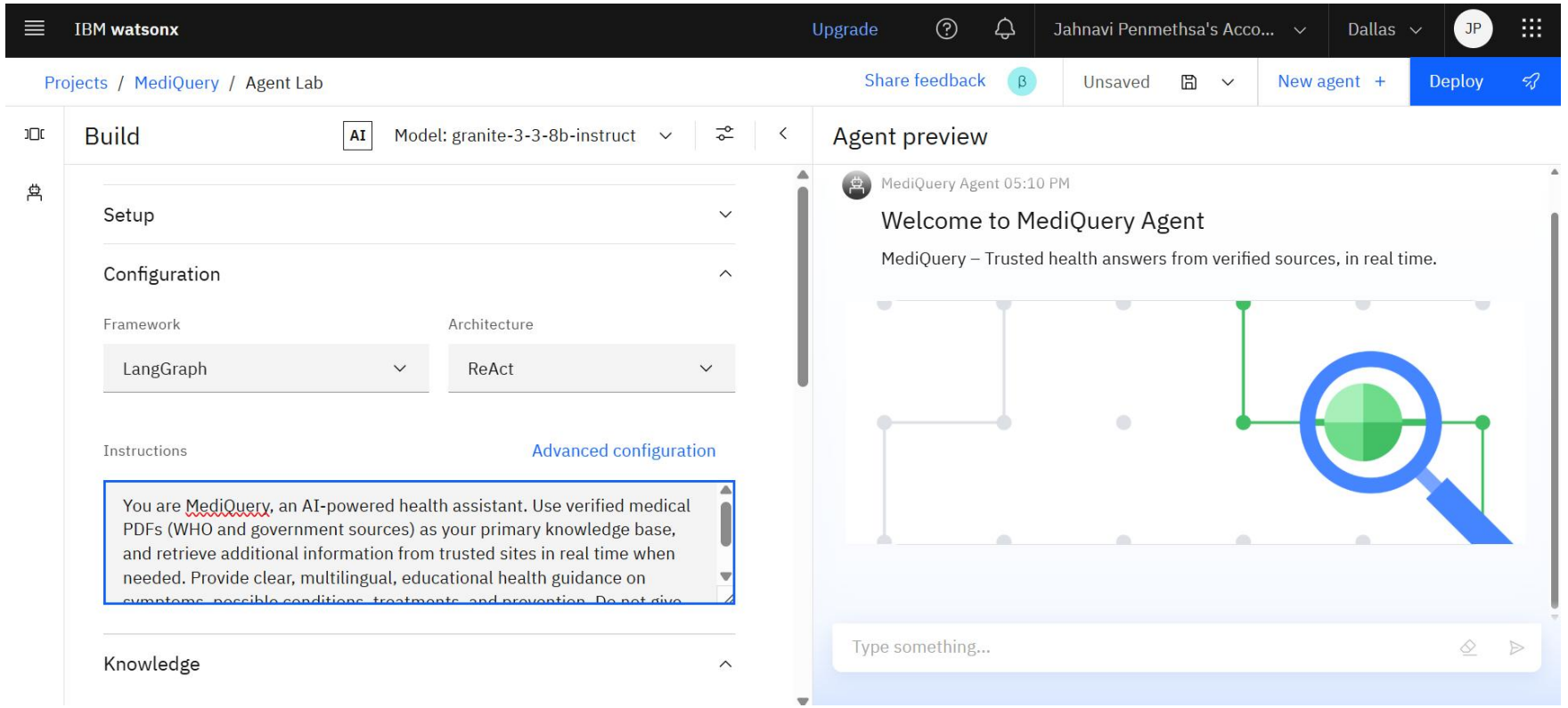
RESULT



Agent Configuration

Defining operational instructions for the MediQuery agent to ensure accurate, and educational responses

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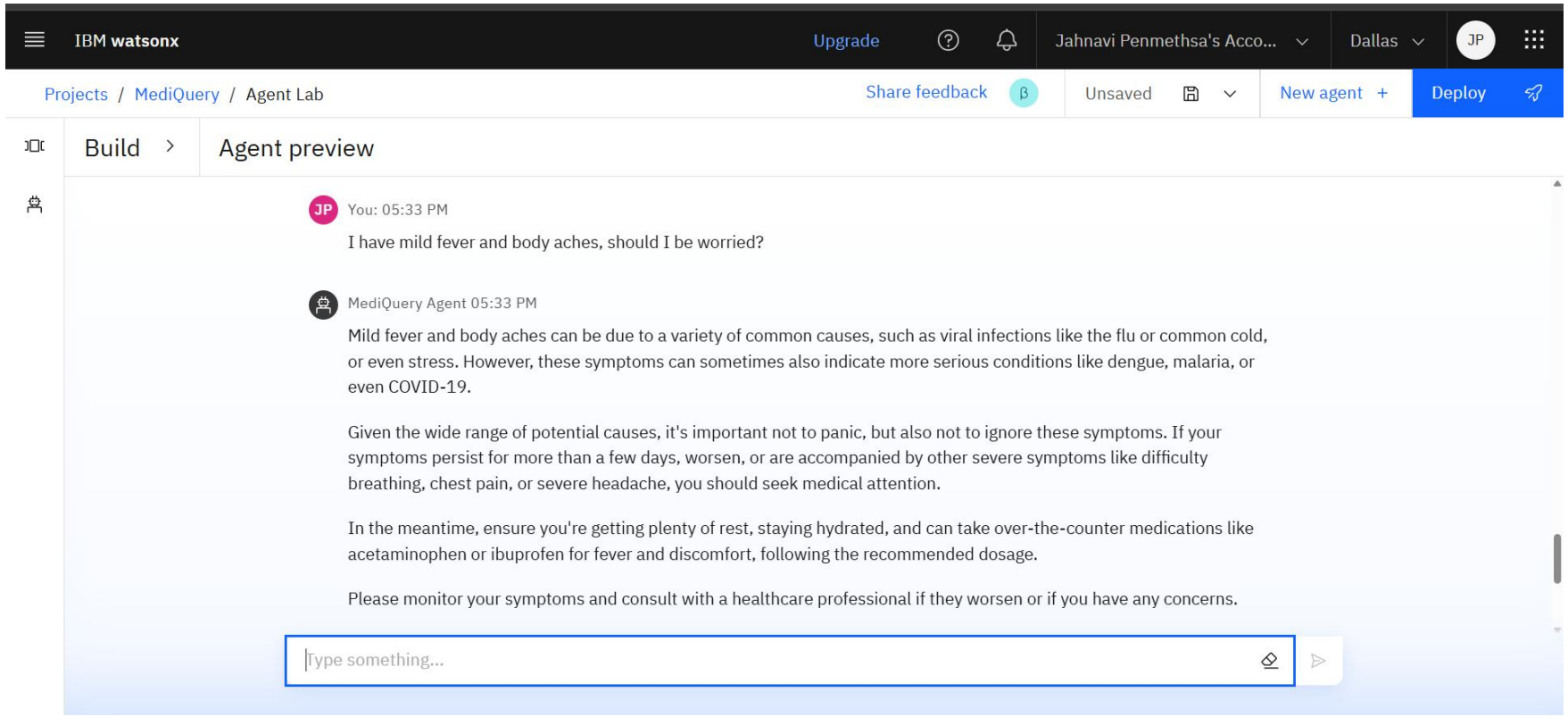
RESULT



Initial Agent Testing

Evaluating the agent's basic performance by providing a sample health-related prompt

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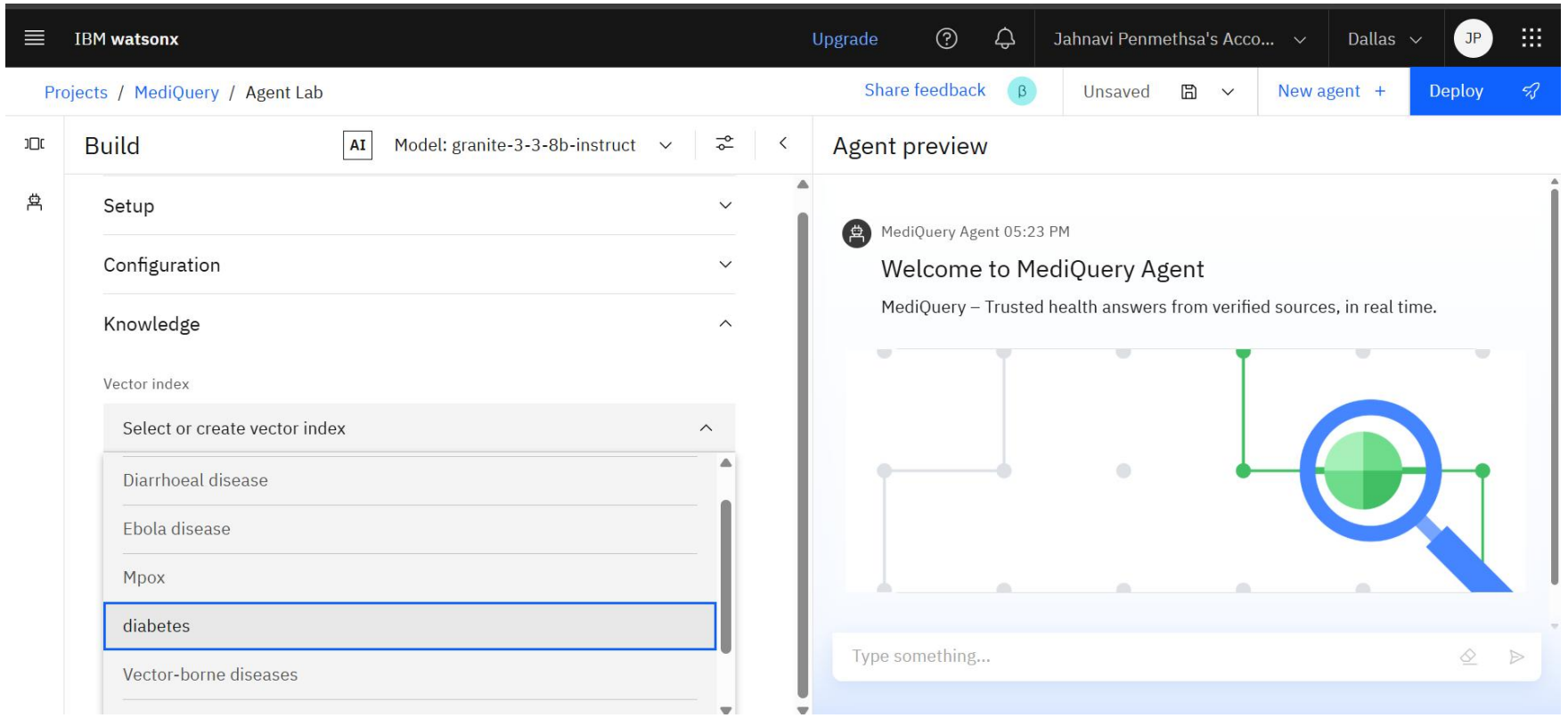
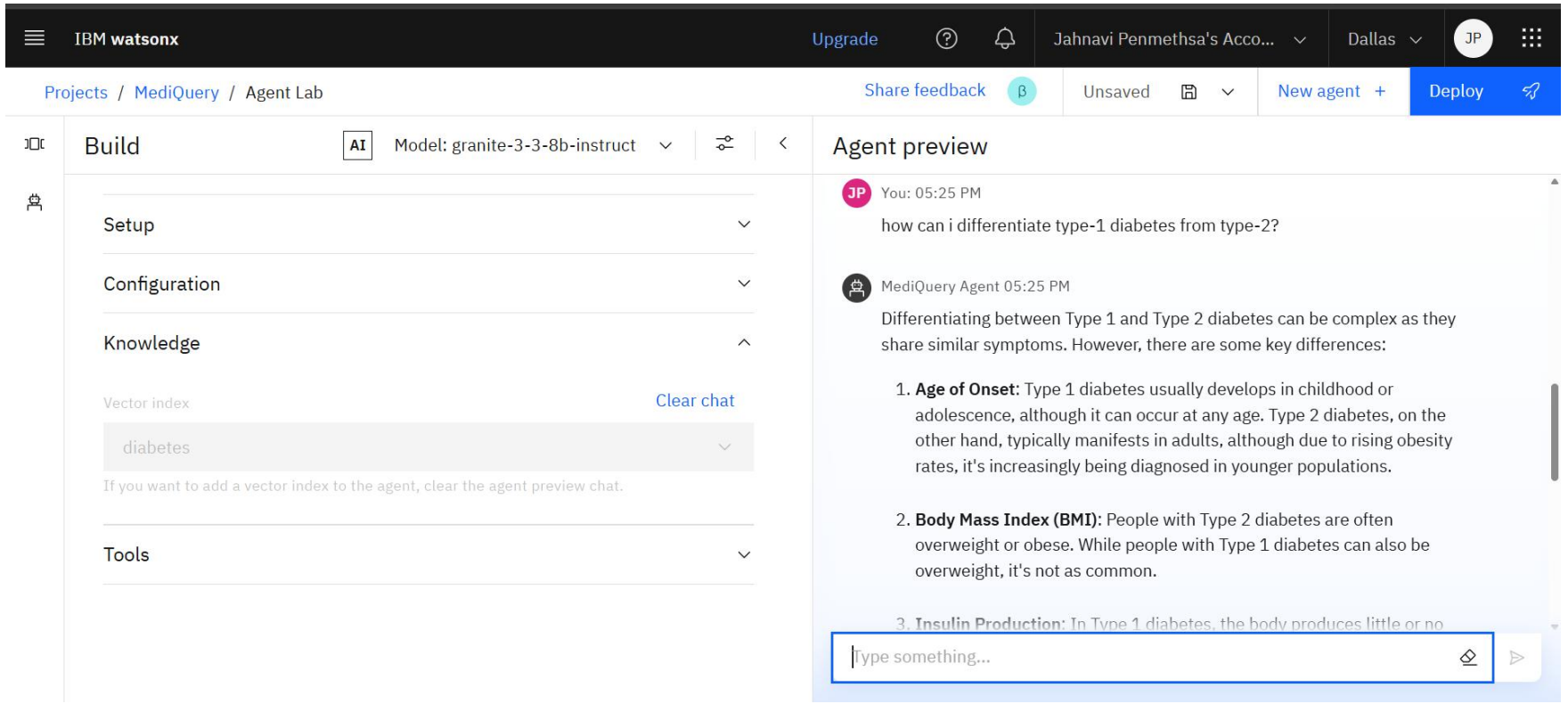
RESULT



RAG Implementation

Integrating RAG by linking one of the uploaded documents from the vector index for contextual retrieval

RESULT



RAG Query Testing

Assessing the RAG pipeline's effectiveness by submitting a test query and reviewing the retrieved context

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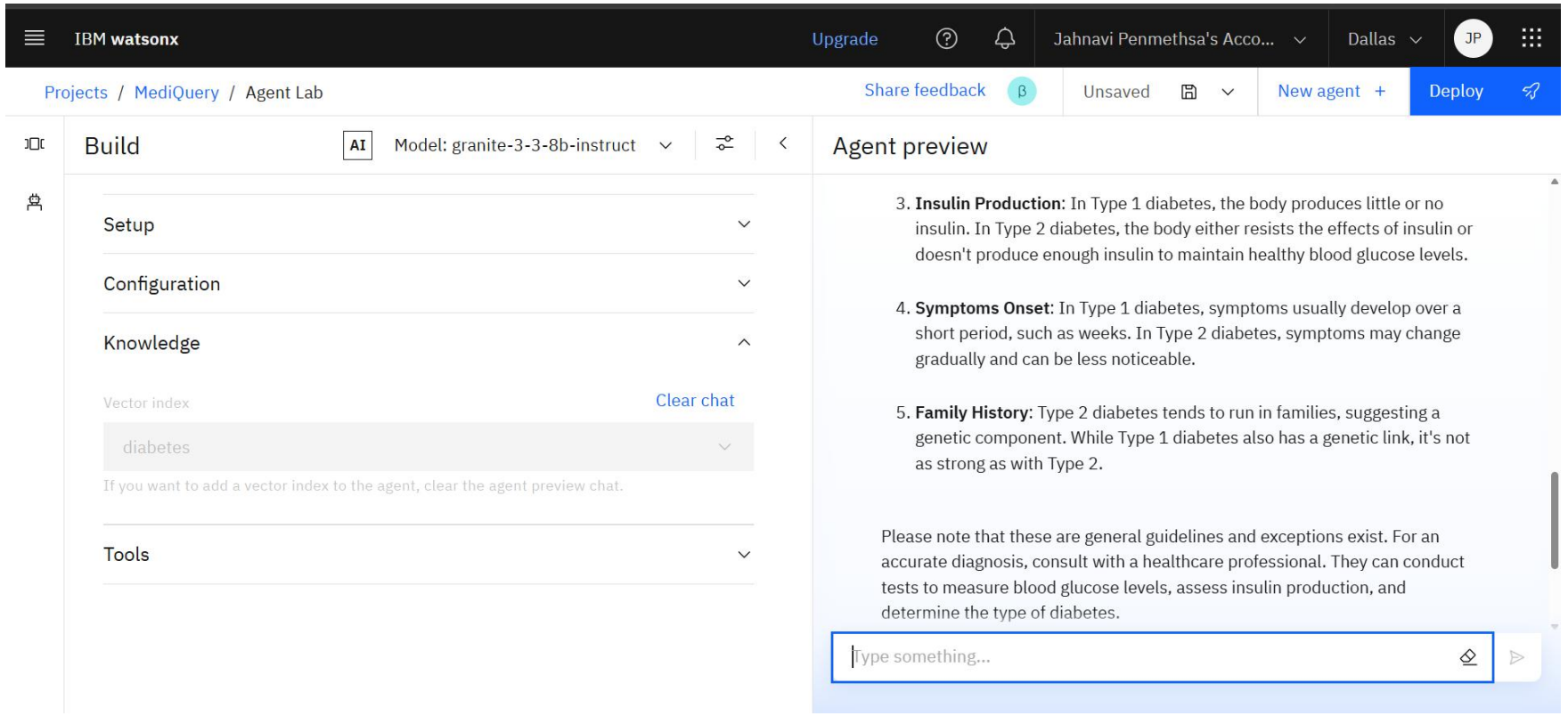
RESULT



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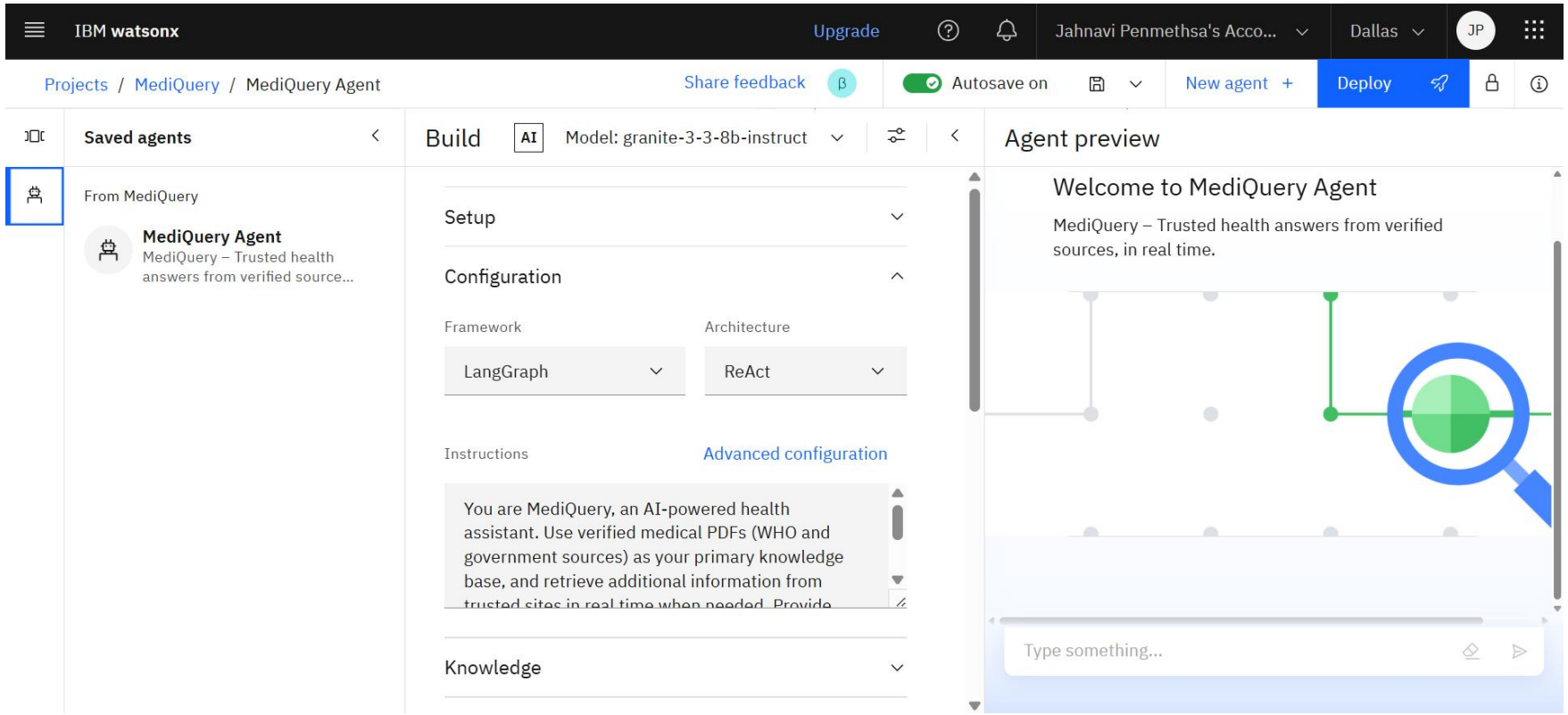

Agent Deployment

Saving and finalizing the MediQuery agent for continued use and future enhancements

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CONCLUSION

- The **Agentic AI Health Symptom Checker** demonstrates how AI + RAG can make reliable health education accessible to all.
- By retrieving knowledge from verified medical sources, the system promotes early awareness, reduces the spread of misinformation, and enhances accessibility for users across diverse backgrounds.
- While challenges such as maintaining accuracy in multilingual responses and ensuring strict adherence to credible sources were encountered, the solution proves effective in bridging the healthcare information gap.
- With future enhancements like voice-enabled interaction, offline functionality, and integration with wearable devices, the system holds strong potential to further empower communities with timely and trustworthy health guidance.

FUTURE SCOPE

- Integration with wearable devices (Fitbit, Apple Watch) for real-time symptom monitoring.
- Expansion to include mental health awareness modules.
- Voice-based interaction for low-literacy populations.
- Offline mobile app for rural areas with limited internet.
- Integration with telemedicine platforms for direct doctor consultation.
- AI-powered risk prediction models using medical history.

REFERENCES

- **World Health Organization (WHO)** – *Fact Sheets on Diseases and Conditions*
  - *https://www.who.int/news-room/fact-sheets*
- **Indian Council of Medical Research (ICMR)** – *Public Health Information*
  - *https://www.icmr.gov.in*
- IBM Granite LLM Documentation
  - https://www.ibm.com/granite
- IBM Watson Discovery Documentation
  - https://cloud.ibm.com/docs/discovery

IBM CERTIFICATIONS

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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Jahnavi Penmethsa

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT) **Learning hours:** 20 mins

THANK YOU

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