# IBM CAPSTONE PROJECT AUDIO SIGNAL PROCESSING ASSISTANT AGENT

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#### **OUTLINE**

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications



# PROBLEM STATEMENT

Designing and debugging audio circuits—like amplifiers, filters, and op-amp systems—is complex and time-consuming. Users often face issues like distortion, noise, wrong component choices, and a lack of clear design resources or expert help.

#### Proposed Solution:

AudioFix.Al Audio Signal Processing Assistant is a specialized Al tool that helps users design, troubleshoot, and optimize audio circuits like amplifiers and filters. It offers expert guidance, diagrams, key formulas, and research links—focused only on audio signal processing.



# **TECHNOLOGY USED**

- IBM cloud lite services
- Natural Language Processing (NLP)
- Retrieval Augmented Generation (RAG)
- IBM Llama Foundation model
- IBM Watsonx.ai Studio
- Vector Index (Watsonx.ai)



#### **IBM CLOUD SERVICES USED**

- IBM Cloud Watsonx Al Studio
- IBM Cloud Watsonx Al runtime
- IBM Cloud Agent Lab
- IBM Llama foundation model
- IBM Cloud Object Storage
- IBM Cloud IAM (Identify and Access Management)



#### **WOW FACTORS**

#### Domain Expert Al

Unlike general-purpose bots, AudioFix is laser-focused on audio signal processing and analog circuit design, offering precision help where others can't.

#### Instant Circuit Diagnostics

Detects noise, distortion, or design flaws instantly and suggests exact fixes—from component tweaks to layout changes.

#### Visual + Analytical Help

Generates clear circuit diagrams, key formulas, and even shares IEEE papers and application notes to back your designs with solid theory.

#### Fast Design Companion

Saves hours in design and troubleshooting by providing real-time feedback, design calculations, and filter configurations.

#### Reliable Scope Enforcement

Never strays from its core domain—ensuring focused, expert-level help without irrelevant distractions.

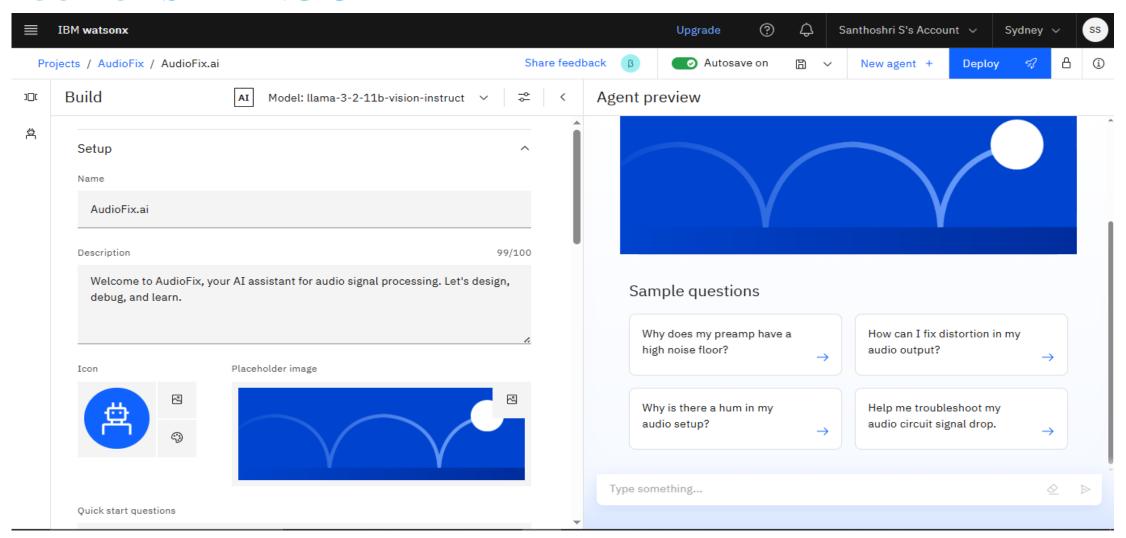


#### **END USERS**

- Academic Researchers
- Research Institutions and Universities
- Industry R&D Teams
- Educators

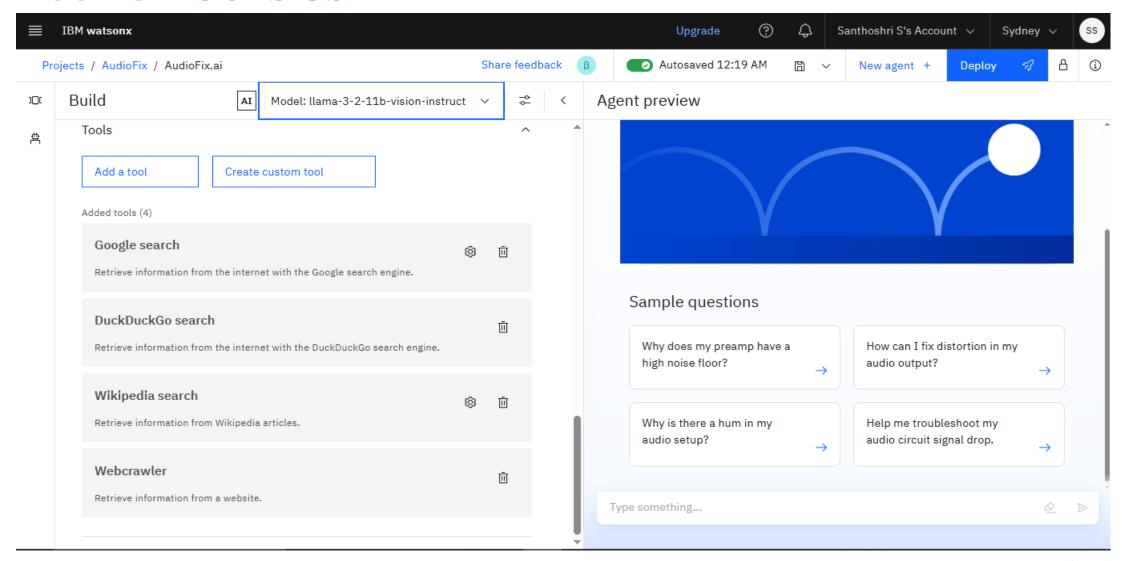


#### **RESULTS:** SETTING UP



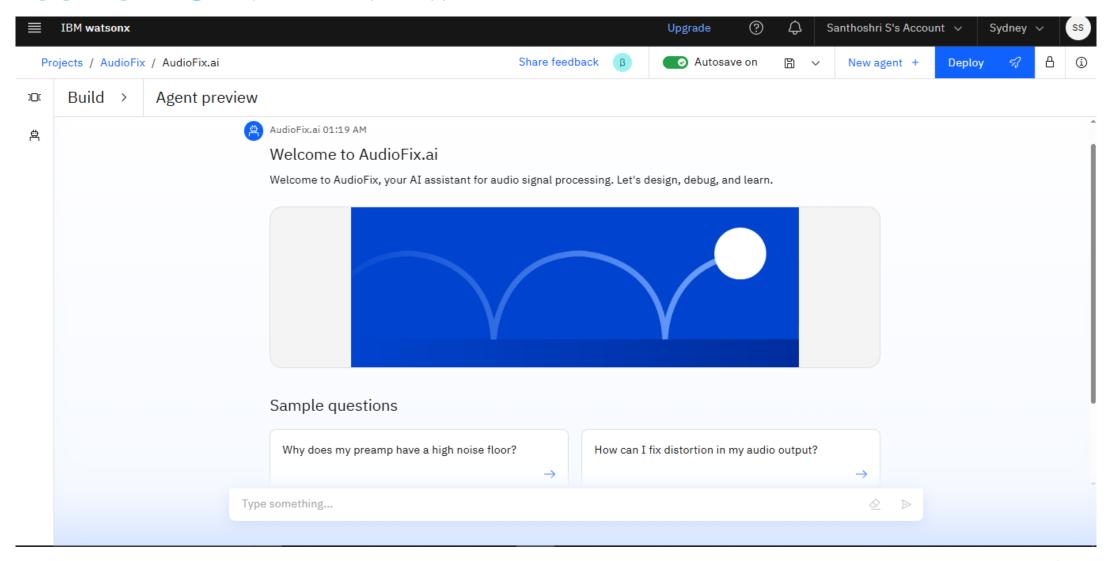


#### **RESULTS:** TOOLS USED



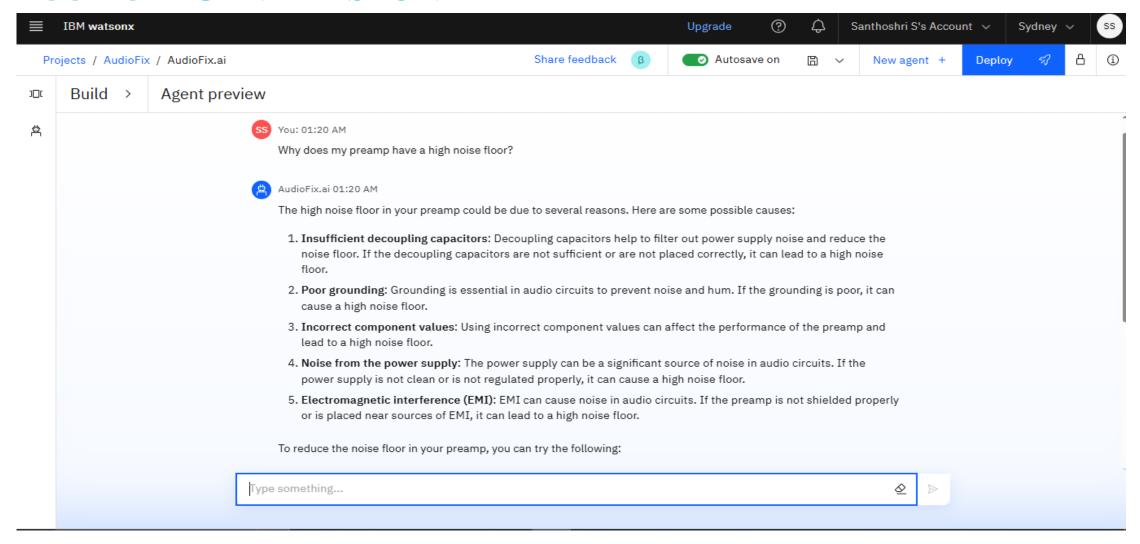


#### **RESULTS:** AGENT PREVIEW





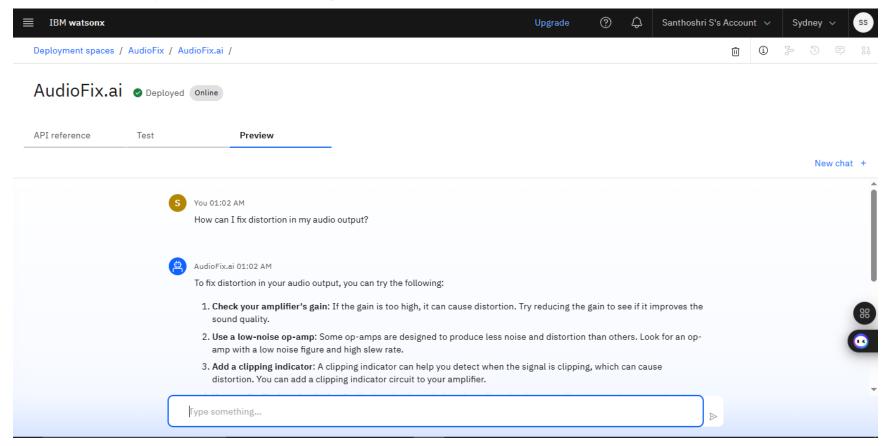
#### **RESULTS:** AGENT RESPOND





#### **RESULTS**

### Deployed AI Agent





#### CONCLUSION

- AudioFix.ai Assistant simplifies complex audio circuit design and troubleshooting.
- Provides expert help on amplifiers, filters, op-amps, and noise reduction.
- Offers accurate diagrams, formulas, and research references.
- Saves time, reduces errors, and boosts design efficiency.
- Ideal for students, hobbyists, and professionals in audio engineering.



#### **GITHUB LINK**

https://github.com/Santhoshri142/AudioFix.ai---Audio-Signal-Processing-Assistant



#### **FUTURE SCOPE**

- Multilingual Research Support
- Voice-Activated Research Assistant
- Real-Time Audio Analysis Integration
- Personalized Assistant Model
- Community & Learning Portal
- Hardware Integration
- Community & Learning Portal



#### **IBM CERTIFICATIONS**

In recognition of the commitment to achieve professional excellence



# Santhoshri S

Has successfully satisfied the requirements for:

#### Getting Started with Artificial Intelligence



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#### IBM SkillsBuild

#### Completion Certificate



This certificate is presented to

Santhoshri S

for the completion of

# Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

Completion date: 26 Jul 2025 (GMT)



Learning hours: 20 mins

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## **THANK YOU**

