Project Report: AI Medical Chatbot using IBM Watson API

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Github repo of project: https://github.com/rupakghanghas/ibm-chatbot

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1. Project Title

AI-Powered Medical Chatbot using IBM Watson API

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2. Abstract

This project involves developing a medical chatbot using IBM Watson Assistant to provide intelligent, real-time support for healthcare-related queries. The chatbot assists users by answering health-related questions, suggesting possible conditions based on symptoms, providing general medical advice, and helping users navigate healthcare resources. The use of IBM Watson's advanced natural language processing capabilities ensures a scalable and reliable digital health assistant.

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3. Summary of Work Done

Phase 1 – Proposal and Idea Submission (10 Marks):
We identified the need for a virtual medical assistant to support users with general healthcare queries. The project objectives were:

- Understand the scope and application of AI-driven conversational systems in healthcare.
- Use IBM Watson Assistant to design intents, entities, and dialog specific to the medical domain.
- Integrate the chatbot with a website for user interaction.

A detailed proposal was submitted including problem definition, goals, required tools, and the expected outcome tailored to a healthcare chatbot.

Phase 2 – Execution and Demonstration (15 Marks):
In this phase, the chatbot was built using IBM Watson Assistant and integrated into a sample health support website. Completed tasks include:

- Created a new assistant named **Medical Support ChatBot**.
- Defined intents such as symptoms inquiry, general health tips, and doctor suggestions.
- Created entities like @symptom, @body_part, @disease to recognize user input.
- Built a structured dialog tree for tailored responses.
- Published the assistant and generated integration code.
- Embedded the chatbot on the website for real-time interaction.
- Tested the chatbot using real-world scenarios to ensure accuracy.

GitHub Link: [Replace with your GitHub repo]

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4. Project Architecture Components

- **User Interface**: Embedded chat interface on the medical support website.
- **Watson Assistant**: Handles intents, entities, dialog management, and responses.
- **Backend (optional)**: Could integrate with APIs for doctor listings, health articles, etc.

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5. Features Implemented

- **Symptom-based Query Handling**: Users can ask about symptoms and get possible conditions.
- **First-Aid Information**: Provides general guidance for common emergencies.
- **Health Tips**: Offers preventive care suggestions.
- **Doctor/Clinic Search**: Suggests nearby medical facilities (planned for future).
- **FAQ Resolution**: Covers common questions like diet, vaccinations, mental health.
- **Fallback & Handoff**: Escalates to a human or provides emergency contact info if needed.

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6. IBM Watson Configuration

- **Create Watson Assistant Service**
- **Define Intents** (e.g., symptoms_check, general_advice)
- **Define Entities** (e.g., @symptom, @body_part)
- **Create Dialog Flow**
- **Preview and Publish**
- **Website Deployment**

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7. Integration with Website

- Watson Assistant deployed via embedded code snippet.
- Chatbot launches automatically or on clicking a chat icon.
- UI customized to match medical site aesthetics.

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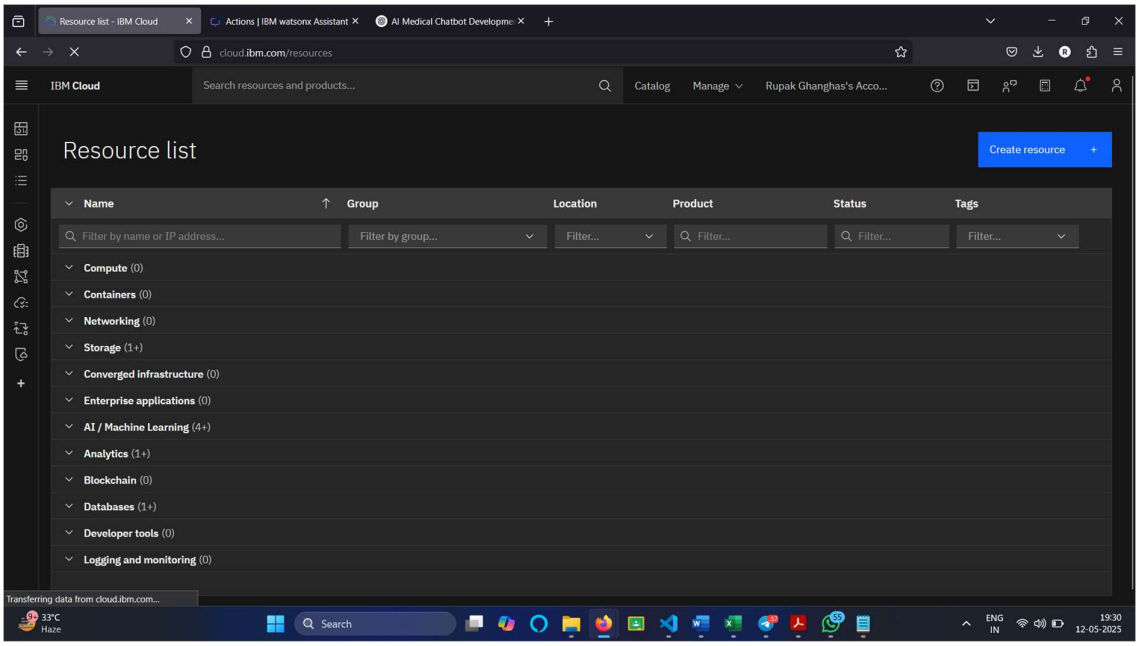
8. Testing Phase

8.1 Testing Strategy
Testing included multiple use cases and both manual and automated methods:

- **Input Handling**: Tested with diverse query formats.
- **Context Understanding**: Checked coherence across multi-turn conversations.
- **Edge Cases**: Handled vague or unrelated input effectively.

8.3 Challenges Faced

- Mapping user symptom descriptions to intents.
- Handling multi-symptom or ambiguous health queries.
- Managing limitations of static data without live backend integration.


Resource list - IBM Cloud
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Resource list
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Filter by group...
Filter...
Compute (0)
Containers (0)
Networking (0)
Storage (1+)
Converged infrastructure (0)
Enterprise applications (0)
AI / Machine Learning (4+)
Analytics (1+)
Blockchain (0)
Databases (1+)
Developer tools (0)
Logging and monitoring (0)
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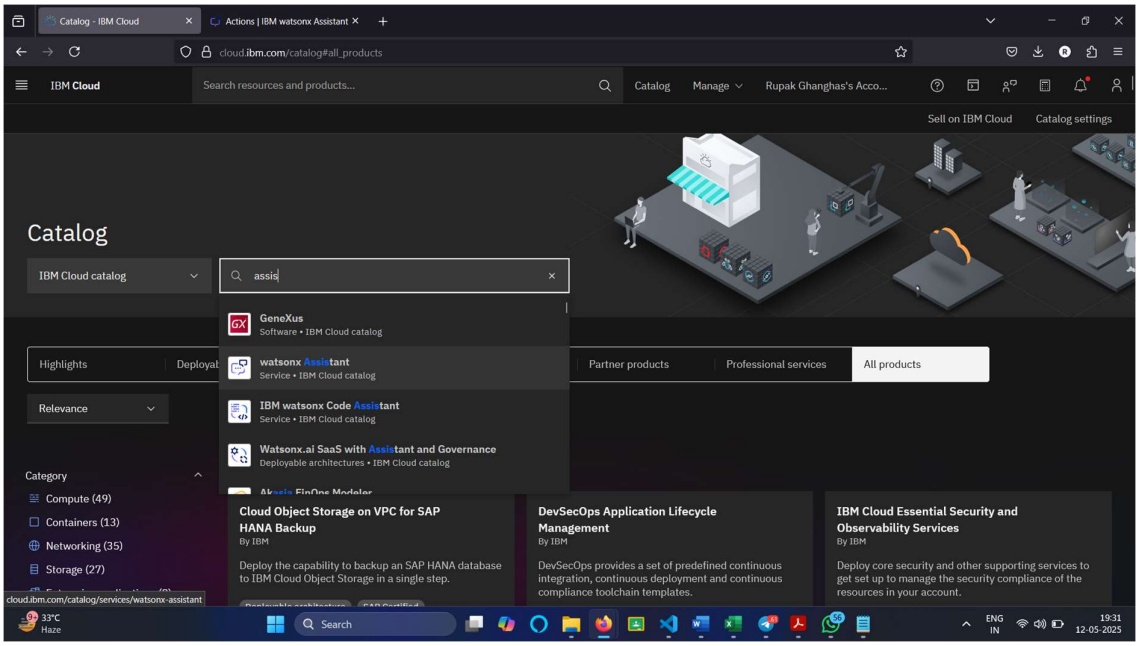
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Deployable architectures • IBM Cloud catalog
Highlights
Partner products
Professional services
All products
Relevance
Category
Compute (49)
Containers (13)
Networking (35)
Storage (27)
Cloud Object Storage on VPC for SAP HANA Backup
By IBM
Deploy the capability to backup an SAP HANA database to IBM Cloud Object Storage in a single step.
DevSecOps Application Lifecycle Management
By IBM
DevSecOps provides a set of predefined continuous integration, continuous deployment and continuous compliance toolchain templates.
IBM Cloud Essential Security and Observability Services
By IBM
Deploy core security and other supporting services to get set up to manage the security compliance of the resources in your account.
cloud.ibm.com/catalog/services/watsonx-assistant
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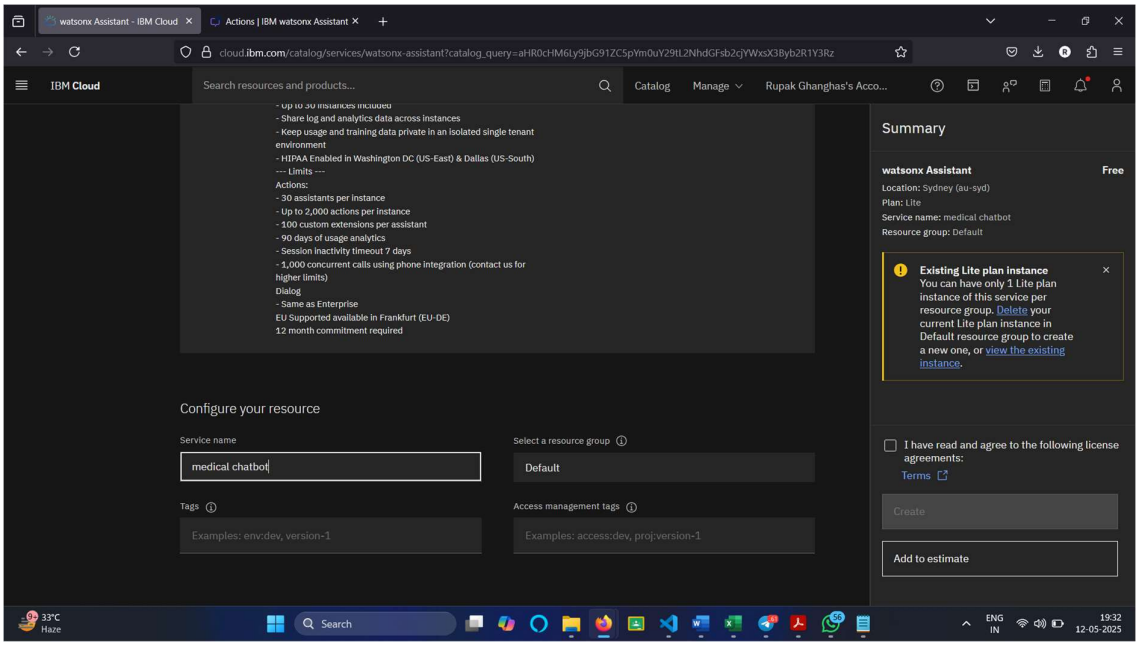
watsonx Assistant - IBM Cloud
Actions | IBM watsonx Assistant
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IBM Cloud
Search resources and products...
Catalog
Manage
Rupak Ghanghas's Acco...
- Share log and analytics data across instances
- Keep usage and training data private in an isolated single tenant environment
- HIPAA Enabled in Washington DC (US-East) & Dallas (US-South)
--- Limits ---
Actions:
- 30 assistants per instance
- Up to 2,000 actions per instance
- 100 custom extensions per assistant
- 90 days of usage analytics
- Session inactivity timeout 7 days
- 1,000 concurrent calls using phone integration (contact us for higher limits)
Dialog
- Same as Enterprise
EU Supported available in Frankfurt (EU-DE)
12 month commitment required
Summary
watsonx Assistant
Free
Location: Sydney (au-syd)
Plan: Lite
Service name: medical chatbot
Resource group: Default
Existing Lite plan instance
You can have only 1 Lite plan instance of this service per resource group. Delete your current Lite plan instance in Default resource group to create a new one, or view the existing instance.
Configure your resource
Service name
medical chatbot
Select a resource group
Default
Tags
Examples: env:dev, version-1
Access management tags
Examples: access:dev, proj:version-1
I have read and agree to the following license agreements:
Terms
Create
Add to estimate
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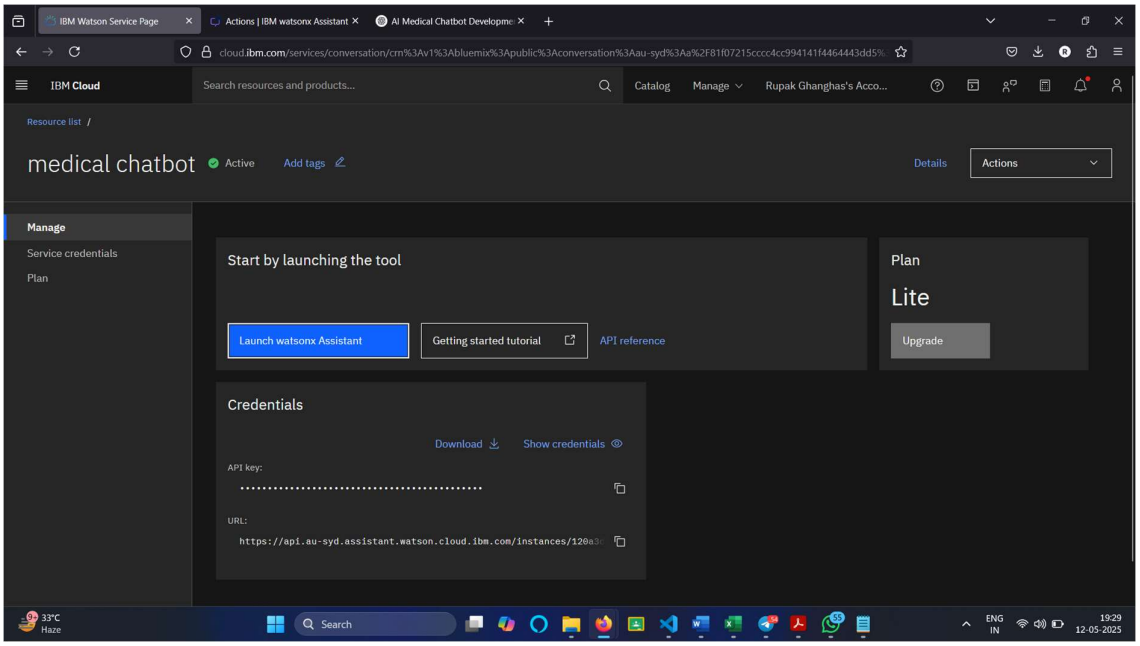
IBM Watson Service Page
Actions | IBM watsonx Assistant
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cloud.ibm.com/services/conversation/crn%3Av1%3Abluemix%3Apublic%3Aconversation%3Aau-syd%3Aa%2F81f07215cccc4cc994141f4464443dd5%
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Active
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Manage
Service credentials
Plan
Start by launching the tool
Launch watsonx Assistant
Getting started tutorial
API reference
Plan
Lite
Upgrade
Credentials
Download
Show credentials
API key:
URL:
https://api.au-syd.assistant.watson.cloud.ibm.com/instances/120
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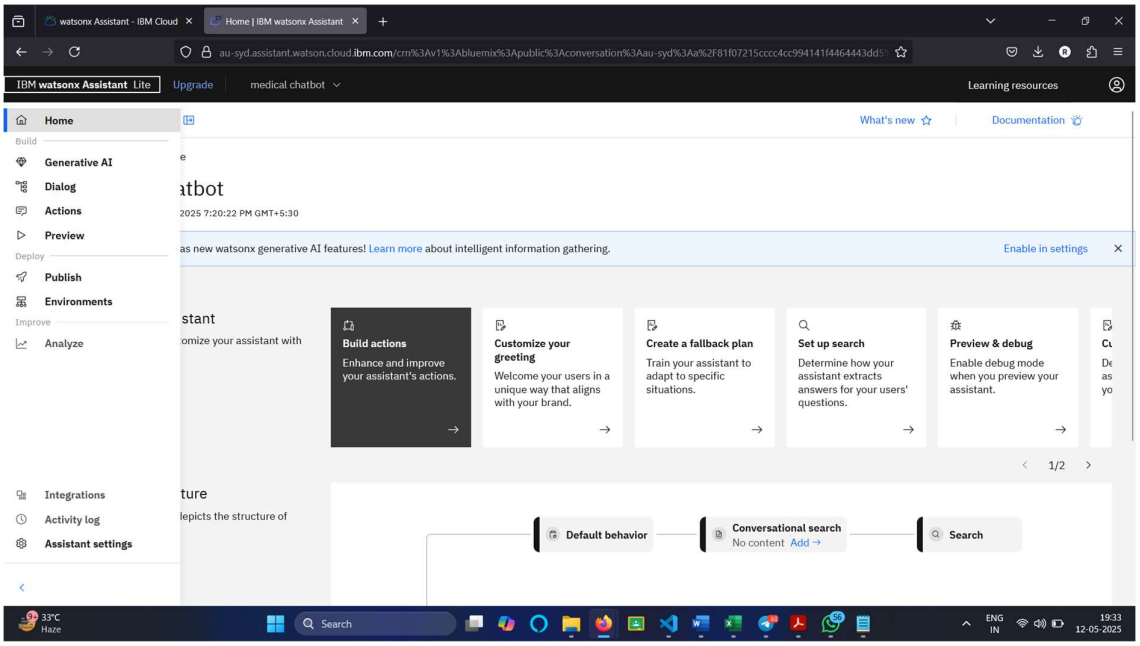
watsonx Assistant - IBM Cloud
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IBM watsonx Assistant Lite
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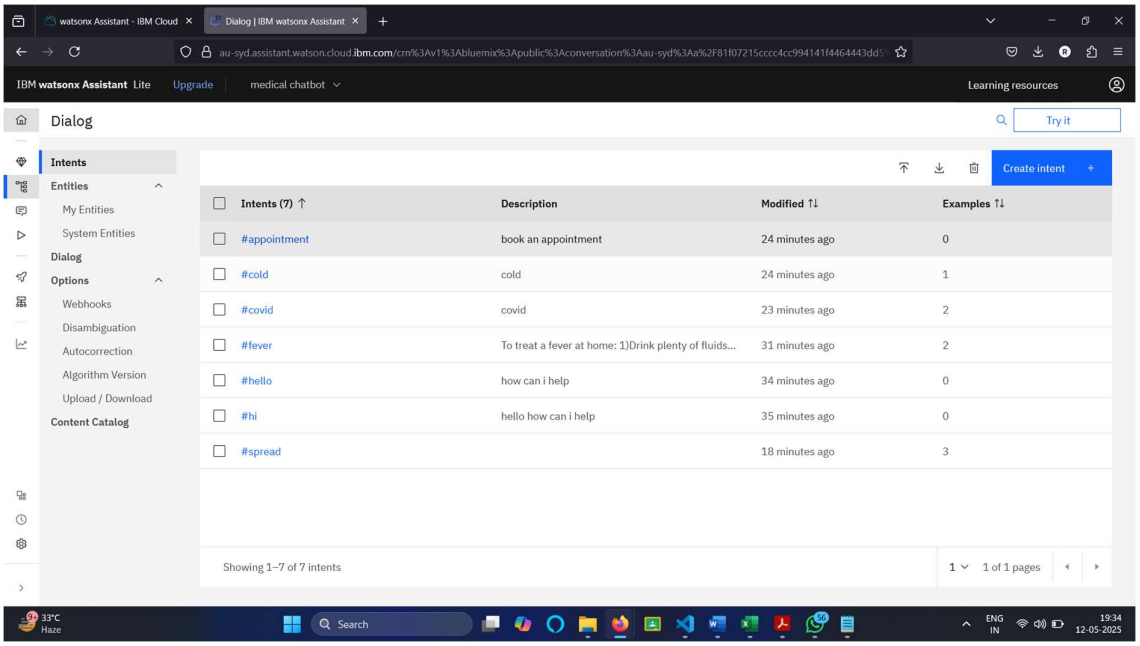
Preview
Deploy
Publish
Environments
Improve
Analyze
Integrations
Activity log
Assistant settings
What's new
Documentation
Enable in settings
Build actions
Enhance and improve your assistant's actions.
Customize your greeting
Welcome your users in a unique way that aligns with your brand.
Create a fallback plan
Train your assistant to adapt to specific situations.
Set up search
Determine how your assistant extracts answers for your users' questions.
Preview & debug
Enable debug mode when you preview your assistant.
1/2
Default behavior
Conversational search
No content Add
Search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IBM watsonx Assistant Lite
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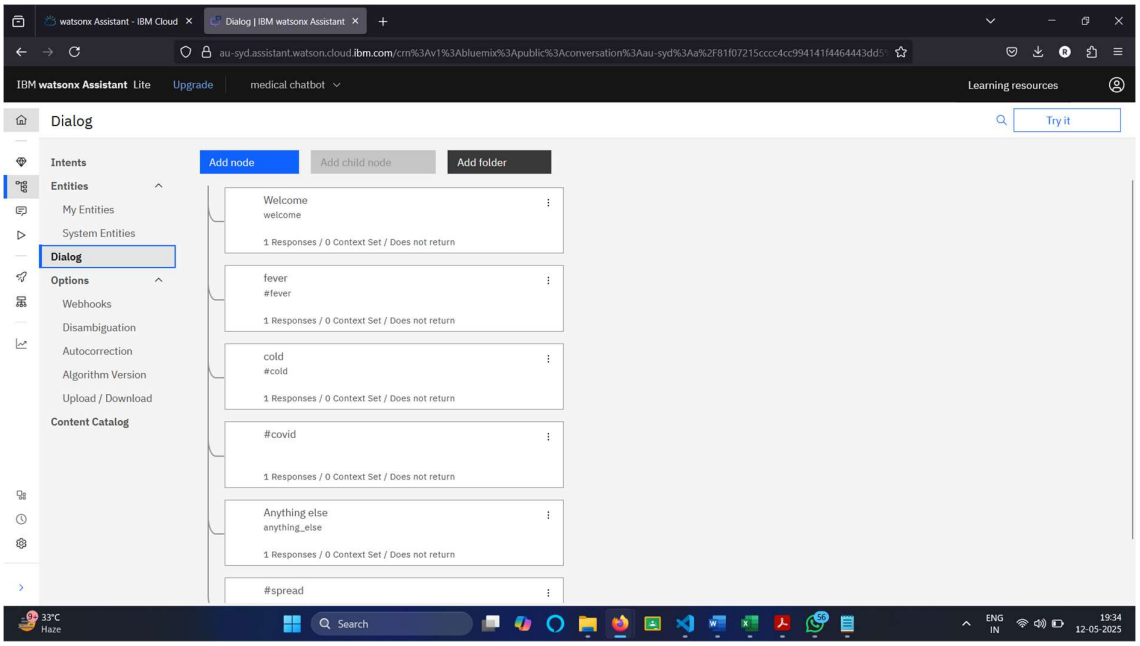
Dialog
Try it
Intents
Entities
My Entities
System Entities
Dialog
Options
Webhooks
Disambiguation
Autocorrection
Algorithm Version
Upload / Download
Content Catalog
Create intent
Intents (7)
Description
Modified
Examples
#appointment
book an appointment
24 minutes ago
0
#cold
cold
24 minutes ago
1
#covid
covid
23 minutes ago
2
#fever
To treat a fever at home: 1)Drink plenty of fluids...
31 minutes ago
2
#hello
how can i help
34 minutes ago
0
#hi
hello how can i help
35 minutes ago
0
#spread
18 minutes ago
3
Showing 1–7 of 7 intents
1 of 1 pages


watsonx Assistant - IBM Cloud
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IBM watsonx Assistant Lite
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Intents
Entities
My Entities
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Dialog
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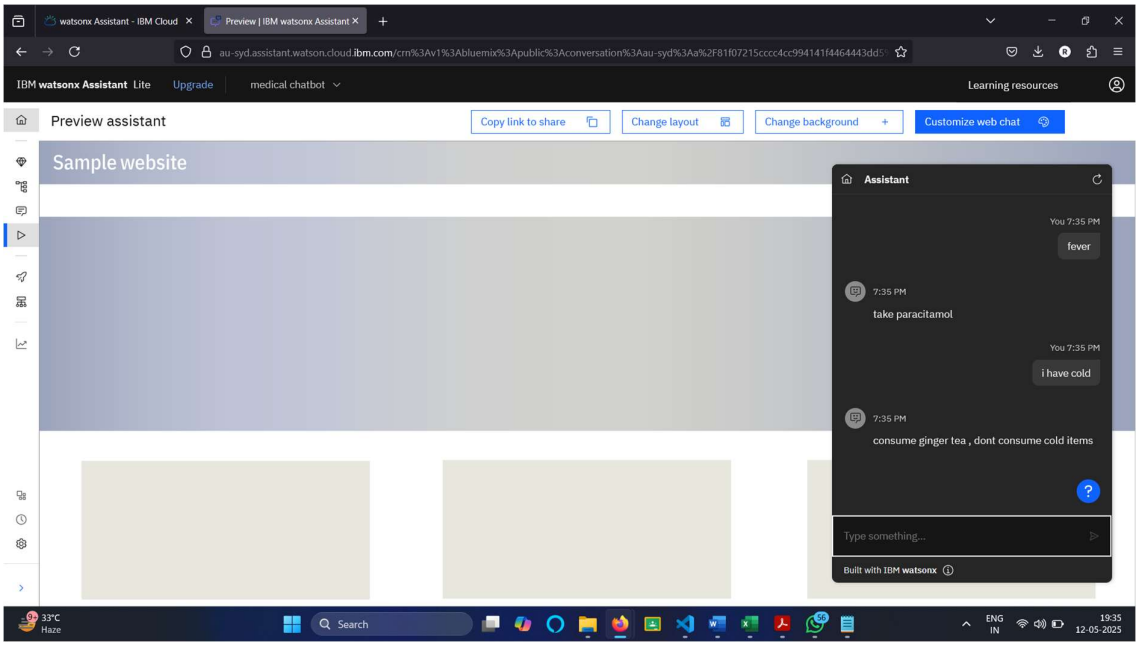
Welcome
welcome
1 Responses / 0 Context Set / Does not return
fever
#fever
1 Responses / 0 Context Set / Does not return
cold
#cold
1 Responses / 0 Context Set / Does not return
#covid
1 Responses / 0 Context Set / Does not return
Anything else
anything_else
1 Responses / 0 Context Set / Does not return
#spread
Search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IBM watsonx Assistant Lite
Upgrade
medical chatbot
Learning resources
Preview assistant
Copy link to share
Change layout
Change background
Customize web chat
Sample website
Assistant
You 7:35 PM
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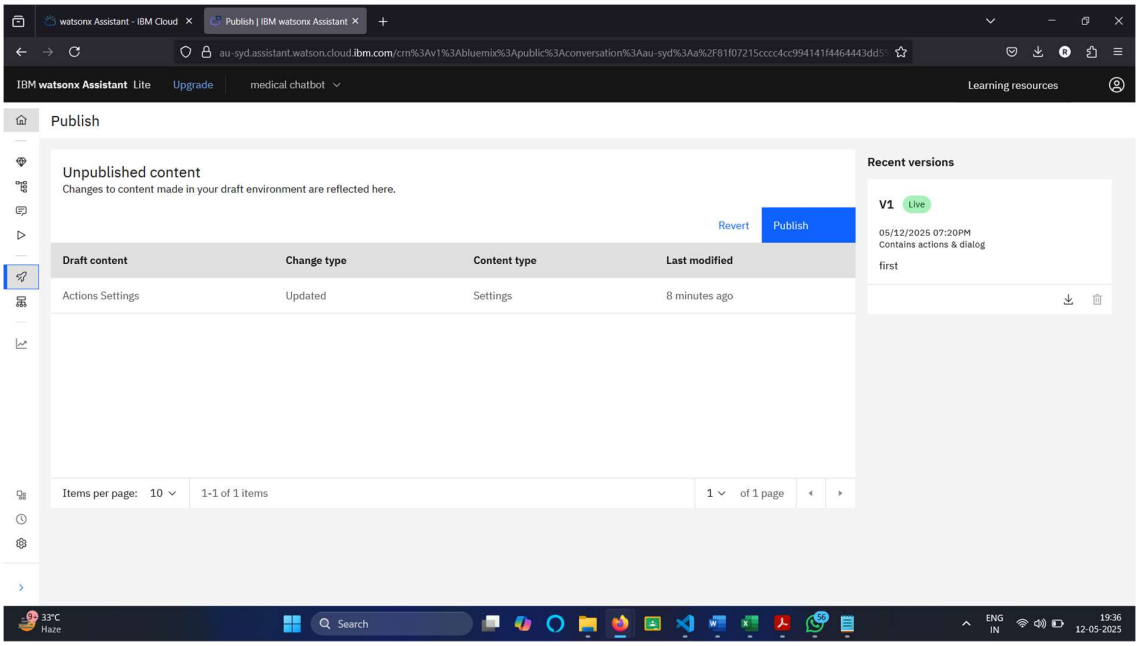
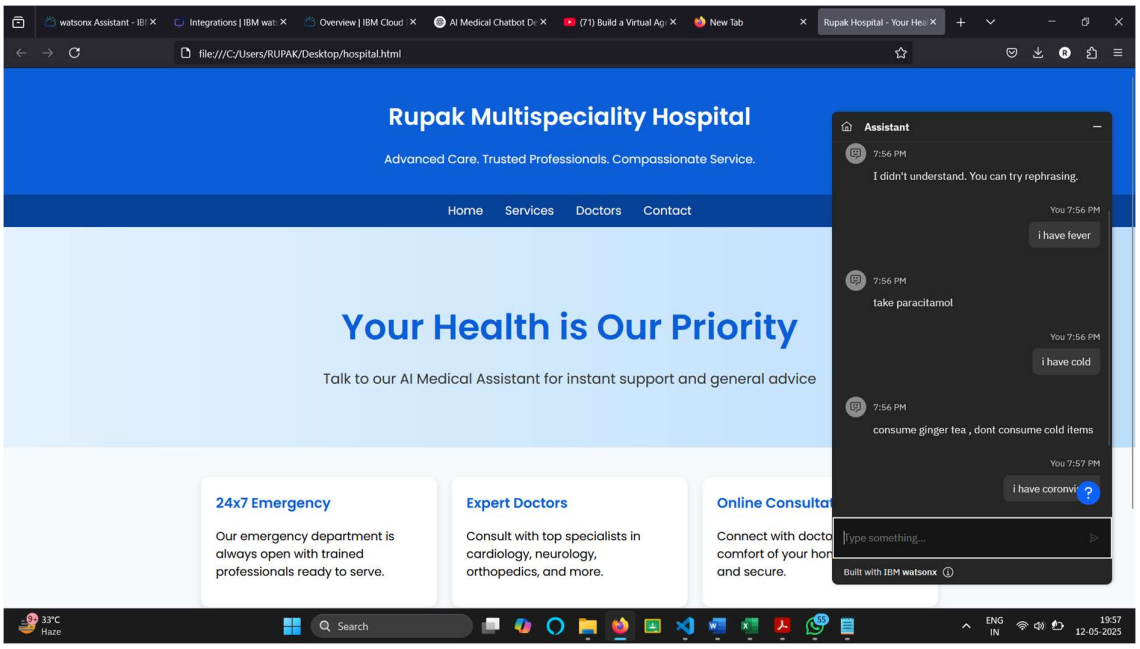
7:35 PM
take paracitamol
You 7:35 PM
i have cold
7:35 PM
consume ginger tea , dont consume cold items
Type something...
Built with IBM watsonx
Search





9. Future Enhancements

- Integrate with live medical databases or APIs.
- Enable voice interface for easier access.
- Add multilingual support via Watson Language Translator.
- Include visuals (diagrams, icons, basic anatomy images).

- Add appointment scheduling and emergency support features.

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10. Conclusion

The AI medical chatbot powered by IBM Watson delivers quick, intelligent health-related assistance. It offers a scalable solution to support basic healthcare queries and helps reduce load on medical professionals by handling common questions, setting the stage for more advanced digital health services.