# PROJECT REPORT

# *Intelligent Customer Helpdesk with Smart Document Understanding*

## *(Machine Learning & Artificial Intelligence)*

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# 1. INTRODUCTION

## 1.1 Project Overview

We build a chatbot using IBM Watson AI Services with an effective Web-based UI, through which a user can chat with the assistant.
Webhooks are used to integrate the Watson Discovery service with Watson Assistant.
Project Requirements:

- Functional Requirements : IBM Cloud (Watson Assistant, Watson Discovery, Watson Cloud Functions, Node-RED)
- Technical Requirements : AI, ML, Watson AI, Node JS

## 1.2 Project Scope

- Create a customer care dialog skill in Watson Assistant
- Use Smart Document Understanding to build an enhanced Watson Discovery collection
- Create an IBM Cloud Functions web action that allows Watson Assistant to post queries to Watson Discovery
- Build a web application with integration to all these services & deploy the same on IBM Cloud Platform

# 2. Literature Survey

## 2.1 Existing Problem

The typical customer care chatbot can answer simple questions, such as store locations and hours, directions, and maybe even making appointments. When a question falls outside of the scope of the pre-determined question set, the option is typically to tell the customer the question isn’t valid or offer to speak to a real person.

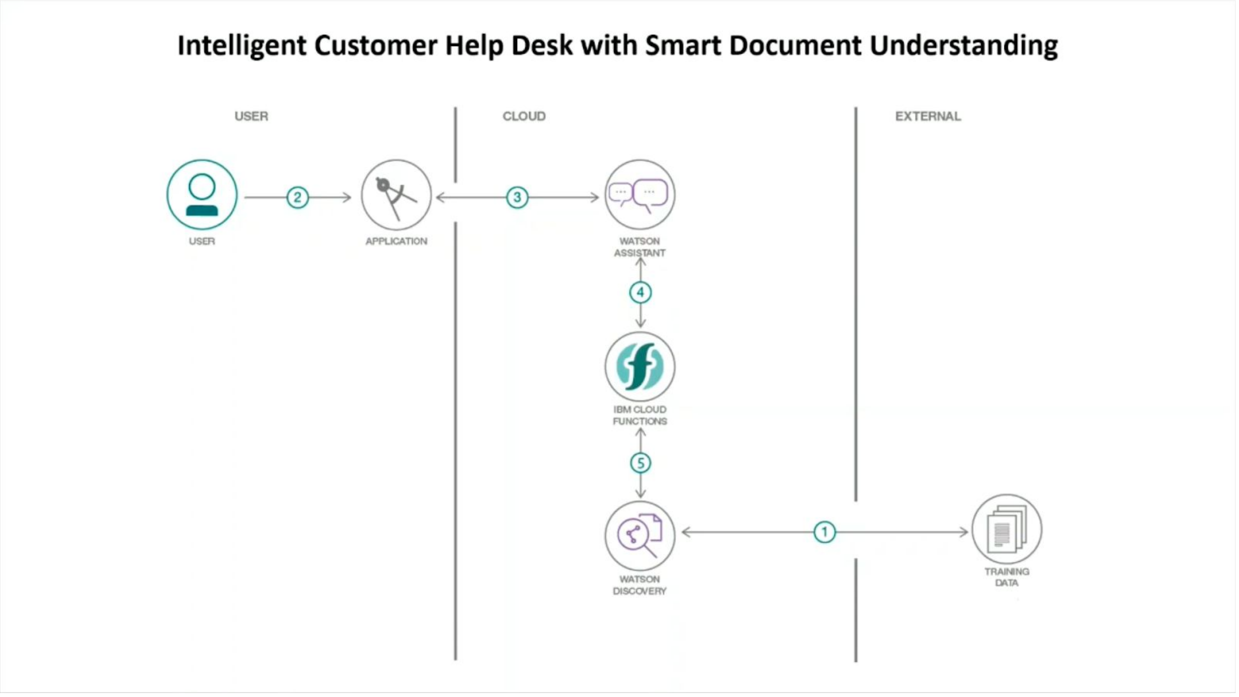
## 2.2 Proposed Solution

In this project, there will be an added feature. If the customer asks a question outside of scope, say with respect to the operations of a device, the application shall pass the question onto the Watson Discovery Service, which has been pre-loaded and trained with the device’s owners-manual. So now, instead of “Would you like to speak to a customer representative?” it can return some relevant sections of the owners-manual to help solve the customers’ problems. This avoids most queries from being directed to the customer representative, until explicitly asked by the customer or in the case of an unusal query, making it more effective and time saving.

To take it a step further, the project shall use the Smart Document Understanding feature of Watson Discovery to train it on what text in the owners-manual is important and what is not. This will improve the answers returned from the queries. Then using Watson actions as a webhook, Watson Discovery can be integrated with Watson assistant. Finally using Node-Red, Watson assistant can be integrated with a web UI. This UI can then be used to connect with Watson assistant and chat with it.

# 3. Theoretical Analysis

## 3.1 Block / Flow Diagram

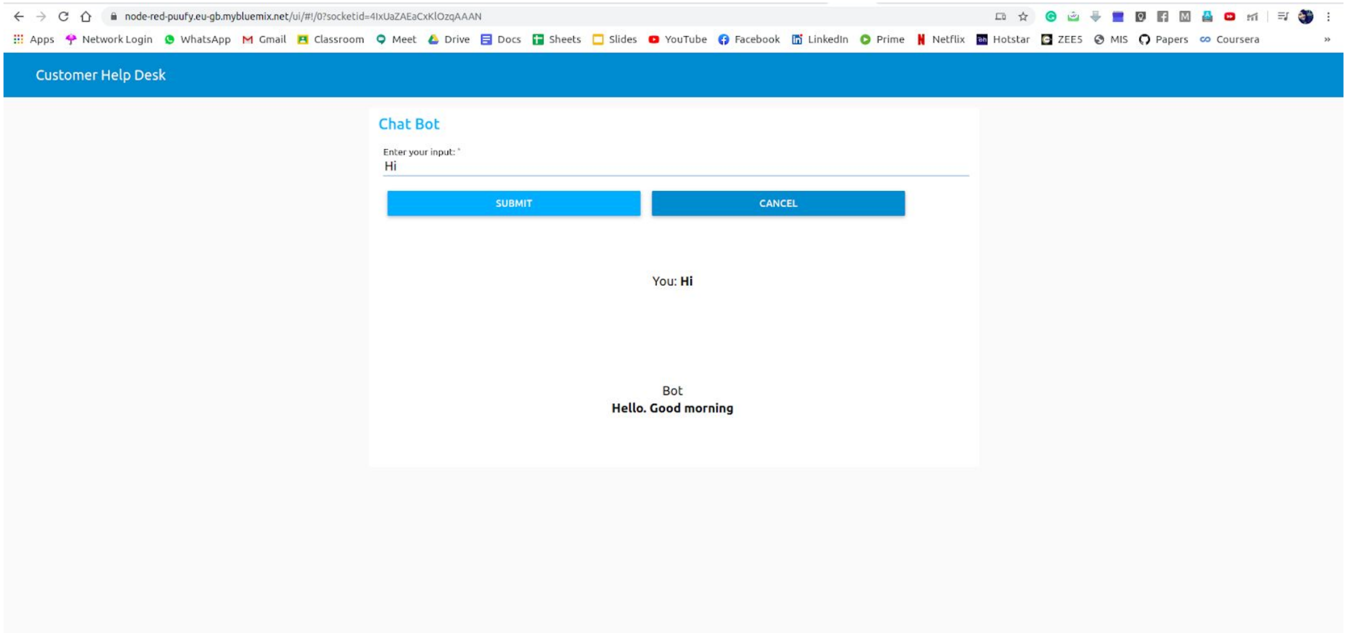


- The document is annotated using Watson Discovery SDU
- The user interacts with the backend server via the app UI. The front-end UI is a chatbot that interacts with the user.
- The dialog between the user and backend server is coordinated using a Watson Assistant dialog skill.
- If the user asks a product operation question, a search query is passed to a predefined IBM Cloud Functions action.
- The Cloud Functions action will query the Watson Discovery service and return the results.

## 3.2 Hardware / Software Designing

- Create necessary IBM Cloud Watson Services.
- Configure Watson Discovery by training it for precise replies.
- Create Watson Cloud Functions Action.
- Configure Watson Assistant by creating required skill.
- Integrate Watson Discovery with Watson Assistant using webhook.
- Build Node-RED flow to integrate Watson Assistant and Web Dashboard and deploy to see the final UI.

# 4. Experimental Investigation



Customer Help Desk

Chat Bot

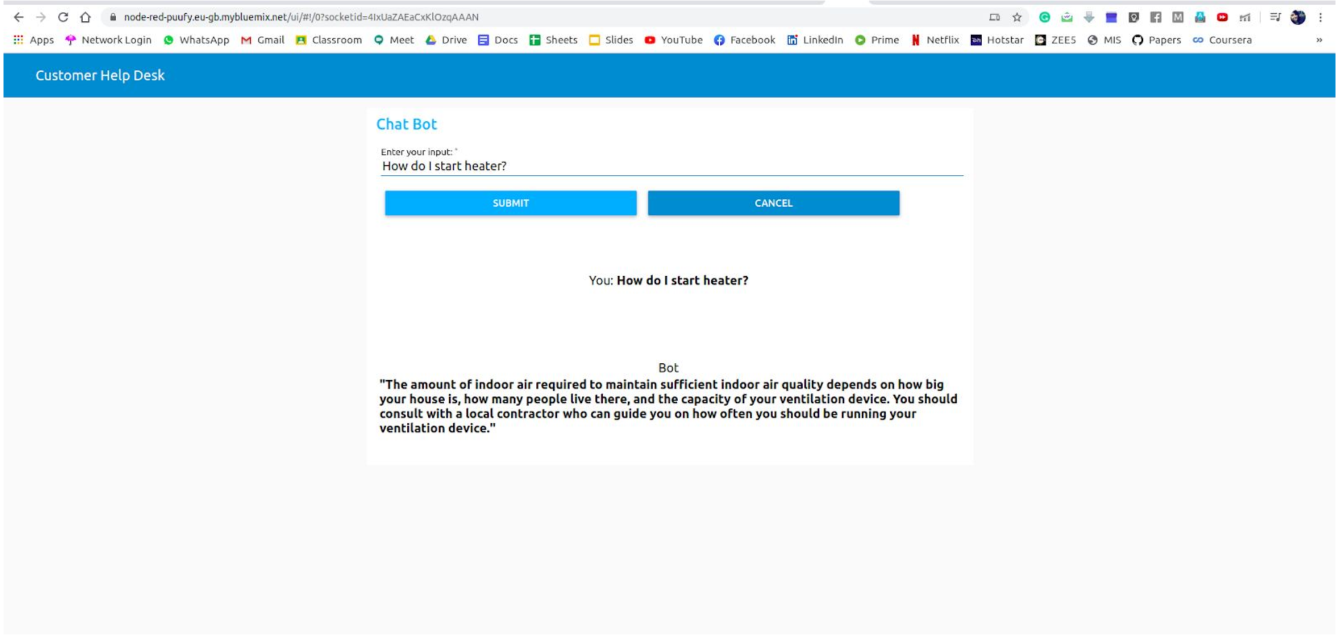
Enter your input: *

Hi

You: **Hi**

Bot

**Hello. Good morning**



Customer Help Desk

Chat Bot

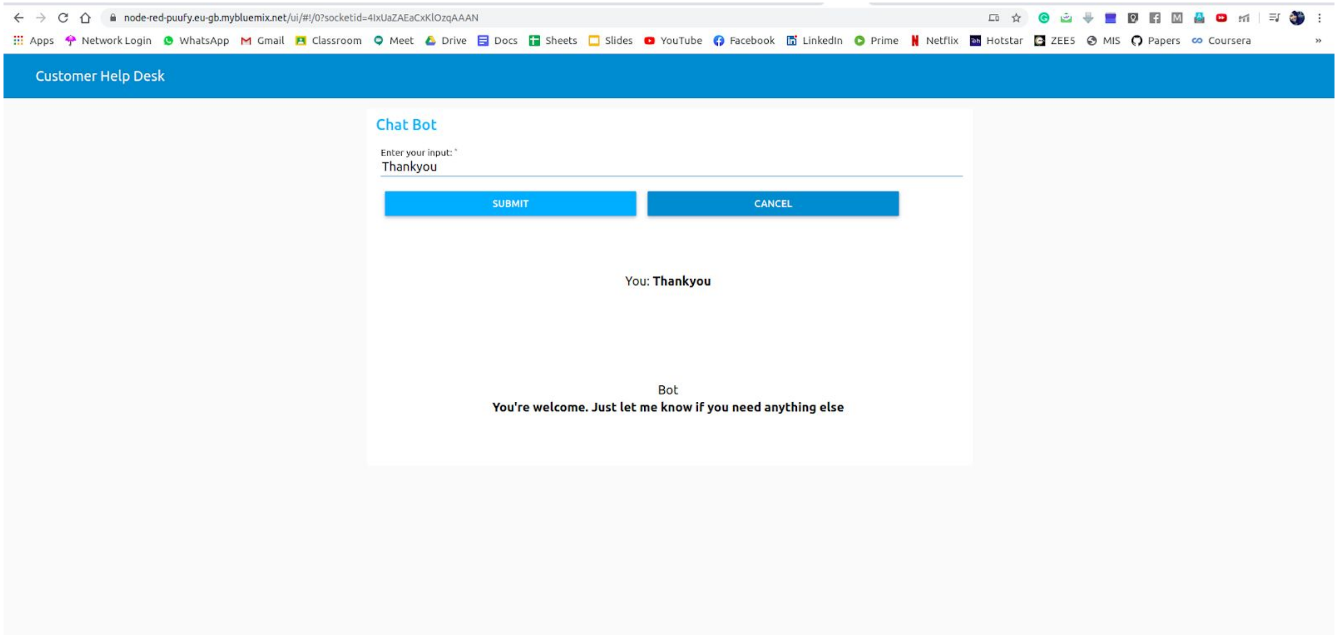
Enter your input: *

How do I start heater?

You: **How do I start heater?**

Bot

**"The amount of indoor air required to maintain sufficient indoor air quality depends on how big your house is, how many people live there, and the capacity of your ventilation device. You should consult with a local contractor who can guide you on how often you should be running your ventilation device."**



Enter your input: * Thankyou

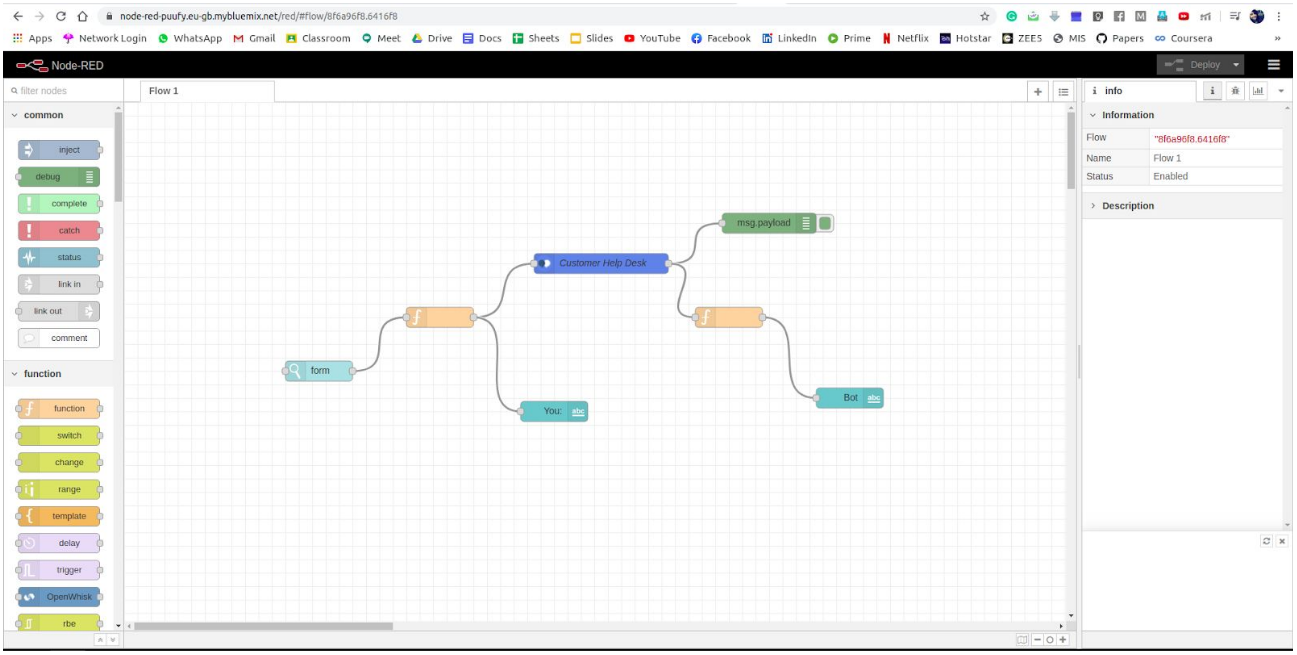
You: **Thankyou**

Bot
**You're welcome. Just let me know if you need anything else**

# 5. Flowchart

To create a flow in Node-RED, insert the following nodes:

- Debug
- ui_Form
- ui_Text
- Function
- Assistant

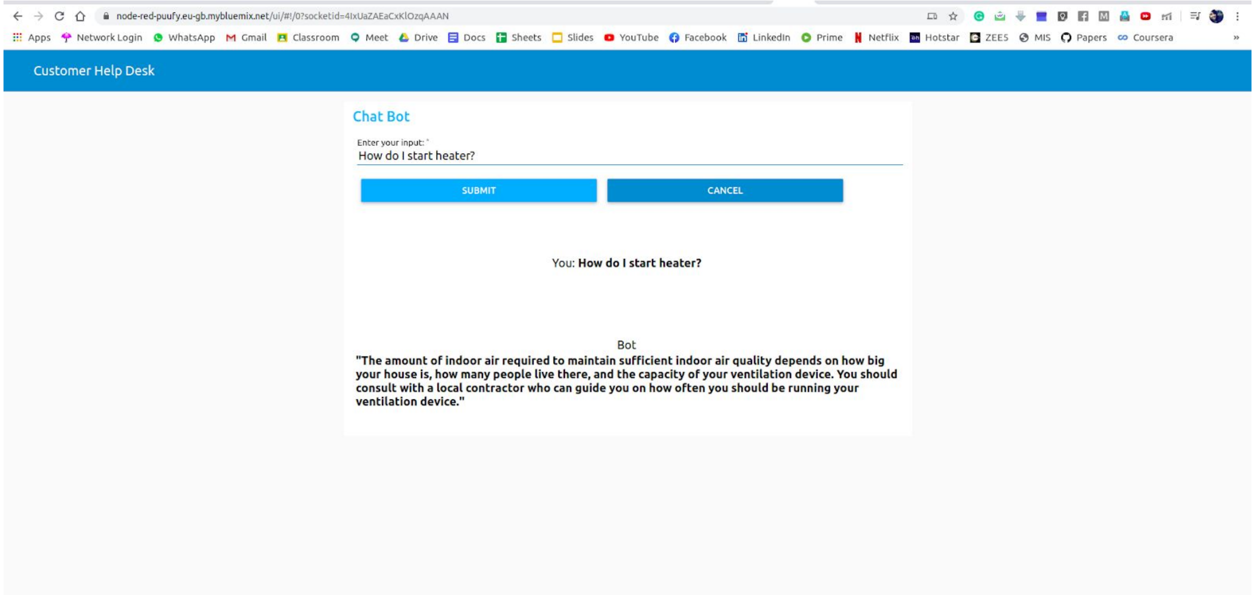


| | |
|---|---|
| Flow | "8f6a96f8.6416f8" |
| Name | Flow 1 |
| Status | Enabled |

# 6. Results

A Web-based UI was developed by integrating all the services using Node-RED.

URL for UI Dashboard : https://node-red-puufy.eu-gb.mybluemix.net/ui/


node-red-puufy.eu-gb.mybluemix.net/ui/#!/0?socketid=4IxUaZAEaCxKlOzqAAAN
Customer Help Desk
Chat Bot
SUBMIT
CANCEL

Enter your input: *
How do I start heater?

You: **How do I start heater?**

Bot

**"The amount of indoor air required to maintain sufficient indoor air quality depends on how big your house is, how many people live there, and the capacity of your ventilation device. You should consult with a local contractor who can guide you on how often you should be running your ventilation device."**

# 7. Advantages & Disadvantages

## Advantages:

- Reduces Man Power
- Cost Efficient
- Less calls diverted to Customer Representatives.
- Can be deployed for answering simple and general human queries.

## Disadvantages:

- Sometimes it can mislead customers as it may search irrelevant information in the manual.
- It may also give the same answers to different queries.
- May not be able to connect to customer sentiments and intentions.

# 8. Applications

- This chatbot can be easily deployed to various websites, especially in the Q/A aspects, as it can solve a lot of basic questions and doubts of users.
- It can be deployed as a Customer Helpdesk for small scale products as their manual usually has the solution for the user's problems.

# 9. Conclusion

An Intelligent Customer Helpdesk Chatbot was successfully created using various Watson services like Watson Discovery, Watson Assistant, Watson Cloud Functions and Node-RED, which is a very effective tool for easing the Customer Care sector.

# 10. Future Scope

In the future, various other Watson services like Text-To-Speech and Speech-To-Text can also be integrated in the chatbot. This can make the chatbot Hands-free. The UI could also be improved so that it can take up only a small space in a website and redirecting to it is not needed.

# 11. Bibliography

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- Watson Discovery: https://developer.ibm.com/articles/introduction-watson-discovery/
- Node-RED Starter Application: https://developer.ibm.com/tutorials/how-to-create-a-node-red-starter-application/
- Smart-Bridge Webinars