PROJECT REPORT

CUSTOMER HELP DESK WITH SMART DOCUMENT UNDERSTANDING

As a part of the internship done on

smartinternz.com

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Category: Artificial Intelligence

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1. Introduction

Overview: We are going to make an application which will take use of many Watson AI services like Discovery,Assistant ,Cloud Function and Node-Red. Our main goal is to learn how to best set up these services such that we can achieve our task of information retrieval using Discovery and Assistant.

- Project Requirements: Python,IBM Cloud,IBM Watson
- Functional Requirements: IBM Cloud
- Technical Requirements:Python,Watson AI, Ml
- Software Requirements: Watson Assistant, Watson Discovery
- Project Deliverables: SmartInternz Internship
- Project Duration: 19 Days

Purpose: Nowadays everyone knows that we have chatbots which are answering to most of the queries related to us. For example store location, active hours, directions and also they can make appointments.

But what happens when the question get out of the scope of the Chatbot. It tells the user to change the question or it can't understand the user and mostly lead to talking to the companies representatives.

So our main goal is reduce the workloads of the representatives by supervising our chatbot in such a way that it can answer to most of the question of the user. For this we are using smart document understanding method where the bot is trained to find relevant answers from the user guide of the particular enterprise using Watson AI services. So using this we can reduce the workload on the representative of the companies.

Scope of work:

- Create a customer care dialog skill in Watson Assistant.
- Use smart document understanding to build an enhanced Watson Discovery Collection.
- Create an IBM Cloud Function web action that allows Watson Assistant to post queries to Watson Discovery.
- Build a web application with integration of all the services and deploy the same on IBM Cloud Platform.

2.Literature Survey

Existing problem:

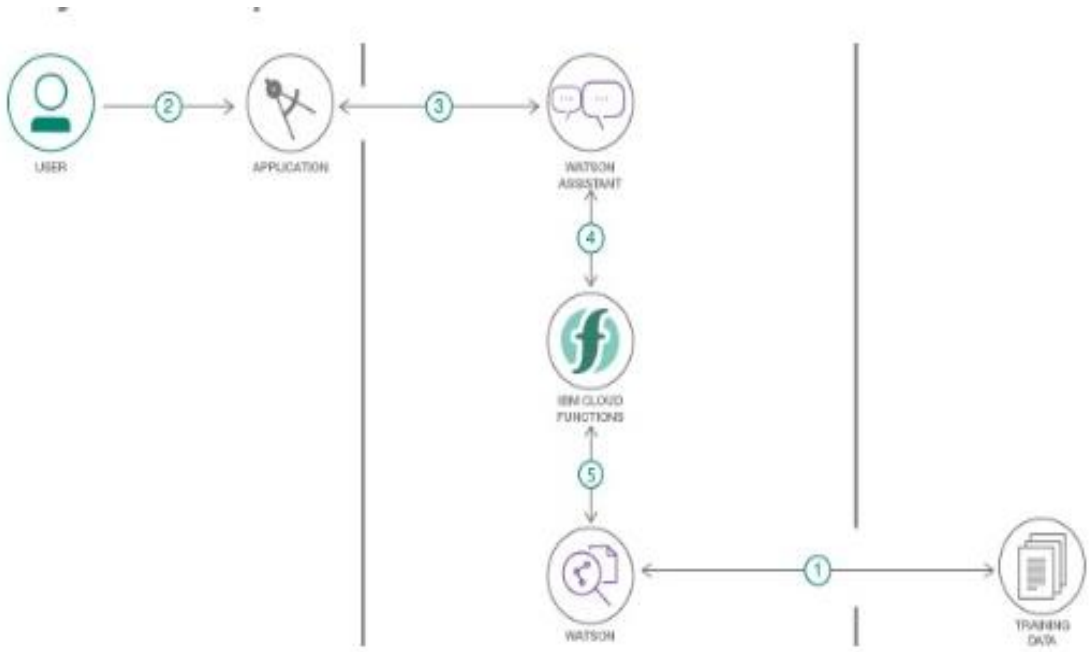
Mostly the chatbots which are developed are working on some pre-defined sets of questions only and usually works on if else statements. So if in case any question of the user falls outside these set of questions, then the chatbot is unable to answer the user and reply with them with statements like 'I cant understand', 'Please try again' or in most of the cases have to connect the user to the representatives.

Proposed Solution:

So to achieve this problem stated above we are going to develop a smart chatbot which will answer mostly all of the user related queries and which will be made using Watson AI services. And also it can work for 24 hours which a normal human being can not.

3. Theoretical Analysis

Flow Diagram of the process:



1. The document is annotated using Watson Discovery SDU.

2. The user interacts with the backend server via the app UI. The frontend app UI is a chatbot that engages the user in a conversation.
3. Dialog between the user and backend server is coordinated using a Watson Assistant dialog skill.
4. If the user asks the product operation question, a search query is passed to a predefined IBM Cloud Function action.
5. Cloud function action will query the Watson Discovery service and return the results.

Hardware/Software Designing:

- Create IBM Cloud Services
- Configure Watson Discovery
- Create IBM Cloud Function action
- Configure Watson Assistant
- Create Flow and Configure Node
- Deploy and run Node red app

4. Experimental Investigation

Create IBM Cloud Services:

1. Watson Discovery
2. Watson Assistant
3. Node Red

Configure Watson Discovery :After creating and launching the discovery from the Catalog, Import the document on which on which we need to train the discovery service. We have selected the ecobee3 user guide located in the data directory of our local repository.

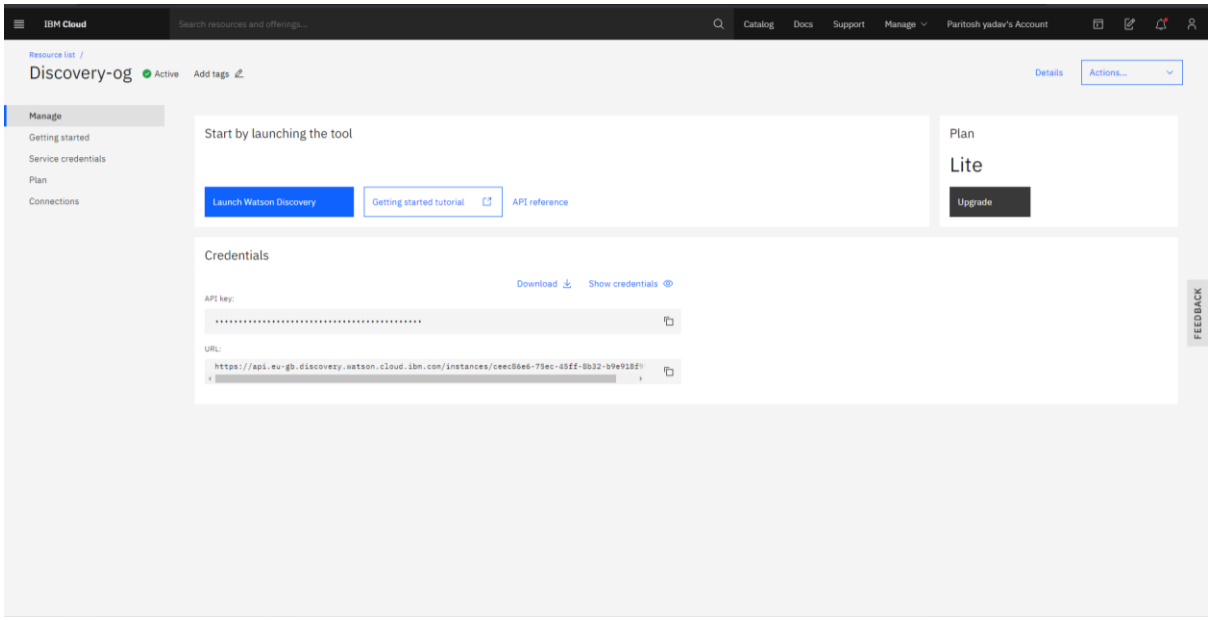
The Ecobee3 is a popular residential thermostat that has a WIFI interface and multiple configuration options. The result of the queries performed without configuring the data present in the document won't be that accurate. But the results improve significantly after applying SDU (Smart Document Understanding).

This can be done easily by clicking on the configure setting and then labelling each word or element present in the document as their respective label such as title, subtitle, text, image and Footer. Some of the labels are not present in the lite plan.

In the lite plan we are provided with limited content of IBM Watson, the labels help us in segmentation of the document which helps the discovery to understand the document better and provide better results. The results provided by the discovery can be improved, all the results are shown in assistant in which the discovery finds the sentiment to be positive i.e. matching between the question or query entered by the user and the data of the document. Better the sentiment analysis accurate the results are.

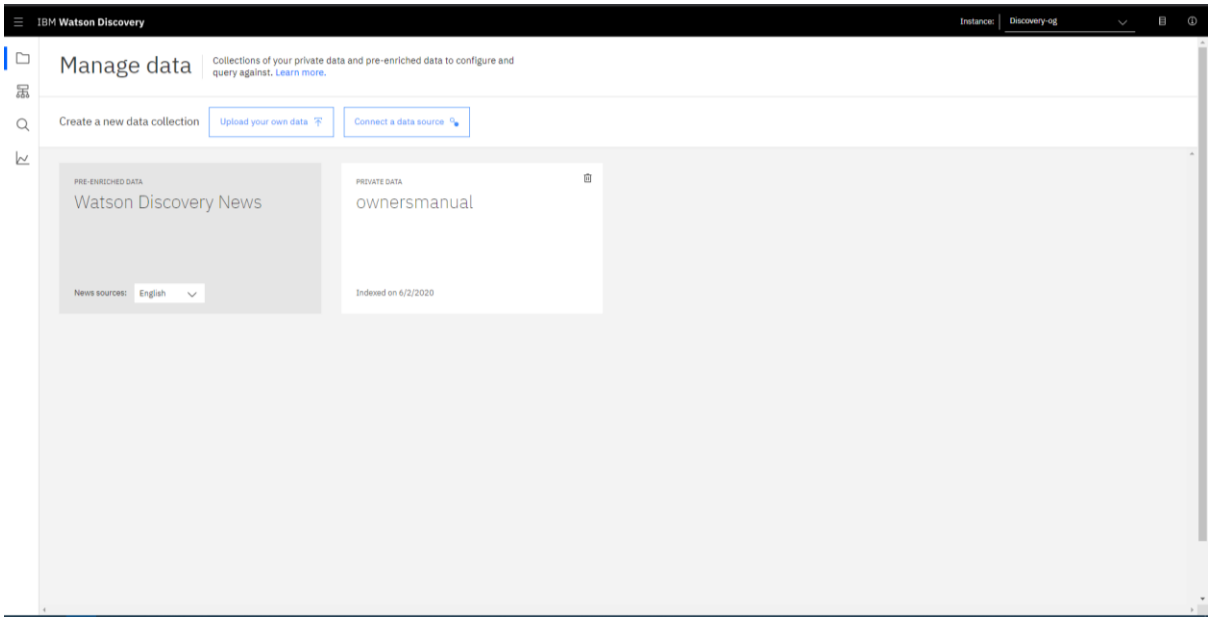
Follow the below mentioned steps:

- After creating the discovery from the catalog, we will be redirected to this base page of discovery where the name of the discovery along with its API Key and URL are mentioned. These credentials will be used in further steps.

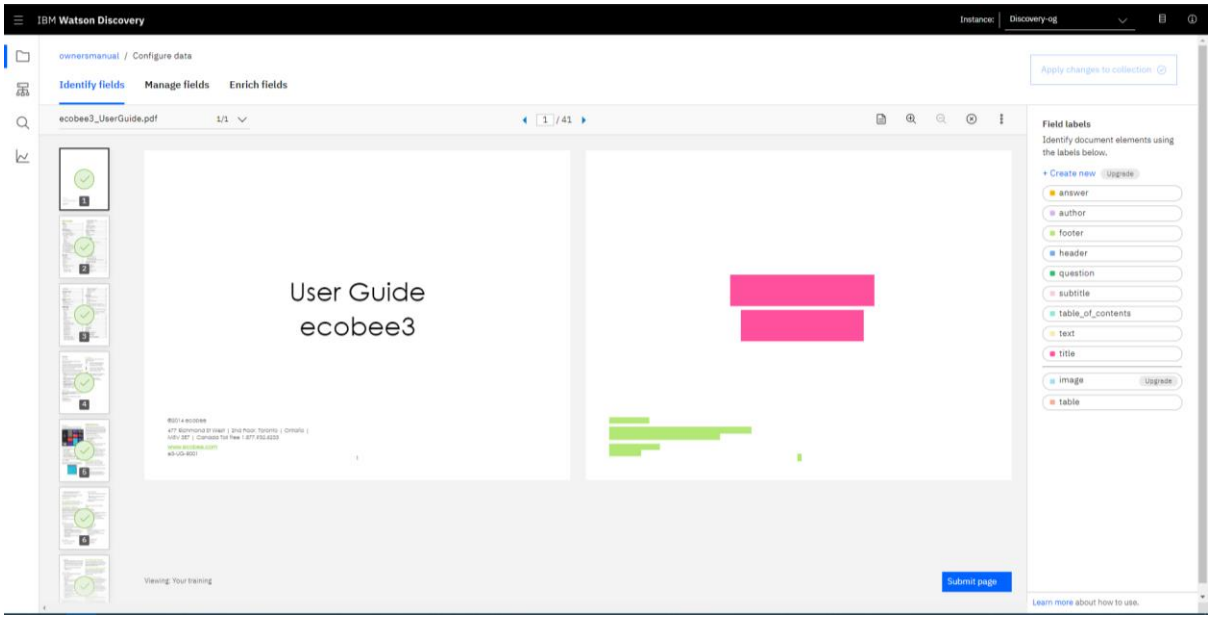


Click on the Launch Watson Discovery [1] to launch the discovery.

• Now in the next step we have to upload the data by clicking, upload your data. Here we have already uploaded the data as manual.

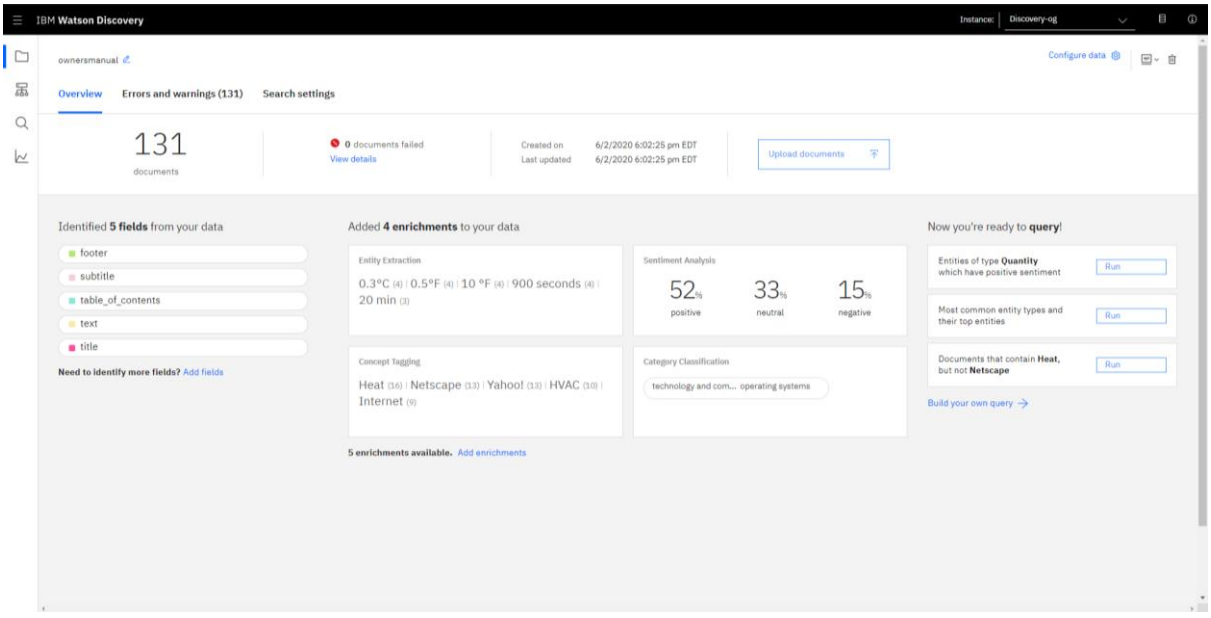


- After uploading the document we will see the page like this, we can ignore the warnings. And now if we run a query in Watson Discovery then we can see a huge amount of data is shown as an output which we do not want as an output. We want processed information to the point. So for this we configure the data



Then after customizing the data, the data need to be split according to different types here we consider it as subtitles format.

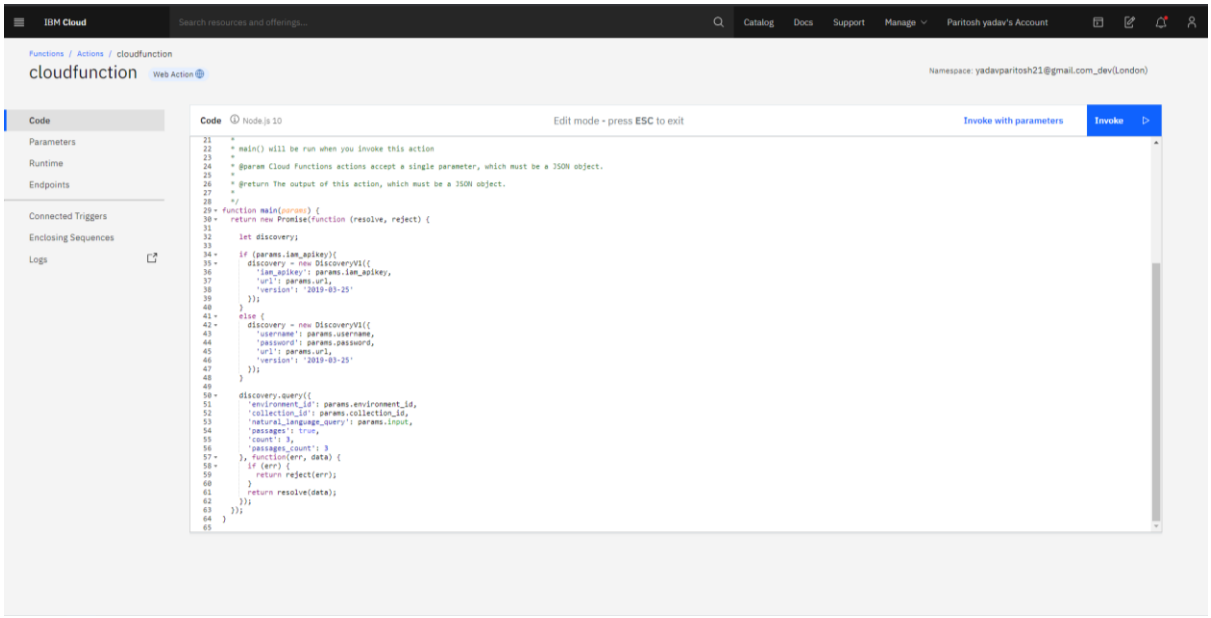
• After customizing the data, It will take some time to process and after that we will have multiple documents as shown below, the document we uploaded earlier is segmented in 131 documents as shown below(we have to segment it with subtitles and text).

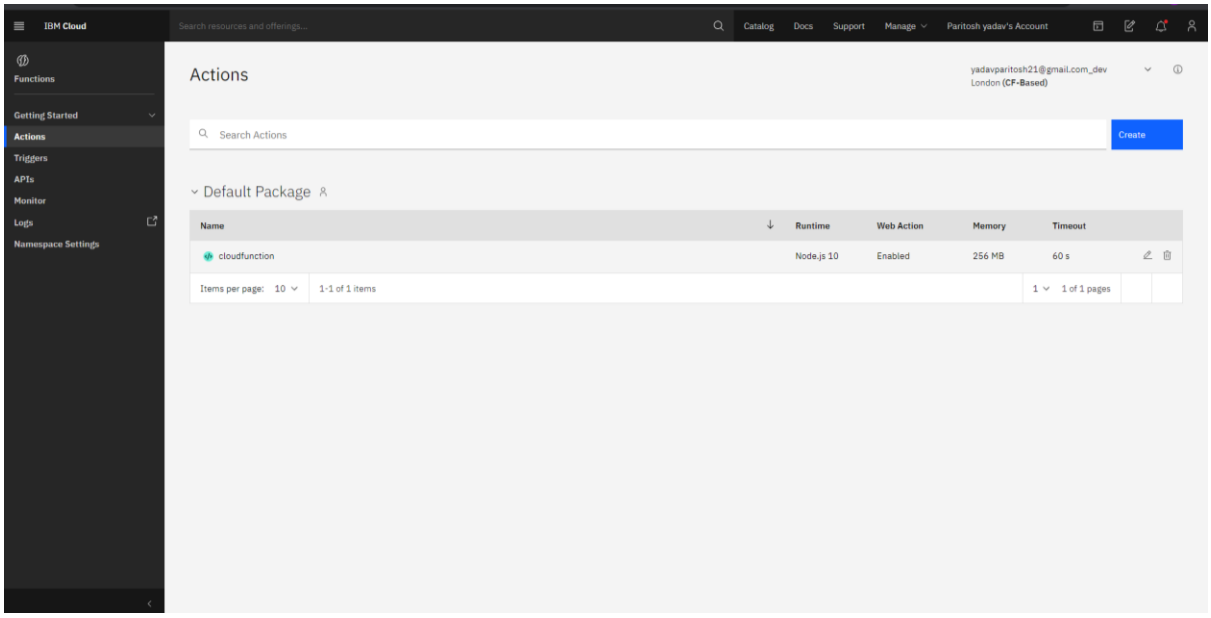


- We already have the API key and the URL.

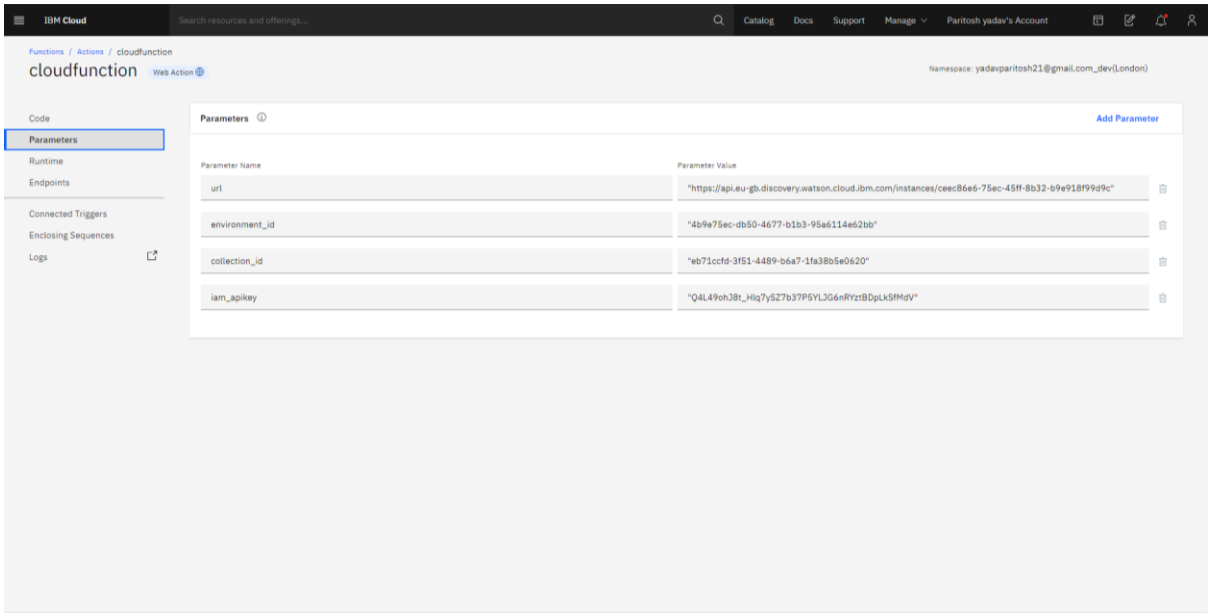
• Next, we have to create the IBM Cloud Function Action: It is used to link the discovery with assistant, so that our queries can be answered by the discovery.

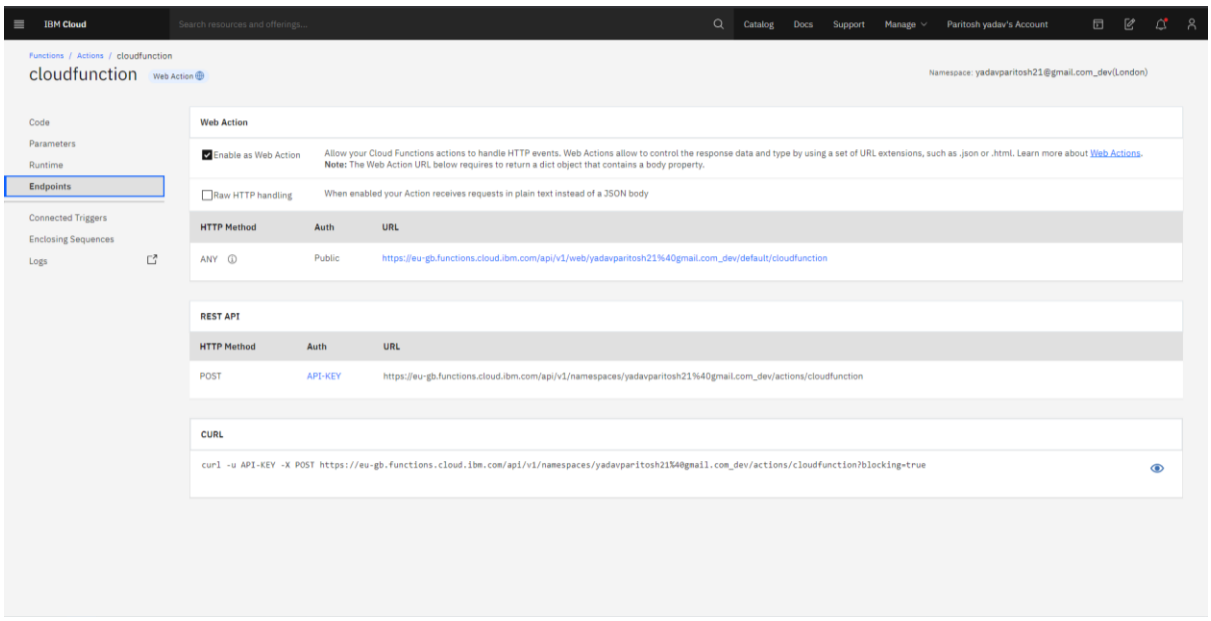
After selecting the action from the IBM catalog, we have to click on the action tab as shown on the left menu. Here we made the Information function. Then we can post the code which will help us to link the discovery.





- We can make the parameters as per the code and paste the parameter value from the discovery credentials. After that we have to click on the endpoint and enable the web action which will generate a public URL and it will be further used.

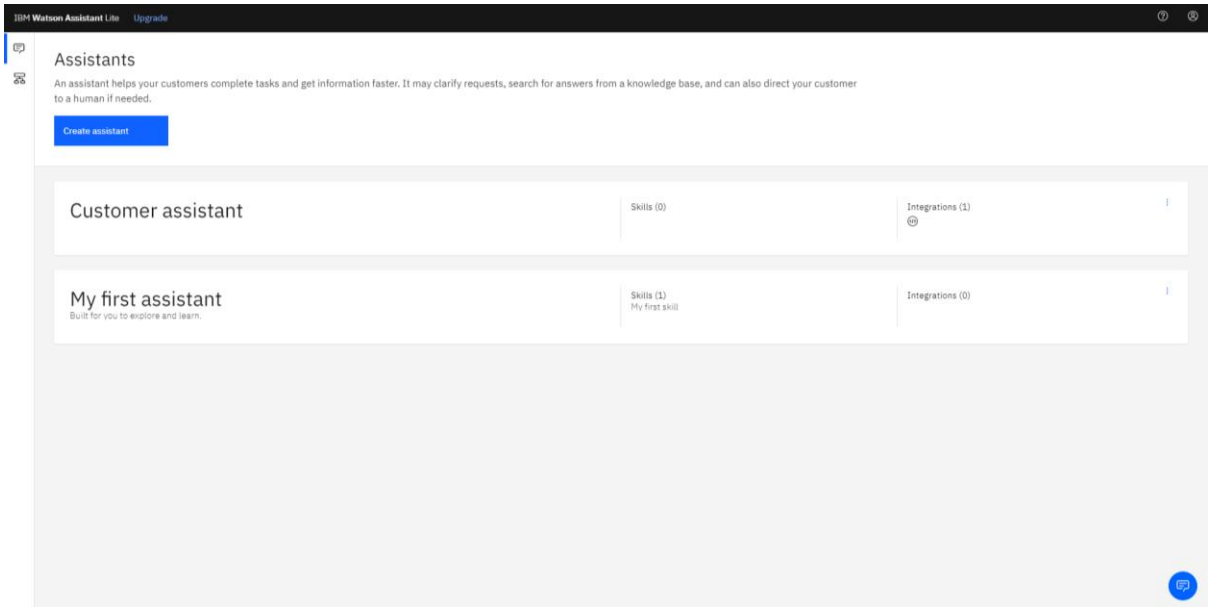


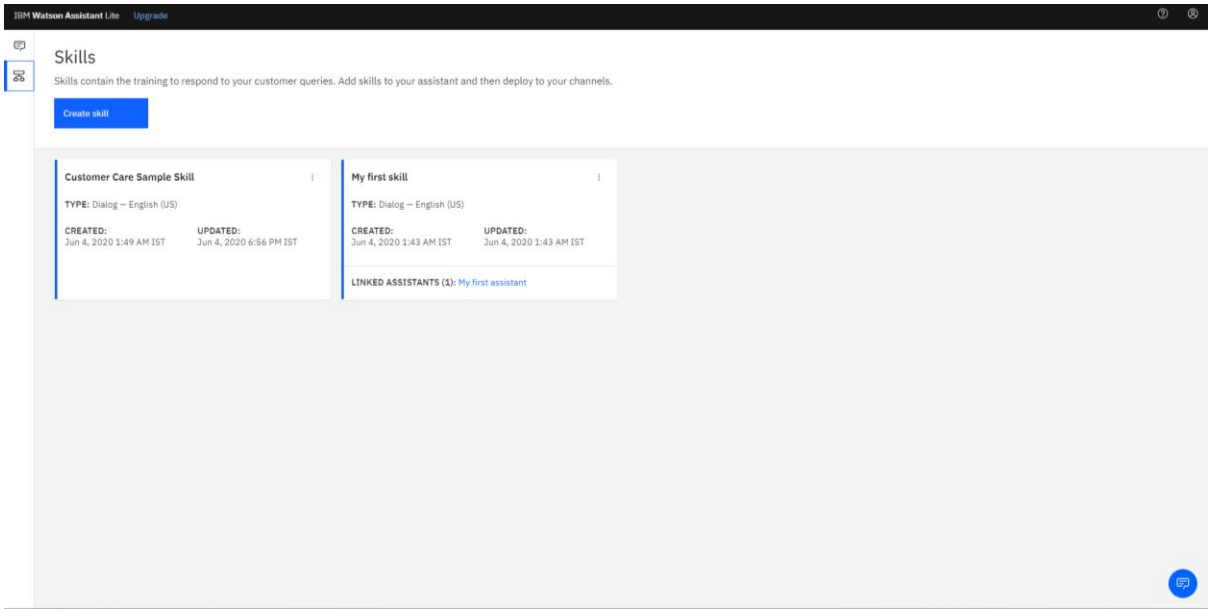


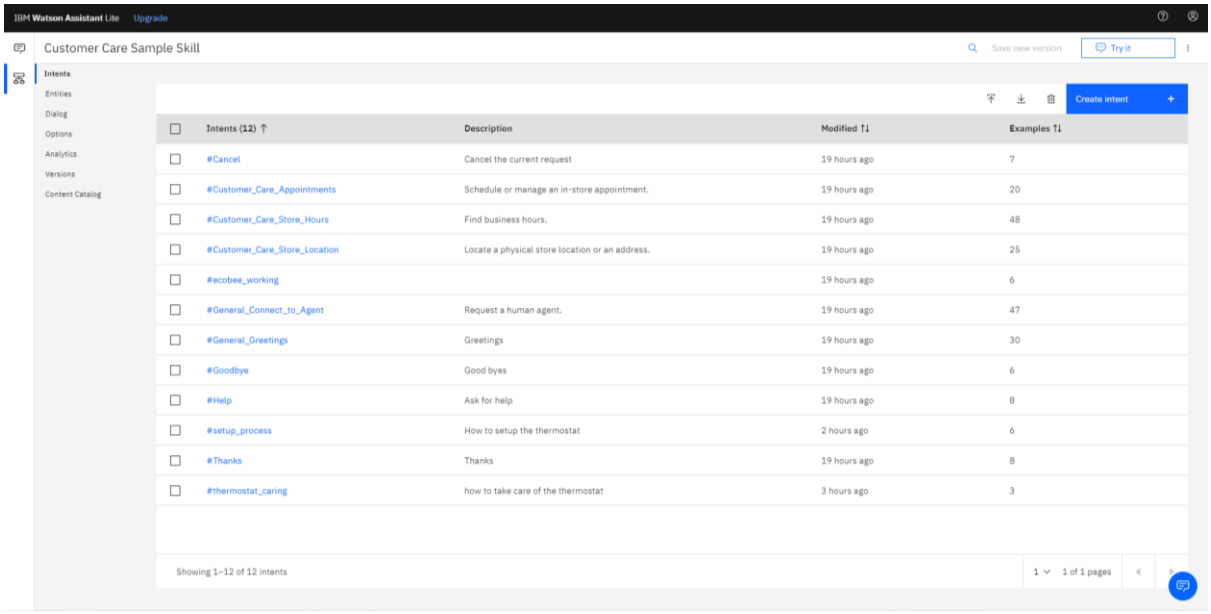
- Next, we have to make the Watson assistant and use the sample customer care skill for convenience. We can add intent related to product information and the related entities and dialog flow.
- We have to create the intents and the name we used here is
  ecobee working
  Thermostat caring
  setup_process
- The contents in the document need to be given as example in the intents so that when the customer needs any help the answer can be resulted using the keywords i.e., the examples.

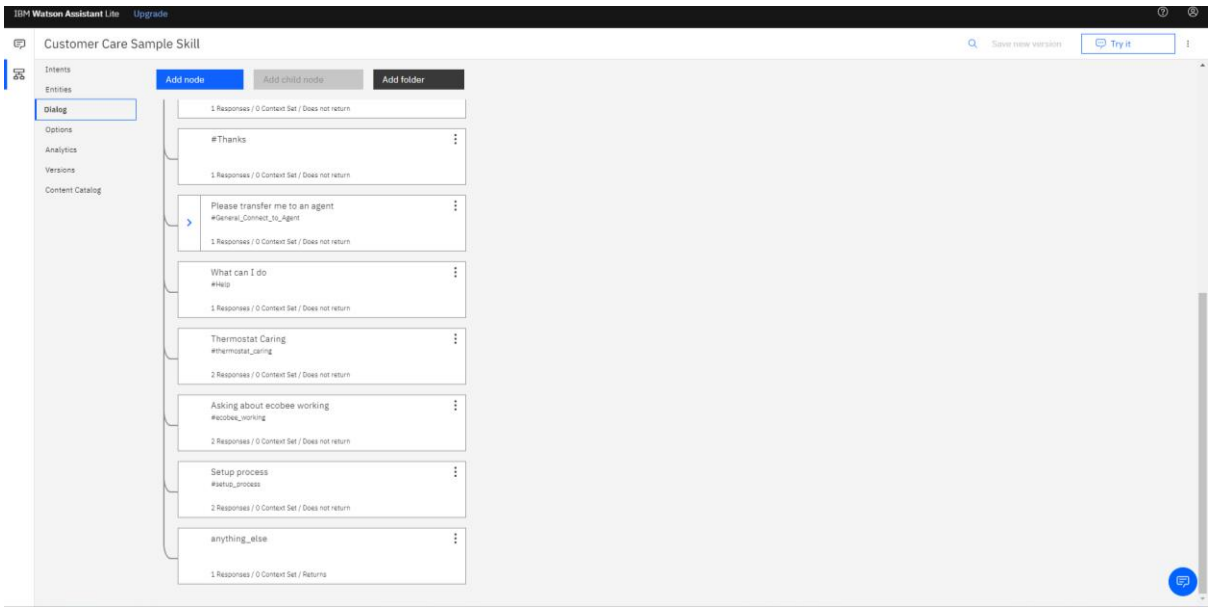
examples like: How to start the heater, How to set the timer, How to clean the thermostat etc.

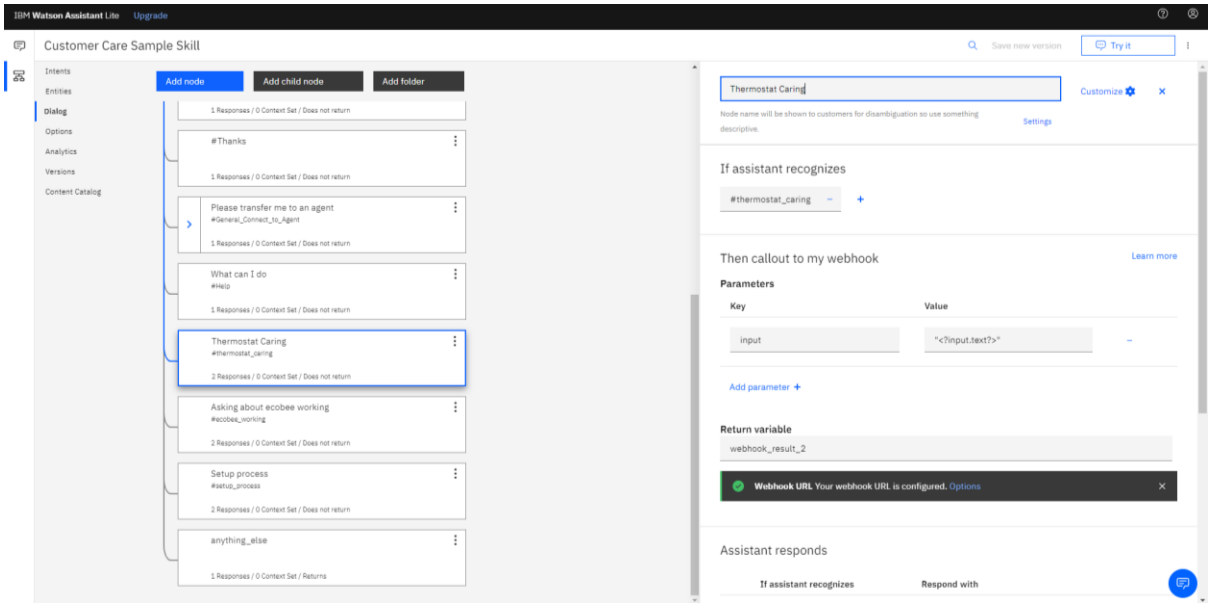
- Then we have to create a node in the Dialogs tab. which contain the question related to the intents. Some dialogs are already provided by the Customer Care Sample Skill. Dialogs added are: "Thermostat Caring" , Asking about ecobee working" etc. We have to connect these dialogs to the intents and enable the web hooks so that our dialog creates a post request to the webhook Url.
- If the assistant recognizes the intent then the webhook is called and returns the result in webhook_result_1,webhook_result_2,webhook_result_3 by taking the input parameters.

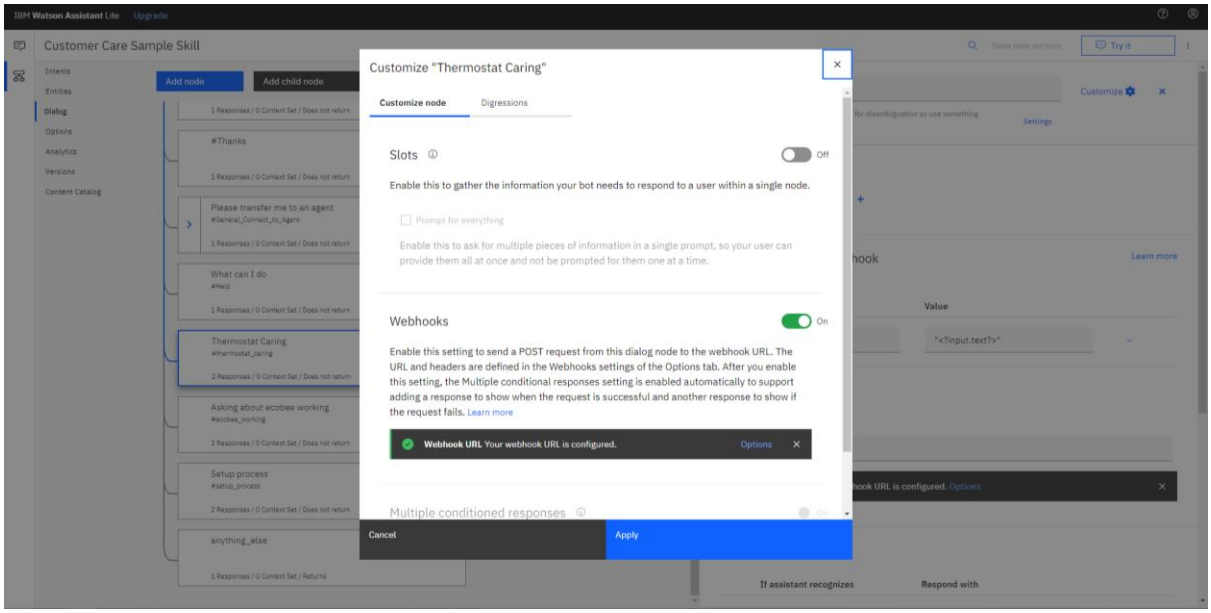





IBM Watson Assistant Lite
Upgrade
Customer Care Sample Skill
Save new version
Try it
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Create intent
Intents (12)
Description
Modified
Examples
#Cancel
Cancel the current request
19 hours ago
7
#Customer_Care_Appointments
Schedule or manage an in-store appointment.
19 hours ago
20
#Customer_Care_Store_Hours
Find business hours.
19 hours ago
48
#Customer_Care_Store_Location
Locate a physical store location or an address.
19 hours ago
25
#ecobee_working
19 hours ago
6
#General_Connect_to_Agent
Request a human agent.
19 hours ago
47
#General_Greetings
Greetings
19 hours ago
30
#Goodbye
Good byes
19 hours ago
6
#Help
Ask for help
19 hours ago
8
#setup_process
How to setup the thermostat
2 hours ago
6
#Thanks
Thanks
19 hours ago
8
#thermostat_caring
how to take care of the thermostat
3 hours ago
3
Showing 1–12 of 12 intents
1 of 1 pages


IBM Watson Assistant Lite
Upgrade
Customer Care Sample Skill
Save new version
Try it
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Add node
Add child node
Add folder
#Thanks
Please transfer me to an agent
#General_Connect_to_Agent
What can I do
#Help
Thermostat Caring
#thermostat_caring
Asking about ecobee working
#ecobee_working
Setup process
#setup_process
anything_else

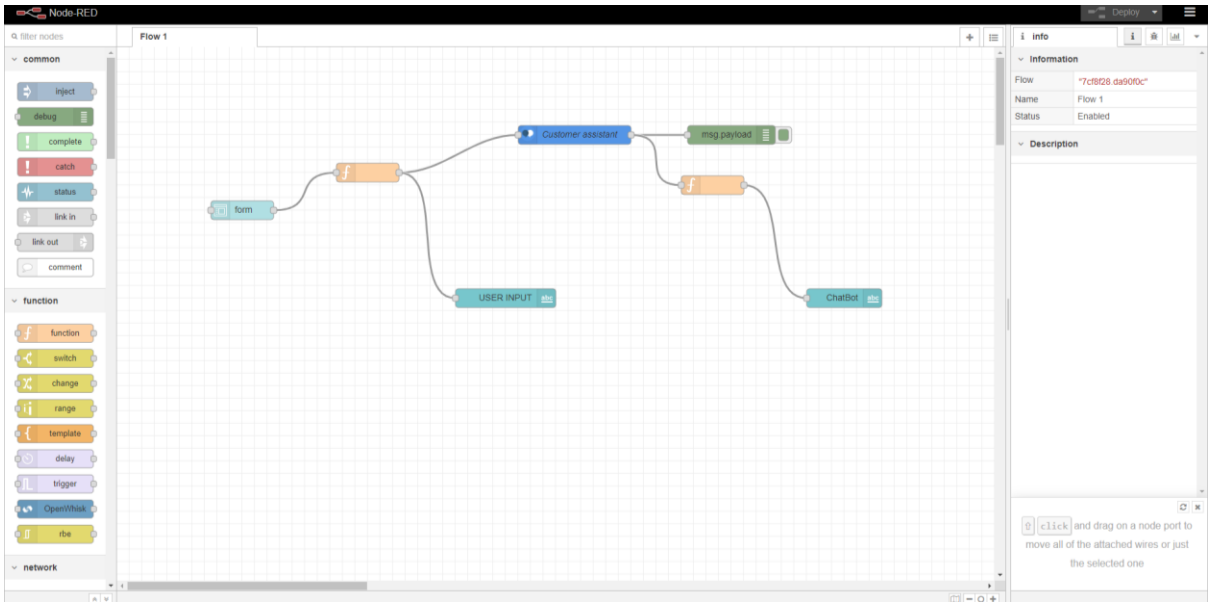




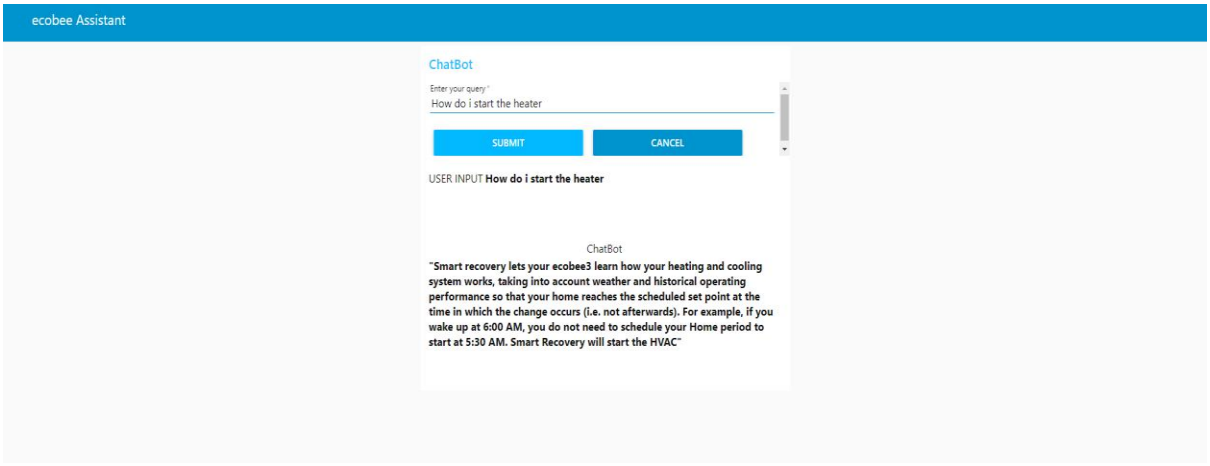
- After this we have to make the node-red flow, and link everything. We will get a UI from the node. The roles of different nodes can be understood by the references mentioned in in the end. The final flow will look like as shown below.

5. Flowchart

- Create flow and configurenode
- At first go to manage pallete and install dashboard.
- Now,Create the flow with the help of following node:
    - Assistant
    - Debug
    - Function
    - Ui_Form
    - Ui_Text



6. Result


ecobee Assistant
ChatBot
Enter your query *
How do i start the heater
SUBMIT
CANCEL
USER INPUT How do i start the heater
ChatBot
"Smart recovery lets your ecobee3 learn how your heating and cooling system works, taking into account weather and historical operating performance so that your home reaches the scheduled set point at the time in which the change occurs (i.e. not afterwards). For example, if you wake up at 6:00 AM, you do not need to schedule your Home period to start at 5:30 AM. Smart Recovery will start the HVAC"

7. Advantages and Disadvantages

Advantages:

- This type of application is better than the user manuals
- Reduce work load on employees
- Solves issue faster
- Result is accurate and take less time

Disadvantages:

- Sometimes it may result into wrong answer completely out of the context of the user
- Giving same answer for different sentiments
- If data is not trained properly then the result will not be accurate

8. Application

- Chatbot can be applied in various fields to help the customer in finding the result in larger documents.
- It can be used to find the data in social medias and in any communication channel.

9. Conclusion

So we have successfully created our Chatbot which can answer mostly all the user related queries from smart document understanding of the manual. This was achieved using Watson Discovery, Watson Assistant and Node red services.

Therefore the Chatbot will minimize the work load and work for 24 hours.

10. Future Scope

We can import the pre-built node-red flow and can improve our UI, moreover we can make a data base and use it to show the recent chats to the customer. We can also

improve the results of discovery by enriching it with more fields and doing the Smart Data Annotation more accurately.

These types of Chatbots for answering question of the students during online classes. like the situation we are facing in Covid scenario.

11.References

- http://www.ibm.com/cloud/architecture/tutorials/cognitive_discovery
- https://cloud.ibm.com/docs/assistant?topic=assistant-getting-started
- https://developer.ibm.com/recipes/tutorials/how-to-create-a-watson-chatbot-on-nodered/
- http://www.iotgyan.com/learning-resource/integration-of-watson-assistant-to-node-red