INTERNSHIP PROJECT REPORT

TITLE: *Intelligent Customer Help Desk with Smart Document Understanding - SB30180*

SMARTBRIDGE
Let's Bridge the Gap

PROJECT ID: SPS_PRO_99

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INTERN ID : llSPS-INT-2265

DEMONSTRATION VIDEO : https://youtu.be/zXTMRAeVM-8

TESTIMONIAL VIDEO : https://youtu.be/iPvvoe8U2-w

INTRODUCTION

OVERVIEW

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 predetermined question set, the option is typically to tell the customer the question is not valid or offer to speak to a real person.

In this project, there will be another option. If the customer question is about the operation of a device, the application shall pass the question onto Watson Discovery Service, which has been preloaded with the device owner's manual. So now, instead of "Would you like to speak to a customer representative?" we can return relevant sections of the owner's manual to help solve our customers' problems.

To take it a step further, the project shall use the Smart Document Understanding feature of Watson Discovery to train the Chatbot on what text in the owner's manual is important and what is not. This will improve the answers returned from the queries.

Project Requirements: Python, IBM Cloud, IBM Watson

Functional Requirements: IBM cloud

Technical Requirements: AI, ML, WATSON AI, PYTHON

Software Requirements: Watson assistant, Watson discovery.

PURPOSE

- Create a Customer Care Chatbot to reply to customer's queries
- Development of Smart Document Understanding Chatbot to reply the Customer when they ask about the instructions to use the products
- Development of a Web Application to integrate all the services

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 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.
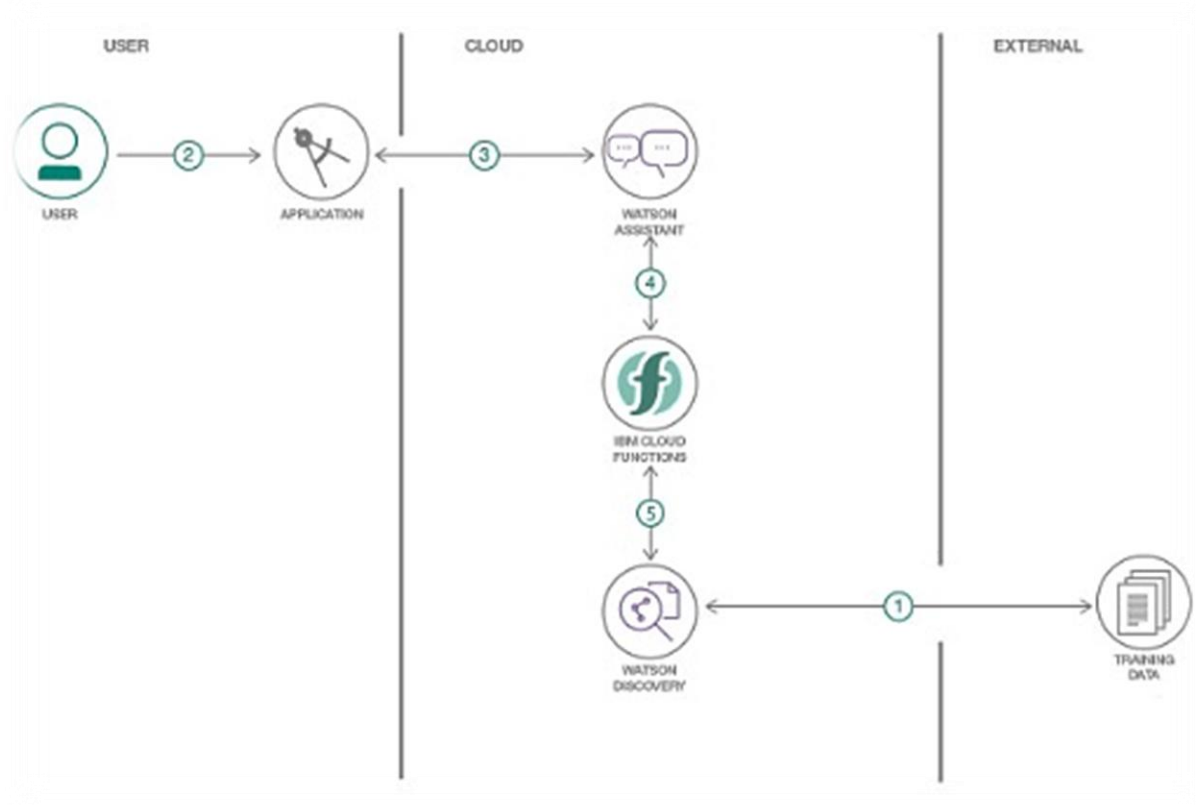
LITERATURE SURVEY

EXISTING PROBLEM

A Conventional Chatbot has the ability to answer simple question such as what is the time, where is the shop located etc. However, when the user ask the question out of the scope it will say I does not know or it will say that it is directing to the official. For complex problem, redirecting to the officials is acceptable but for problems such as asking about the products or the instructions to use the product it also redirect to the officials. This makes the firm to appoint more number of people in the customer care.

PROPOSED SOLUTION

The Proposed solution will allow the user to get information from the Chatbot about the instruction of how to handle the product. Smart Document Understanding Skill will allow the Chatbot to understand the user manual and reply to the customer what they want. So thus it reduces the manpower and it can be used by the customer where and when they want. As well as the customer can get the response as quick as possible so the customer satisfaction will be more compared to conventional customer care chatbot.

THEORETICAL ANALYSIS

BLOCK DIAGRAM

USER   CLOUD   EXTERNAL

USER → (2) → APPLICATION ← (3) → WATSON ASSISTANT

WATSON ASSISTANT → (4) → IBM CLOUD FUNCTIONS

IBM CLOUD FUNCTIONS ← (5) → WATSON DISCOVERY

WATSON DISCOVERY ← (1) → TRAINING DATA

SOFTWARE DESIGNING

Project Requirements: Python, IBM Cloud, IBM Watson

Functional Requirements: IBM cloud

Technical Requirements: AI, ML, WATSON AI, PYTHON

Software Requirements: Watson assistant, Watson discovery.

EXPERIMENTAL INVESTIGATIONS

STEPS TO CREATE AN SDU CHATBOT

1. Create IBM Cloud services

2. Configure Watson Discovery

3. Create IBM Cloud Functions action.

4. Create a Node red flow to connect all the services together.

5. Configure Watson Assistant.

6. Create flow and configure node
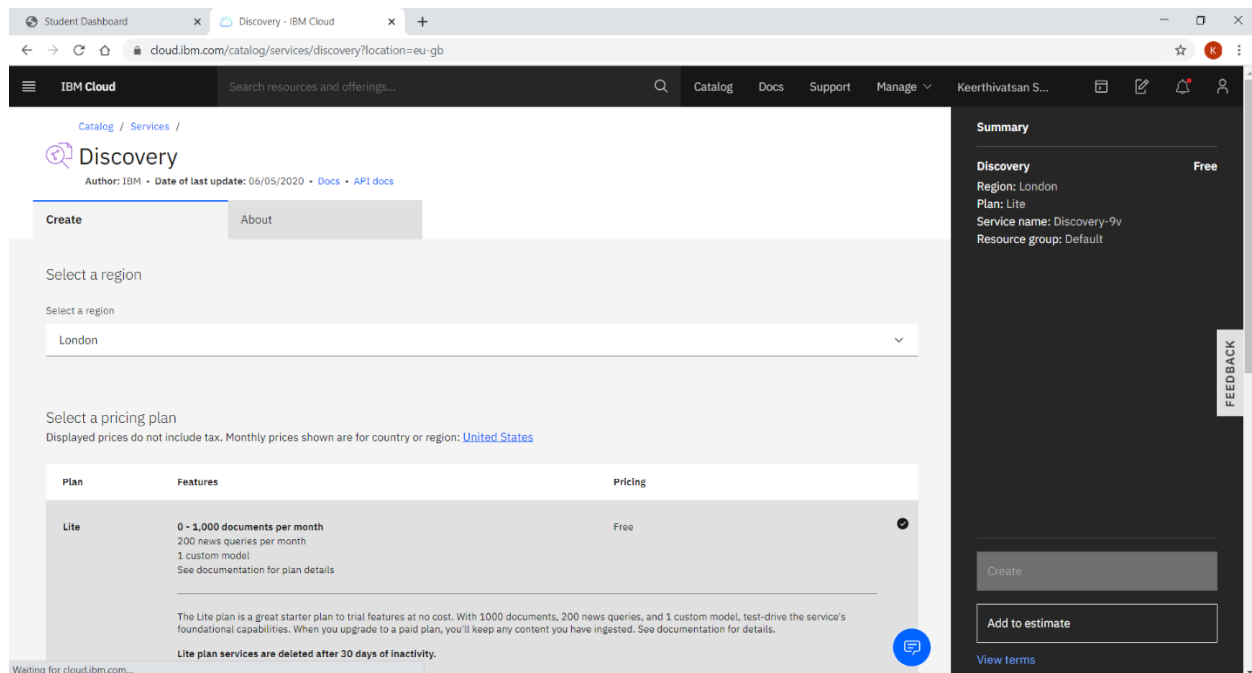
7. Deploy and run Node Red app.

Create IBM Cloud services
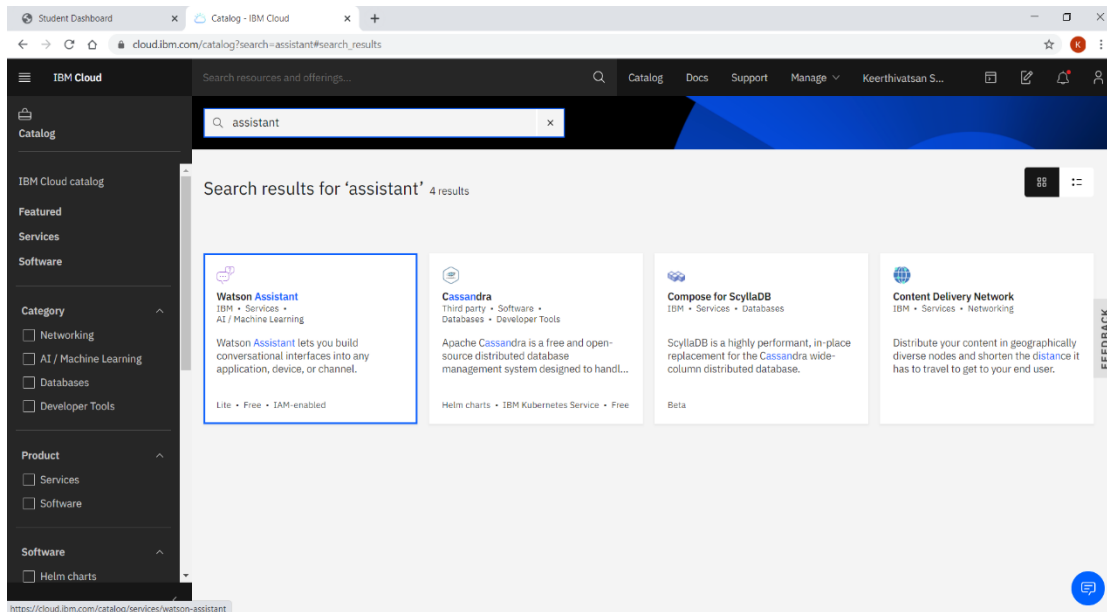
Create the following services

Watson Discovery
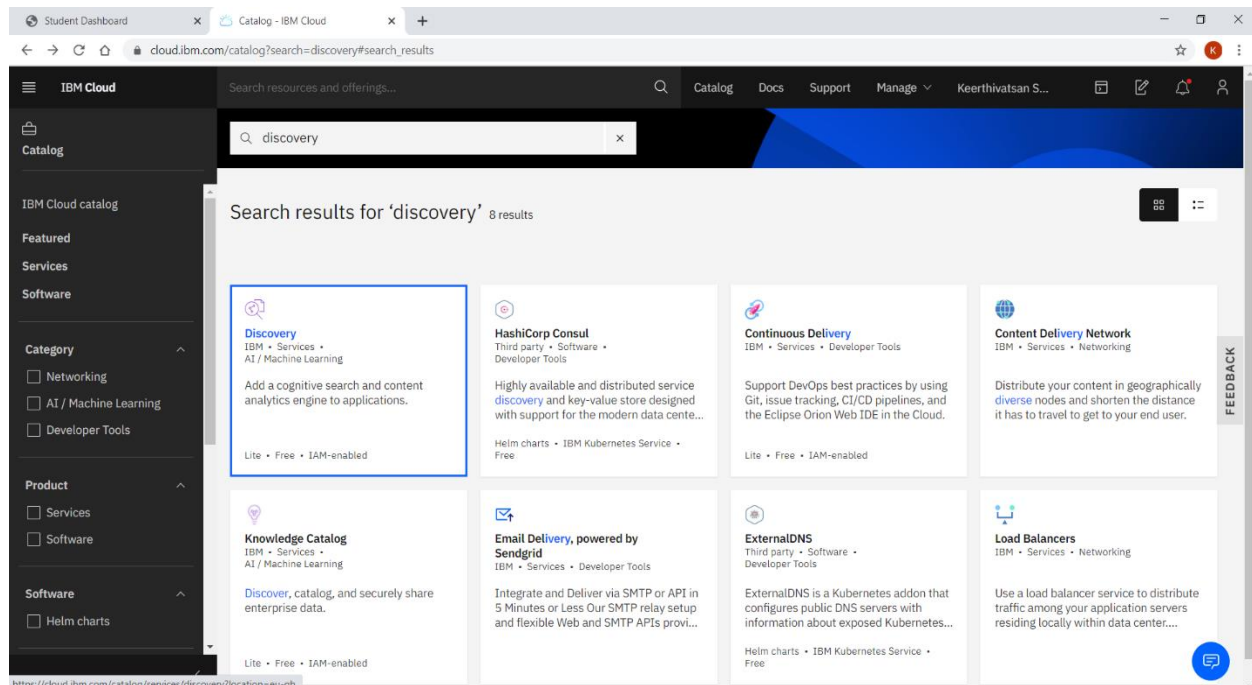
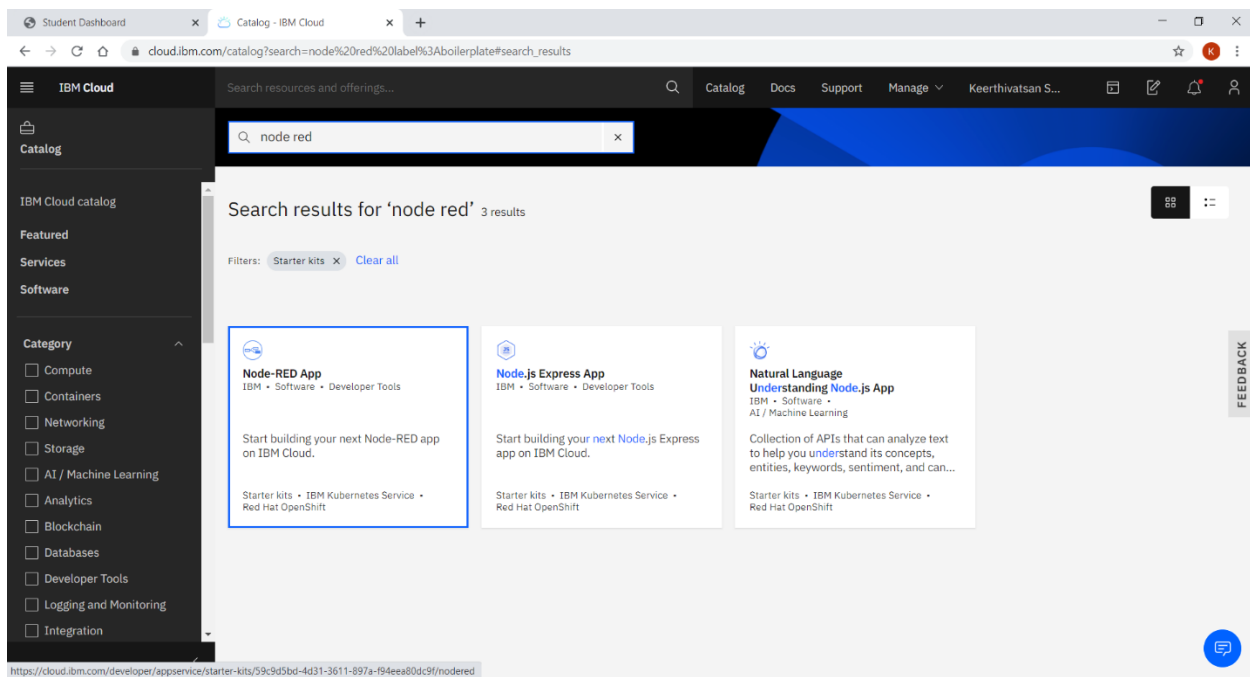**Step 1**: Create Discovery service by clicking on the Discovery

Step 2: Click on Create to create the discovery service

Watson Assistant

Step 3: Click on Watson Assistant and tap CREATE to create Watson assistant service

Step 4: Create the Node Red service by clicking on Node red

Step 5: Click on Create to create the Node red service

Step 6: Click on Deploy your app to deploy the Node red
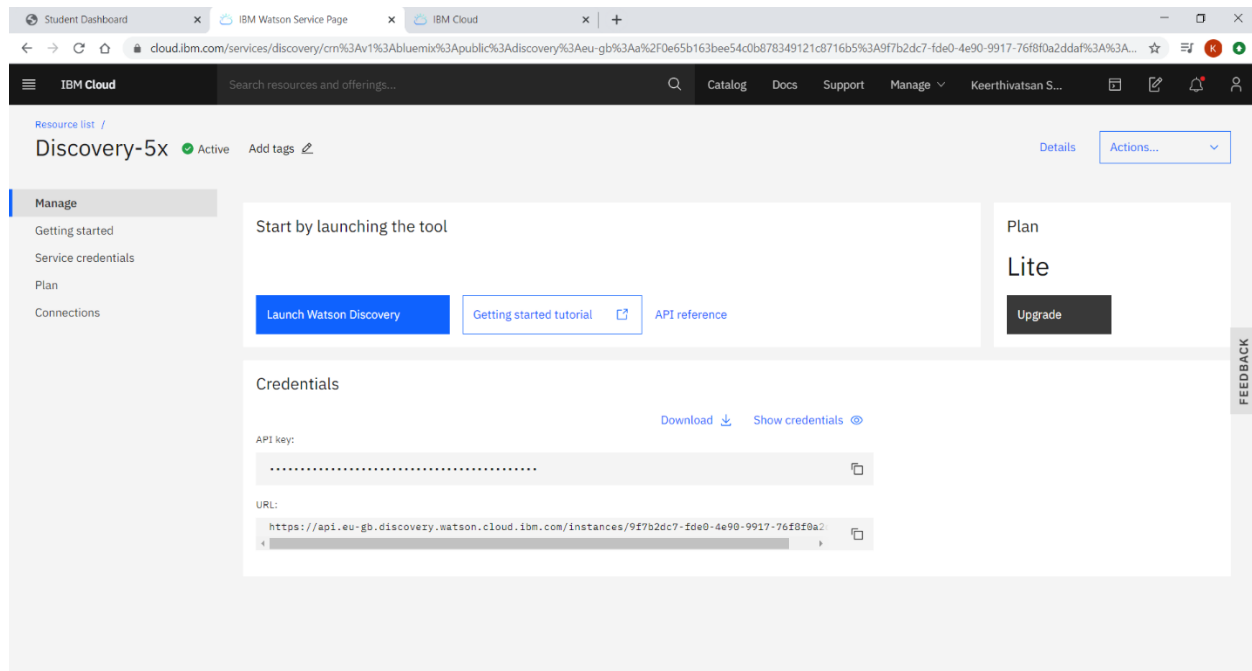
Step 7: Click on New

Step 8: Click on OK to create IBM Cloud API Key

Step 9: Change the region until it shows the organization and space

Step 10: Click on Next

Step 11: Click on Create to deploy the app

Step 12: Click on In progress to see the progress of the deploying the app

Step 13: Click on Discovery in the resource list
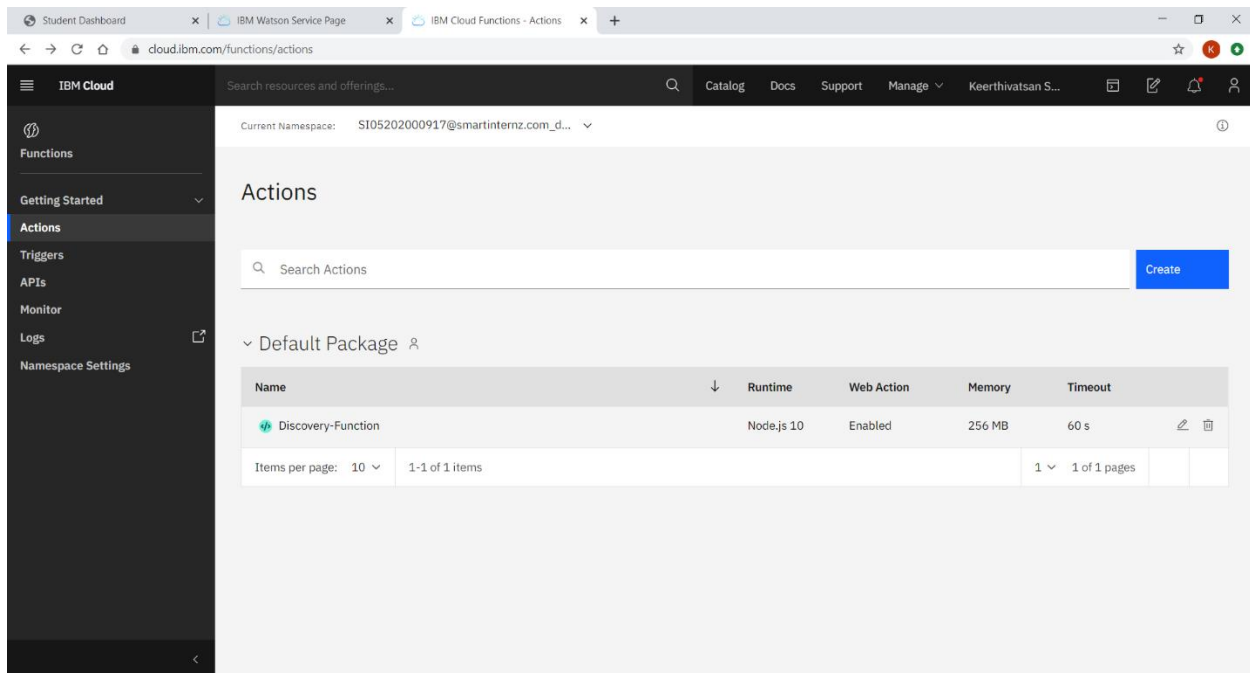
Step 14: Click Launch Watson Discovery

Step 15: Click on Upload your own data to upload the document

Step 16: Click on Configure data

Step 17: Select the respective fields in the document

Step 18: Manage the field in the document and click on Apply Change to the collection

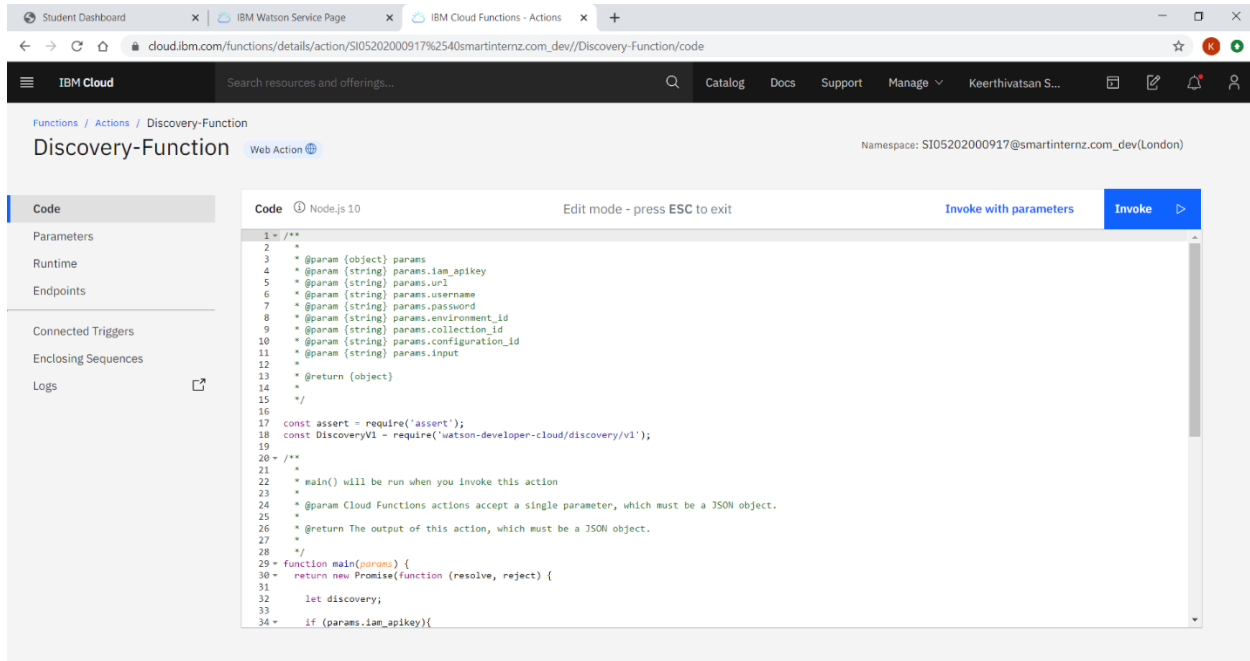**Step 19**: Go to Cloud Functions -> Action

Step 20: Create an Action by clicking on Create

Step 21: Click on Action

Step 22: Type the name and click on create button

Step 23: Enter the code for accessing the Watson Discovery services

Step 24: Enter the parameters

Step 25: Go to Watson Assistant through the resource list

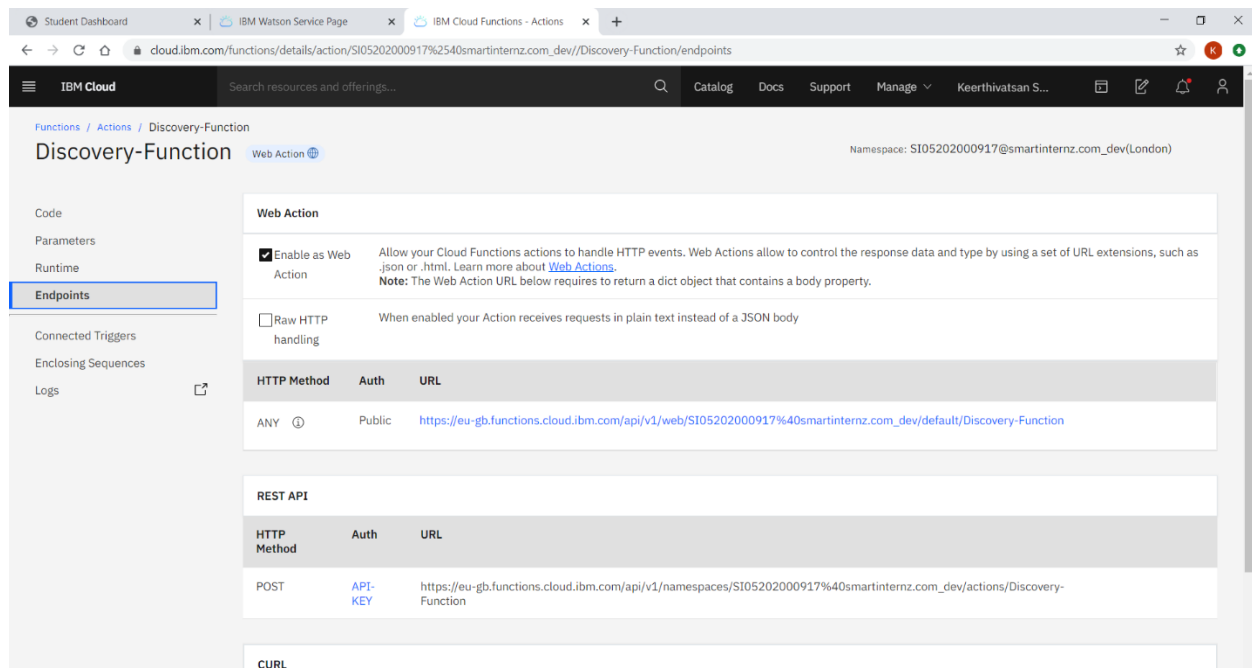**Step 26**: Click on the Launch Assistant

Step 27: Click on Skill to create a skill

Step 28: Click on Create Skill

Step 29: Click on Next

Step 30: Click on Customer Care Sample Skill

Step 31: Create an Intent to get the information about the product

Step 32: Go to Option -> Webhook Paste the link of the cloud function (Endpoint-> Check Enable as Web action and copy HTTP Method URL)

Step 33: Create a Node in Dialog, fill the input, and output parameter

Step 34: Test the Watson Assistant

Step 35: Go to Node red from Resource list

Step 36: Click on the node red URL
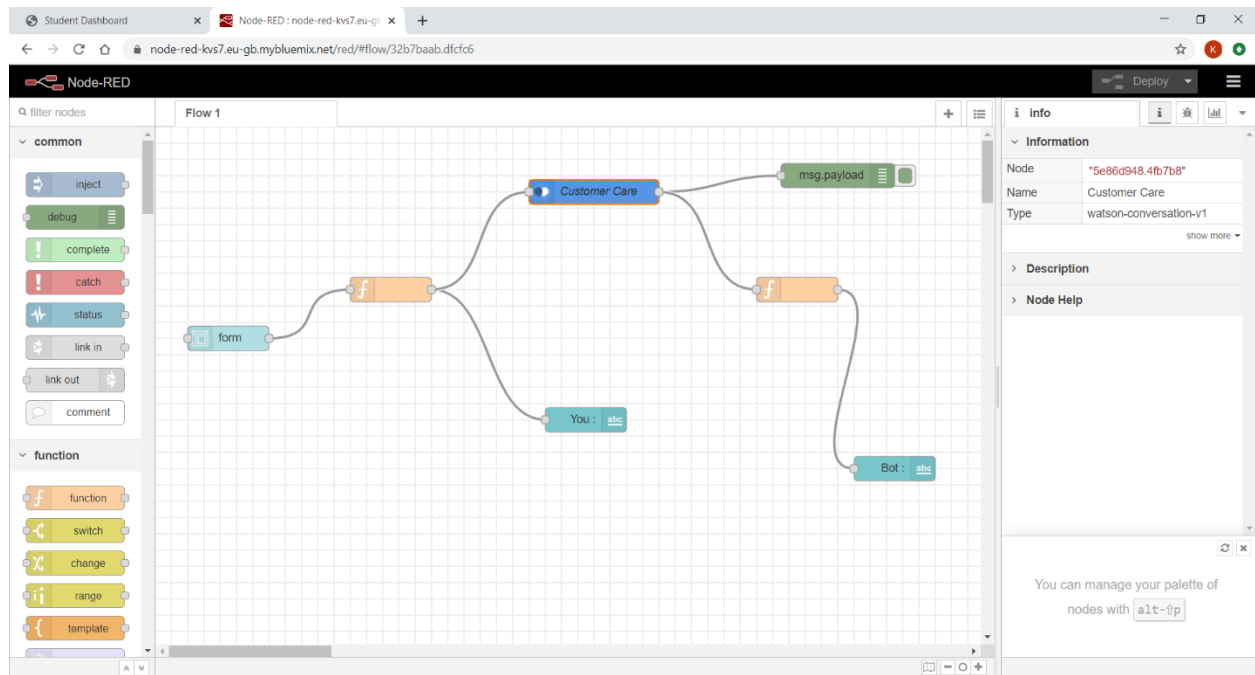
Step 37: Create the flow for the assistant.

Step 38: Enter the API key, Service endpoint and Workspace id in Watson Assistant node

Step 39: Parse the output from Form node to Assistant node and Test node.

Step 40: Parse the output of Assistant node to Test node

Step 41: Click on Deploy to deploy the web app.

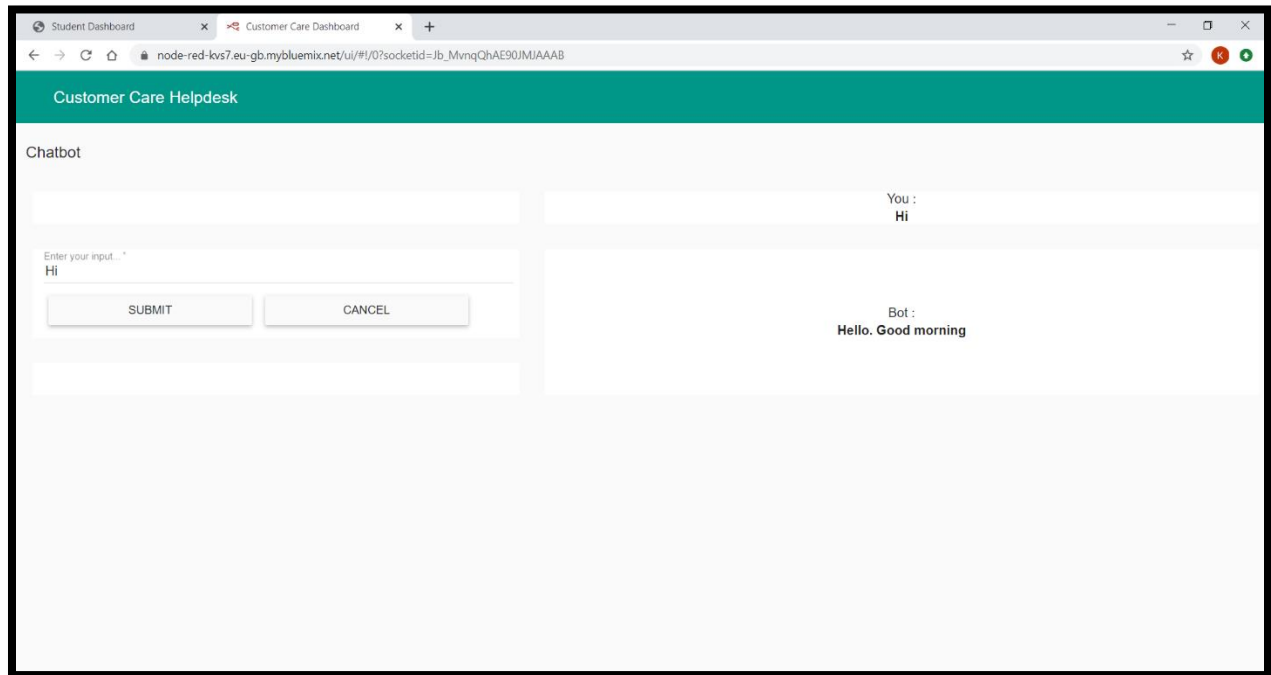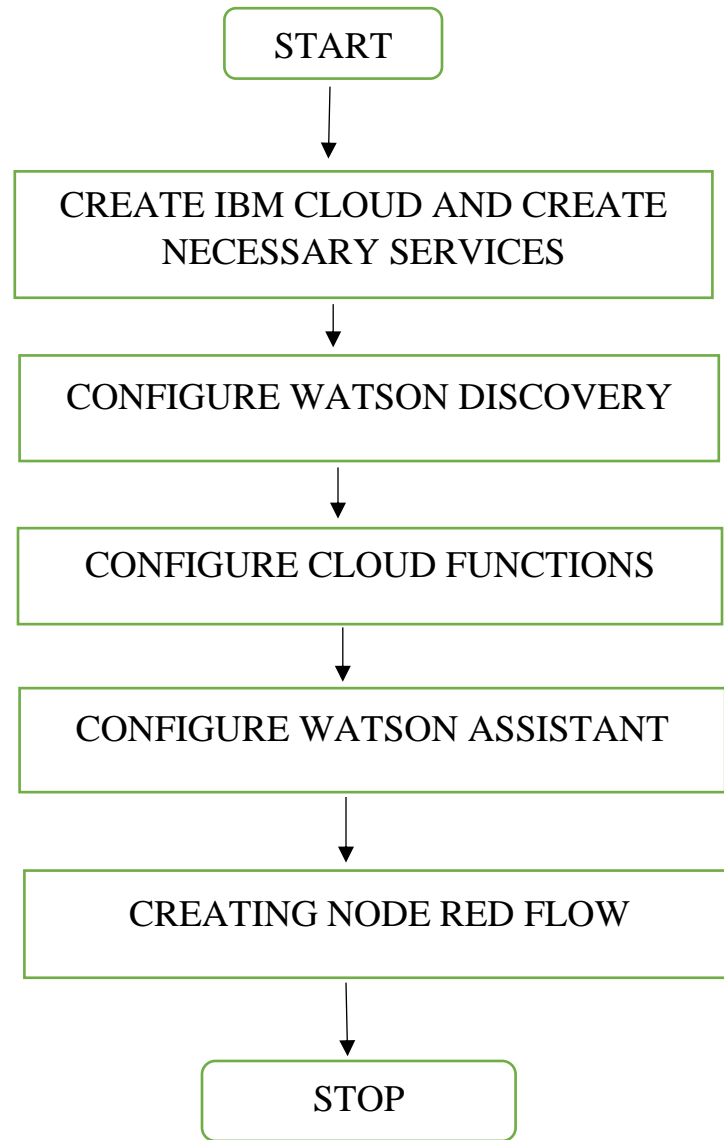**Step 42**: Go to the web application by clicking on this ⬈ icon.

Step 43: Run the Output.

FLOWCHART

METHODOLOGY

```
                    ┌─────────────────┐
                    │     START       │
                    └─────────────────┘
                             │
                             ▼
          ┌──────────────────────────────────┐
          │   CREATE IBM CLOUD AND CREATE     │
          │      NECESSARY SERVICES           │
          └──────────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────────┐
          │    CONFIGURE WATSON DISCOVERY     │
          └──────────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────────┐
          │    CONFIGURE CLOUD FUNCTIONS      │
          └──────────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────────┐
          │    CONFIGURE WATSON ASSISTANT     │
          └──────────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────────┐
          │      CREATING NODE RED FLOW       │
          └──────────────────────────────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │      STOP       │
                    └─────────────────┘
```

RESULT

STORE TIMING

QUERIES ABOUT THE PRODUCT

ADVANTAGE AND DISADVANTAGE

ADVANTAGE

- ❖ Chatbot reduces the need of labor in customer care so that it saves the cost of paying the labor by the companies.
- ❖ Chatbot can be used 24x7 to handle queries
- ❖ AI-based chatbots are able to learn from interactions and update independently. This is one of the main advantages. When you hire a new employee, you have to train them continuously.
- ❖ Humans can serve a limited number of customers at the same time. This restriction does not exist for chatbots, and they can manage all the necessary queries simultaneously. Thus the waiting time of the customer is reduced

DISADVANTAGE

- ❖ It is often considered that chatbots are complicated and need a lot of time to understand what you want in customer. Sometimes, it can also annoy the client about their slowness, or their difficulty in filtering responses. If a query does not relate to something you have previously taught it, it will not reply properly.
- ❖ The chatbots are not able to memorize a conversation already had, which forces the user to write the same thing repeatedly. This can be cumbersome for the client and annoying for the effort required. Therefore, it is important to be careful when designing chatbots and make sure that the program is able to understand users' queries and respond accordingly.

APPLICATIONS

APPLICATION

- ❖ This Chatbot will be useful for the user to ask the assistant the queries related to the Product and will give them clear guidance about the Product. If the Assistant does not know about a certain query, it will redirect to the correct person for it.

- ❖ Media Publishers have realized that chatbots are a powerful way to engage with their audiences and monitor engagement to gain valuable insights on reader interests. Chat with the CNN and Wall Street Journal Chatbots on Facebook Messenger and receive the latest news directly in Messenger, without having to visit their websites.

- ❖ The primary function of the chatbot is to be a virtual companion – To speak with senior people on general topics like the weather, nature, hobbies, movies, music, news, etc. The chatbot asks questions, reacts to the answers, is able to speak on various topics, and share interesting news and facts from Google.

CONCLUSION

This Chatbot will be useful for the user to ask queries related to the Product and it will give them clear guidance about the product. If the Assistant does not know about a certain query, it will redirect to the experts for it. Use of AI Chatbots only means better engagement and relentless need for customer satisfaction in the near future.

FUTURE SCOPE

❖ The chatbot can be trained with Image processing so if a user does not know the product he can take a picture send it via chatbot so it will recognize the product and reply to it accordingly

❖ We can create a virtual assistant using the Watson assistant for controlling the home appliances

❖ Voice recognition can be added with the virtual assistant. Then the customer can control application by using his voice. Soon, we could be joining meetings with a voice command, instead of dialing in the long meeting ID and password.

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[7] I. Cloud, "IBM Cloud Functions," [Online]. Available:
https://cloud.ibm.com/docs/openwhisk?topic=openwhisk-getting-started.

APPENDIX

IBM CLOUD FUNCTION

```
/**
 *
 * @param {object} params
 * @param {string} params.iam_apikey
 * @param {string} params.url
 * @param {string} params.username
 * @param {string} params.password
 * @param {string} params.environment_id
 * @param {string} params.collection_id
 * @param {string} params.configuration_id
 * @param {string} params.input
 *
 * @return {object}
 *
 */

const assert = require('assert');
const DiscoveryV1 = require('watson-developer-cloud/discovery/v1');

/**
 *
 * main() will be run when you invoke this action
 *
 * @param Cloud Functions actions accept a single parameter, which must be a JSON
object.
 *
 * @return The output of this action, which must be a JSON object.
 *
 */
function main(params) {
 return new Promise(function (resolve, reject) {

   let discovery;

   if (params.iam_apikey){
    discovery = new DiscoveryV1({
      'iam_apikey': params.iam_apikey,
      'url': params.url,
      'version': '2019-03-25'
     });
```

```
          }
          else {
           discovery = new DiscoveryV1({
             'username': params.username,
             'password': params.password,
             'url': params.url,
             'version': '2019-03-25'
           });
          }

          discovery.query({
            'environment_id': params.environment_id,
            'collection_id': params.collection_id,
            'natural_language_query': params.input,
            'passages': true,
            'count': 5,
            'passages_count': 5
          }, function(err, data) {
           if (err) {
             return reject(err);
           }
           return resolve(data);
          });
        });
       }
```

NODE RED FLOW

[{"id":"32b7baab.dfcfc6","type":"tab","label":"Flow
1","disabled":false,"info":""},{"id":"8c76ae11.66831","type":"ui_tab","z":"","name":"Customer
Care
Helpdesk","icon":"dashboard","disabled":false,"hidden":false},{"id":"d6a412dd.36a8f","type":"
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Neue,sans-serif"},"themeState":{"base-color":{"default":"#0094CE","value":"#0094CE","edited":false},"page-titlebar-backgroundColor":{"value":"#0094CE","edited":false},"page-backgroundColor":{"value":"#fafafa","edited":false},"page-sidebar-backgroundColor":{"value":"#ffffff","edited":false},"group-textColor":{"value":"#1bbfff","edited":false},"group-borderColor":{"value":"#ffffff","edited":false},"group-backgroundColor":{"value":"#ffffff","edited":false},"widget-textColor":{"value":"#111111","edited":false},"widget-backgroundColor":{"value":"#0094ce","edited":false},"widget-borderColor":{"value":"#ffffff","edited":false},"base-font":{"value":"-apple-system,BlinkMacSystemFont,Segoe UI,Roboto,Oxygen-Sans,Ubuntu,Cantarell,Helvetica Neue,sans-serif"}},"angularTheme":{"primary":"teal","accents":"red","warn":"red","background":"grey","palette":"light"}},"site":{"name":"Customer Care Dashboard","hideToolbar":"false","allowSwipe":"false","lockMenu":"false","allowTempTheme":"none","dateFormat":"DD/MM/YYYY","sizes":{"sx":40,"sy":40,"gx":15,"gy":15,"cx":30,"cy":30,"px":20,"py":20}}},{"id":"a5e42d7b.4b02c","type":"ui_spacer","name":"spacer","group":"d6a412dd.36a8f","order":1,"width":9,"height":1},{"id":"789f6e29.6629d","type":"ui_spacer","name":"spacer","group":"d6a412dd.36a8f","order":5,"width":9,"height":1},{"id":"7ea70f66.25328","type":"ui_form","z":"32b7baab.dfcfc6","name":"","label":"","group":"d6a412dd.36a8f","order":3,"width":9,"height":2,"options":[{"label":"Enter your input...","value":"text","type":"text","required":true,"rows":null}],"formValue":{"text":""},"payload":"","submit":"submit","cancel":"cancel","topic":"","x":90,"y":260,"wires":[["2ec4a1f9.247c0e"]]},{"id":"2ec4a1f9.247c0e","type":"function","z":"32b7baab.dfcfc6","name":"","func":"msg.payload=msg.payload.text;\nreturn msg;","outputs":1,"noerr":0,"x":290,"y":200,"wires":[["f8cd0fc7.100b7","5e86d948.4fb7b8"]]},{"id":"8c282651.0e7468","type":"function","z":"32b7baab.dfcfc6","name":"","func":"msg.payload=msg.payload.output.text[0];\nreturn msg;","outputs":1,"noerr":0,"x":790,"y":200,"wires":[["cda9c73.cd82e38"]]},{"id":"5e86d948.4fb7b8","type":"watson-conversation-v1","z":"32b7baab.dfcfc6","name":"Customer Care","workspaceid":"","multiuser":false,"context":true,"empty-payload":false,"service-endpoint":"","timeout":"","optout-learning":false,"x":540,"y":80,"wires":[["39fc281d.760048","8c282651.0e7468"]]},{"id":"f8cd0fc7.100b7","type":"ui_text","z":"32b7baab.dfcfc6","group":"d6a412dd.36a8f","order":2,"width":13,"height":1,"name":"","label":"You : ","format":"{{msg.payload}}","layout":"col-center","x":530,"y":360,"wires":[]},{"id":"39fc281d.760048","type":"debug","z":"32b7baab.dfcfc6","name":"","active":true,"tosidebar":true,"console":false,"tostatus":false,"complete":"false","x":840,"y":60,"wires":[]},{"id":"cda9c73.cd82e38","type":"ui_text","z":"32b7baab.dfcfc6","group":"d6a412dd.36a8f","order":4,"width":13,"height":3,"name":"","label":"Bot :","format":"{{msg.payload}}","layout":"col-center","x":910,"y":420,"wires":[]}]