# Project Report

# on

# Intelligent Customer Help Desk With Smart Document Understanding

*(Category: **Artificial Intelligence**)*

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SMARTBRIDGE
Let's Bridge the Gap

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# 1. INTRODUCTION

### 1.1 Overview

A chatbot is built using IBM cloud services like IBM Watson Assistant, IBM Watson Discovery and Cloud Functions and all these services are intergrated via Node-Red application available on IBM cloud as well.

### 1.2 Purpose

A customer care chatbot is being made in this project with smart document understanding which can answer to some simple queries of the customer. This chatbot will be trained with the most frequently asked questions by the customer and will answer accordingly. If the question asked by the customer is outside of its scope then it will tell the customer that the question is invalid or it is beyond its scope of knowledge. In that case, it can provide the customer an option to speak to the customer executive.

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.

# 2. LITERATURE SURVEY

### 2.1 Existing Problem

Today, it is an really important for a compary or an organization to provide the facility of customer care supoort to their customers so that if their customer are encountered with any issues or have any doubts regarding anything, they can provide guidance to them and solve their respective issues.

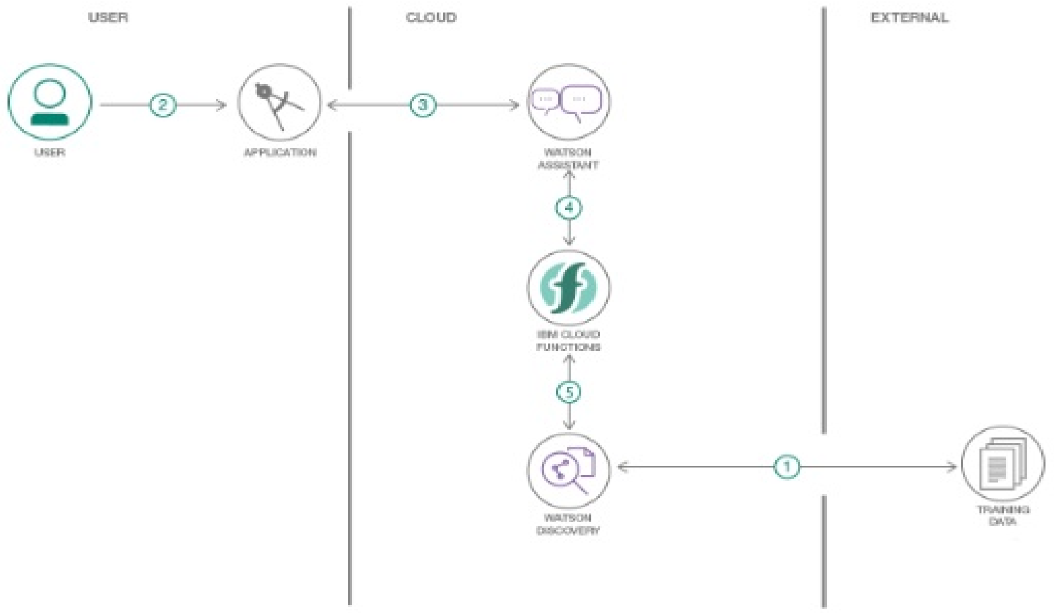
For this, company have to hire people just for solving customers problems. Some of the customer issues are simple and common among other customers that can be solved in a minute. Yet handling that number of customers is a tiring and time consuming process for the attendies.

### 2.2 Proposed Solution

So to overcome this problem, a chatbot is made which can solve some simple issues of the customer and can save the time for customer attendies so that they can take care of those customers which have some greater problems. This can save their time and also the company has to hire lesser people for customer assistance. A customer care chatbot is being made in this project with smart document understanding which can answer to some simple queries of the customer, such as store locations and hours, directions. 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. And then finally this Waton Assistant and Watson Discovery are integrated using Node-Red application which is a Web based User Interface which is used by the customer to interact with the chatbot.

## 3. THEORITICAL ANALYSIS

### 3.1 Block Diagram

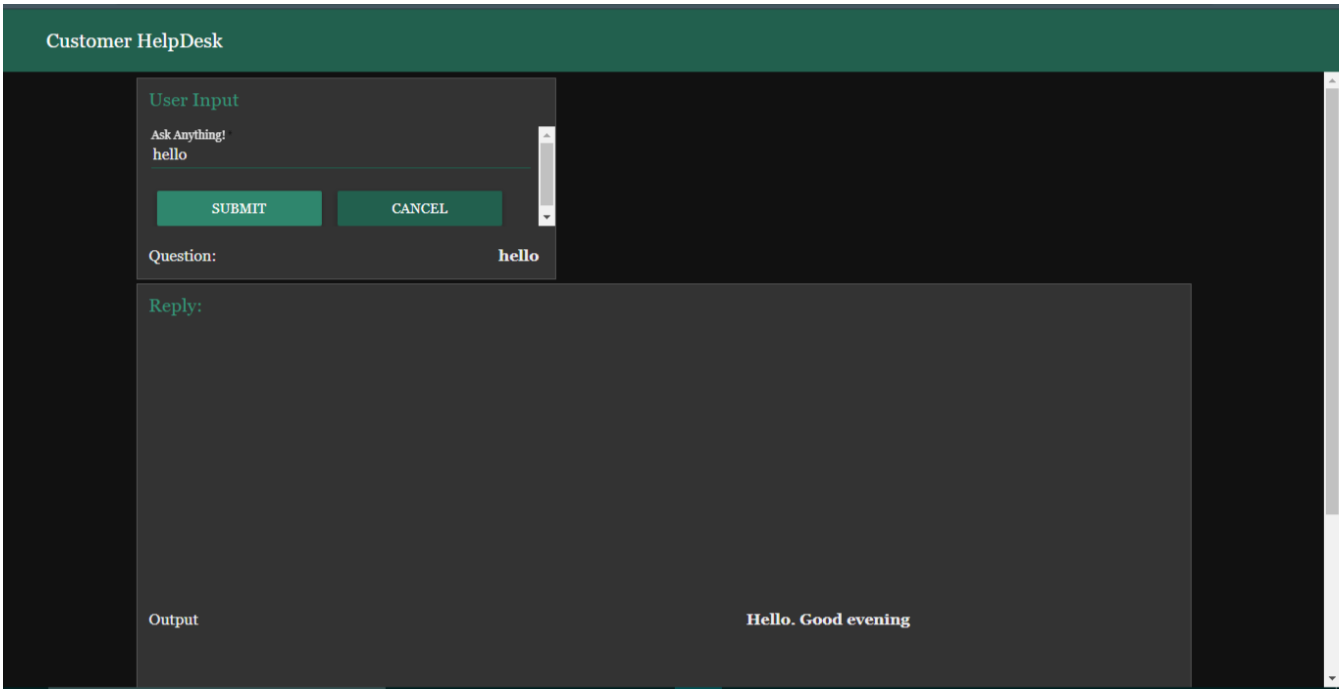


### 3.2 Software / Hardware Designing

- Create necessary Watson services.
- 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

## 4. EXPERIMENTAL INVESTIGATION

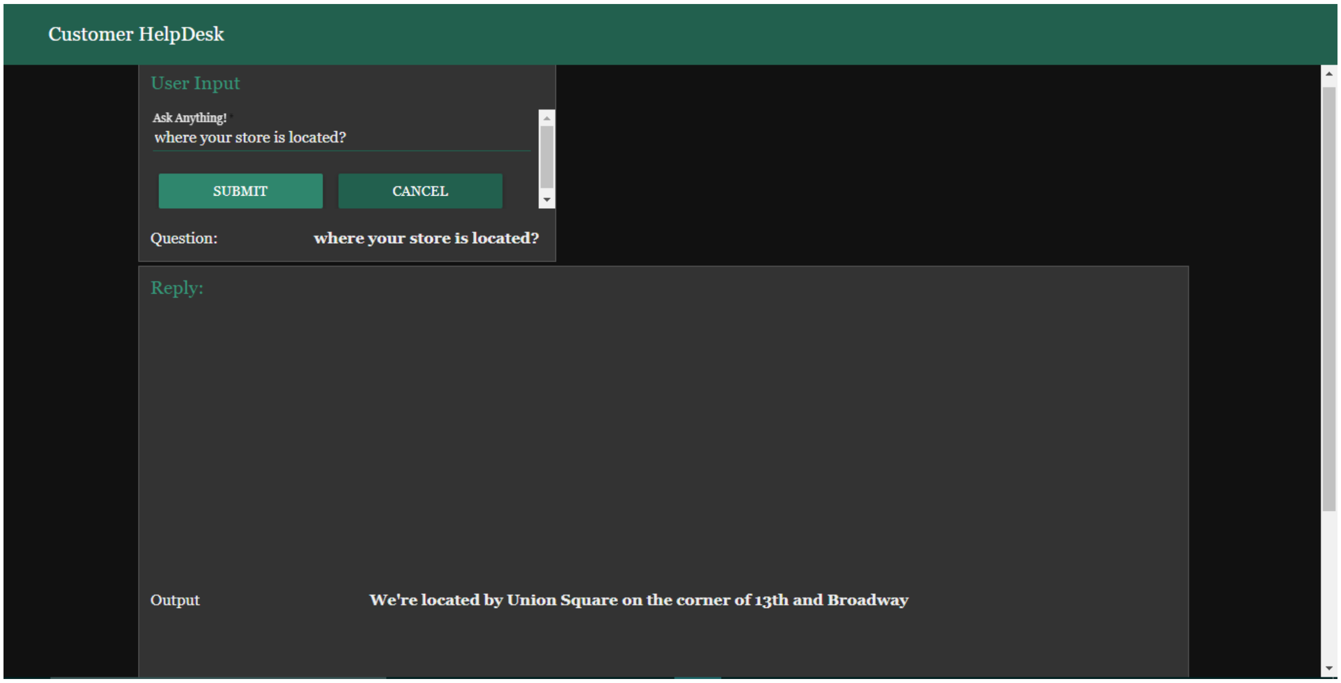
After integrating the Watson Assistant and Watson Discovery using Node-Red and here are the experimental results of the Customer Help Desk.



Ask Anything!
hello

Question: hello

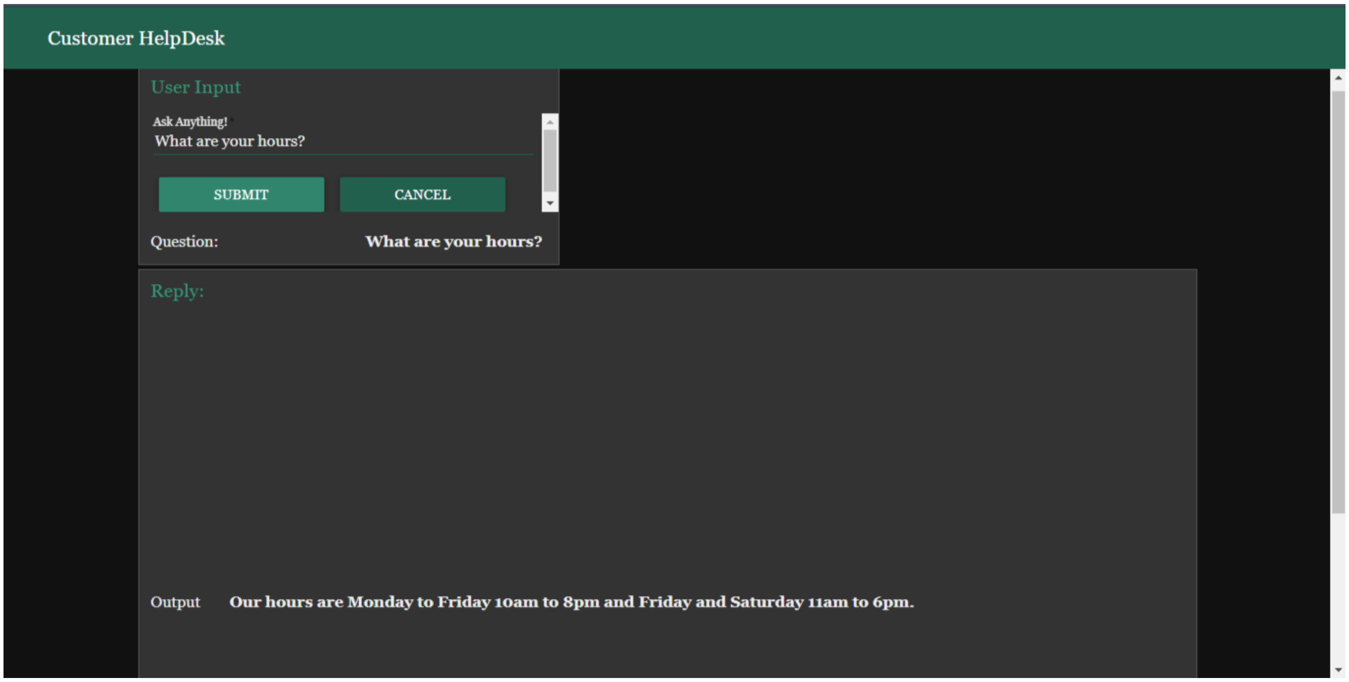
Output Hello. Good evening



Ask Anything!
where your store is located?

Question: where your store is located?

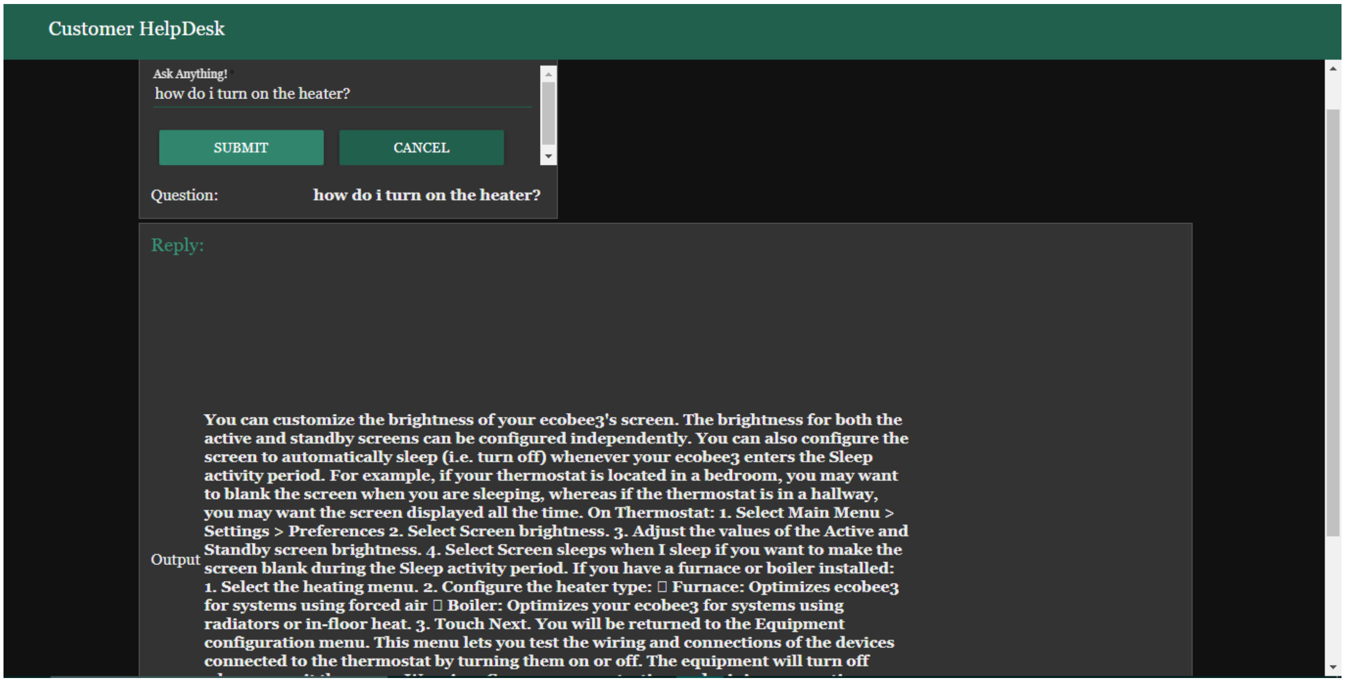
Output We're located by Union Square on the corner of 13th and Broadway



What are your hours?

Question: What are your hours?

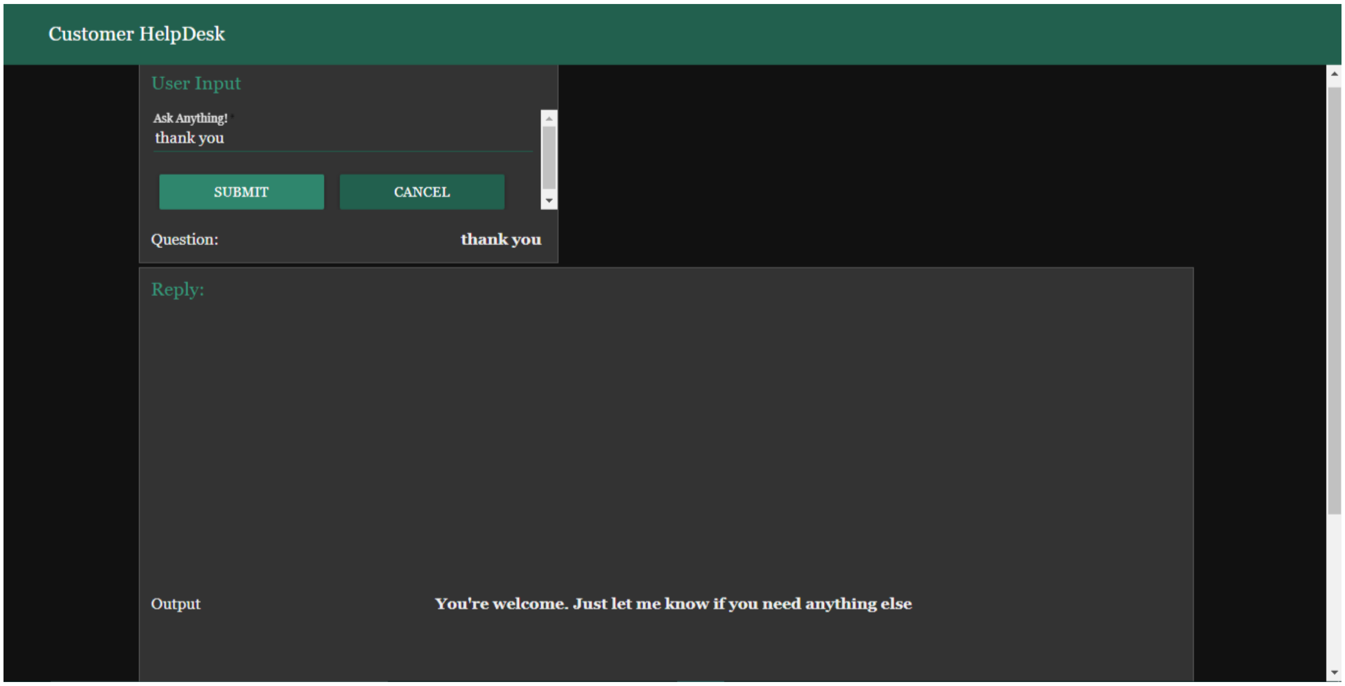
Output Our hours are Monday to Friday 10am to 8pm and Friday and Saturday 11am to 6pm.



how do i turn on the heater?

Question: how do i turn on the heater?

Output You can customize the brightness of your ecobee3's screen. The brightness for both the active and standby screens can be configured independently. You can also configure the screen to automatically sleep (i.e. turn off) whenever your ecobee3 enters the Sleep activity period. For example, if your thermostat is located in a bedroom, you may want to blank the screen when you are sleeping, whereas if the thermostat is in a hallway, you may want the screen displayed all the time. On Thermostat: 1. Select Main Menu > Settings > Preferences 2. Select Screen brightness. 3. Adjust the values of the Active and Standby screen brightness. 4. Select Screen sleeps when I sleep if you want to make the screen blank during the Sleep activity period. If you have a furnace or boiler installed: 1. Select the heating menu. 2. Configure the heater type:  Furnace: Optimizes ecobee3 for systems using forced air  Boiler: Optimizes your ecobee3 for systems using radiators or in-floor heat. 3. Touch Next. You will be returned to the Equipment configuration menu. This menu lets you test the wiring and connections of the devices connected to the thermostat by turning them on or off. The equipment will turn off



Ask Anything!
thank you

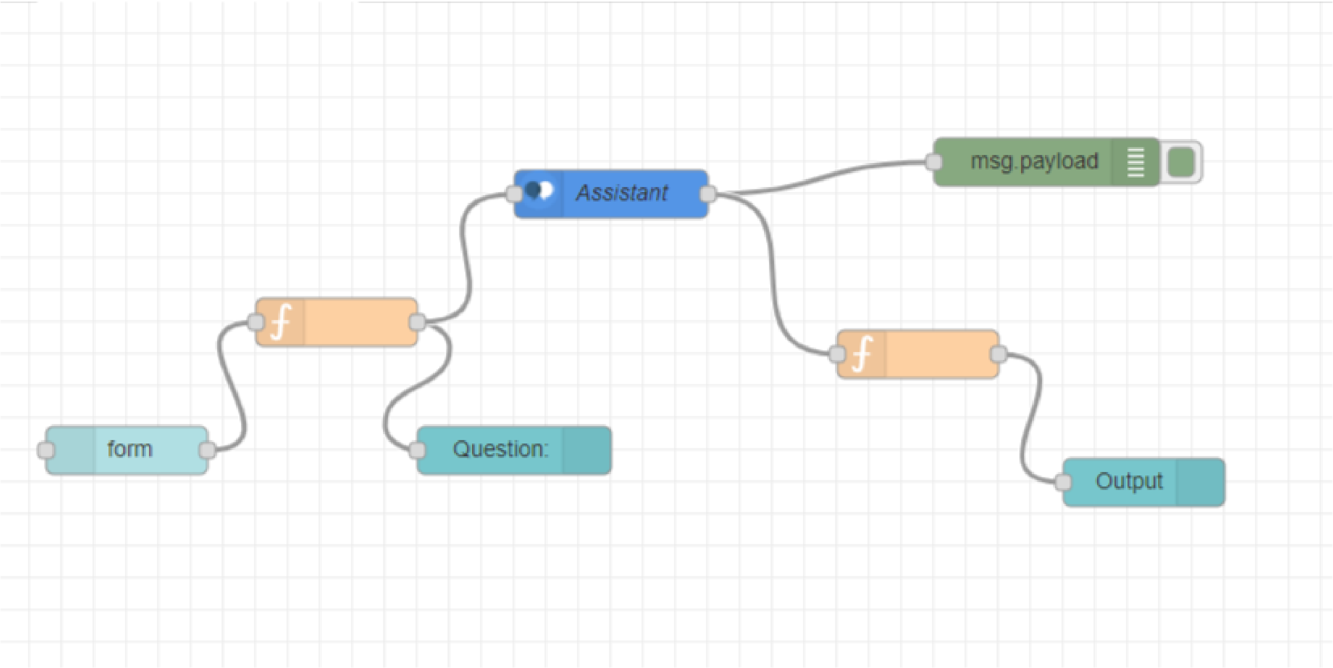
Question: thank you

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

## 5. FLOWCHART

Insert the following nodes into the flow of Node-red:

i. form (takes input from the user)
ii. function node (for passing the input to assistant and ui_text for printing the question)
iii. ui_text (output the question asked by the user)
iv. assistant node (takes the question as input and provides the answer via Watson assistant and Watson Discovery)
v. function node (for processing the output given by the assistant node)
vi. msg.payload node(for debugging)
vii. ui_text (for printing the processed output or answer provided by assistant)



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## 6. RESULT

Finally our node-red application integrates all the components and and displayed on UI Dashboard. URL is provided for chatbot: https://node-red-eqpwy.eu-gb.mybluemix.net/ui

## 7. ADVANTAGES & DISADVANTAGES

**Advantages:**

- Company has to hire lesser people for customer assistance
- Cost efficient
- Saves time of customer attendies as chatbot can answer simple questions itself
- Customers would not have to wait for customer attendies to pick their call

**Disadvantages:**

- May provide irrelevent or irrelated information to the customer
- May provide same answers to different questions

## 8. APPLICATIONS

- It can be used as a Customer Helpdesk to solve some common and simple queries of customer.
- This cahtbot an be deployed to various websites or apps to answer to customer queries in accordance with the service they provide.
- It can also be integrated with other social media platforms like slack or facebook messenger.

## 9. CONCLUSION

A intelligent customer helpdesk with smart documentation understanding chatbot is build using IBM cloud services.

## 10. FUTURE SCOPE

In future, speech recognition system can also be added to this chatbot with which a customer can raise his/her queries using his voice so as to make this chatbot Hand-free and easy to use.

## 11. BIBLIOGRAPHY

For building Watson Assistant:

- https://www.youtube.com/watch?v=TrVmuM6AhMU&feature=youtu.be
- https://cloud.ibm.com/docs/assistant?topic=assistant-getting-started

For building Watson discovery instance for SDU:

- https://cloud.ibm.com/docs/discovery?topic=discovery-getting-started

For Node-red application:

- https://developer.ibm.com/tutorials/how-to-create-a-node-red-starter-application

## 12. APPENDIX

### Source Code

### Node -Red Flow Code:

```
[{"id":"1c73b350.c607ad","type":"tab","label":"Assistant","disabled":false,"info":""},

{"id":"363f81d1.1926ce","type":"ui_text","z":"1c73b350.c607ad","group":"208d2847.0725c
8","order":1,"width":"15","height":"11","name":"","label":"Output","format":"

{{msg.payload}}","layout":"row-spread","x":710,"y":300,"wires":[]},

{"id":"f38a0a33.618ed8","type":"debug","z":"1c73b350.c607ad","name":"","active":true,"tosid
ebar":true,"console":false,"tostatus":false,"complete":"false","x":650,"y":100,"wires":[]},

{"id":"49a79099.4d72f","type":"watson-conversation-v1","z":"1c73b350.c607ad","name":"A
ssistant","workspaceid":"dd45ed37-012e-488a-ab5b-5f78797283b9","multiuser":false,"co
ntext":false,"empty-payload":false,"service-endpoint":"https://api.eu-gb.assistant.watson.
cloud.ibm.com/instances/ab6cf061-8743-45c4-8ca8-d79f2c90d468","timeout":"","optout
-learning":false,"x":380,"y":120,"wires":[["f38a0a33.618ed8","b2e3586f.348248"]]},

{"id":"26dd1d6.c7005e2","type":"ui_text","z":"1c73b350.c607ad","group":"7f2db856.4a73f8
","order":2,"width":0,"height":0,"name":"","label":"Question: ","format":"

{{msg.payload}}","layout":"row-spread","x":320,"y":280,"wires":[]},{"id":"891d2d10.71e0b","ty
pe":"function","z":"1c73b350.c607ad","name":"","func":"msg.payload =
msg.payload.input;\nreturn
msg;","outputs":1,"noerr":0,"x":210,"y":200,"wires":[["26dd1d6.c7005e2","49a79099.4d72f"]]
},

{"id":"b2e3586f.348248","type":"function","z":"1c73b350.c607ad","name":"","func":"msg.pay
load.text = \"\";\nif(msg.payload.context.webhook_result_1){\n for(var i in
msg.payload.context.webhook_result_1.results){\n msg.payload.text =
msg.payload.text+ \"\\n\" + msg.payload.context.webhook_result_1.results[i].text;\n
\n }\n msg.payload = msg.payload.text;\n}\nelse\nmsg.payload =
msg.payload.output.text[0]\nreturn
msg;","outputs":1,"noerr":0,"x":570,"y":220,"wires":[["363f81d1.1926ce"]]},
{"id":"14702de3.ef1782","type":"ui_form","z":"1c73b350.c607ad","name":"","label":"","group":
```

"7f2db856.4a73f8","order":1,"width":"0","height":"0","options":[{"label":"Ask Anything!","value":"input","type":"text","required":true,"rows":null}],"formValue":{"input":""},"payload":"","submit":"submit","cancel":"cancel","topic":"","x":80,"y":280,"wires":[["891d2d10.71e0b"]]},

{"id":"208d2847.0725c8","type":"ui_group","z":"","name":"Reply: ","tab":"e6941bd8.3633e8","order":2,"disp":true,"width":20,"collapse":false},

{"id":"7f2db856.4a73f8","type":"ui_group","z":"","name":"User Input","tab":"e6941bd8.3633e8","order":1,"disp":true,"width":8,"collapse":false},

{"id":"e6941bd8.3633e8","type":"ui_tab","z":"","name":"Customer HelpDesk","icon":"dashboard","disabled":false,"hidden":false}]

**Cloud Function Nodejs Code:**

```
/**
         *
         * @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': 3,
      'passages_count': 3
    }, function(err, data) {
      if (err) {
        return reject(err);
      }
      return resolve(data);
    });
  });
}
```