A Project on Artificial Intelligence

INTELLIGENT CUSTOMER HELP DESK WITH SMART DOCUMENT UNDERSTANDING

For

Smart Internz

By

Yaswanth Sai Chinthakayala

In Fulfilment of

Internship Program at Smart Internz

Which is a cross platform of

Smart Bridge

CERTIFICATE

This is to certify that the Project Report titled "**Intelligent Customer help Desk with Smart Document Understanding**" for **Smart Internz** is a bona fide work carried out by **Yaswanth Sai Chinthakayala** for the fulfilment of Internship program in Smart Internz which is a cross platform of Smart Bridge.

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Place: Anantapur, AP

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Last But not the least I thank all my fellow members in the slack who helped me a lot in clearing the ambiguity. I am thankful for their moral support.

With sincere regards,

Yaswanth Sai Chinthakayala.

ABSTRACT

Title of the project:

The title of the project is *Intelligent Customer Help Desk with Smart Document Understanding*. The project we are going to do is resembles the normal customer care service but it has more advantages than the normal one. Here we will use smart document understanding feature.

Objectives and Sources:

The objective of the project is to create a web application which is similar to a chat bot. The chat bot should need to answer the questions in the document which is provided by us. The document can be of any kind such as user manual, guide or policy. We use Artificial Intelligence here.

The sources which we are using to do the project is IBM cloud services. Here we will be using different type of cloud services such as Watson assistant and Watson discovery service. We can see how to use the services or do the project in smart internz platform.

Conclusions:

By doing this project we can easily find the answers and give it to web application. This will be a lot easier work when compared manually.

Recommendations:

I will recommend you to have the idea of all the services of IBM cloud. You need to know about the Node-Red application.

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Introduction

In this project we are going to use smart document understanding feature and integrate it to a chat bot. We will present this by using Node-Red, which will result a web application.

The necessity of the project is it can eliminate the diversion of out of bound topics to manual operations. We can directly interact our problems or ambiguity or instructions directly on a web page. We can save a lot of time and there is no need of a person.

When we compare this project to a typical chatbots we can see a lot of advantages and we can overcome the problem of limiting the questions to basic instinct such as location, appointments, greetings etc. It will analyse the document which we need and gives the correct answers by using the latest technology Artificial Intelligence.

First, we will use Watson discovery and train the given document by using different formats such as titles, subtitles, header and footer. By using cloud function, we will write a code to link Watson discovery and cloud function.

We should use Assistant and link the cloud function using webhooks. We can retrieve the data from Watson discovery to Watson assistant.

We will create a Node-Red application in IBM cloud. By using the node red, we can create the web application as our wish. We need set up a proper user interface. The next step is to integrate all the services. By using the assistant node, we can link all the services.

IBM CLOUD:

The first thing you need to do is you should create an IBM cloud account. The best option is you need to create academic initiative account provided by IBM to get more features.

After creating the account, you can see about your plan there are two plans one is free and one is paid. For students the free plan which is also called as lite plan would suffice. For entrepreneurs and larger companies, a large number of use their website. So, they can use the premium account and avail all the features without limits.

For this project the lite account is enough. After creating the account, you need to explore different type of services provided by them. We can see lot of different apps and some related to machine learning and artificial intelligence. This is one of the best sources to use without more work to do.

For our project we need to create Watson Discovery service, Watson assistant service, IBM cloud function and a node red application. When creating a service if the service asks for a location, we need to check which server is available to us. The location London can be used in the project.

We can see the services that we have created in resources tab. There is also dashboard we can see which service has started and which service is running. There is also catalogue you can search for different type of apps or services.

If we have any doubt or problem about a service you can see everything in detail by the links given in the particular section. You can be thorough and start the work. For creating the account, you can go to the link https://cloud.ibm.com .

IBM Watson Discovery:

We need to create Watson discovery service. Select the lite plan and region as London to avoid problems.

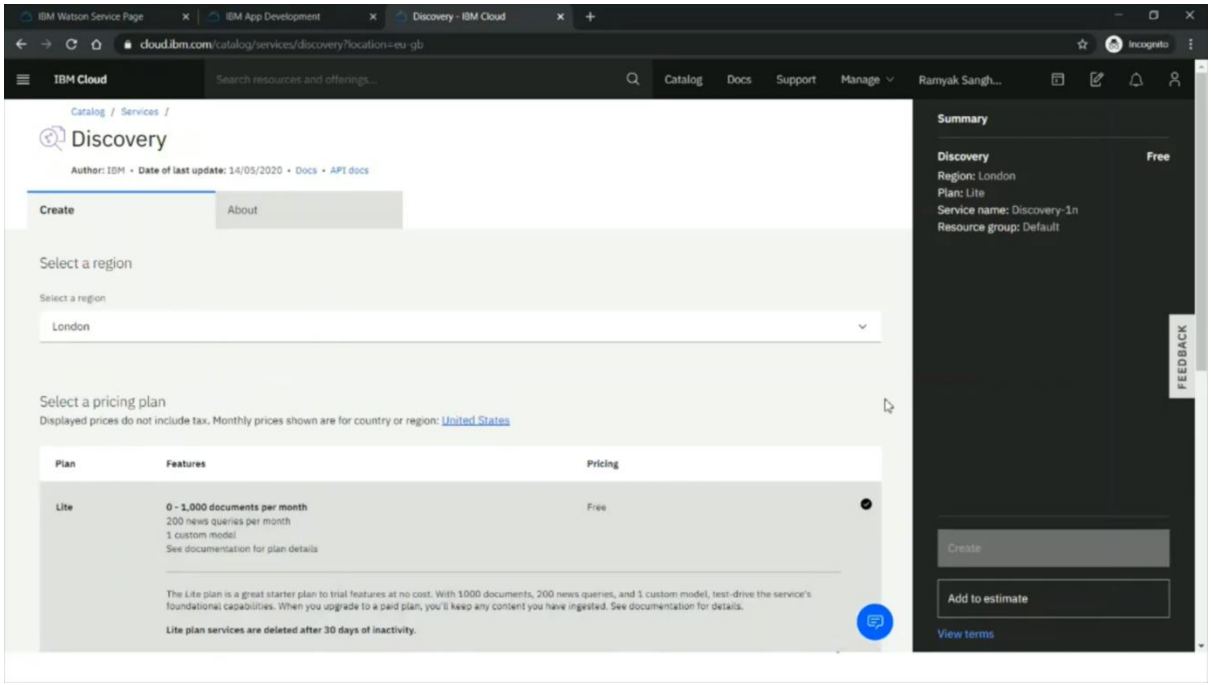

Figure 1

After creating Watson discovery service, you need to add the document what we need. Here we are adding ecobee3 user guide a smart thermostat and a heater. There are lot of features in it.

After adding the document, we need to train the document to get accurate results. You can try the Watson discovery without training the document. You will some answers but they are not very accurate.

We can see how to train the document as shown in Figure 2. We can there are different type of field labels such as title, header, footer, Subtitle and many more. We should select a field label and select the corresponding text in the document. The Watson discovery will train itself. You don't need to do this to entire document. You just need to train for 5 or 6 pages. The Watson discovery will train itself for the entire document. You just go through document and verify once. If not train the model again.

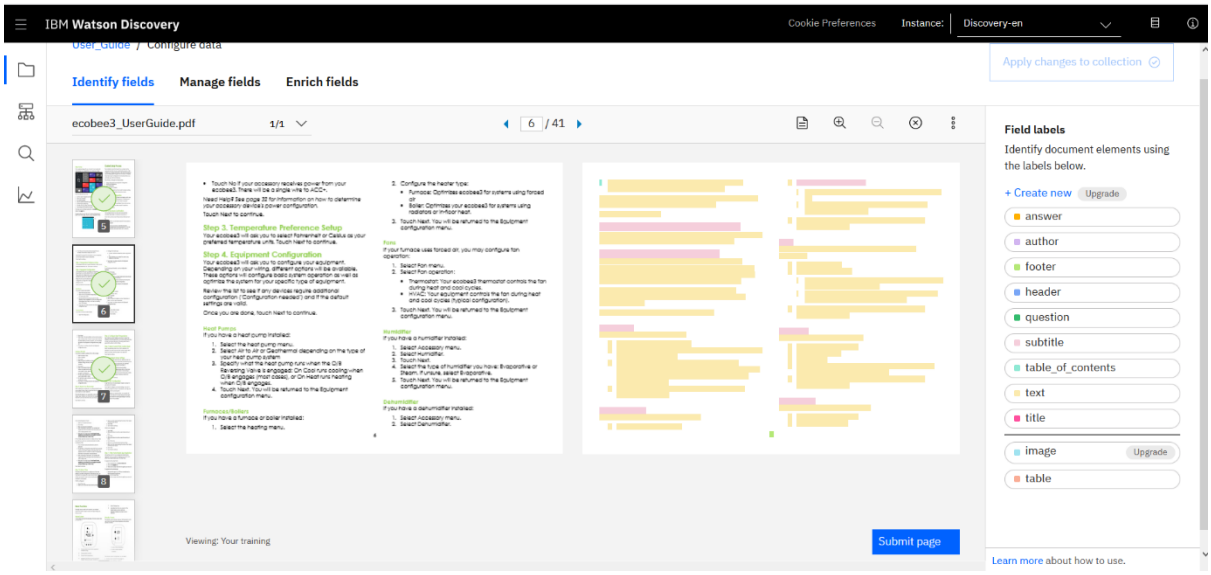

Figure 2

After training the document, you can eliminate the part which is not useful like footer, table of contents, header etc. For more accurate results you can split the document by headings which are mentioned as subtitle in the field label.

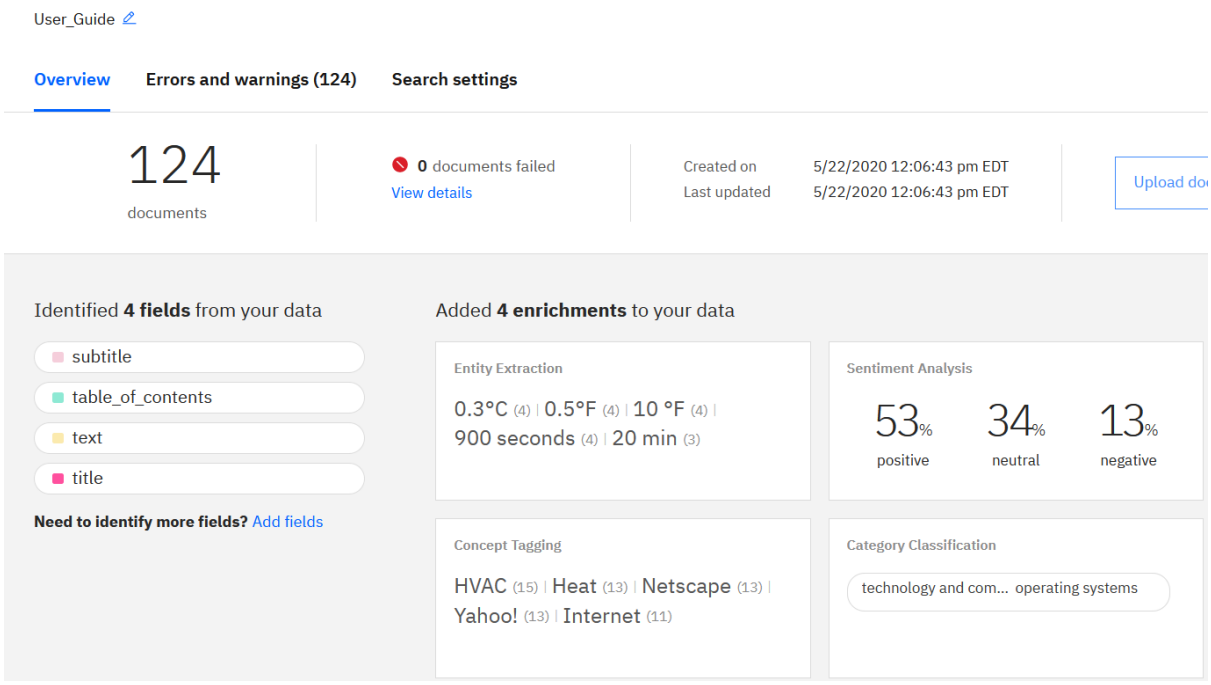

Figure 3

If we split the document by using a field label (for example subtitle). The document will be split into number of documents and we need to upload the same document again.

We can see in Figure 3 our document is split into 124 documents by using the label subtitle. Now we can test the model by using the search button. Now, we can see we have more accurate results. If we think the answer should be more accurate you should train the document again.

If we search for a question for example “Describe the terms of warranty”. We will get the corresponding output.

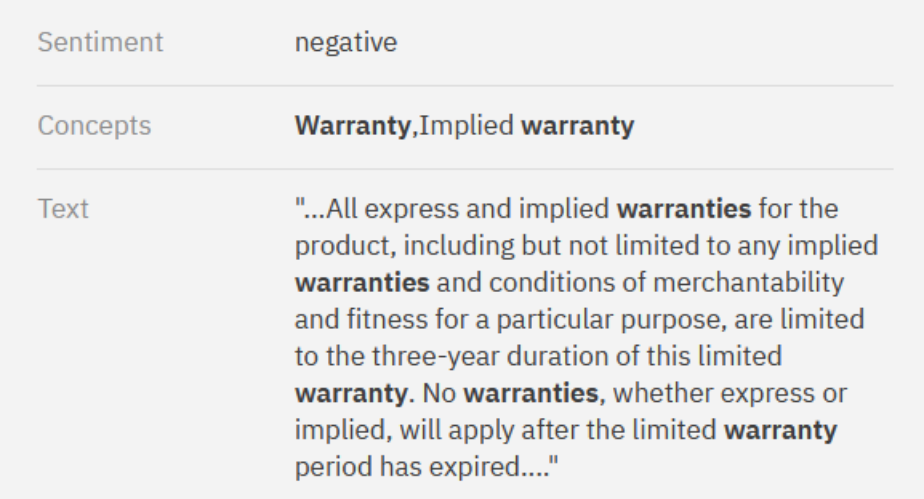

Figure 4

We got the output that we want. We can clearly see that the warranty is three years and after three years no warranty is implied. After successful completion of training data and acquiring the expected results. Now we can go to further steps. Next we will create cloud function and link it with IBM Watson discovery.

IBM Cloud Functions:

To create the cloud function, you just need to type function in the IBM cloud home page and select the function. After creating the function, you need to write code and set parameters which will link discovery service.

The code is:

```
*/
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);
    });
  });
}
```

Figure 5

After writing the code you need set up the parameters by using the details of Watson discovery API details and collection ID. They will be shown like this.

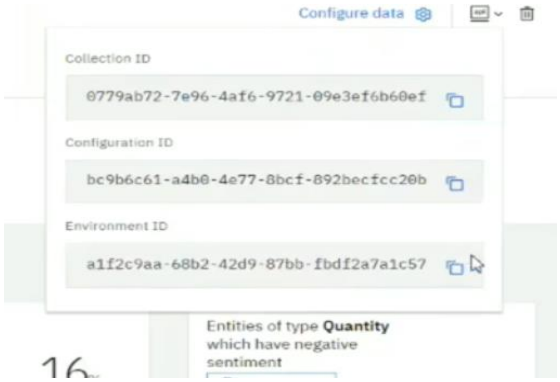

Figure 6

You need to add parameter in cloud function by the name you created in the code and copy the details from here. You should set all parameters like this.

Figure 7

After setting the parameters the most important thing you need to do is you need to enable the web action. So that we can use the link where ever we want. In the next step what we are going to do is we need to use this link as the webhook in Watson assistant. So that we integrated these two services to Watson assistant. We will clearly discuss how to do it in the assistant part.

IBM Watson Assistant:

In this part we are going to make a chatbot which will be very interesting. First you need to create the Watson assistant as we already discussed and you need to launch the Watson assistant.

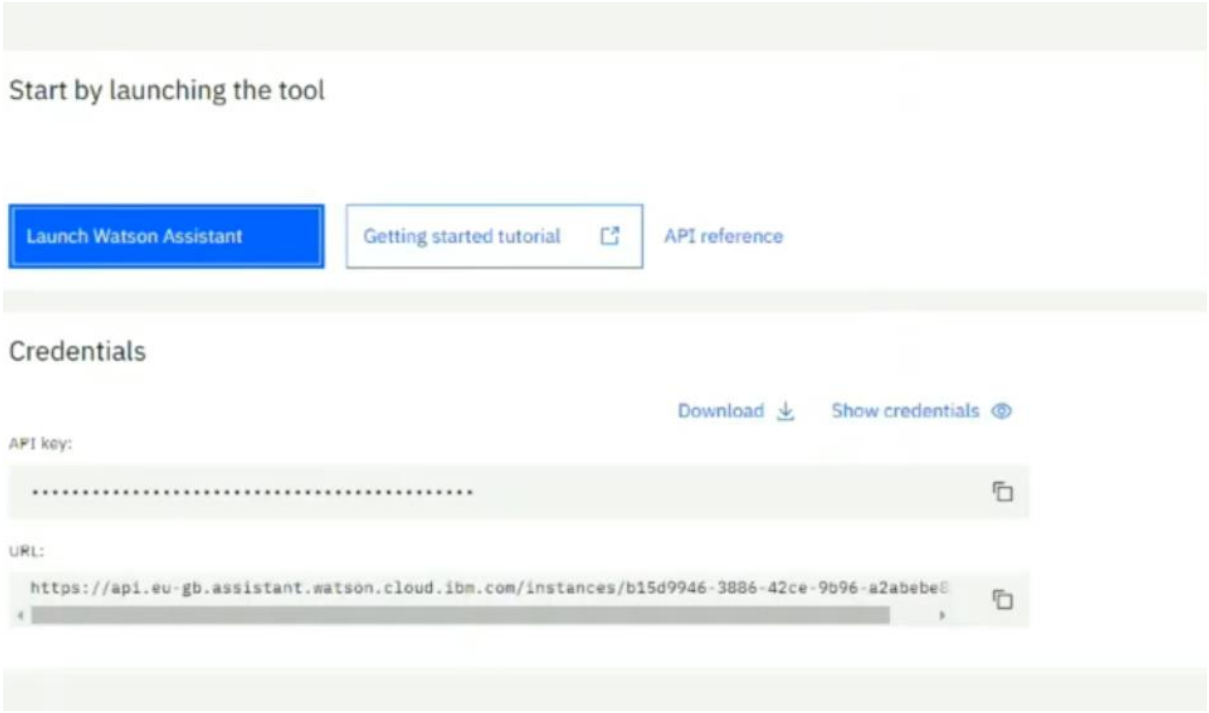

Figure 8

You can see in the Figure 8 launch assistant. We also have API details and URL which will be used further.

After launching the assistant, you need to create a new assistant and you need to add skills here. There are three main terms you need to know before creating the skill. They are Intents, Entities and Dialogue.

- Intent: What is your intention? Or What are you going to ask?
- Entities: The meanings or other ways of using the words (Intents)
- Dialogue: The reply to our intents

Note: The above are not the exact definitions they are only explained for your understanding in reference to Watson assistant.

First you need to create intents. Let me show a small example of an assistant for greetings. Create an intent and name it as “Greetings” add a description if you like. Give the user examples like Hi, Hello and Good morning.

After giving examples try it. The Watson assistant recognizes the intent. But it won’t give the reply yet. We need to use dialogue for this. Before going to dialogue, we need to fill the entities like gm, hii etc. Some people don’t use the standard words. If we train like this, the assistant recognizes gm as a greeting. Now we can go to the next step.

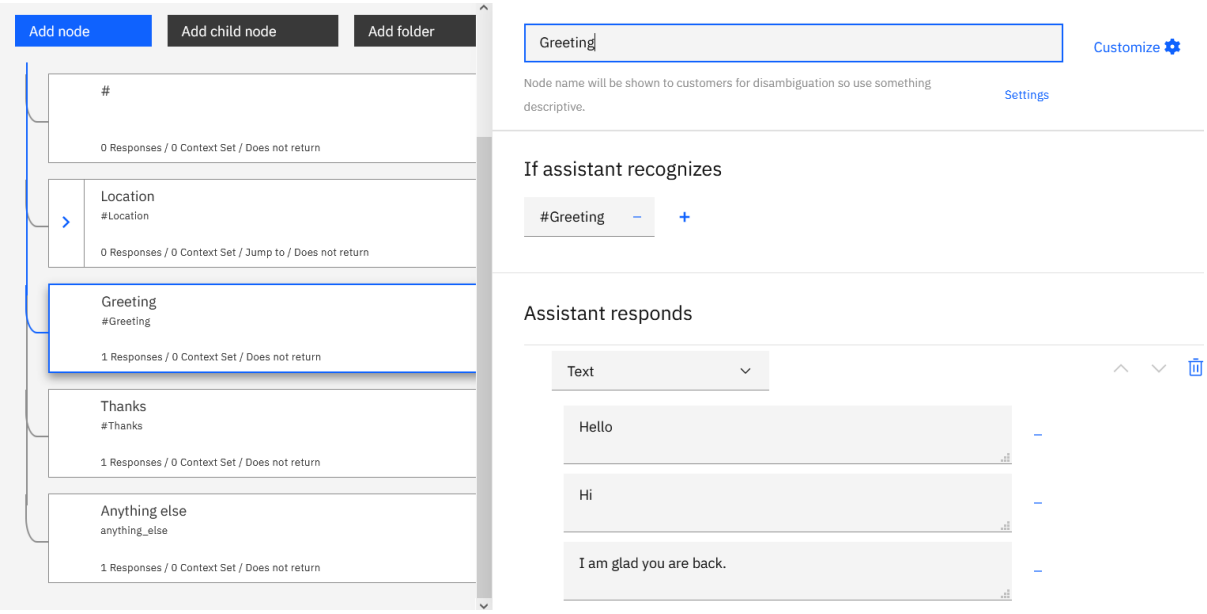

Figure 9

First you need add a node below the welcome node and name it as greeting. You can create different types of nodes. We can reply whatever we want.

In the dialogue box we can see If assistant recognizes intent greeting we will respond with Hello, Hi or Glad you are back. Now if we try saying a greeting it will return with one of these. You can check by using the button “try it”.

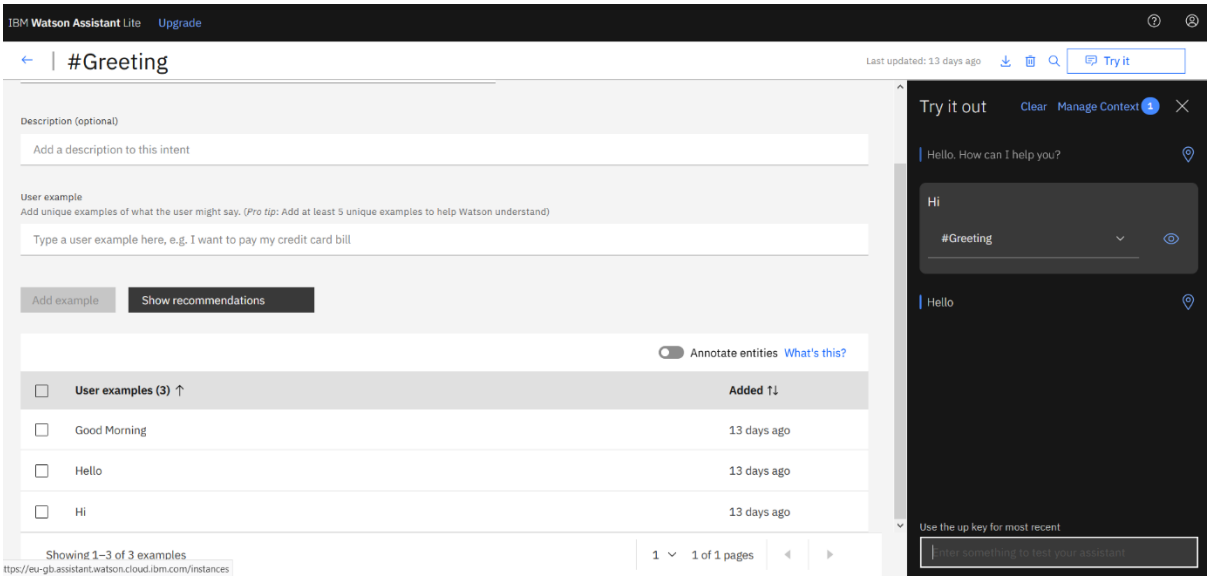

Figure 10

You can see the result as shown in Figure 10. Now let's create another skill name it as customer care. In content catalogue there will be common skills that are mostly used we can use one of them. For this project we will choose customer care it will have some basic intents that are required for the customer care.

Now we are ready to add the link of Watson discovery to Watson assistant. Before linking we need to read the ecobee user guide thoroughly and prepare the questions that are commonly asked or you can use the previous data of questions asked by the customers and add the questions as intents to the skill with a single intent name. Here we used Product information.

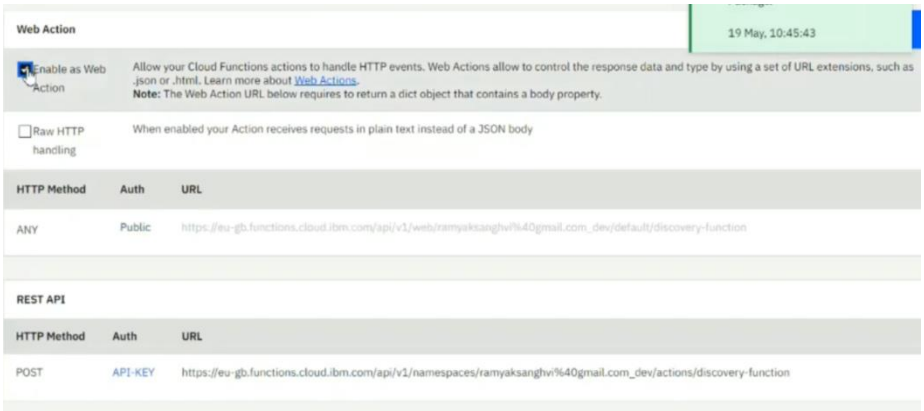

Figure 11

Now In the dialogue box you need to add the webhook if the assistant recognizes the intent as product information. Then the assistant goes to the Watson discovery and the answer is returned in assistant.

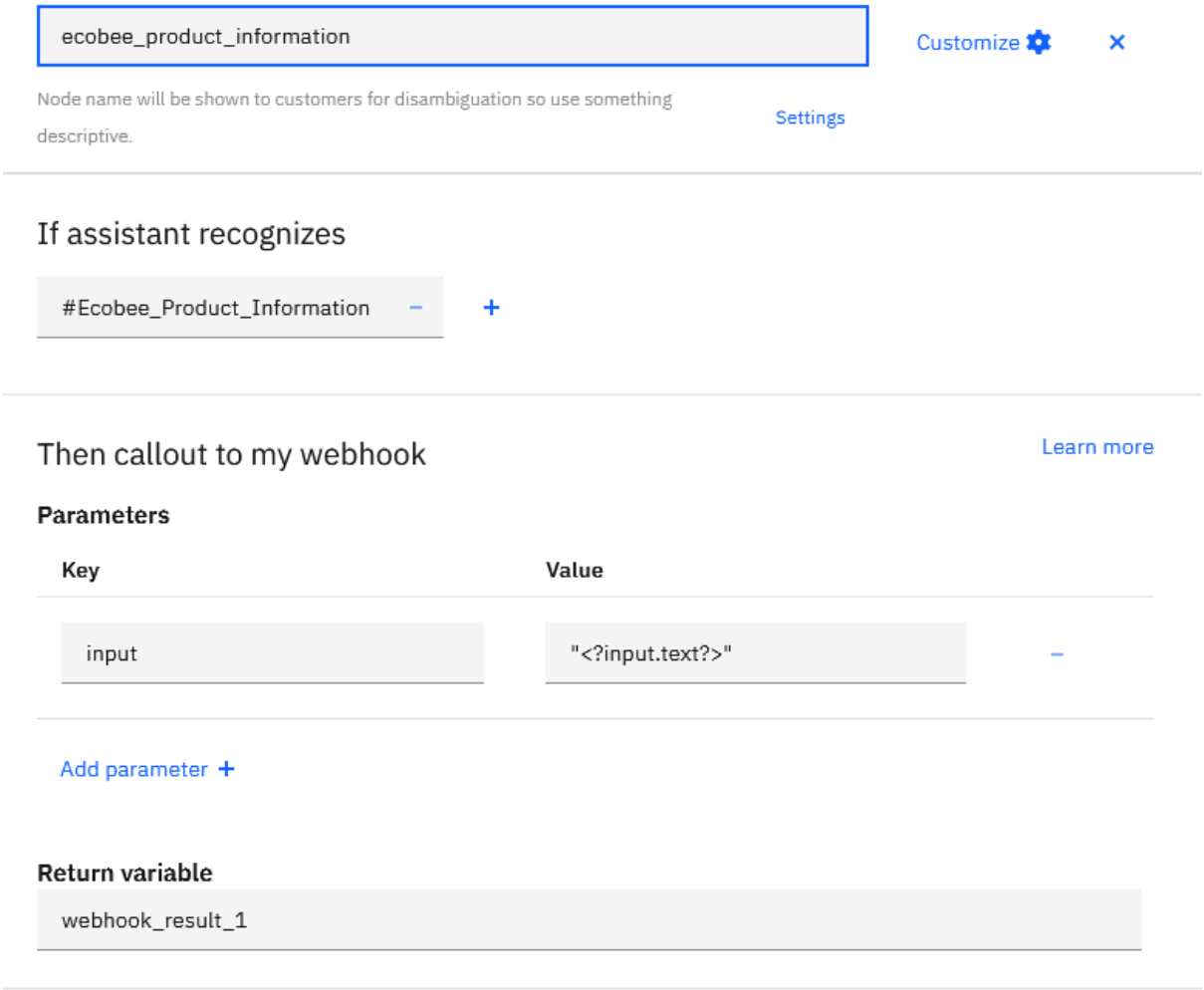

Figure 12

Here the webhook we used is link that is the output of cloud function. You can see that in Figure 11. In this way we can integrate the services and we can get result. But In assistant we get the answer in json format. We can convert it in node-red or in Watson assistant itself. If assistant recognizes with Product information, we will return with the given code to eliminate the json format.
<?$webhook_result_1.passages[0].passage_text?>"

Node-Red Application:

We need to create the node-red application first. We just need to type node red in the search bar. We need to select it and create the app in lite plan. We need to create node-red app in lite version.

After creating the app, we need to deploy the app. We need set the location as London to create the app. We can set the memory limit to 256 MB so that we don't have any problem. After creating we need to enable the continuous delivery service.

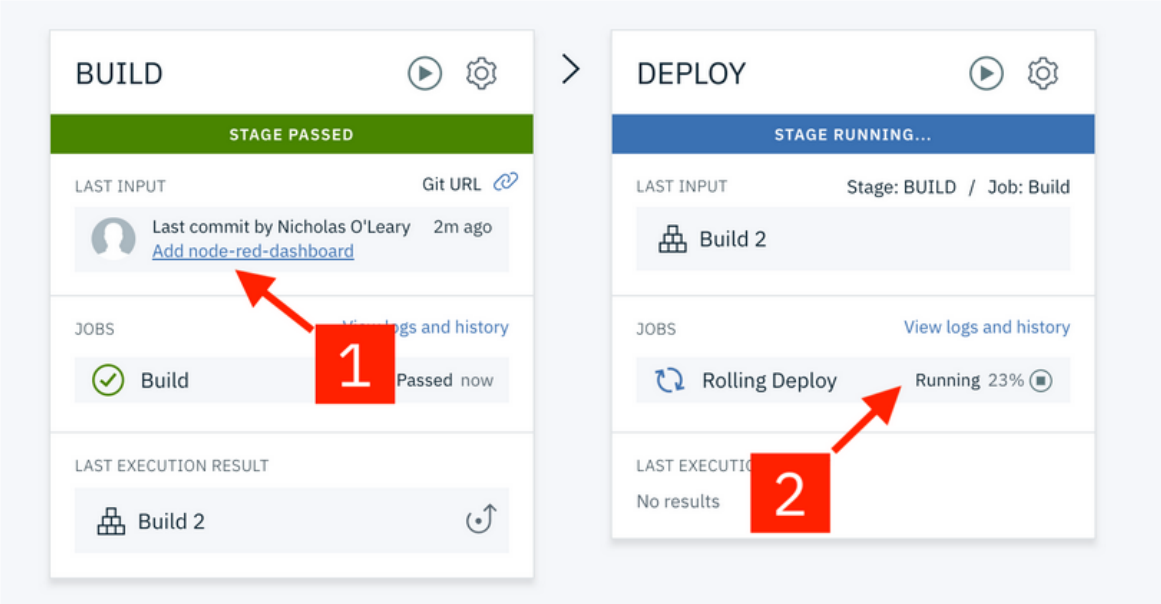

Figure 13

You need to wait until both the roll and deploy complete. This may take a while. It also depends on your internet connection. After completion of the process you are ready to create your web application.

After creating you can access to all blocks input, output and functions. But in our project, we need more blocks so we need to install specific packages. First, we need to go to settings and select manage palate and search for node-red-dashboard and install this package. Then we can access the form and assistant blocks.

Now let us take a form to ask the questions and function node to display the text. Next, we will use the assistant node and link our Watson assistant here so that the questions we ask directly contact assistant and we get the answers from Watson assistant.

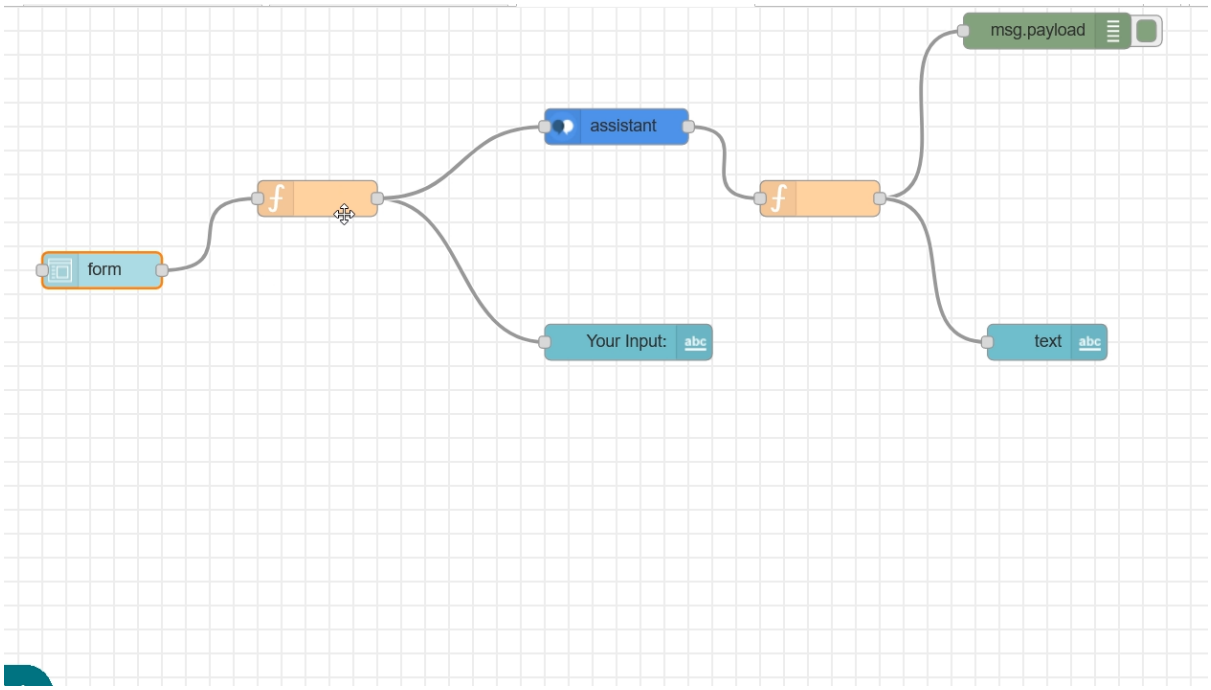

Figure 14

In the above figure you can see that in form we are going to ask questions and by using the functions we are going it to display it in web app by Your input block and to assistant block. You should to fill the details of assistant block with the API details and service end point. You can refer it in Figure 8. Then we will get the output and it will be returned in the format of text by the function node. You can launch the web app easily. It will look like in the Figure 15.

You can design the web interface as your wish. Here We created it in two groups. One for question and another for the answer. The dashboard name is Smart document understanding chatbot.

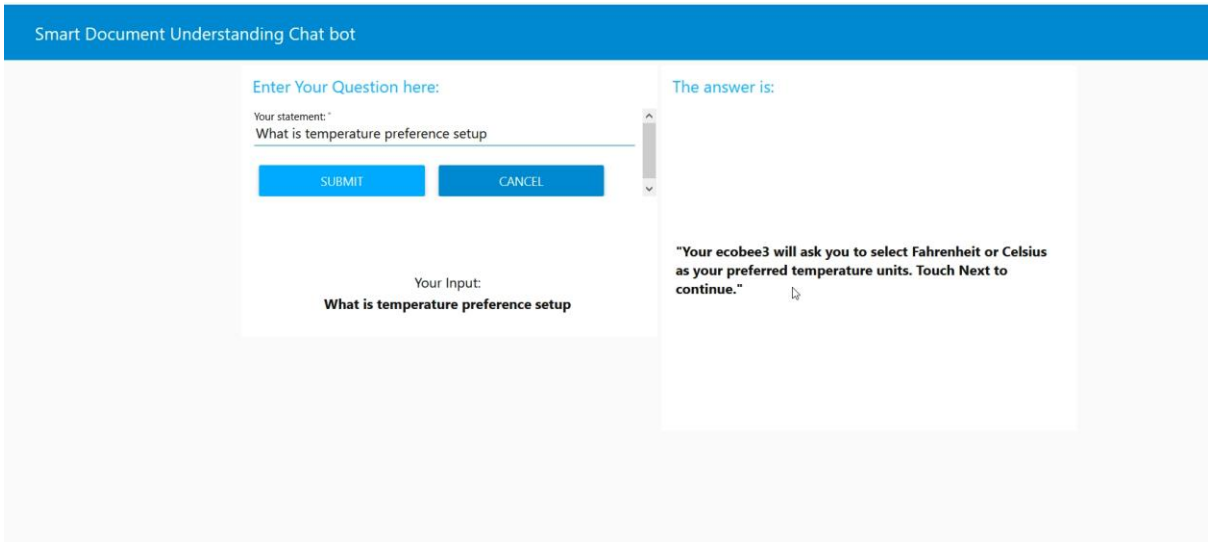

Figure 15

In this way we can design the web app and we can just give the URL to the customers so that they can get the answers. You can also set the feedback in the same page to know how much the customers are satisfied and how much you need to develop it.

Conclusion:

Intelligent Customer care smart document understanding will be very useful for larger companies. It can decrease the lot of manual work and will be very easy interface So that every one can easily access it.

References:

- https://github.com/watson-developer-cloud/node-red-labs
- https://developer.ibm.com/tutorials/how-to-create-a-node-red-starter-application/
- https://www.w3schools.com/howto/howto_make_a_website.asp
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