Project Report

On

Intelligent Customer Help Desk with Smart Document Understanding

Internship Under:

SmartBridge

Submitted By,

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Project ID: SPS_PRO_99

Project Title : Intelligent Customer Help Desk with Smart Document Understanding

Category: Artificial Intelligence

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INTRODUCTION

1. **Project Overview**

The conventional customer care chatbots are designed to answer questions that are straight-forward. They deal with questions outside the fixed set either telling the customer that the question is not valid or direct them to a person. Unlike these traditional chatbots, this project will have an additional option to deal with these outside the scope questions. If the question is regarding the operation of a device, the developed application will delegate it to Watson Discovery Service, which is pre-loaded with the device's owner manual. The advantage of this option being that, instead of asking the customer whether he/she would like to speak to a customer representative, we will be returning the pertinent sections of the owners manual to resolve the customer's issues. The project in addition will be employing Smart Document Understanding feature of Watson Discovery to teach the application on what text of the owners manual is significant and what is not. Doing this will ameliorate the replies that are returned from the queries.

2. **Project Requirements:** Python, IBM Cloud, IBM Watson

3. **Functional Requirements:** IBM Cloud

4. **Technical Requirements:** Artificial Intelligence, Machine Learning, Watson AI, Python

5. **Software Requirements:** Watson Assistant, Watson Discovery.

6. Scope of Work

- Setup the development environment
- Create a IBM Account
- Create a node-red starter application
- Build AI assistant with IBM Watson assistant
- Add webhook to Watson Assistant chatbot
- Integrate telegram with Watson chatbot using node-red
- Create necessary IBM Cloud services
- Configure Watson Discovery service
- Create Cloud function actions
- Configure Watson Assistant
- Build Node-Red flow to integrate all services
- Build a Web Dashboard
- Test the bot and capture the results

7. Project Deliverables

- Constructing a customer care dialog skill in Watson Assistant.
- Employing the Smart Document Understanding to build an enhanced Watson Discovery collection.
- Creating an IBM Cloud Functions web action that allows Watson Assistant to publish queries to Watson Discovery.
- Building a web application with integration to all the above stated services & deploying the same on IBM Cloud Platform.

LITERATURE SURVEY

1. Problem Statement

The stereotypical customer care chatbots can answer only simple questions, such as store locations and hours, directions, and in a few cases maybe even make appointments for you. But, when a question falls outside of the scope of the predetermined question set, then the way to go about it is to typically tell the customer that the question is not valid or offer the user to speak to a real human.

2. Proposed Solution

Step 1: Create IBM Cloud services

- Watson Discovery
- Watson Assistant
- Node Red

Step 2: Configure Watson Discovery

Launch the Watson Discovery tool and create a new data collection by selecting the Upload your own data option. Give the data collection a unique name. When prompted, select and upload the Ecobee3_UserGuide file located in the data directory of your local repo.

Next apply Smart Document Understanding to your document in order to improve the query responses. From the Discovery collection panel, click the Configure data button to start the SDU process. The main motive is to annotate each and every page in the document so that the Discovery can learn which text is important, and which is not.

Step 3: Create IBM Cloud Functions Action

Create the web action that will make queries to our Discovery collection. Begin by , starting the IBM Cloud Functions service after selecting the Create Resource from the IBM Cloud dashboard.

Create the discovery-function and enter the code. Invoke it and obtain the results after entering the parameter names and values in the parameters tab. This is where the credentials have to be entered for the url, environment_id, collection_id and iam_apikey.

Next move on to the Endpoints tab and click the checkbox for Enable as Web Action. This will consequently generate a public endpoint URL. Copy this URL into the notepad.

Step 4: Configure Watson Assistant

Launch the Watson Assistant tool and create a new dialog skill. Select the Use sample skill option as this dialog skill contains all the necessary typical nodes that are needed. Next add a new intent called Product_Information and give some user examples that the user can use to ask queries to the bot.

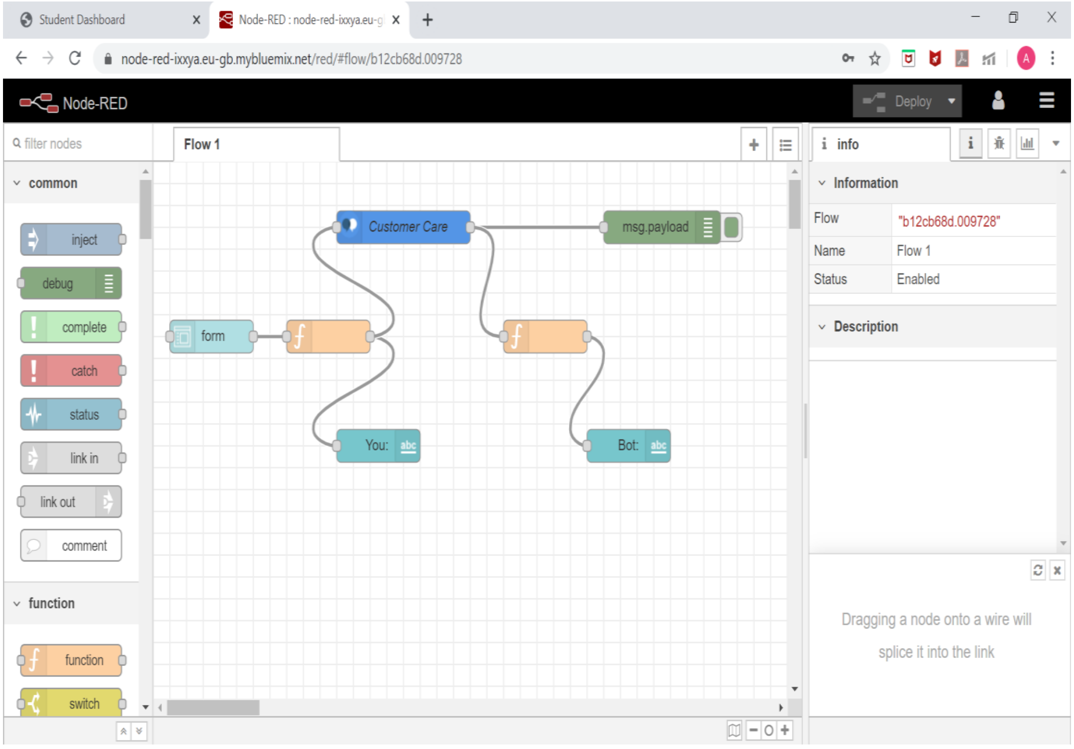
Create a new dialog node and name it Ask about product and assign it with the new intent that we created earlier. This means that whenever the Watson Assistant recognizes a product information intent based user input it will direct the conversation to this particular node.

Step 5: Enable webhook in Customize Settings

Set up access to our Webhook for the IBM Cloud Functions action and enter the url that we obtained from our cloud function action into the webhook url field in the options tab. Test the assistant by clicking the try it button in the Dialog Tab and verify the replies to the queries.

Step 6: Create the Node-RED flow using the following nodes:

- Inject
- Assistant
- Debug
- Function
- Ui_Form
- Ui_Text

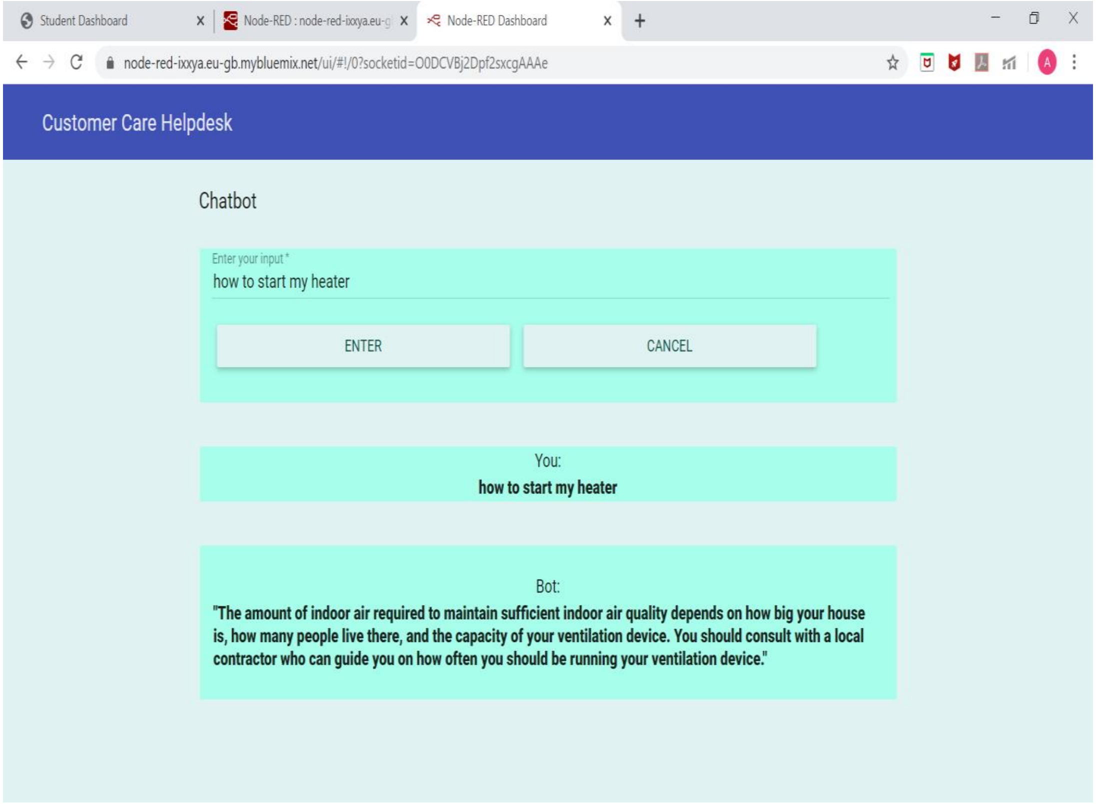


Flow	"b12cb68d.009728"
Name	Flow 1
Status	Enabled

Dragging a node onto a wire will splice it into the link

Step 7: Deploy and run the Node-RED application

Copy the url of the Node-RED Dashboard upto .net and then type /ui and obtain the results.

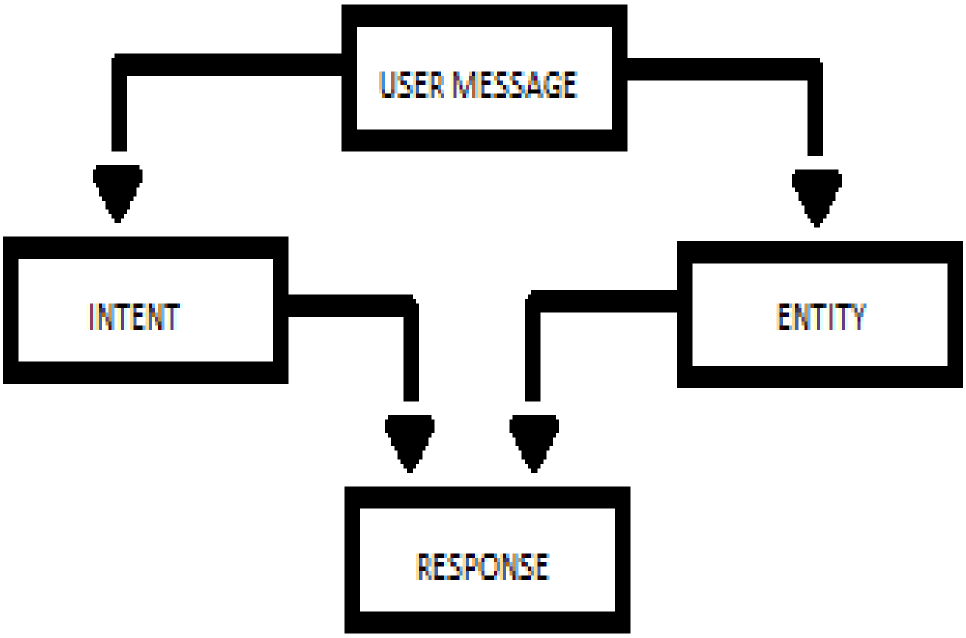

Student Dashboard
Node-RED : node-red-ixxya.eu-g
Node-RED Dashboard
node-red-ixxya.eu-gb.mybluemix.net/ui/#!/0?socketid=O0DCVBj2Dpf2sxcgAAAe
Customer Care Helpdesk
Chatbot
Enter your input *
ENTER
CANCEL

how to start my heater

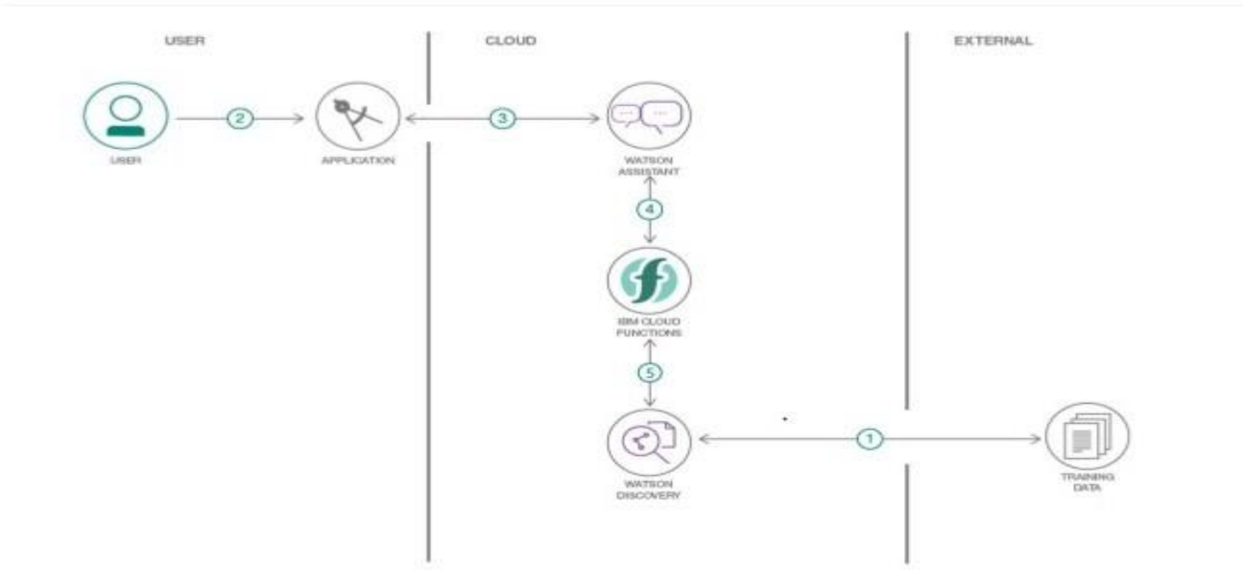
You:
how to start my heater

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."

THEORITICAL ANALYSIS



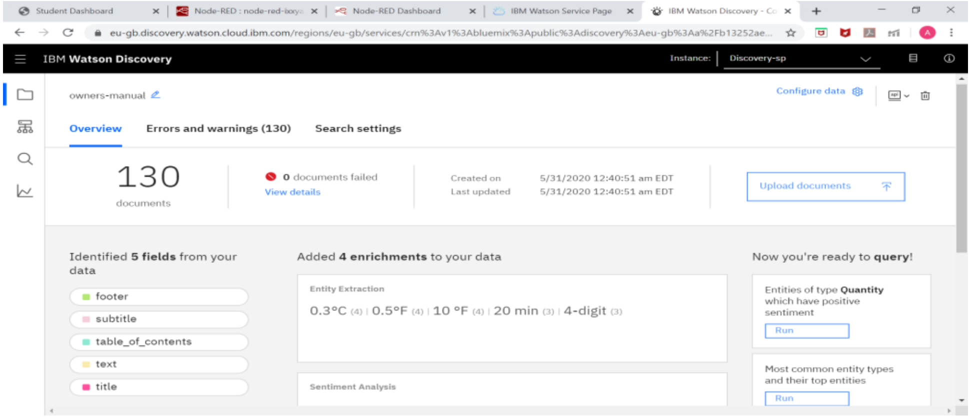
Block Diagram



Flowchart

EXPERIMENTAL INVESTIGATION

1. Watson Discovery


Student Dashboard
Node-RED : node-red-ixxya
Node-RED Dashboard
IBM Watson Service Page
IBM Watson Discovery - Co
eu-gb.discovery.watson.cloud.ibm.com/regions/eu-gb/services/crn%3Av1%3Abluemix%3Apublic%3Adiscovery%3Aeu-gb%3Aa%2Fb13252ae...
IBM Watson Discovery
Instance: Discovery-sp
owners-manual
Configure data
Overview
Errors and warnings (130)
Search settings
Upload documents
Run
Run

130 documents

0 documents failed
View details

Created on 5/31/2020 12:40:51 am EDT
Last updated 5/31/2020 12:40:51 am EDT

Identified **5 fields** from your data
- footer
- subtitle
- table_of_contents
- text
- title

Added **4 enrichments** to your data

Entity Extraction
0.3°C (4) | 0.5°F (4) | 10 °F (4) | 20 min (3) | 4-digit (3)

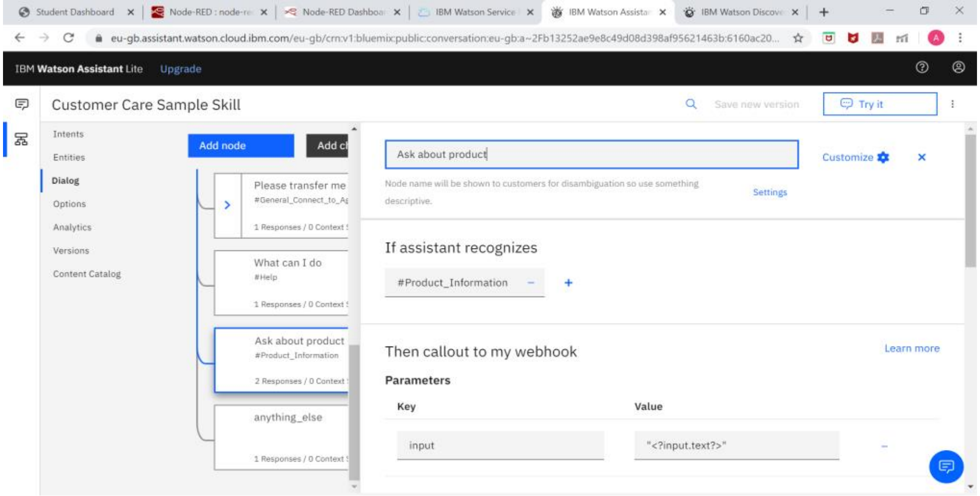
Sentiment Analysis

Now you're ready to **query**!

Entities of type **Quantity** which have positive sentiment

Most common entity types and their top entities

2. Watson Assistant



Please transfer me
#General_Connect_to_Ag
1 Responses / 0 Context

What can I do
#Help
1 Responses / 0 Context

Ask about product
#Product_Information
2 Responses / 0 Context

anything_else
1 Responses / 0 Context

Ask about product

Node name will be shown to customers for disambiguation so use something descriptive.

If assistant recognizes

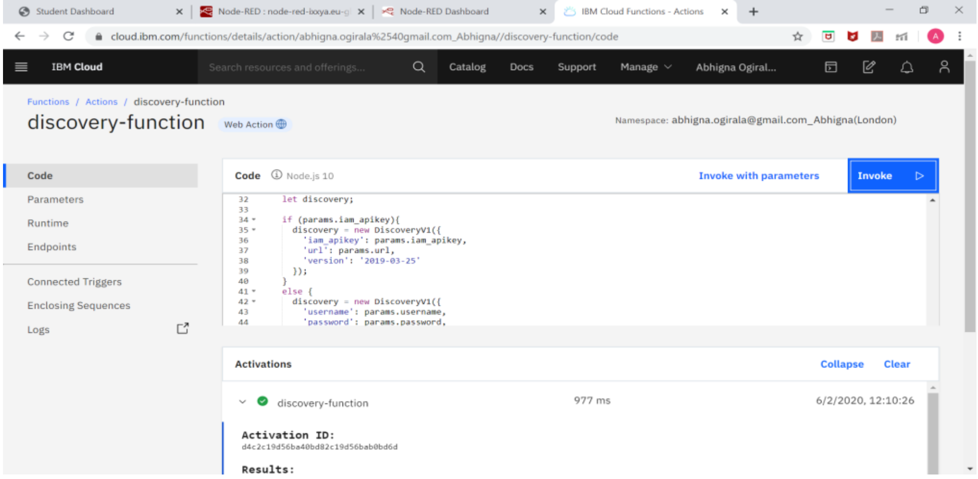
#Product_Information

Then callout to my webhook

Parameters

Key	Value
input	"<?input.text?>"

3. Cloud Function


Student Dashboard
Node-RED : node-red-ixxya.eu-g
Node-RED Dashboard
IBM Cloud Functions - Actions
cloud.ibm.com/functions/details/action/abhigna.ogirala%2540gmail.com_Abhigna//discovery-function/code
IBM Cloud
Search resources and offerings...
Catalog
Docs
Support
Manage
Abhigna Ogiral...
Functions / Actions / discovery-function
Web Action
Code
Parameters
Runtime
Endpoints
Connected Triggers
Enclosing Sequences
Logs
Invoke with parameters
Invoke
Collapse
Clear

discovery-function

Namespace: abhigna.ogirala@gmail.com_Abhigna(London)

Code Node.js 10

```
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,
```

Activations

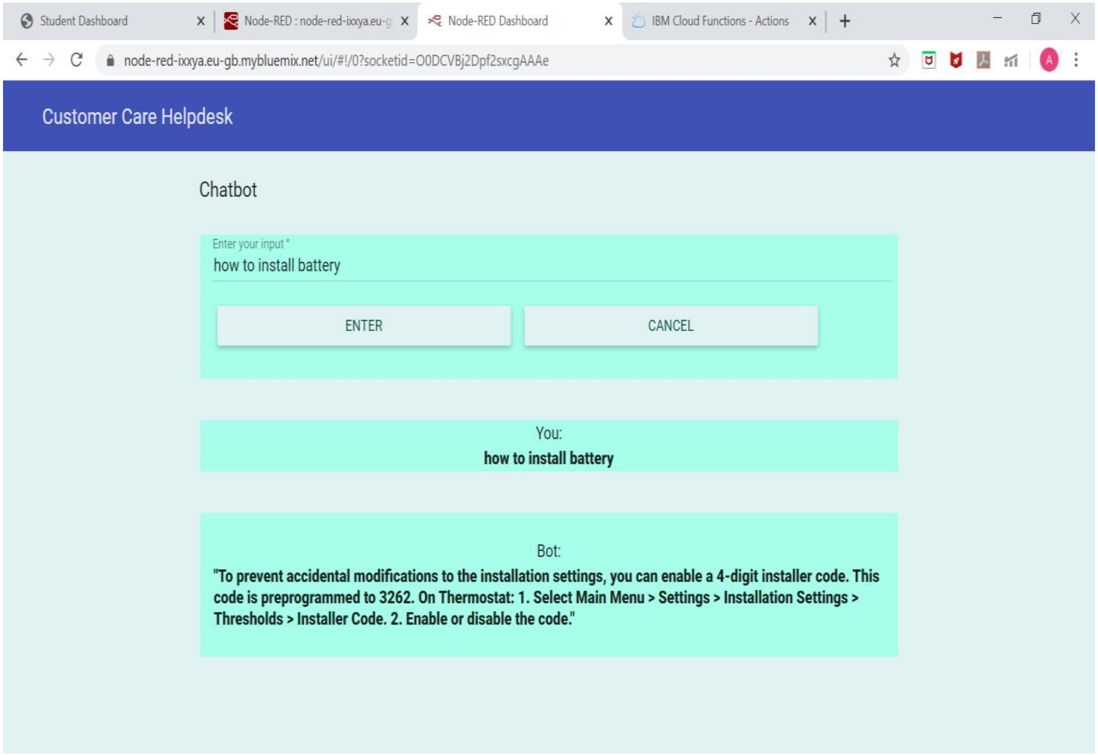
discovery-function 977 ms 6/2/2020, 12:10:26

Activation ID:
d4c2c19d56ba40bd82c19d56bab0bd6d

Results:

RESULTS

The chatbot was made successfully by integrating all Watson AI services and the Node-RED UI was created and the results were tested.


Student Dashboard
Node-RED : node-red-ixxya.eu-g
Node-RED Dashboard
IBM Cloud Functions - Actions
node-red-ixxya.eu-gb.mybluemix.net/ui/#!/0?socketid=O0DCVBj2Dpf2sxcgAAAe
ENTER
CANCEL

Customer Care Helpdesk

Chatbot

Enter your input *
how to install battery

You:
how to install battery

Bot:
"To prevent accidental modifications to the installation settings, you can enable a 4-digit installer code. This code is preprogrammed to 3262. On Thermostat: 1. Select Main Menu > Settings > Installation Settings > Thresholds > Installer Code. 2. Enable or disable the code."

PROS AND CONS

Pros:

- Reduced costs
- Round the clock availability
- AI based Learning and automatic updating
- Multiple clients can be managed simultaneously

Cons:

- Multifaceted interface
- Poor memory

APPLICATIONS

Smart Help Desks can be created which will be able to return pertinent answers to users queries about the Product instead of delegating the task to some human. Companies wishing to offer there customers with more interactive and informative responses can effectively utilize these intelligent chatbots to improve customer satisfaction. Apart from this, these smart bots can also serve as virtual companions to people and offer them assistance in their daily activities.

CONCLUSION

The Intelligent Customer Help Desk with Smart Document Understanding is a web application that integrates multiple Watson AI Services such as the Watson Assistant, Watson Discovery, Cloud Functions and the Node-RED. This project demonstrates one of the best methods of amalgamating the above mentioned Watson Services, and shows how they can be infused together to build an interactive information recovery system. Application of such chatbots in the near future will lead to healthier customer involvement and improved customer satisfaction.

FUTURE SCOPE

These Intelligent chatbots can be integrated with IoT devices and other wearable electronics to create in-context devices that provide excellent virtual assistants and improved services. In addition, we can also add the voice recognition feature to this chatbot and consequently read aloud the bot replies so that it can be more user-friendly and can be more approachable to all people.

REFERENCES

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- https://developer.ibm.com/recipes/tutorials/how-to-create-a-watson-chatbot-on-nodered/
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