Project Report

on

Intelligent Customer Help Desk With Smart Document Understanding

Category: Artificial Intelligence

By

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Submitted to

SmartInternz.com

Github link :
https://github.com/vivekverma1221998/IISPS-INT-471-Intelligent-Customer-Help-Desk-with-Smart-Document-Understanding

Youtube link :
https://youtu.be/WjeR39F45ac

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1. Introduction

i. Overview

We will be able to write an application that uses multiple Watson AI services like Discovery, Assistant, Cloud Function and Node Red. By the end of the project we will learn best practices of combining Watson Services, and how they can build interactive retrieval system with discovery + assistant.

- Project Requirements: Python, IBM Cloud, IBMWatson
- Functional Requirements: IBMCloud
- Technical Requirements: Python, Watson AI,ML
- Software Requirements: Watson Assistant, WatsonDiscovery
- Project Deliverables: Smartinternz Internship
- Project Duration: 1Month

ii. Project Description

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 pre-determined question set, the option is typically to tell the customer the question isn't 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 pre-loaded with the device's owners manual. So now, instead of "Would you like to speak to a customer representative?” we can return relevant sections of the owners 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 it on what text in the owners manual is important and what is not. This will improve the answers returned from the queries.

iii. Project Scope

- 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

2. Literature Survey

i. Existing Problem

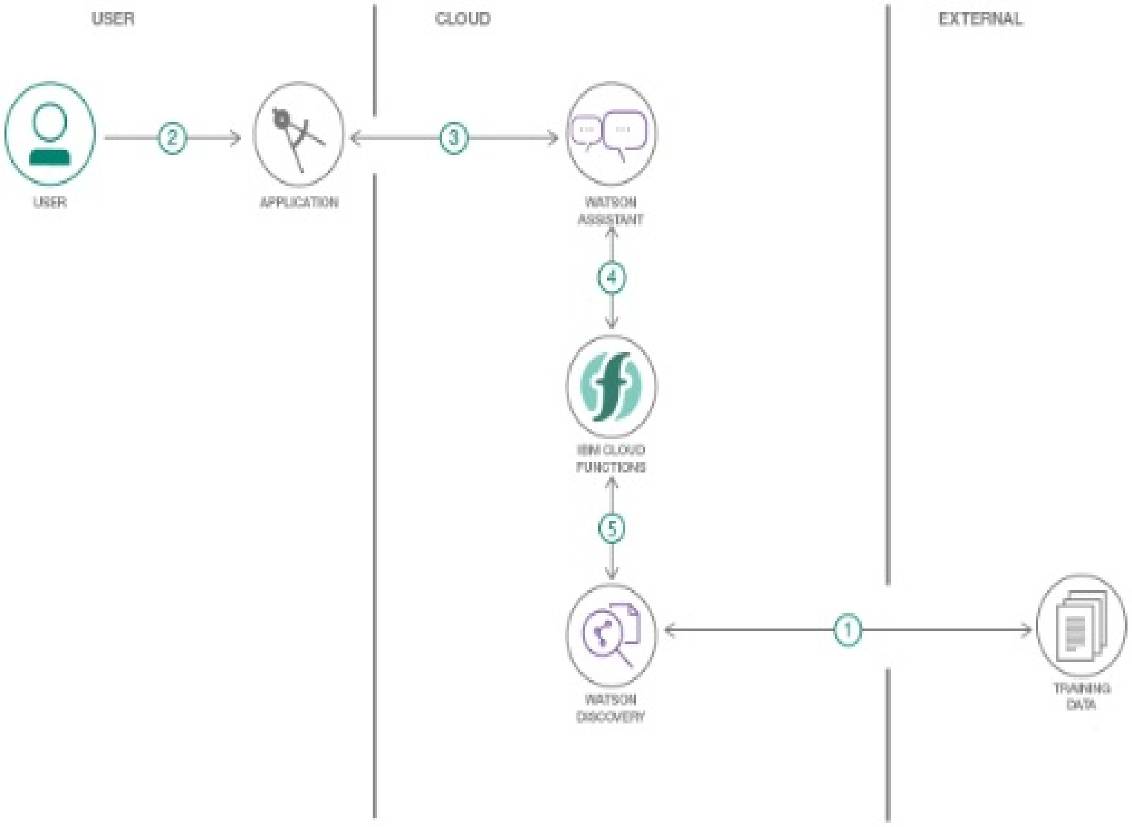
Generally chatbot are loaded with a certain set of questions that is more like if and else flow, the question or the user input which lies out of the scope of the chatbot is not answered and rather a message like “Please try again.....” & “I didnot able to understand, Please Retype.. ” are displayed and it directs the user to the customer agent or the representative but an efficient chatbot should reduce the traffic reaching to the representatives, So to achieve this we include a Smart chatbot so that it can answer the queries of the customer.

ii. Proposed Solution

For the above-mentioned problem, we have to put a virtual agent in chatbot so it can understand the queries that are posted by customers. The virtual agent should be trained from some insight based on store backgrounds, working hours, store locations and product related information. In this project I used Watson Discovery to achieve the above solution.

3. Design

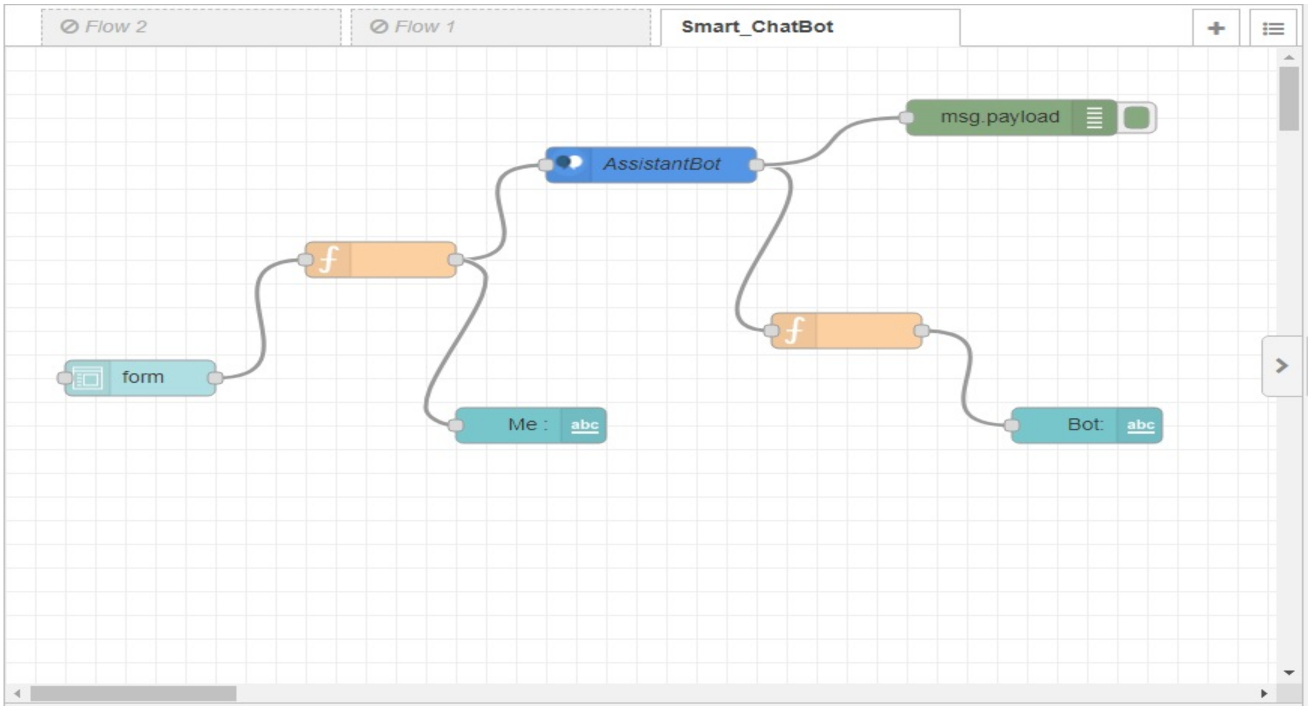
i. Data Flow Diagram



1. The document is uploaded using Watson DiscoverySDU(smart document understanding).
2. The user interacts with the server via the application User Interface .
3. The frontend application User Interface is a chatbot that engages the user in a conversation.
4. Dialog between the user and backend server is coordinated using a WatsonAssistant dialog skill.

5. If the user asks the product operation question, a search query is passed to a predefined IBM Cloud Function action.
6. Cloud function action will query the Watson Discovery service and return the results.

ii. Node Red Flow Chart



It Contains:

a. Form
b. Function
c. Assistant
d. Output

4. Technical Details

i. Hardware Specification

Hardware	: Pentium
RAM	: 1GB and more

ii. Software Specification

Operating System	: Windows, Linux
Technology	: Python, IBM Watson Discovery
User Interface tool	: Node Red Application
Assistant	: IBM Watson Assistant
Database	: IBM Cloud

iii. Software Designing

i. Create an IBM Cloud services.

ii. Configure Watson Discovery.

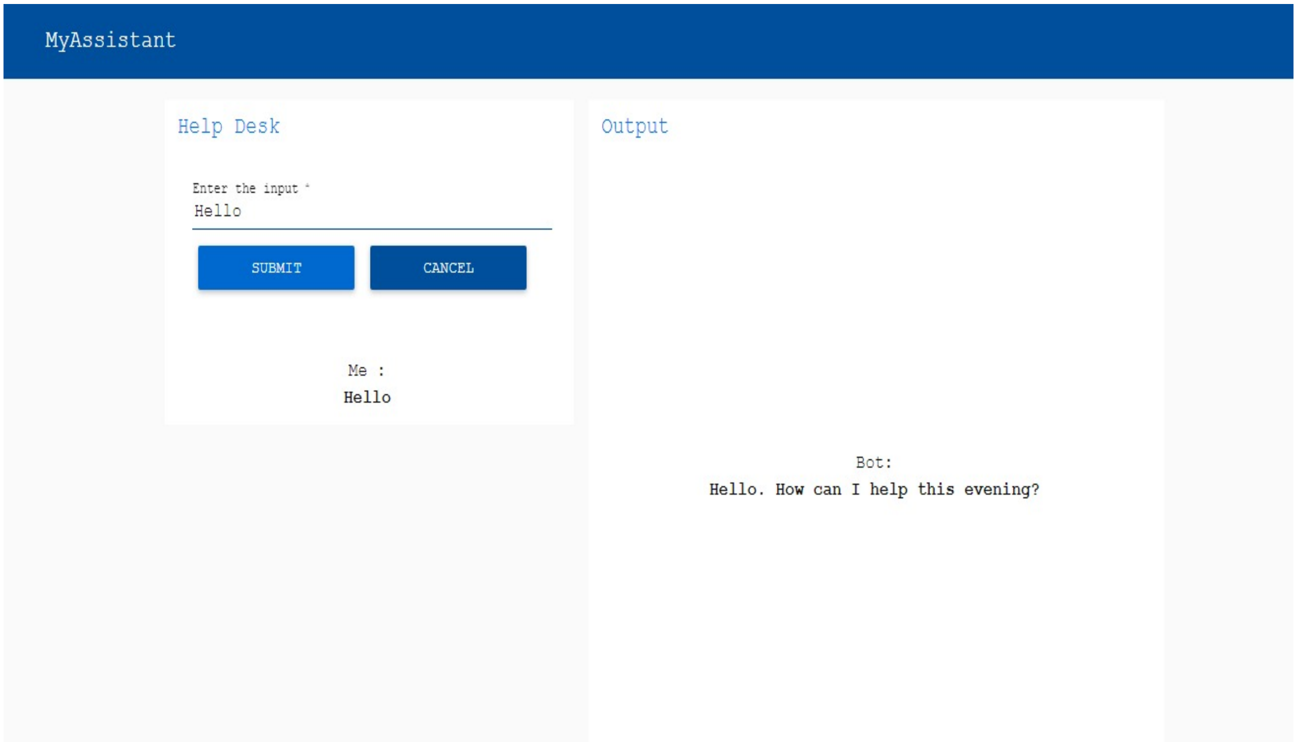
iii. Create IBM Cloud Function action

iv. Configure Watson Assistant

v. Create flow and configure node

vi. Deploy and run node red app

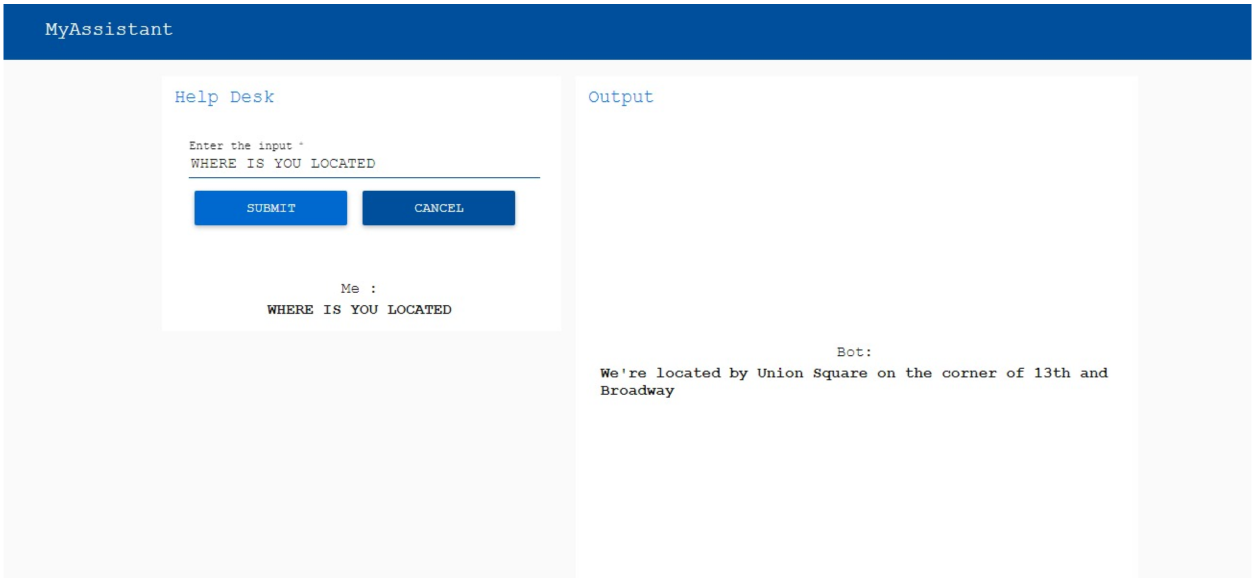
5. Experiments



Enter the input *
Hello

Me :
Hello

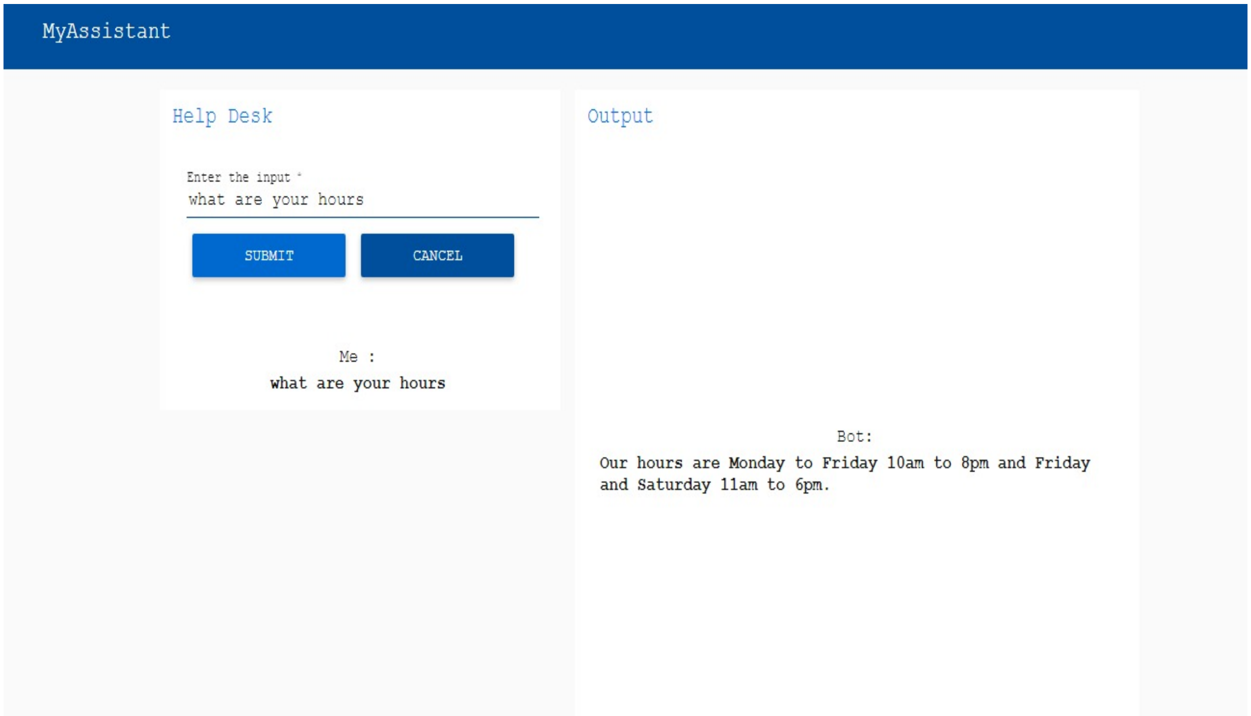
Bot:
Hello. How can I help this evening?



Enter the input *
WHERE IS YOU LOCATED

Me :
WHERE IS YOU LOCATED

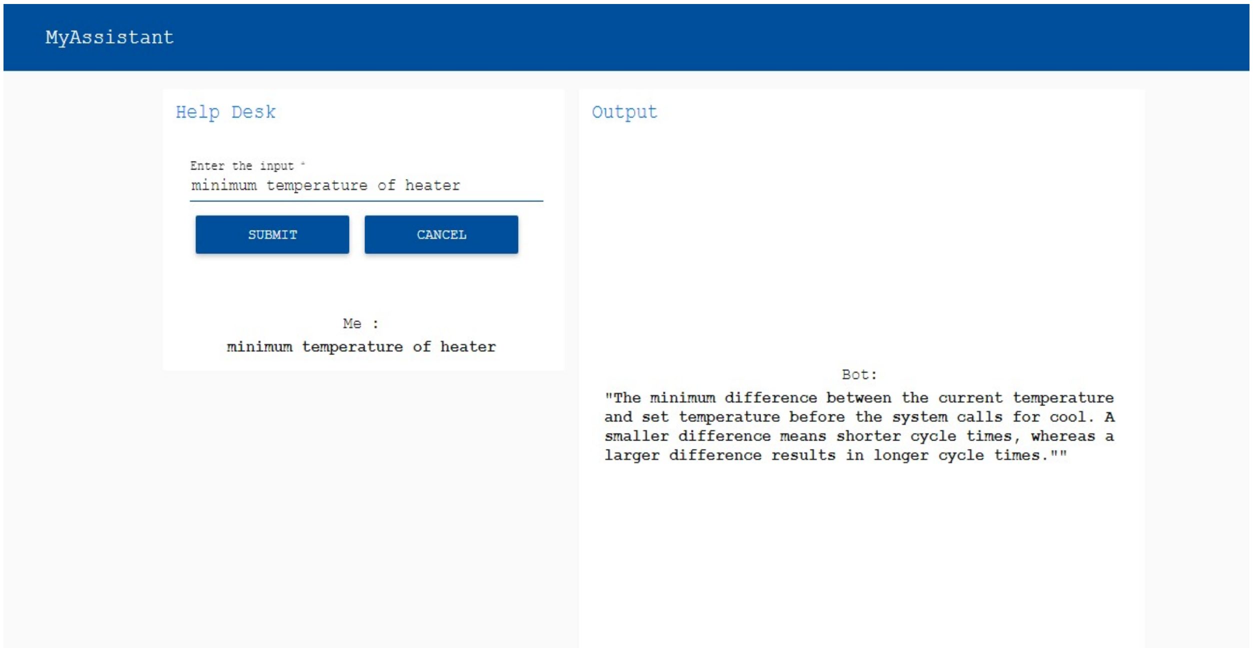
Bot:
We're located by Union Square on the corner of 13th and Broadway



Enter the input *
what are your hours

Me :
what are your hours

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



Enter the input *
minimum temperature of heater

Me :
minimum temperature of heater

Bot:
"The minimum difference between the current temperature and set temperature before the system calls for cool. A smaller difference means shorter cycle times, whereas a larger difference results in longer cycle times.""

6. Results

Web based User interface was developed by integrating all services on Node red.

URL - https://node-red-vivek.eu-gb.mybluemix.net/ui

7. Applications

1. This chatbot can be deployed to various websites as it can solve a lot of basic questions.
2. It can be used to deploy as Customer Helpdesk for small scale products as their manual usually has the solution for the user's problems.

8. Conclusion

An Intelligent Customer Helpdesk Chatbot was created using various Watson services like Watson Discovery, Watson Assistant, Watson Cloud Functions and Node-RED.

9. Future Enhancement

In the future, various other Watson services like Text-To-Speech and Speech-To-Text can be integrated in the chatbot. This can make the chatbot Hands-free.

Bibliography

1. Node-RED Starter Application:

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

2. Build your oen AI assistant : https://www.youtube.com/watch?v=hitUOFNne14
3. How to use Watson Assistant with Webhooks : https://www.youtube.com/embed/5z3i5IsBVnk
4. Watson Discovery : https://developer.ibm.com/articles/introduction-watson-discovery/

Appendix

Source Code

Watson Cloud Function 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);
  });
 });
}
```

Node Red Flow Code

```
[
{"id":"449b476c.8aa988","type":"tab","label":"Flow 4","disabled":false,"info":""},
{"id":"5a56a0d.925846","type":"ui_form","z":"449b476c.8aa988","name":"","lab
el":"","group":"95b15e92.91d39","order":3,"width":0,"height":0,"options":
[{"label":"Enter the
input","value":"input","type":"text","required":true,"rows":null}],
"formValue":{"input":""},"payload":"","submit":"submit","cancel":"cancel","topic":
"","x":90,"y":280,"wires":
[["17437ec7.ca2dd1"]]},
{"id":"17437ec7.ca2dd1","type":"function","z":"449b476c.8aa988","name":"","fu
nc":"msg.payload = msg.payload.input;\nreturn
msg;","outputs":1,"noerr":0,"x":250,"y":180,"wires":
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["1a1e3ab0.106155","8bfaad3c.56dd2"]
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{"id":"1a1e3ab0.106155","type":"watson-conversation-v1","z":"449b476c.8aa
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296f0e0a","multiuser":false,"context":true,"empty-payload":false,"service-end
point":"https://api.eu-gb.assistant.watson.cloud.ibm.com/instances/5ac74
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]},
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70,"y":60,"wires":[]},
{"id":"bd1e1474.480068","type":"function","z":"449b476c.8aa988","name":"","f
unc":"msg.payload.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    msg.payload = msg.payload.text;\n    \n}
\nelse
{\n    msg.payload = msg.payload.output.text[0];\n}
\nreturn msg;","outputs":1,"noerr":0,"x":560,"y":240,"wires":
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{"id":"f413de95.dd8d1","type":"ui_text","z":"449b476c.8aa988","group":"95b15
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e92.91d39","order":2,"width":0,"height":0,"name":"","label":"input","format":"
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{"id":"463675ef.0eee1c","type":"ui_tab","z":"","name":"MyAssistant","icon":"das
hboard","disabled":false,"hidden":false}]
```