

Project Report
on
Intelligent Customer Helpdesk with Smart
Document Understanding in
Machine learning & AI
by
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1. Introduction

1.1 Overview We will build a chatbot that uses various Watson AI Services (Watson Discovery, Watson Assistant, Watson Cloud Functions and Node-Red) to deliver an effective Web based UI through which we can chat with the assistant. We will integrate the Watson Discovery service with Watson Assistant using webhooks.

- Project Requirements : Node-RED, IBM Cloud, IBM Watson, Node JS
- Functional Requirements : IBM Cloud
- Technical Requirements : AI, ML, Watson AI, Node JS
- Software Requirements : Watson Assistant, Watson Discovery, Watson Cloud Functions, Node-RED, Web Browser
- Project Deliverables : Intelligent Chatbot with Smart Document Understanding
- Project Team : Sayed Mohd Kazim Mehdi
- Project Duration : 19 Days

1.2 Purpose 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. So unless and until customer specifically asks for a customer representative the bot will try to solve all your queries

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. Then using Watson actions as webhook, Watson Discovery can be integrated with Watson assistant. Finally using Node-Red, Watson assistant can be integrated with a web UI. This UI can then be used to connect with Watson assistant and chat with it.

2. Literature Survey

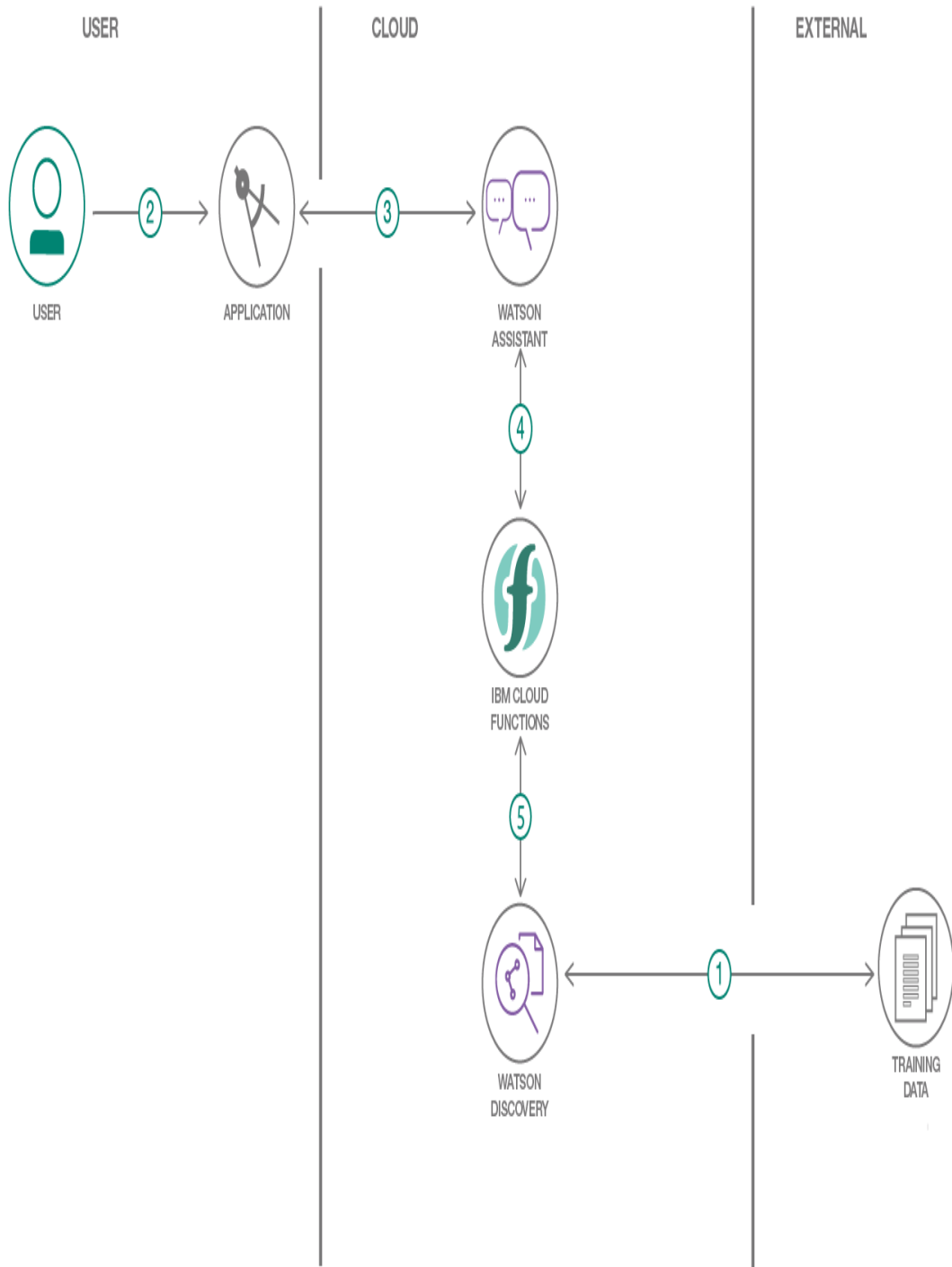
2.1 Existing Problem The typical customer care chatbot can answer simple questions, such as store locations and hours, directions, and maybe even making appointments. When a question falls outside of the scope of the pre-determined question set, the option is typically to tell the customer the question isn't valid or offer to speak to a real person.

2.2 Proposed Solution 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. So unless and until customer specifically asks for a customer representative the bot will try to solve all your queries. 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. Then using Watson actions as webhook, Watson Discovery can be integrated with Watson assistant. Finally using Node-Red, Watson assistant can be integrated with a web UI. This UI can then be used to connect with Watson assistant and chat with it.

3. Theoretical Analysis

Block / Flow Diagram



Hardware / Software Designing

1. Create necessary Watson Services.
2. Configure Watson Discovery.
3. Create Watson Cloud Functions Action.
4. Configure Watson Assistant.
5. Integrate Watson Discovery with Watson Assistant using webhook.
6. Build Node-RED flow to integrate Watson Assistant and Web Dashboard.

4. Experimental Investigation

The screenshot displays a web application interface with a dark theme. At the top, there is a purple header bar with the text "Home". Below the header, the interface is divided into two main sections. On the left, there is a form with the label "Enter Text" and a text input field containing the text "hi". Below the input field are two buttons: "SUBMIT" and "CANCEL". Below these buttons, the text "Input : hi" is displayed. On the right, there is a large dark gray rectangular area with the label "Answer" at the top. In the center of this area, the text "Hello. Good morning" is displayed.

Home

Enter Text

how to turn on heater?

SUBMIT

CANCEL

Input : how to turn on heater?

Answer

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 when you exit the menu. **Warning:** Compressor protection and minimum run-time features are not enforced while in this mode. 30 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. The HVAC System settings depend on the type of system you have. Depending on your system, one or more the following options are shown: ☐ Cool: Turn on the air conditioner when the current temperature rises above the set temperature. ☐ Heat: Turn on the heat when the current temperature drops below the set temperature. ☐ Auto: Activate the heating or cooling system as required to keep your home within the configured range of set temperatures. 12 ☐ Aux: Only use the auxiliary or backup heat source to maintain the heat set point temperature. This option only appears if auxiliary heat is configured in the Equipment menu. ☐ Off: Turn the system off. When the system is off, only the current temperature will be displayed on the Home screen. On Thermostat and Mobile: Select Main Menu > System > HVAC System On Web: Select System tile > HVAC

Home

Enter Text

how to use thermostat

SUBMIT

CANCEL

Input : how to use thermostat

Answer

You can configure how long it takes for the standby screen to activate after you have finished using the thermostat. On Thermostat: 1. Select Main Menu > Settings > Preferences 2. Select Active to standby screen timer. 3. Adjust the activation time as required. On Web: 1. Select Settings tile. 2. Select Preferences. 3. Select Active to Standby Sleep Timer. 4. Select the length of time before the screen sleeps by sliding the values left or right. Follow Me is a feature that applies to a selected group of the sensors in your network (including the sensor built-in your thermostat). It works by looking for motion triggered by any of 14 the selected sensors. If motion is detected, the temperature reading from that sensor will be used by your ecobee3 to decide when to operate your heating or cooling system. This ensures that you are comfortable in the rooms that you are occupying. If more than one sensor detects motion, the average of these sensors will be used. Your ecobee3 makes changes gradually when many sensors are detecting motion to make sure there are no sudden or large changes for your heating and cooling system to deal with. When Follow Me is disabled, your ecobee3 will continuously use the average temperature readings from all the sensors that you've selected as the desired temperature to control your ecobee3. For example, suppose you have a room in your house that is far from your thermostat and you want this room to be at the thermostat's set temperature, regardless if motion is occurring. In this case, set Follow Me to Disable and only select this room. Your ecobee3 will now only use the temperature in this room to decide when to operate your heating or cooling system. On Thermostat: 1. Select Main Menu > Sensors > Follow Me 2. Enable or disable the Follow Me feature. 3. If enabled, select which sensors are affected by pressing on each checkbox. The standby screen activates whenever the thermostat is not in use. It shows the current indoor temperature and outdoor weather conditions. 1 Current indoor temperature 2 Current outdoor weather conditions The standby screen is configurable. You can adjust: ☐ Standby screen activation time (page 21) Standby screen brightness (page 21)

Home

Enter Text

thanks

SUBMIT

CANCEL

Input : thanks

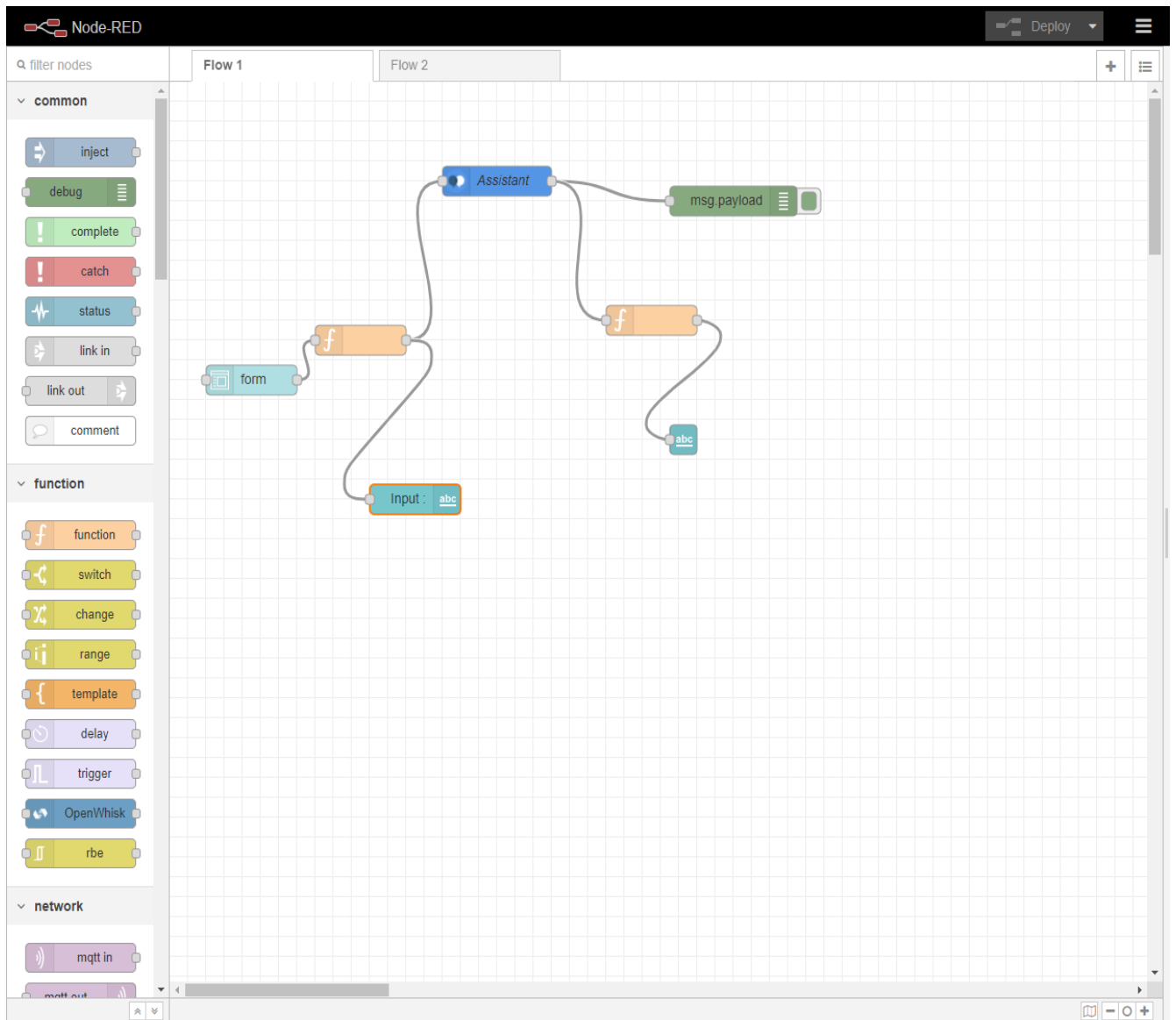
Answer

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

5. Flowchart

Insert the following nodes into the flow in Node-RED.

- UI_Form
- Function
- Assistant
- UI_Text
- Debug



6. Results

Web based UI was developed by integrating all the services using Node-RED.

URL for UI Dashboard :

<https://node-red-btgmf.eu-gb.mybluemix.net/ui/>

7. Advantages & Disadvantages

Advantages

1. Reduces Man Power.
2. Cost Efficient.
3. Less and less calls will be diverted to Customer Representatives.

Disadvantages

1. Sometimes it can mislead customers as it tries to search irrelevant information in the manual.
2. It may also give same answers to different queries.

8. 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 manual usually has the solution for the user's problems.

9. Conclusion

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

10. Future Scope

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 .We can use a visual recognition or NLP to get a user mood so according to that bot can talk.

11. Bibliography

1. Node-RED Starter Application :

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

2.

Build your own 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

Node-RED Flow code

<https://github.com/SmartPracticeschool/IISPS-INT-707-Intelligent-Customer-Help-Desk-with-Smart-Document-Understanding/blob/master/Node-red-flow/flows.json>

Watson Cloud Function Action Code

<https://github.com/SmartPracticeschool/IISPS-INT-707-Intelligent-Customer-Help-Desk-with-Smart-Document-Understanding/blob/master/Cloud%20Function%20action/disco-action.js>

Assistant Skill Code

<https://github.com/SmartPracticeschool/IISPS-INT-707-Intelligent-Customer-Help-Desk-with-Smart-Document-Understanding/blob/master/Assistant%20Skill/skill-Customer-Care-Sample-Skill.json>