Report: Intelligent Customer Help Desk with Smart Document Understanding

Contents:

1. Introduction

1.1 Overview:

Customer care chat bot that can not only answer the basic questions such as store locations and hours, directions, making appointments but also could give the answers based on Watson Discovery service, which has been pre-loaded with the device manual.

Project Deliverables: Chat bot that can not only answer the basic questions such as store locations and hours, directions, making appointments but also could give the answers based on Watson Discovery service, which has been pre-loaded with the device manual.

Project Team: Individual

Project Schedule: 1 Month (May-June)

1.2 Purpose:

The typical customer care Chat Bot 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 owner’s manual to help solve our customer’s 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 Chabot 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 owner’s manual. So now, instead of “Would you like to speak to a customer representative?” we can return relevant sections of the owner’s manual to help solve our customers’ problems. So unless and untill 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

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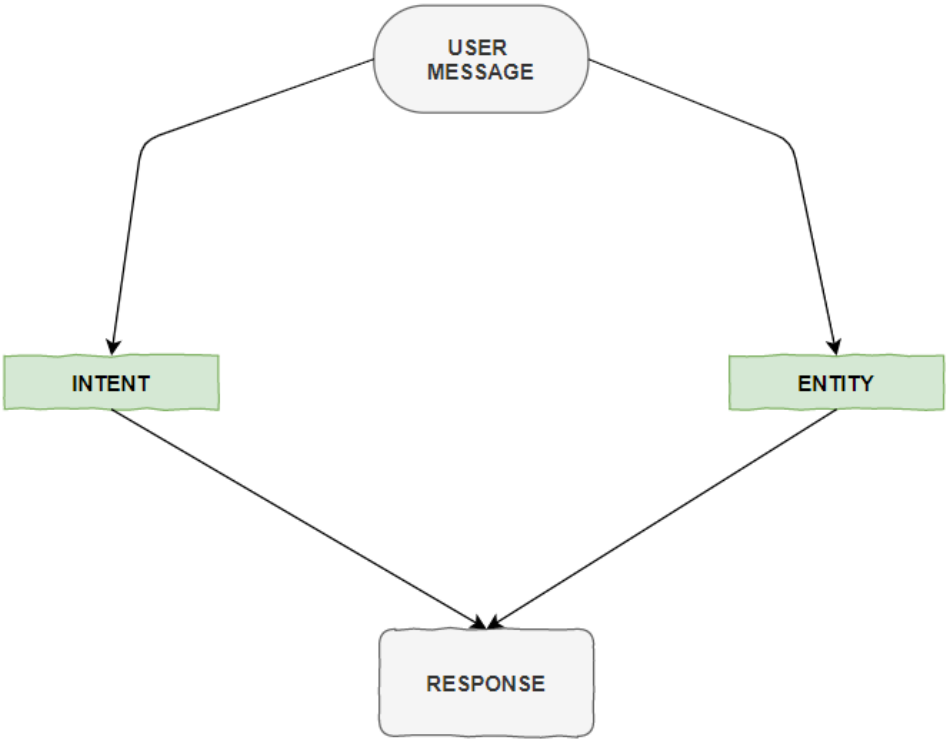
3. Theoretical Analysis

3.1 Block/ Flow diagram



3.2 Hardware/ Software Designing

Project Requirements: The project shall use the Smart Document Understanding feature of Watson Discovery to train it on what text in the owner manual is important and what is not. This will improve the answers returned from the queries.

Functional Requirements: Create customer care chat bot that can not only answer the basic questions such as store locations and hours, directions, making appointments but also could give the answers based on Watson Discovery service, which has been pre-loaded with the device manual.

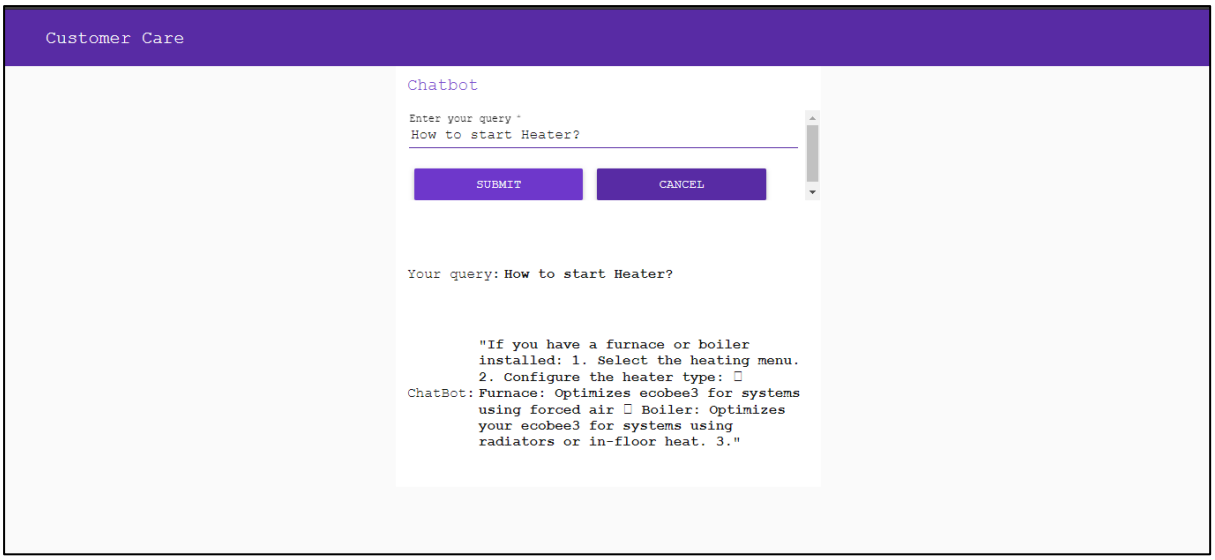
Technical Requirements:

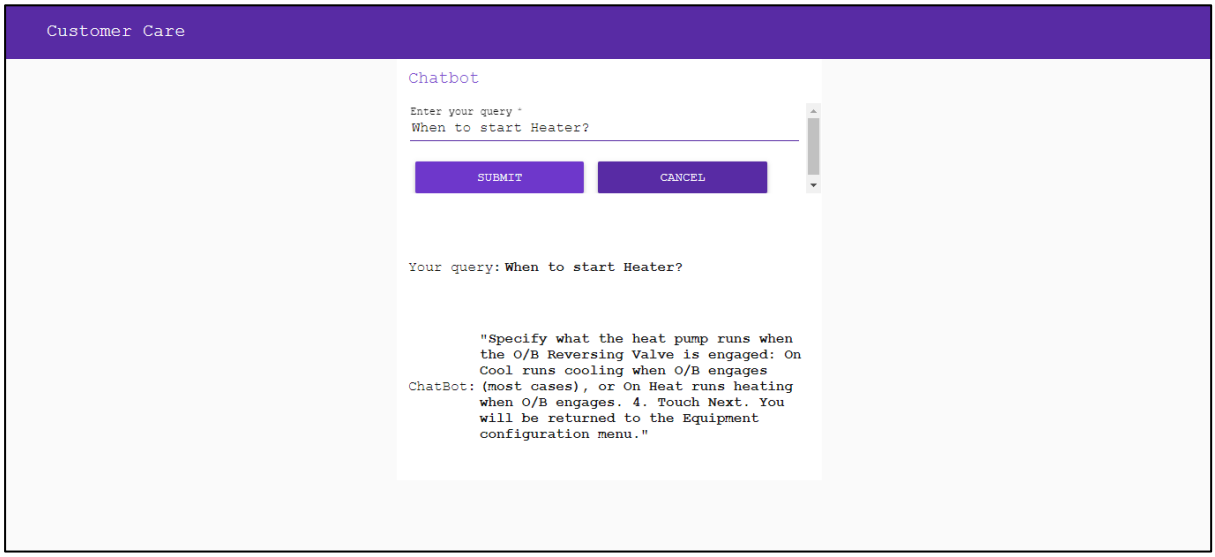
1. Create a customer care dialog skill in Watson Assistant
2. Use Smart Document Understanding to build an enhanced Watson Discovery collection
3. Create an IBM Cloud Functions web action that allows Watson Assistant to post queries to Watson Discovery
4. Build a web application with integration to all these services & deploy the same on IBM Cloud Platform

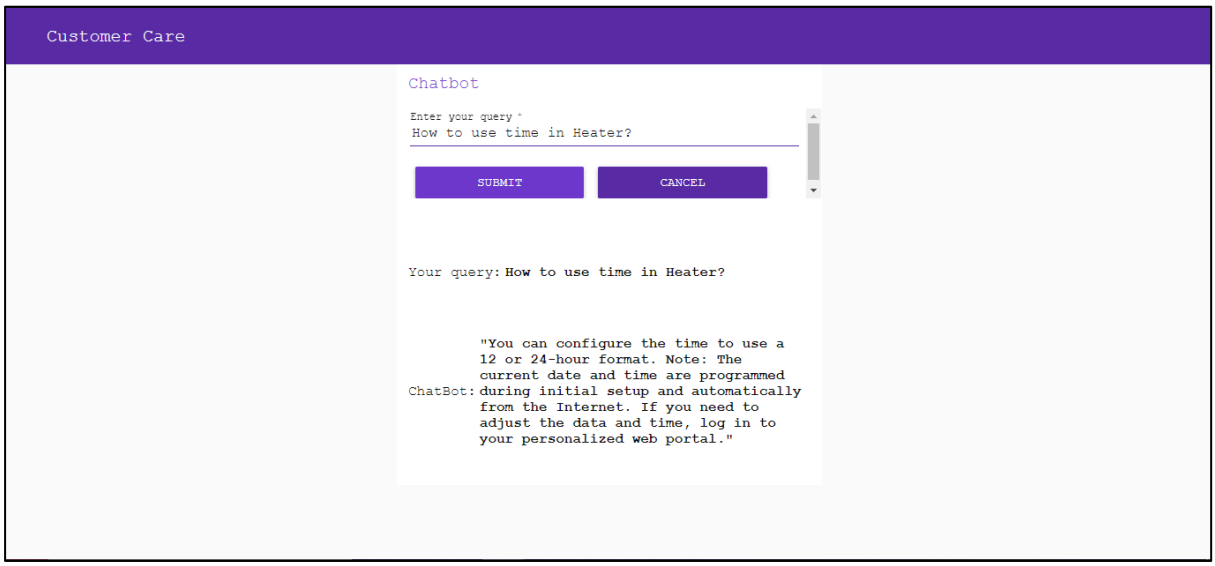
Software Requirements:

JavaScript, IBM Cloud, IBM Watson Discovery, Node Red, IBM cloud Functions

4. Experimental Investigations:



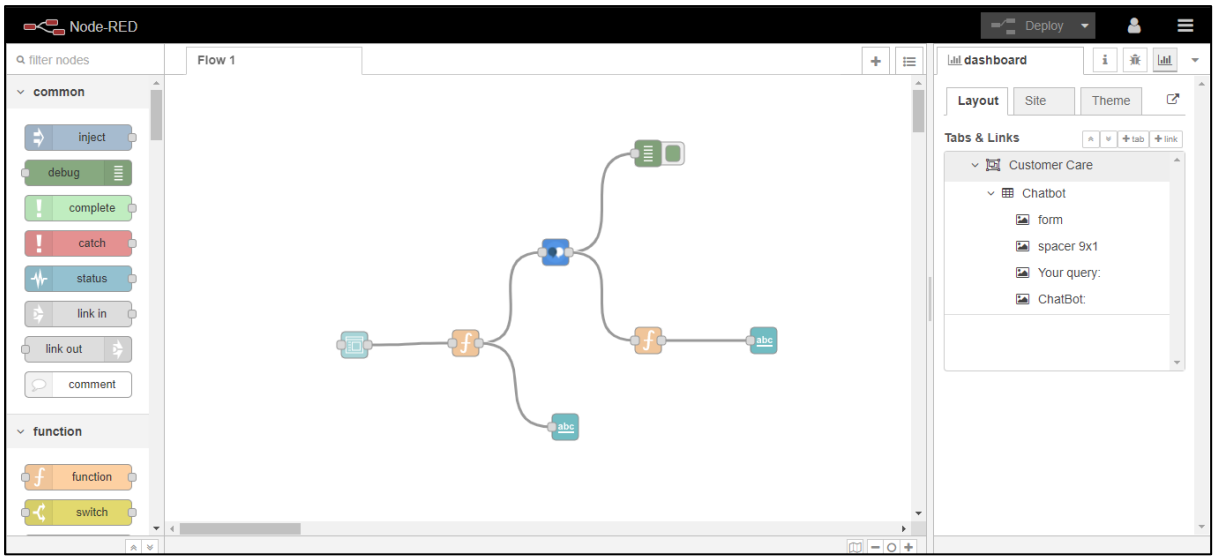




5. Flowchart:

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

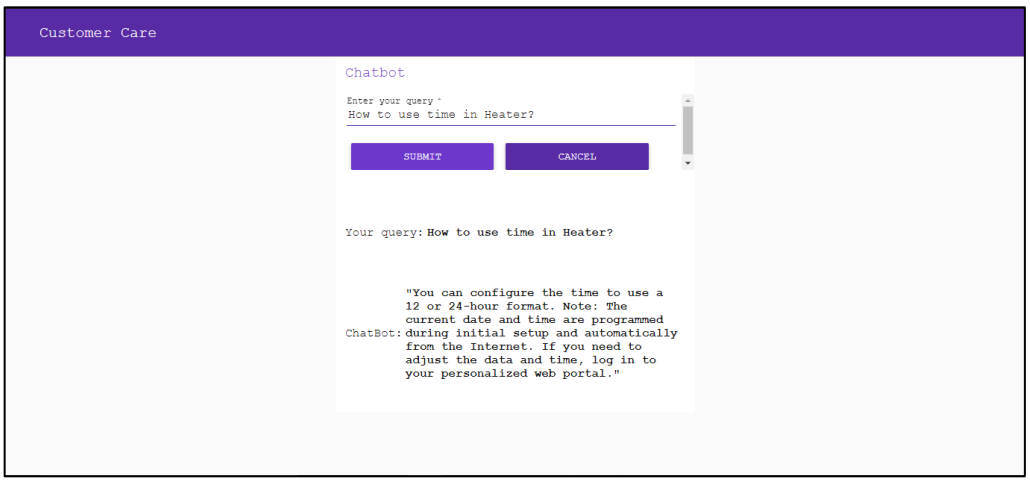
(1) Inject
(2) Debug
(3) form
(4) text
(5) Function
(6) Assistant



6. Result

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

URL for UI Dashboard: https://node-red-sixtp.eu-gb.mybluemix.net/ui



7. Advantages & Disadvantages

Advantages:

1) ***Reduced costs***: Chat bots eliminate the need for labour during online interaction with customers. This is obviously a great advantage for companies that receive multiple queries at once. In addition to saving costs with them, companies can align the Chabot with their objectives, and use them as a means to enhance customer conversion.

2) ***24/7 Availability***: Unlike humans, once we install a Chabot, it can handle queries at any time of day. Thus, the customer does not have to wait for a commercial of the company to help him. This also allows companies to monitor customer « traffic » during non-working hours and contact them later.

3) ***Learning and updating***: AI-based Chabot's are able to learn from interactions and update independently. This is one of the main advantages. When you hire a new employee, you have to train them continuously. However, Chabot's « form » themselves (with certain limitations, of course).

4) ***Management of multiple clients***: Humans can serve a limited number of customers at the same time. This restriction does not exist for Chabot's, and they can manage all the necessary queries simultaneously. This is one of the main advantages of using Chabot, as no customer is left unattended and you are solving different problems at the same time. There are Chabot's companies already working on developing voice Chabot services.

Disadvantages:

1) ***Complex interface***: It is often considered that chatbots are complicated and need a lot of time to understand what you want in customer. Sometimes, it can also annoy the client about their slowness, or their difficulty in filtering responses. They don't get you right: Fixed chatbots can get stuck easily. If a query doesn't relate to something you've previously « taught » it, you won't understand it. This can lead to a frustrated customer and the loss of the sale. Other times they do understand you, but they need double (or

triple) as many messages as one person, which spoils the user experience.

2) ***Bad memory***: The chatbots are not able to memorize a conversation already had, which forces the user to write the same thing over and over again. This can be cumbersome for the client and annoying for the effort required. Therefore, it is important to be careful when designing chatbots and make sure that the program is able to understand users' queries and respond accordingly.

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

3. The primary function of the chatbot is to be a virtual companion – To speak with senior people on general topics like the weather, nature, hobbies, movies, music, news, etc.

9. Conclusion:

An Intelligent Customer Helpdesk Chatbot was created using various Watson services like Watson Discovery, Watson Assistant, Watson Cloud Functions and Node-RED. The feedback and survey through chatbots strengthen the position of businesses as they analyze the reason behind different levels of customer approval. Use of conversational AI chatbots only means better engagement and relentless need for customer satisfaction in the near future.

10. Future Scope:

1. As natural language processing (NLP) continues to mature, virtual assistants will improve their comprehension and response capabilities, allowing for their use to become more

widespread and complex. Also, as machine learning progresses, we may see virtual assistants become smarter and begin to learn and predict customer needs.

2. Car speakers, smart home devices, and wearables are just a few examples where the virtual assistant is departing from its original hardware and making its way to in-context devices.

3. These integrations ensure that virtual assistants can always be near their human and ready to support any need. It is expected that these integrations will continue at an accelerated pace throughout 2018.

4. Voice recognition can be added with the virtual assistant. Then the customer can control application by using his voice.

5. Soon, we could be joining meetings with a voice command, instead of dialling in the long meeting ID and password.

11. Bibliography

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3. https://developer.ibm.com/recipes/tutorials/how-to-create-a-watson-chatbot-on-nodered/
4. http://www.iotgyan.com/learning-resource/integration-of-watson-assistant-to-node-red
5. https://github.com/IBM/watson-discovery-sdu-with-assistant
6. https://www.youtube.com/watch?v=Jpr3wVH3FVA

12. Source Code:

GitHub Repo URL: https://github.com/UmangAjw/Intelligent-Customer-Help-Desk

Also, YouTube URL: https://youtu.be/irchfIcORmk