INTERNSHIP PROJECT REPORT

ON

Intelligent-customer-Help-Desk-with-smart-document-

Understanding

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Project Scope

Project Name: Intelligent Customer Help Desk with Smart Document Understanding

Start Date: 18/05/2020

Project Summary:

The project revolves around the concept of a 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 is not 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 owner's manual.

Project Requirements:

The project requirements include,

- Creating a customer care dialogue
- Building an enhanced Watson Discovery collection
- Creating an IBM Cloud Functions web action
- Building a web application
- Deploying the same on IBM Cloud Platform

Functional Requirements:

The functional requirements include,

- A simple Chatbot
- When a question falls outside of the scope of the pre-determined question set, the application shall pass the question onto Watson Discovery Service, which has been pre-loaded with the device's owner's manual
- The project shall use the Smart Document Understanding feature of Watson Discovery to train it on what text in the owner's manual is important and what is not. This will improve the answers returned from the queries

- Integrating all features and building a web application and using IBM Cloud to deploy them

Technical Requirements:

The technical requirements include the following,

- Making a simple functional Chatbot
- Improving the functionality and 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
- Building a web application and using IBM Cloud

Software Requirements:

The project will require the use of following software:

- Python 3.7.4
- PyCharm/Sublime Text
- IBM Cloud
- IBM Watson
- MS Word for Project Scope
- Zoho Writer for Project Documentation

Project Deliverables:

The project aims to provide the following deliverables:

- A simple and functional Chatbot for customer interaction and queries
- Improving the Chatbot to eliminate human intervention when an out-of-scope question is prompted by the user

Project Team:

Soumallya Dev

Project Schedule:

Start Date: 18/05/2020

Tentative End Date: 17/05/2020

LITERATURE SURVEY

The literature review method is an examination of information on specific subject.

It is reviewing what is known and not what is assumed. It aims to create the final, precise representation of the knowledge and research-based theory available topic

Existing problems

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.

Proposed solution

So, the solution is that, 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.

THEORITICAL ANALYSIS

Conversations play an important role in everyday life. Conversation can be general which are used to generate fun or they can be used to solve queries. For any conversation in general at least two people are required. Conversation can also occur between a computer and a human. Such conversations can be achieved through chatbots.

What is a Chatbot?

Chatbot is made up of two words "Chat" representing conversation and"Bot" representing a robot. Hence a chatbot is enabling conversations with arobot.

- Generally speaking a bot is any software that performs an automated task, however, we are interested in the class of bots that live online in chat platforms or on social media calledchatbots.
- In this context, there are many possible definitions and some confusion about what a bot is. This is partly because there are so many varied use cases for bots and these influence what people perceive a chatbot tobe.
- The most intuitive definition is that a bot is software that can have a conversation with a human. For example, a user could ask the bot a question or give it an instruction and the bot could respond or perform an action as appropriate.

Types of Chatbots

To understand the nature of chatbot conversations it is important to understand that there are three types of chatbots:

- ***Scripted ChatBot*** : These are chatbots whose behaviour is determined by rules. Conversations with this type of chatbot can only follow predetermined paths. At each step in the conversation the user will need to pick fromexplicit options to determine the next step in the conversation. How the options are presented to the user at each step in the conversation, i.e. whether they need a text, voice or touch response will depend on the features of the chat platform and how the bot is programmed that the user is on and the design of thebot.
- ***Intelligent ChatBot*** : Intelligent chatbots are built with artificial intelligence techniques. Artificial intelligence allows them to be more flexible in terms of the user input they can accept. They can accept free form input in the formof text or voice statements (but of course they are not limited to other formsof

  input if that makes sense). AI also allows them to improve the more that they are used. It should be noted however that although AI works very well in very limited knowledge domains, or for one off instructions, the actual intelligence of the bot is limited. It is extremely difficult to get a bot to “understand” context or ambiguity or to have a useful memory that influences the conversation.

- ***Application ChatBot*** : Both scripted and intelligent chatbots can have graphical user interfaces. As mentioned, both scripted and intelligent chatbots can have graphical user interfaces. Application bots is therefore not a separate category of bots per say. The fact that the bots can be interacted with using a graphical user interface is an important concept for chatbot developers. If a user can do the job they need to do more

efficiently via a graphical interface then the bot needs to show a graphical interface at that point in the conversation.

Why chatbots are important?

Chatbot applications streamline interactions between people and services, enhancing customer experience. At the same time, they offer companies new opportunities to improve the customer engagement process and operational efficiency by reducing the

typical cost of customer service.

To be successful, a chatbot solution should be able to effectively perform both of these tasks. Human support plays a key role here: Regardless of the kind of approach and the platform, human intervention is crucial in configuring, training and optimizing the chatbot system.

How a chatbot works?

A chatbot performs two main tasks

1. User request analysis
2. Returning response

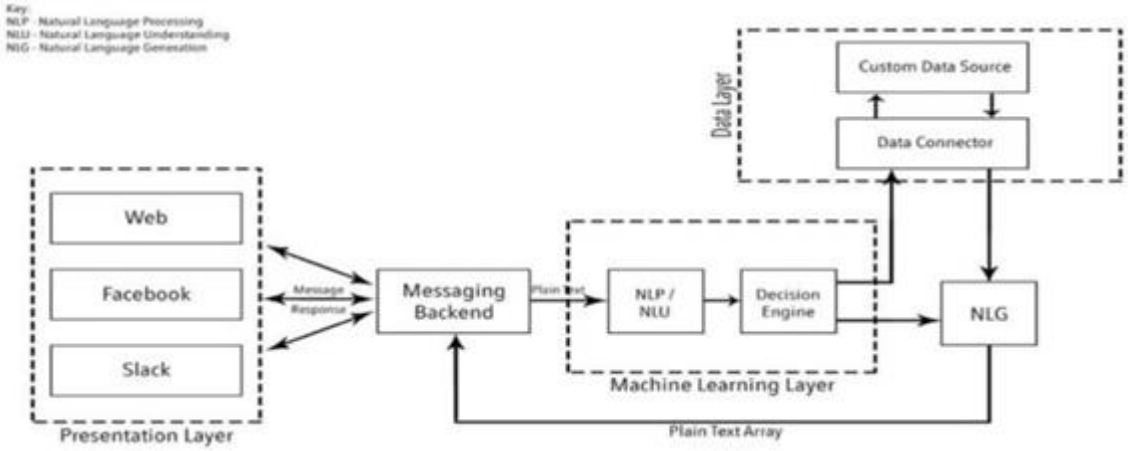
The ability to identify the user’s intent and extract data and relevant entities

contained in the user’s request is the first condition and the most relevant step at the core of a chatbot: If you are not able to correctly understand the user’s request, you won’t be able to provide the correct answer. Returning the response: once the user’s intent has been identified, the chatbot must provide the most appropriate response

for the user's request. The answer may be:

1. A generic and predefinedtext
2. A text retrieved from a knowledge base that contains differentanswers
3. A contextualized piece of information based on data the user hasprovided
4. Data stored in enterprisesystems
5. The result of an action that the chatbot performed by interacting with one or more backendapplication
6. A disambiguating question that helps the chatbot to correctly understandthe user's request

ARCHITECTURE OF A CHATBOT



SOFTWARE DESIGNING

The software which are required to build the chatbot are:

a. IBM watson services
b. IBM Assistant
c. IBM cloud
d. Github
e. Node red

f. User interface
g. JSON Editor

Creating a chatbot on IBM cloud

Process for creating a Restaurant Chatbot using IBM cloud is shown below. To build a chatbot 3 important things are to be built, they are

- Intents : An intent is a collection of user statements that have the same meaning. By creating intents, you train your assistant to understand the variety of ways users express a goal. (represented using#)
- Entities : Entities are like nouns or keywords. By building out yourbusiness terms in entities your assistant can provide targeted responses to queries. (represented using@)
- Dialog : Bot responses to the user queries are mentioned in Dialogue. Dialog contains two pre defined nodes. One is Welcome node and the other is Anything else node. The Welcome contains the text to be displayed tostart

the conversation. Anything else node triggers when no node conditions are satisfied. All the other node lie between these two nodes only.

Apart from these three, context variables are used to store user mentioned content which bot have to remember for future conversation like the person's name, email-id or any other details.

In the given example 2 context variables are used one for storing the item name for which the order has to be placed and other for storing the number i.e., the quantity of the food_item for which the order has to be placed. These contexts are stored in the bots memory and once the processing of the information is done these contexts can be deleted using simple JSON code.

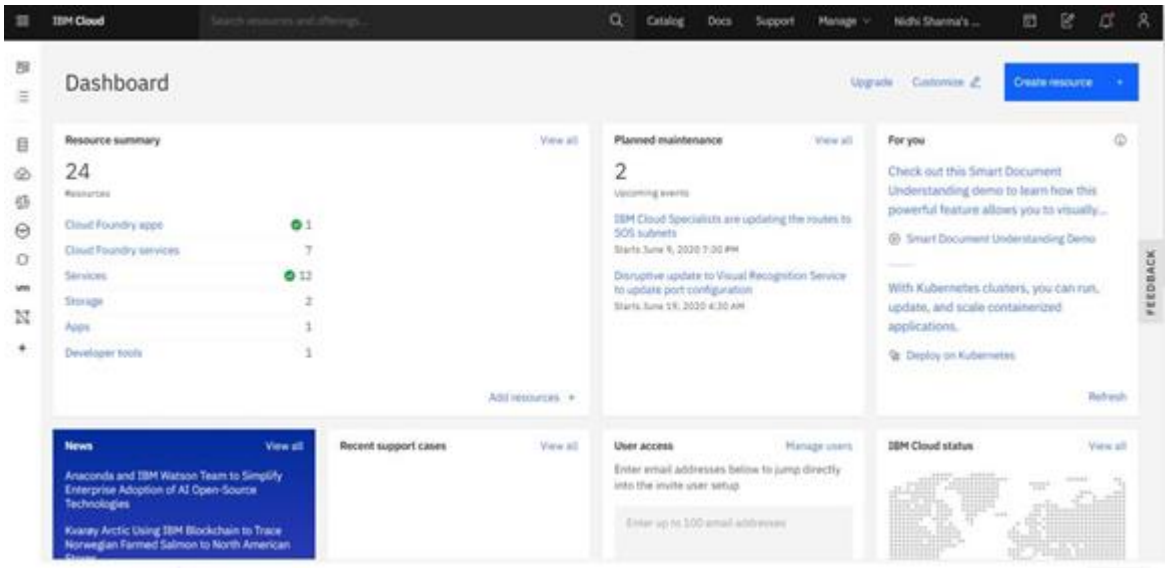
At the end of the process the bot is integrated to a sample page provided by IBM. Apart from the page, the bot can also be integrated to Third Party

Integrations like Slack, Facebook page, Intercom or Standalone Integrations like Web Chats or Preview link or as a Wordpress plugin.

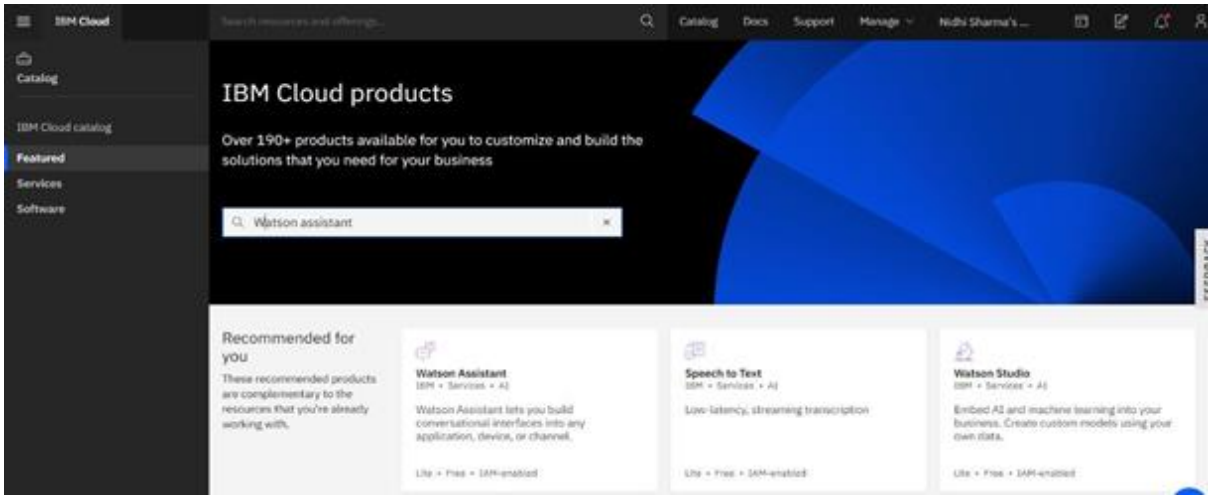
STEPS:

1. Create an IBM account by logging in into https://cloud.ibm.com/ and clicking on Create an IBMaccount.

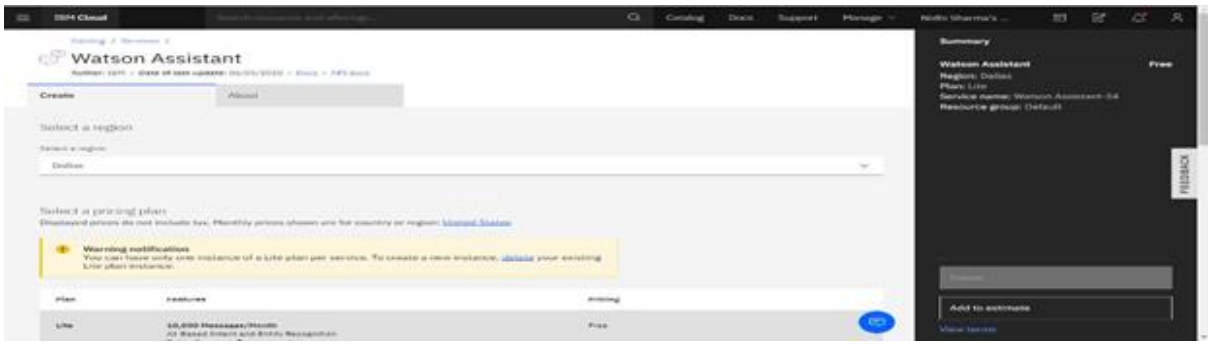
2. Fill the details and create an IBMaccount
3. Verify your email id and then login into IBM account by clicking onLogin.
4. After the login dashboard is launched. On dashboard all the created resources will bedisplayed.



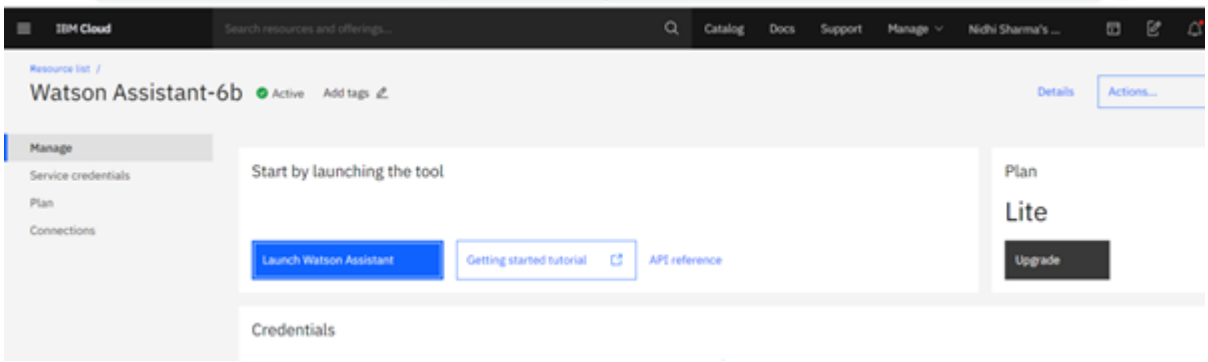
5. To create a chatbot on IBM cloud we require Watson Assistant service. All the available resources on the cloud are found under the catalog section. Open Catalog. Under categories select AI and in that Watson Assistant service isfound



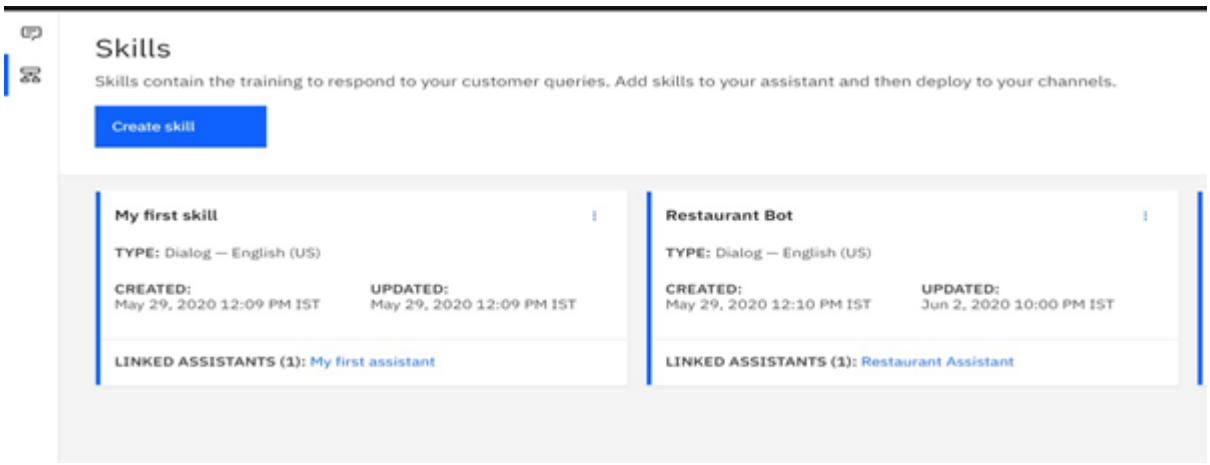
6. Click open the Watson Assistant service. Select the region, pricing plan and give a name to the service and click on Create. It's showing me a warning because I have already created this.



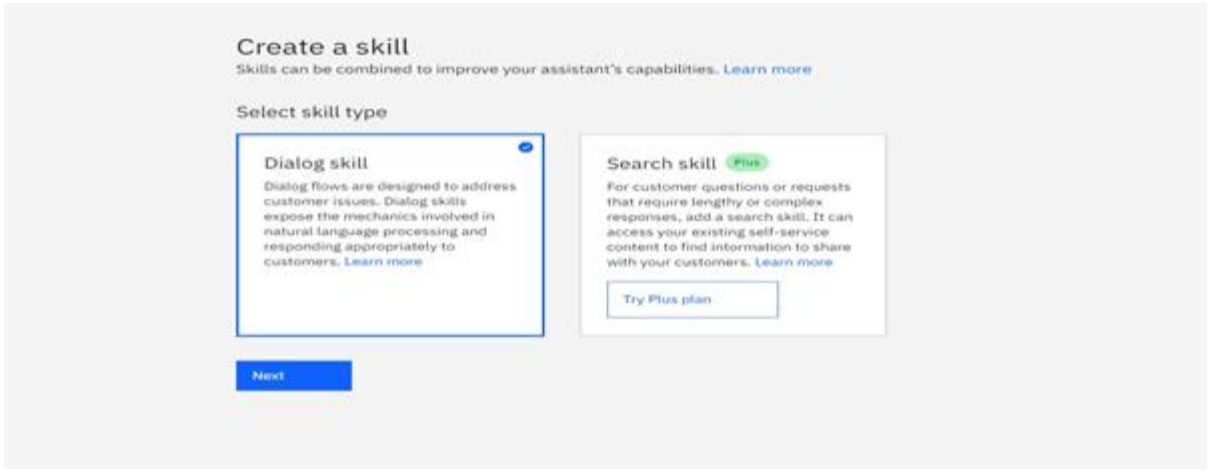
7. On launch page click on Launch Watson Assistant



8. Assistant page is launched. On the left pane click onskills.



9. On the launch page click on Create Skill. Select the skill type to be Dialog Skill and click onNext.



10. Skill can be created in 3 different ways. Select Create Skill tab and give a name to your skill (also optionally description) of the skill and click on Create a Dialog Skill.

11. You can create Intents, Entities and Dialog. and Click on Try it on the right side of the screen and check try giving the greetings and check the response.

12. Under saved integrations click Preview Link. Click on the link on the launch page, give a name to the integration and save the changes.

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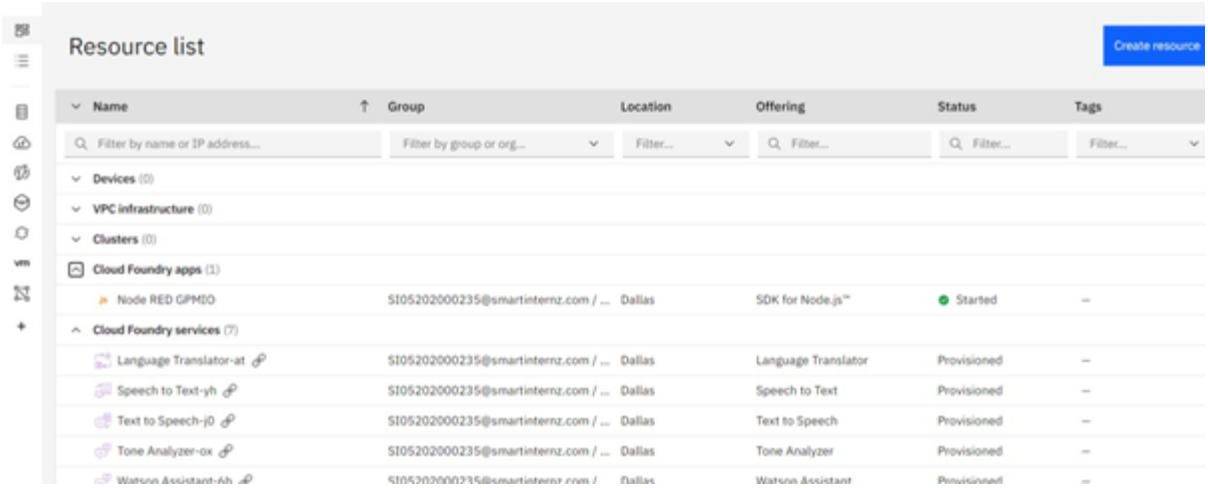
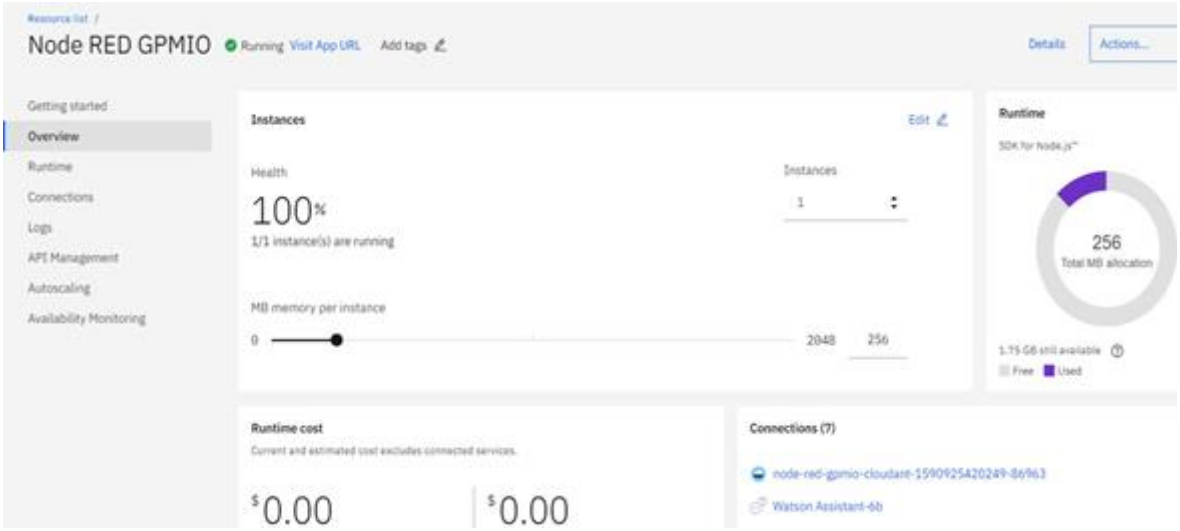
14. Test the bot with the preview given by IBM.

Creating UI of Watson Assistant with Node red flow (Chatbot)

1. Click on the services in the dashboard. Go to the Cloud Foundary apps.And click on Node red app.(Here I,m assuming that you have already created the Node-redservices).



2. A node red dashboard appears as shown below:

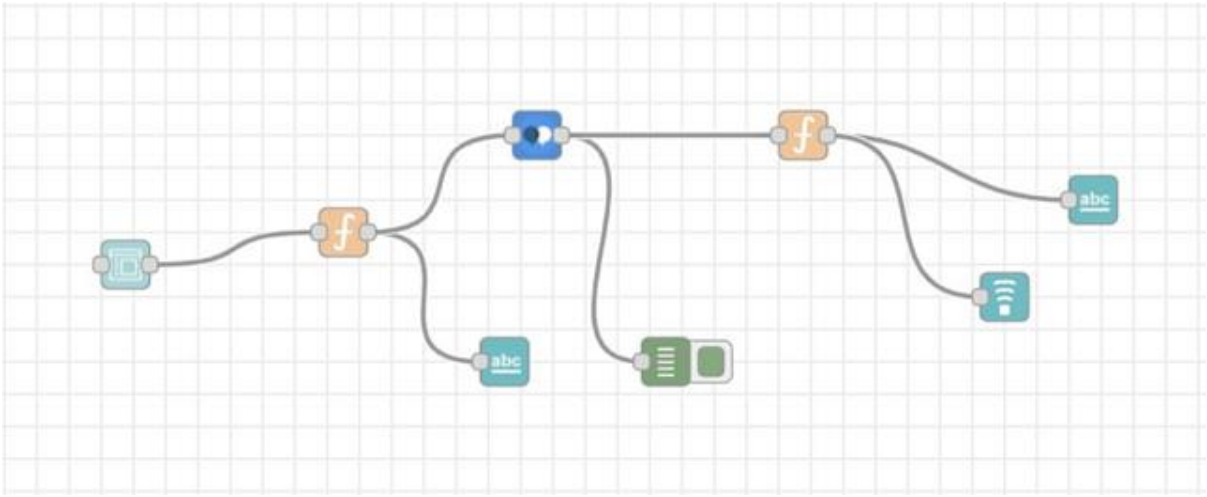


1. Click on Visit app URL. A page appears. Click on Go to your node red flow Editor.

2. Node-Red-flow-Editor page appears as shownbelow:

3. Click on import. Copy the json flow from the local repo and paste it here. and click import to new flow. The flow gotcreated.

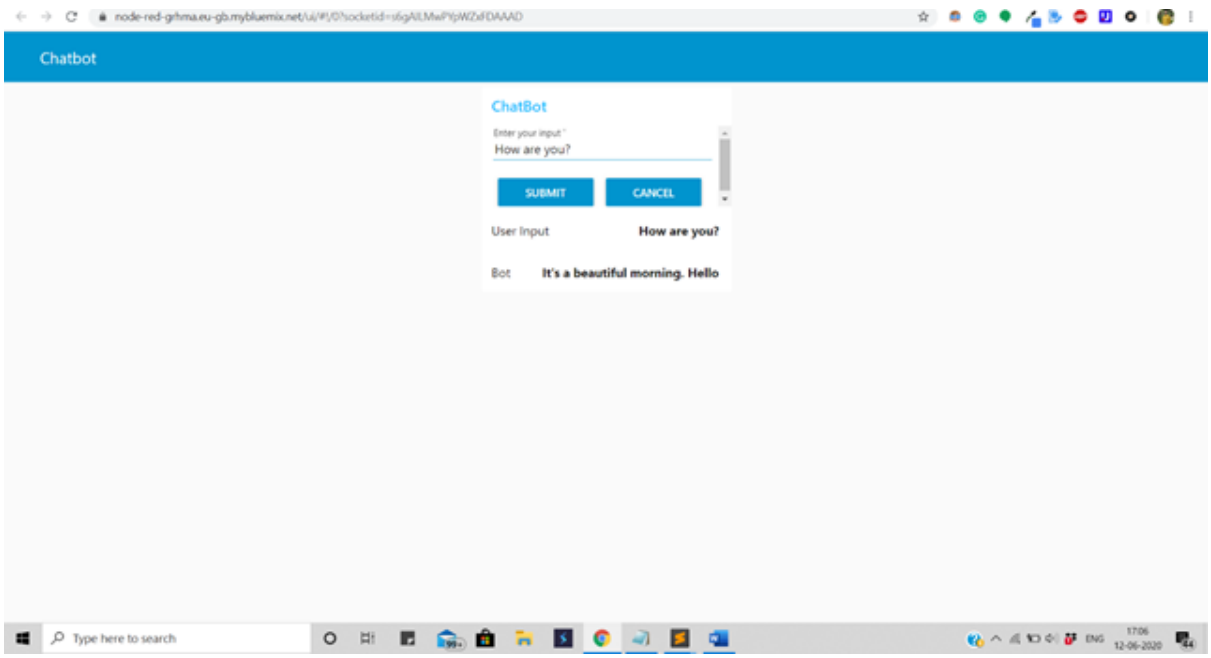
4. Here's theflow:



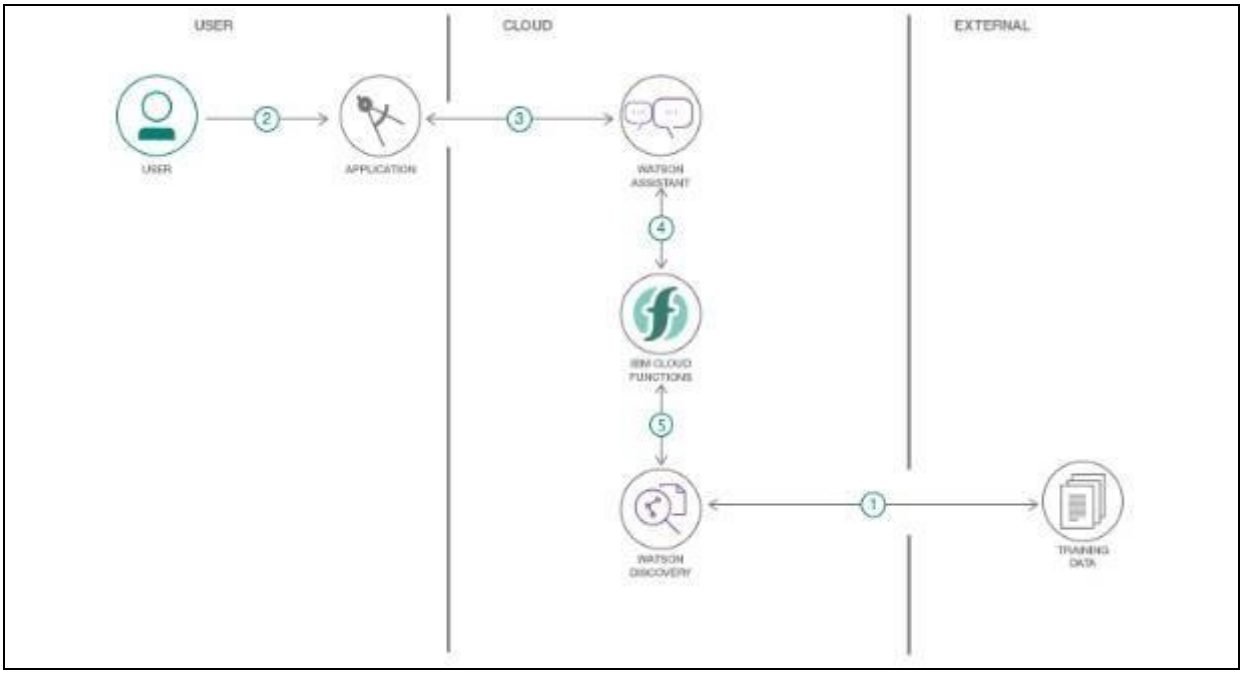
1. Deploy your Flow. Click on the dashboard. Also add the workspace Id and Serviceendpoint.

2. UI is created successfully. Click on that arrow button present near the themes.

3. The output is shown as below:



FLOWCHART:



1. The document is annotated using Watson Discovery Smart Document Understanding.

2. The user interacts with the back-end server via the app UI. The front-end app UI is a chatbot that engages the user in aconversation.
3. Dialog between the user and back-end server is coordinated using a Watson Assistant dialogskill.

4. If the user asks a product operation question, a search query is passed to a predefined IBM Cloud Functionsaction.

5. The IBM Cloud Functions action will query the Watson Discovery Service and return theresults.

RESULTS

- We have Created a Chatbot which is able to answerqueries.
- The model created i.e. a chatbot would be able to identify any operational question posted by the user and using IBM Watson discovery will redirect the user to the section of the owner's manual where the answer to the questionlies.

ADVANTAGES

Chatbots have been on the rise since a couple of years and have already faced a wide adoption. They are bringing a new way for businesses to communicate with the world and most importantly with their customers by the help of exploding popularity of messaging apps, the accelerated development of all kinds of sensors and wearables and of course with the rise of emerging technologies and Artificial Intelligence (AI).

- Keeping Up with the Trends: Being Present on Messaging Platforms
- Improved Customer Service.
- Always-Available Customer Support
- Proactive Customer Interaction Increased Customer Engagement

DISADVANTAGES

This definition however often leads to two potential misconceptions.

1. The biggest misconception that arises is that a chatbot is a bot that converses with a human in the way that another human would converse with a human. Software or even a robot (the digital part of the robot is of course software) that communicates with a human in natural language is not difficult to imagine. Science fiction is full of examples. While this may be the end goal, this is simply not possible using the current technology. Not only is it not possible, it often leads to unrealistic expectations regarding the chatbots capabilities and inevitable frustrations when those expectations are not met.

The second misconception is that a chatbot communicates using only text or voice. Actually chatbots allow users to interact with them via graphical interfaces or graphical widgets, and the trend is in this direction. Many chat platforms including WeChat, Facebook Messenger and Kik allow web views on which developers can create a completely customized graphical interfaces.

APPLICATIONS

A Chatbot is a program that can have a conversation with a person using rules and Artificial Intelligence (AI) in a way that mimics human-like conversations and interactions. Chatbots have become popular in the past few years as businesses discover innovative ways to put them to use. Having a Chatbot today has numerousbenefits for businesses – they make life easier for customers, are available 24/7, save time (no more long waits to talk to a service rep) and they are easy to use.

- *Content delivery:*Media Publishers have realized that chatbots area powerful way to engage with their audiences and monitor engagement to gain valuable insights on readerinterests.
- *Order Food:*Various fast food giants like KFC and Pizza Hut have invested in Chatbots that enable customers to place their orders through conversations. Taco Bell went a step further to improve the conversational experience by giving their Chatbot named TacoBot somepersonality.
- *Book Flights:*Icelandair's chatbot gives their customers the ability to search for and book flights in a text-based conversational manner. Instead of drop-down menus, customers enter the informationthemselves.

- *Companionship:* Russian technology company Endurancedeveloped its companion chatbot for Senior People and Patients withAlzheimer's Disease. 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. The chatbot asks questions, reacts to the answers, is able to speak on various topics, and share interesting news and facts from Google

- *Health Care:*Chatbots have also made their way into health care by easing the burden on medical professionals by facilitating faster medical diagnosis, answering health-related questions, booking appointments and lots more. A Chatbot like Super Izzy can track menstrual cycles, dates and fertilewindows.

CONCLUSION

There is more to building chatbots and conversational UI than just plugging tools, services, and data together. It takes practice and a deeper understanding of underlying concepts to get the design right and build bots that give users a great experience. The user should be able to get the job done by having a conversation with the bot without having to think too much and with a smile on their face.

From my perspective, chatbots or smart assistants with artificial intelligence are dramatically changing businesses. There is a wide range of chatbot building platforms that are available for various enterprises, such as e-commerce, retail, banking, leisure, travel, healthcare, and so on.

Chatbots can reach out to a large audience on messaging apps and be more effective than humans. They may develop into a capable information-gathering tool in the near future.

FUTURE SCOPE

Chatbots are hot software in the enterprise, but to maintain longevity and relevance, developers need to take a look at the barriers to entry, interface options and NLP issues.

From gauging purchase intent to answering questions about IT issues, chatbots are on track to play a major role in the contemporary enterprise. Chatbots are fully functioning, semi-autonomous systems that can assist customer service experiences and response time.

The clearest use of chatbots right now is in customer service and online ordering, where it can automate (and in some cases solve) customer issues or complete orders without human interaction.

- Adding Natural Language Processing in the Bot to understand the User Statements.
- Adding Sentiment Analysis to predict User Sentiment during the Chat.
- Use Voice Capabilities of the Bot.
- Use Voice Recognition with Bot.

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