

Project Report :

Intelligent Customer Help Desk with Smart Document Understanding :



Done By –

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Under Supervision Of :

Smart Bridge

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Introduction :

This is an AI enabled Customer Care chat bot which can make appointments for certain meetings, answer simple questions, get user details, etc.., This chat bot can be inserted at the help desks and receptions which acts as a virtual human and also used for automation. This can recognize the user queries and answer the questions however if it fails to recognize the user question it will ask for repeat the question or states as invalid question.

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.

1.1 Overview :

This project reduces the work of help desk by answering the simple queries by the users or clients. This “Smart help desk with smart document understanding” is built via integrating three technologies like IBM Watson Assistant, Node-Red and Watson Discovery. These Three are integrated using cloud function which acts as an API to connect these modules.

IBM Cloud is the Platform which holds all these modules and creates a gateway to build end products. Basically this is an AI enabled chat bot which recognizes the user queries and answer the question based on the certain input. This AI bot understands the query using NLP (Natural Language Processing) and NLU (Natural Language Understanding).

1.2 Purpose :

The most important purpose of this project is to reduce the automation tasks. In the normal method any person is required to answer these repetitive and small queries so, to automate these tasks I have created this AI chat bot which answer the queries of user and replay backs with accurate input.

The Next Important task is to make appointments for the user if he/she is busy with their work. We just have to load all the required document for the tasks to do if user needs to make any appointment for a certain organization or a company.

1.3 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 :

Def : A literature survey or a literature review in a project report is that section which shows the various analyses and research made in the field of your interest and the results already published, taking into account the various parameters of the project and the extent of the project.

2.1 Existing System :

In the Existing system the chat bot can answer the questions made by the user but, if any question falls outside the pre-built intent / trained question it doesn't make any response to the user so, the user won't be satisfied by the answer and recognize this is a bot.

The main theme of our project is to eliminate the human and create a virtual human and answer all the questions which are asked by the human being. So, this is the biggest disadvantage of the existing system

2.2 Proposed System :

Here I have proposed a system which is enabled by AI and answer all the questions which are asked by the user and replay

Back with an accurate answer. If any question falls out of the trained intents / Question within seconds bot will make a request to the Watson discovery and pulls the answer from the document which we have trained earlier.

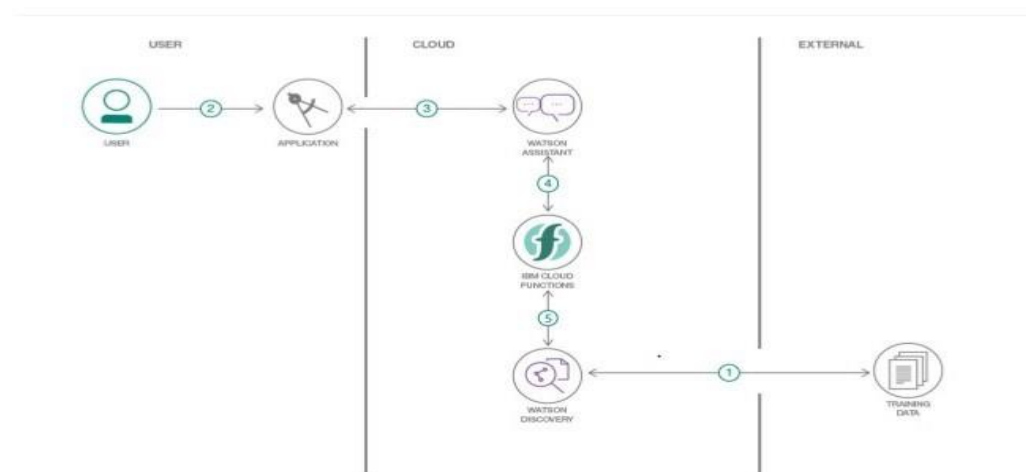
Another important part is here no human is needed. Only we have to train the data and it will take care of everything.

This is less expensive and easy to maintainable.

3. Theoretical Analysis :

Theoretical analysis means investigation of problem's decision process methods and peculiarities of the problem description and initial data impact on obtained results. This is the analysis which will give insights for the requirements and statements.

3.1 Block Diagram:



3.2 Software and Hardware Designing:

There are two steps to create this project.

1. Creating IBM Cloud Services:

1. Creating Watson Assistant:
2. Creating Watson Discovery
3. Creating Node-Red Application
4. Creating Cloud function

2. Configuring IBM Cloud Services :

The first important thing is to create the Watson Assistant which provides response to the user queries. Here we will declare the Intents, Entities and Dialog elements to make an interactive conversation. We can try Watson Assistant while creating by clicking on Try button on the top right corner of the page.

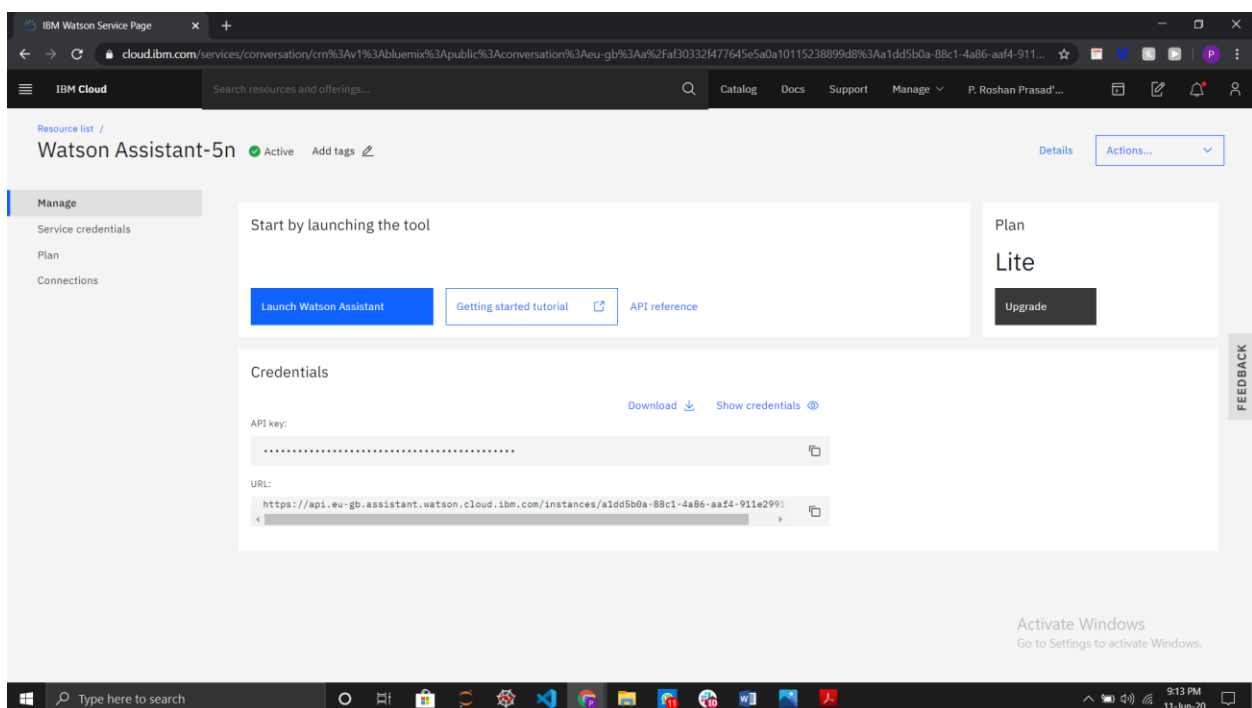
The second thing is to create a Watson Discovery and an input dataset (Document) with the required information about the organization. Here we will train the discovery with this document and highlight the titles/ sub-titles based on the requirements and split the document.

The third thing is to integrate these Watson Assistant and Discovery. So, here we are using the cloud function basically the JSON (Java script Object Notation) file which will make a bridge for these two.

The Final thing is to make a UI (User Interface) that will contain an input field, submit and reset field. Here user has to write their query in the input field and click on submit button. Now, Assistant will recognize the question and gives response.

4. Experimental Investigations :

Watson Assistant :



IBM Watson Assistant Life Upgrade

Intelligent Customer Help Desk

This is an Intelligent Customer chatbot which able to understands the user queries and conversations.

Skill

A dialog skill provides specific responses you've created. Choose one for your assistant. [Learn more](#)

Dialog

LANGUAGE:	TRAINED DATA:	VERSION:	DESCRIPTION:	VERSION CREATED:
English (US)	7 Intents 3 Entities 25 Dialog nodes	---	---	---

LINKED ASSISTANTS (1): Intelligent Customer Help Desk

Search Plus

Expand your assistant's knowledge
For customer questions or requests that require lengthy or complex responses, add a search skill. A search skill can access your existing self-service content to find relevant information and share it with your customers. [Learn more](#)

[Try Plus plan](#)

Integrations

Choose a channel to deploy your assistant.

[Add integration +](#)

Deploy with Web Chat Plus

Add your assistant to your company website.

[Integrate Web Chat](#)

Saved integrations

Activate Windows
Go to Settings to activate Windows

Preview Link

IBM Watson Assistant Life Upgrade

Help Desk Chatbot

Intents Entities Dialog Options Analytics Versions Content Catalog

[Add node](#) [Add child node](#) [Add folder](#)

- Welcome
welcome
1 Responses / 0 Context Set / Does not return
- greetings
@greet
5 Responses / 0 Context Set / Does not return
- thank you
@thank || @thank
2 Responses / 0 Context Set / Does not return
- change language
#changelanguageorientation
2 Responses / 0 Context Set / Does not return
- adjust brightness
#adjustbrightness

Try it out

Clear Manage Context

Hi! there how can I help you?

good morning

#greetings

@greet:good morning

A pleasant morning

Use the up key for most recent

Enter something to test your assistant

Discovery :

IBM Watson Service Page

cloud.ibm.com/services/discovery/cm%3Av1%3Abluemix%3Apublic%3Adiscovery%3Aeu-gb%3Aa%2Faf30332f477645e5a0a10115238899d8%3Abc19e0db-0da9-4f46-bf8d-1d3f12a13...

IBM Cloud

Search resources and offerings...

Resource list /

Discovery-1n Active Add tags

Details Actions...

Manage

- Getting started
- Service credentials
- Plan
- Connections

Start by launching the tool

Launch Watson Discovery Getting started tutorial API reference

Credentials

Download Show credentials

API key:

URL:

https://api.eu-gb.discovery.watson.cloud.ibm.com/instances/bc19e0db-0da9-4f46-bf8d-1d3f12a1...

Plan Lite

Upgrade

FEEDBACK

Activate Windows
Go to Settings to activate Windows.

Type here to search

9:15 PM 11-Jun-20

IBM Watson Service Page

IBM Watson Discovery - Collecti...

eu-gb.discovery.watson.cloud.ibm.com/regions/eu-gb/services/cm%3Av1%3Abluemix%3Apublic%3Adiscovery%3Aeu-gb%3Aa%2Faf30332f477645e5a0a10115238899d8%3Abc1...

IBM Watson Discovery

Instance: Discovery-1n

apple_watch_user_guide

Configure data

Overview Errors and warnings (87) Search settings

87 documents

0 documents failed View details

Created on: 6/1/2020 8:58:20 am EDT

Upload documents

Identified 5 fields from your data

- footer
- subtitle
- table_of_contents
- text
- title

Need to identify more fields? Add fields

Added 4 enrichments to your data

Entity Extraction

Apple (82) Siri (7) 18-karat (3) 4-digit (2) U.S. (2)

Sentiment Analysis

43% positive 13% neutral 45% negative

Concept Tagging

App Store (38) Apple Inc. (26) iPhone (24) Watch (14) Graphical user interface (12)

Category Classification

technology and comp... tech news

5 enrichments available. Add enrichments

Now you're ready to query!

Entities of type Company which have negative sentiment Run

Documents about Apple as a Company with a very negative sentiment Run

Most common entity types and their top entities Run

Build your own query ->

Activate Windows
Go to Settings to activate Windows.

Type here to search

9:16 PM 11-Jun-20

Cloud Function :

Getting Started ▾

Actions

Triggers

APIs

Monitor

Logs

Namespace Settings

Search Actions Create

▾ Default Package ⓘ

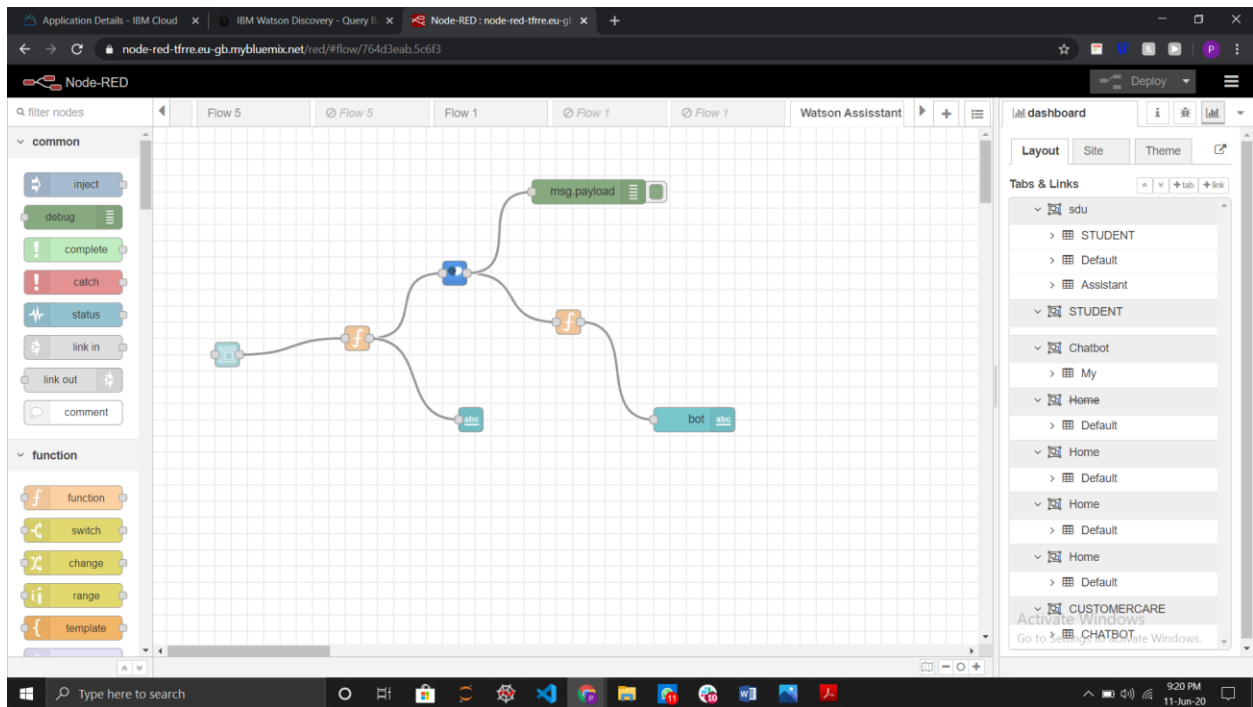
Name	↓	Runtime	Web Action	Memory	Timeout	
assistantenhanced		Node.js 10	Enabled	256 MB	60 s	

Items per page: 10 ▾ 1-1 of 1 items

1 ▾ 1 of 1 pages

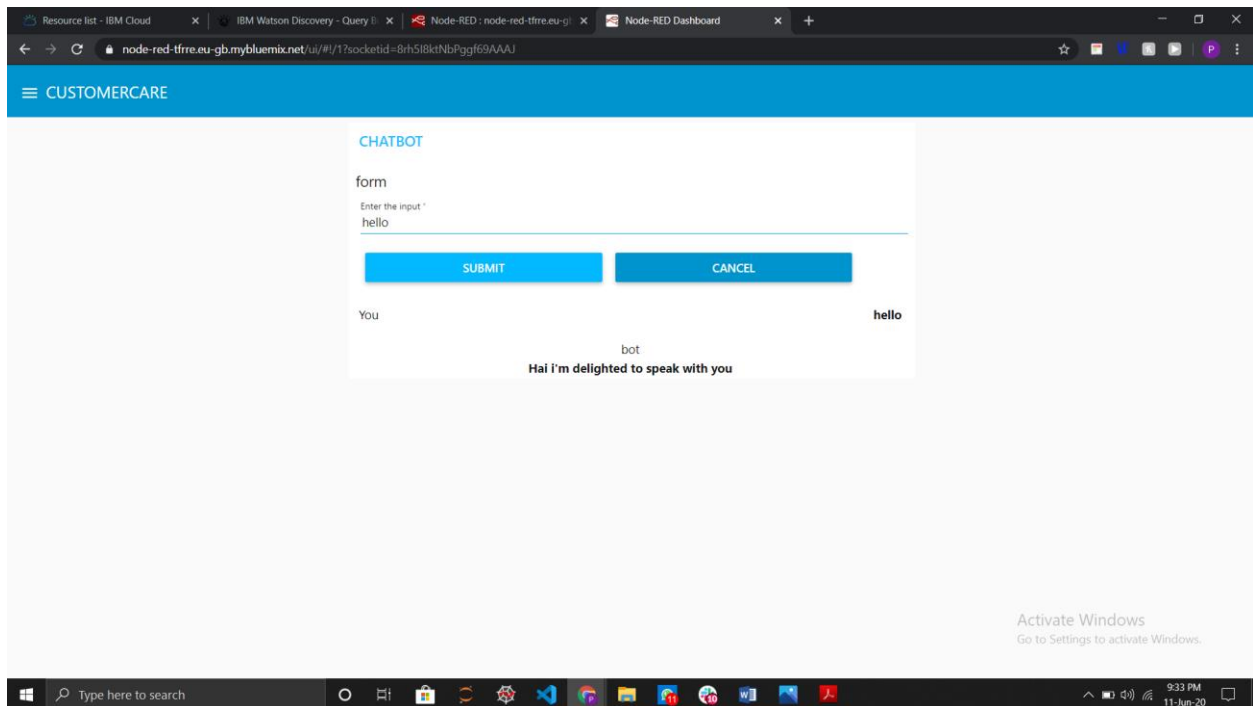
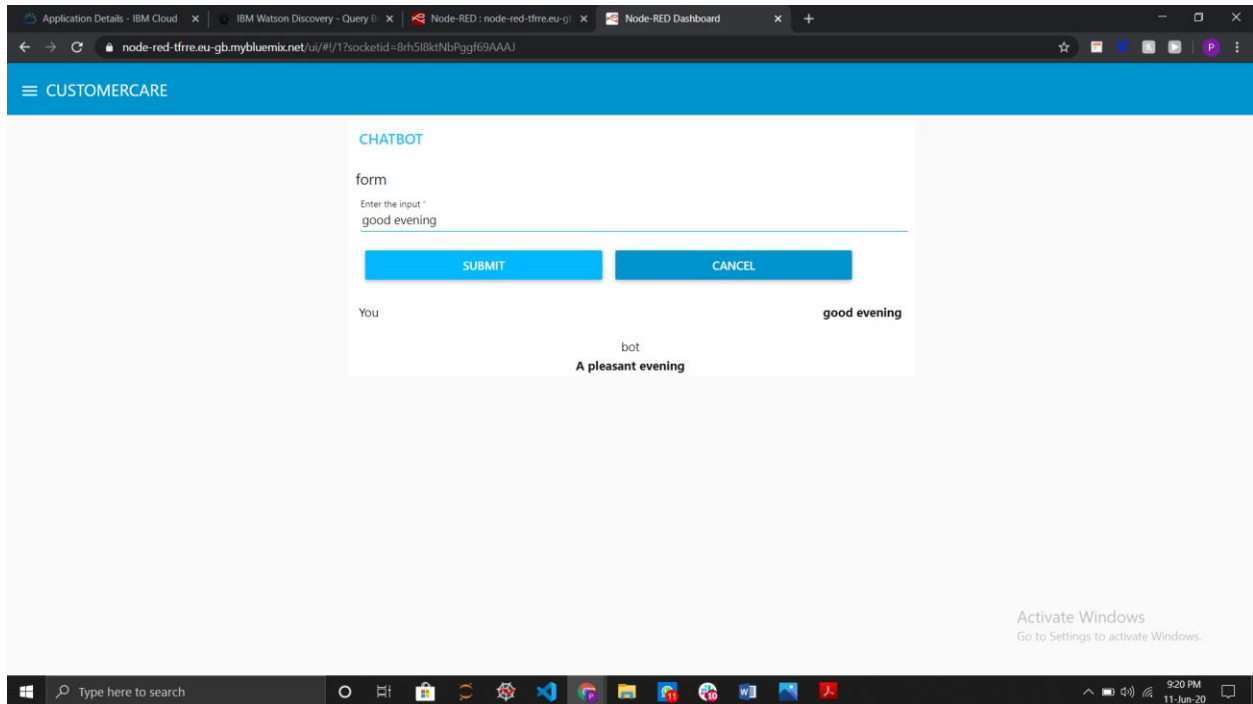
Code ⓘ Node.js 10 Edit mode - press **ESC** to exit Invoke with parameters Invoke ▶

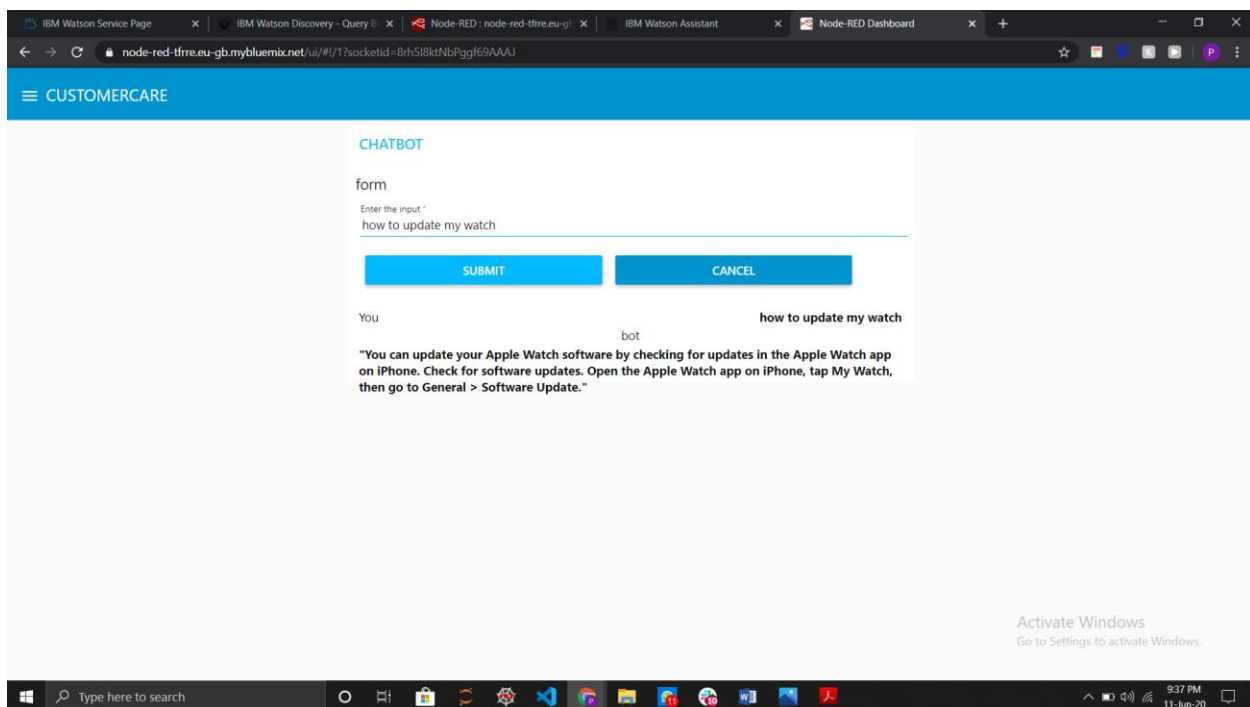
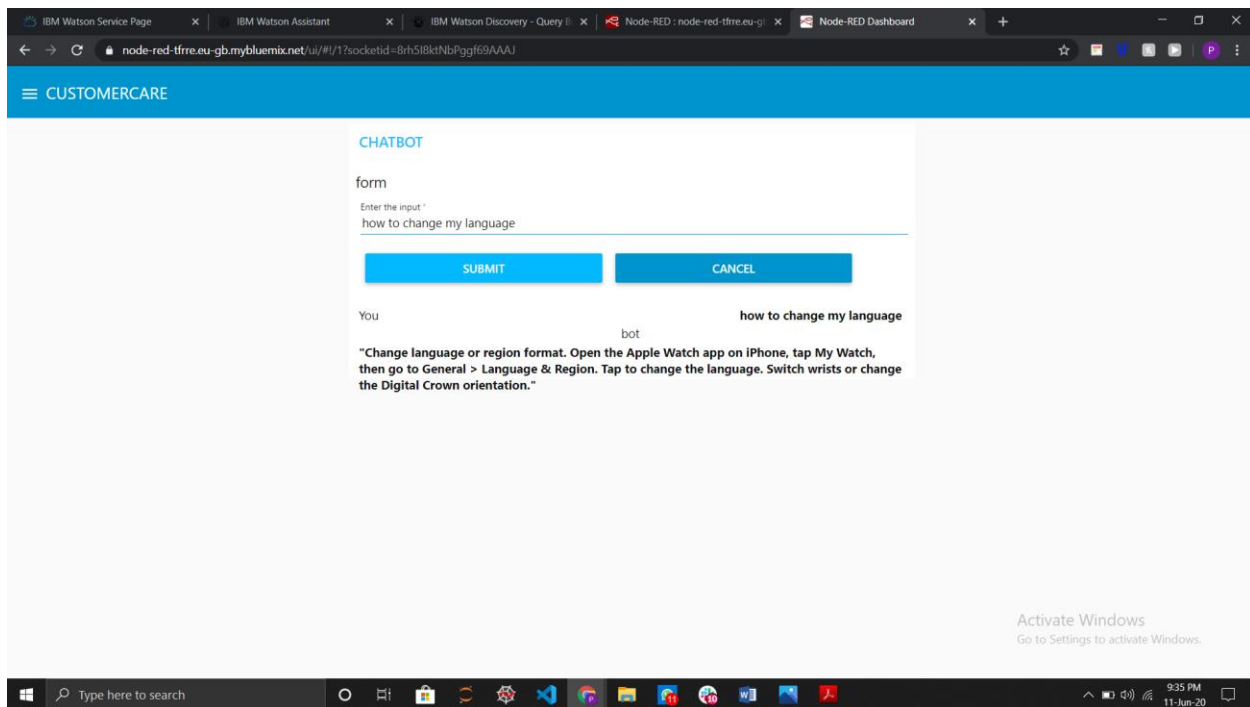
```
1  /**
2   *
3   * @param (object) params
4   * @param (string) params.iam_apikey
5   * @param (string) params.url
6   * @param (string) params.username
7   * @param (string) params.password
8   * @param (string) params.environment_id
9   * @param (string) params.collection_id
10  * @param (string) params.configuration_id
11  * @param (string) params.input
12  *
13  * @return (object)
14  *
15  */
16
17  const assert = require('assert');
18  const DiscoveryV1 = require('watson-developer-cloud/discovery/v1');
19
20  /**
21   *
22   * main() will be run when you invoke this action
23   *
24   * @param Cloud Functions actions accept a single parameter, which must be a JSON object.
25   *
26   * @return The output of this action, which must be a JSON object.
27   *
28   */
29  function main(params) {
30    return new Promise(function (resolve, reject) {
31      let discovery;
32
33      if (params.iam_apikey){
34        discovery = new DiscoveryV1({
35          'iam_apikey': params.iam_apikey,
36          'url': params.url,
37          'version': '2019-03-30'
38        });
```

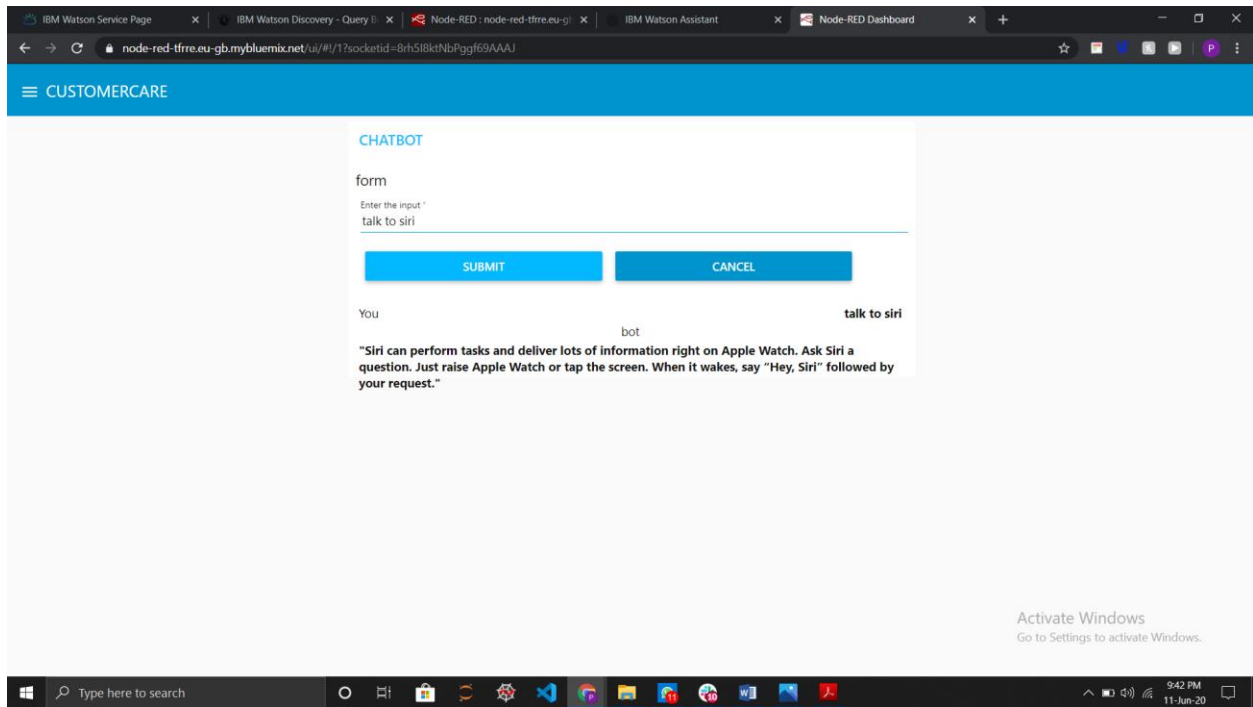
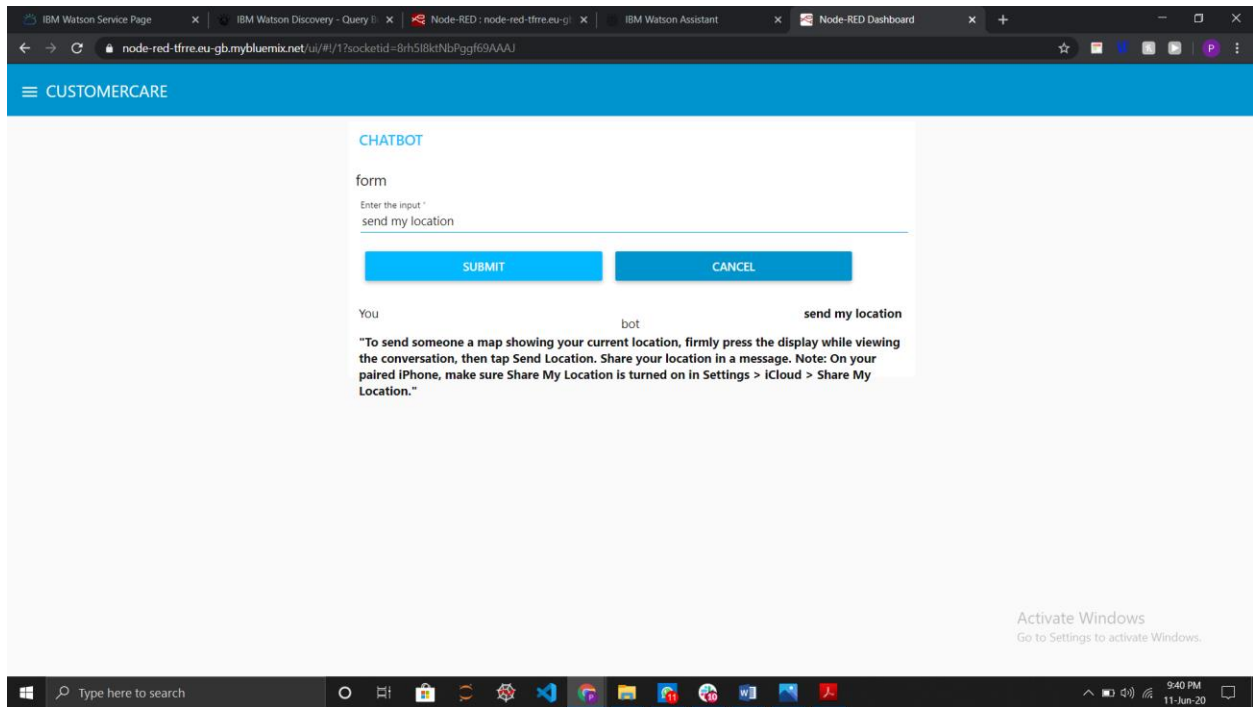



The screenshot shows the CUSTOMERCARE chatbot interface. The chatbot is named 'CHATBOT' and is in 'form' mode. The input field shows 'good evening' and the output shows 'A pleasant evening'. The interface includes a 'SUBMIT' button and a 'CANCEL' button. The bottom status bar shows the time as 9:20 PM on 11-Jun-20.

5. Results :







6. Advantages and Disadvantages :

1 . Advantages :

- It automates the repetitive tasks
- It is less expensive
- Increases user interaction
- It can be integrated be in any platform
- Rich analytics and customer interaction
- Instantaneous response without the need for human response delays
- It has an ability like Quick learning and updating
- This chat bot can Management of multiple clients

2. Disadvantages :

- It will take more time for training if we has big dataset or document.
- They have been designed to handle first-level questions only. They may not be able to solve complex queries
- This is not a human which can able to understand the emotions of humans
- To create a efficient chat bot it requires AI concepts and programming knowledge

7. Applications :

- Recruiting : This chat bot can be used to screen the interviewee for the first level. This chat bot can be programmed so that it can ask basic questions like “Do you have any programming experience?”, “What is the A/B testing?”, etc., so that the bot can rate a person’s performance based on their answers.
- Medical : This chat bot can be used as a virtual doctor which can track the symptoms of the user and alerts them when it is emergency. This can also give suggestions based on their suggestions.
- Booking Appointments : Chat bots are smart so, they can also book appointments like Hospitals, meetings, saloons, restaurants, boot camps, etc.,
- Help User : Chat bots can also be used as a friend to the user by displaying any information from the web. If any person asks anything to the user, it will search that information and give accurate output.

8. Conclusion :

Chat bots are becoming smart by improving the performance and user experience. Bots are very essential in the future because most of the companies are implementing in their companies like a virtual customer care – which solves the user queries and assist them.

The next important aspect for the chat bot are feedback and survey through chat bots they strengthen the position of businesses as they analyze the reason behind different levels of customer approval.

They can also make conversations based on the user's mood like playing music, playing games, etc.,

9. Future Scope :

1 . Voice based control :

The next generation chat bots can be used to control the vehicles by the user's voice like “park my car”, “open roof top”, etc., these experiments are in testing now and can be definitely implemented in the future.

2. Emotional Chat bot :

Chat bots are becoming smarter so, we can expect the bots can

Understand the human emotional language and gives response and also recognizes the human voice and perform tasks based on the desire of user. NLP (Natural Language Language) is making tremendous things by improving them.

3. Smart Control :

Smart control in the sense we can control all our surroundings by virtual bots. Like we can unlock the door by saying “open the door.” Integrating the IOT and Chat bots will have a great impact.

10. Bibliography :

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