A Project Report on

Intelligent Customer Helpdesk with Smart Document Understanding

By -

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1. Introduction :-

1.1 Overview :-

I have built a chatbot using IBM cloud, Watson Discovery, Watson Assistant and Node-red which can answer queries related to customer helpline. This chatbot uses Watson Discovery to understand a document using natural language processing which can analyze sentiment of document(it is positive, negative or neutral).

1.2 Purpose :-

The chatbot which is used nowadays is hard coded i.e. it gives the information about what it is trained on. If anyone asks any irrelevant question, it fails to answer and connects the customer to customer representative.

This chatbot uses smart document understanding feature of Watson discovery to search the answer of question within a document on which it is trained. It search for a answer using natural language processing feature. This chatbot asks user to connect to customer representative when user asks it to do so. Using webhook this discovery feature can be integrated with Watson assistant. Finally, this assistant is integrated with node-red which is used to make a user interface.

2. Literature Survey :-

2.1 Existing Problem :-

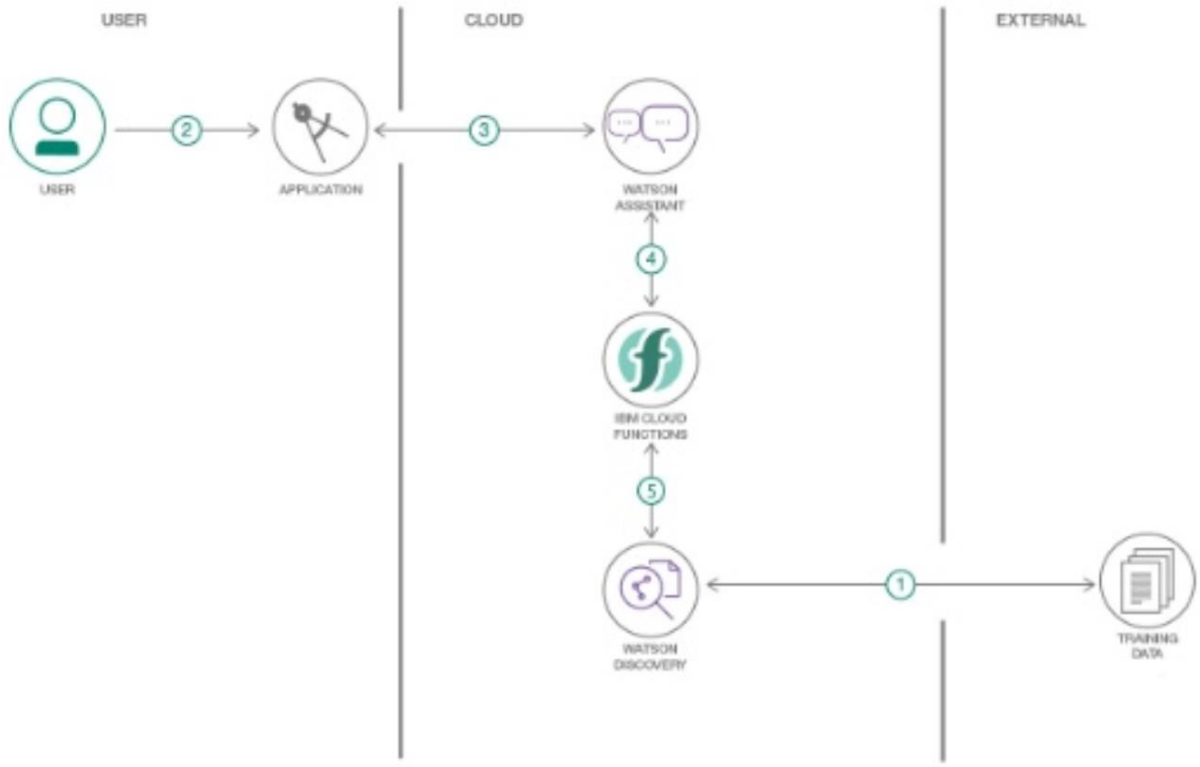
Basically a chatbot means answers to some hard coded questions. If the chatbot doesn't understands the question it gives reply like "Please try again", "I am unable to get you" and "Transferring call to representative". Due to this problem, user requires more time to solve his problem and also there is more need of manpower to do such job. So to take care of this problem we have to include a service in our chatbot which will act like a virtual agent.

2.2 Proposed Solution :-

To solve the above problem Watson discovery feature of IBM Cloud is used. Watson discovery takes the document as input and it is trained on that input data. User has to train it by separating title, subtitles, headings and test. After training 10-15 pages whole document is trained automatically. By using cloud functions, this feature is integrated with Watson assistant and tested. Now, if user asks any question to this chatbot it search for the answer in the document given at the time of training discovery. Thus it increases the chances of giving answers to the user.

3. THEORITICAL ANALYSIS

3.1 Block diagram



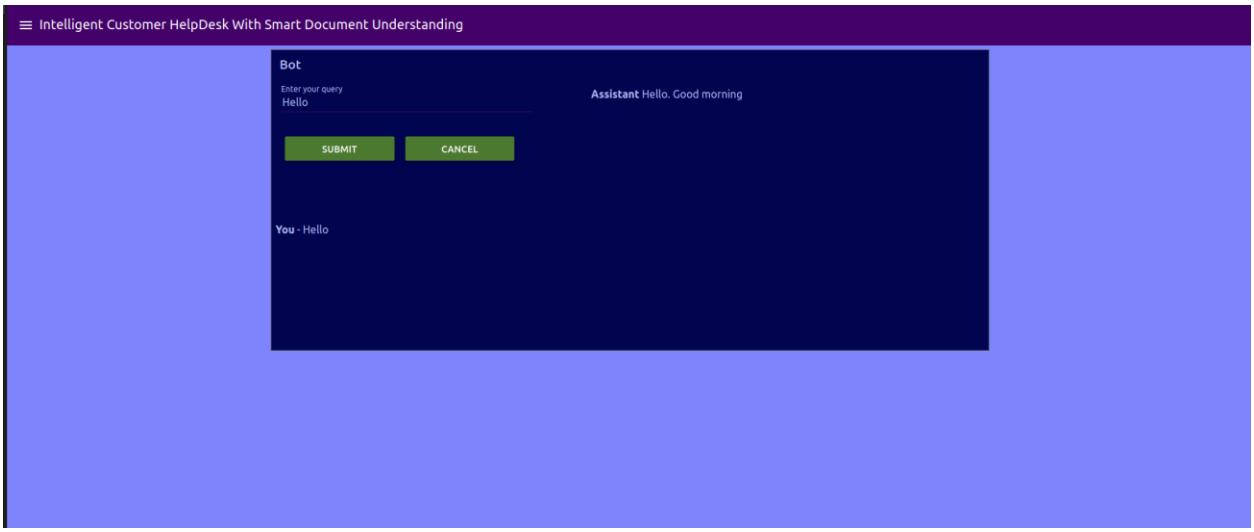
This block diagram shows that first Watson assistant is configured and then with cloud functions are used and Watson discovery is trained and the final result is given to node-red.

3.2 Hardware / Software designing :-

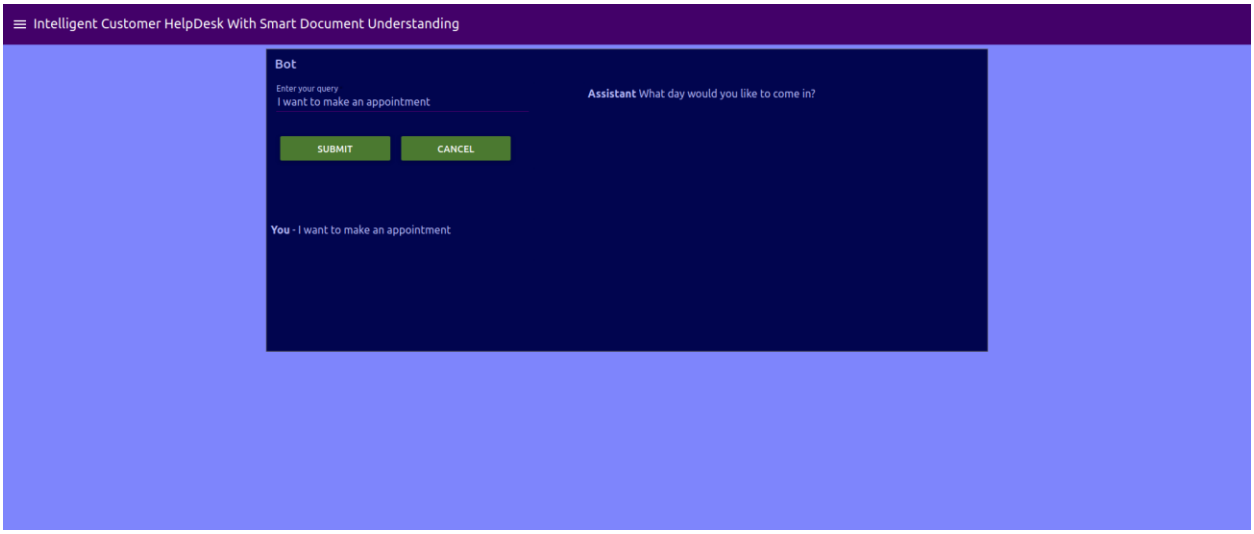
- Create IBM cloud services.
- Configure Watson Discovery
- Create IBM Cloud Function action
- Configure Watson Assistant
- Create flow and integrate node
- Deploy and run node-red app

4. Experimental Investigations :-

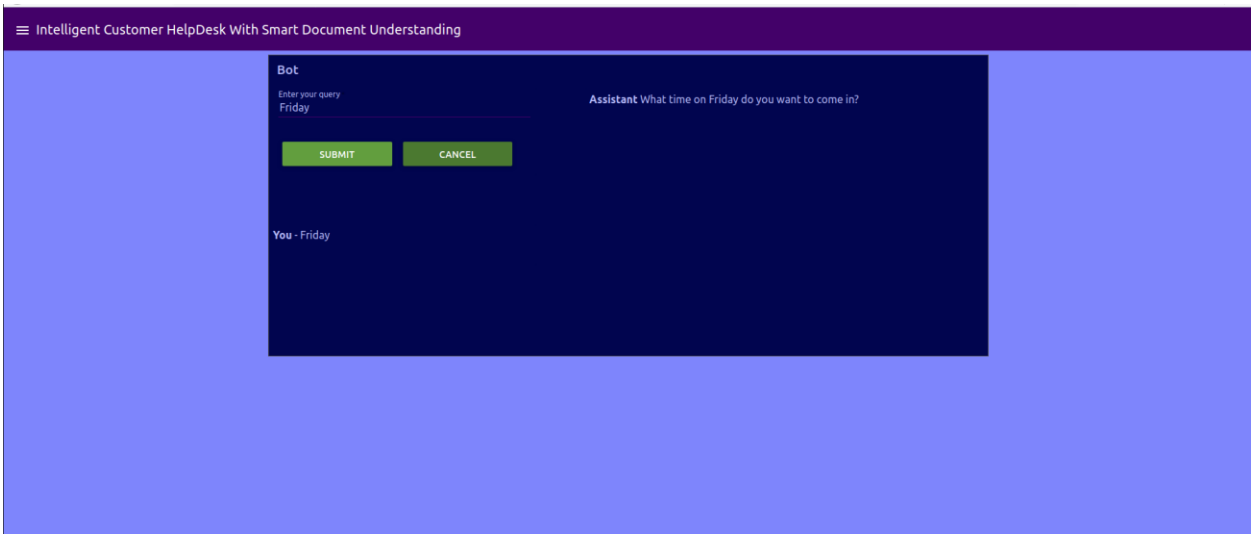
1.


Intelligent Customer HelpDesk With Smart Document Understanding
Bot
Enter your query
Hello
SUBMIT
CANCEL
Assistant Hello. Good morning
You - Hello

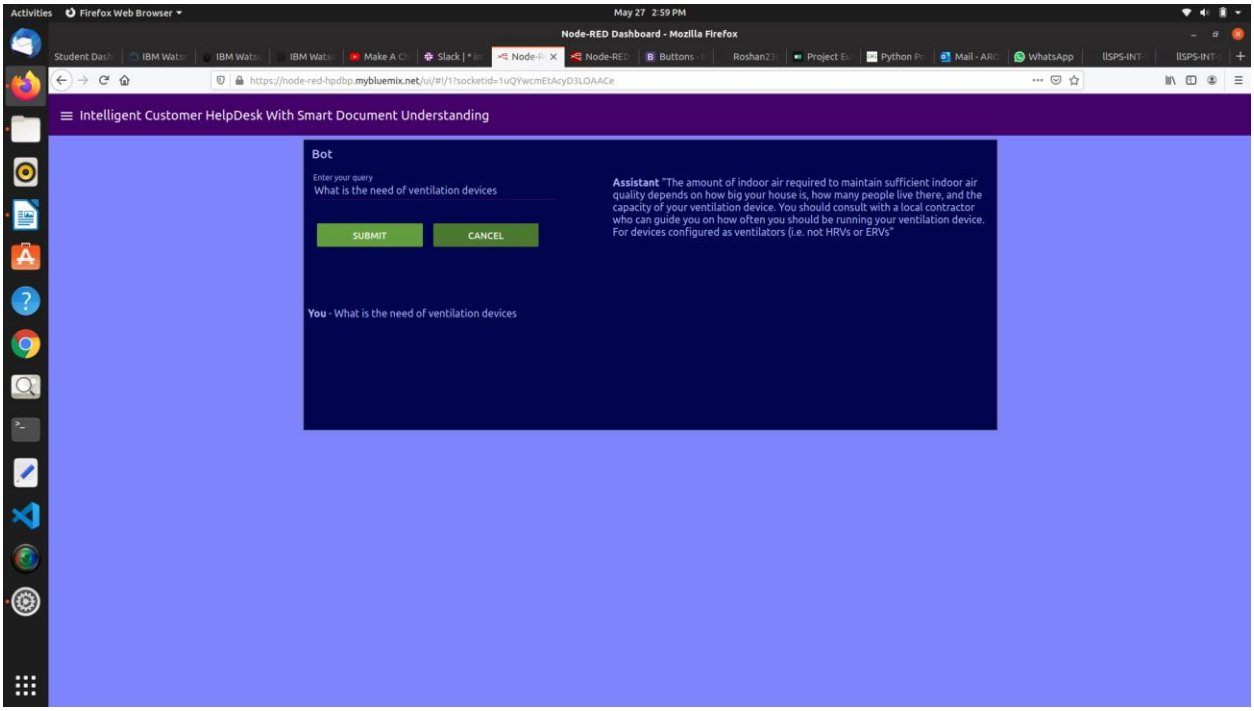
2.


Intelligent Customer HelpDesk With Smart Document Understanding
Bot
Enter your query
I want to make an appointment
SUBMIT
CANCEL
Assistant What day would you like to come in?
You - I want to make an appointment

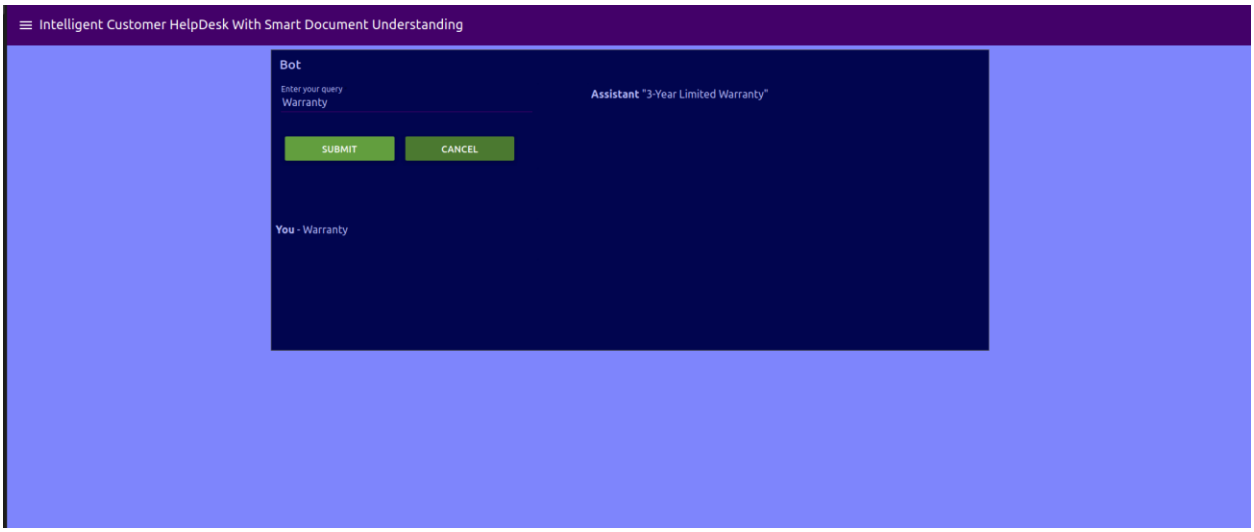
3.


Intelligent Customer HelpDesk With Smart Document Understanding
Bot
Enter your query
Friday
SUBMIT
CANCEL
Assistant What time on Friday do you want to come in?
You - Friday

4.


Activities
Firefox Web Browser
May 27 2:59 PM
Node-RED Dashboard - Mozilla Firefox
https://node-red-hpdbp.mybluemix.net/ui/#!/1?socketid=1uQYwcmEtAcyD3LOAACe
Intelligent Customer HelpDesk With Smart Document Understanding
Bot
Enter your query
What is the need of ventilation devices
SUBMIT
CANCEL
Assistant "The amount of indoor air required to maintain sufficient indoor air quality depends on how big your house is, how many people live there, and the capacity of your ventilation device. You should consult with a local contractor who can guide you on how often you should be running your ventilation device. For devices configured as ventilators (i.e. not HRVs or ERVs"
You - What is the need of ventilation devices

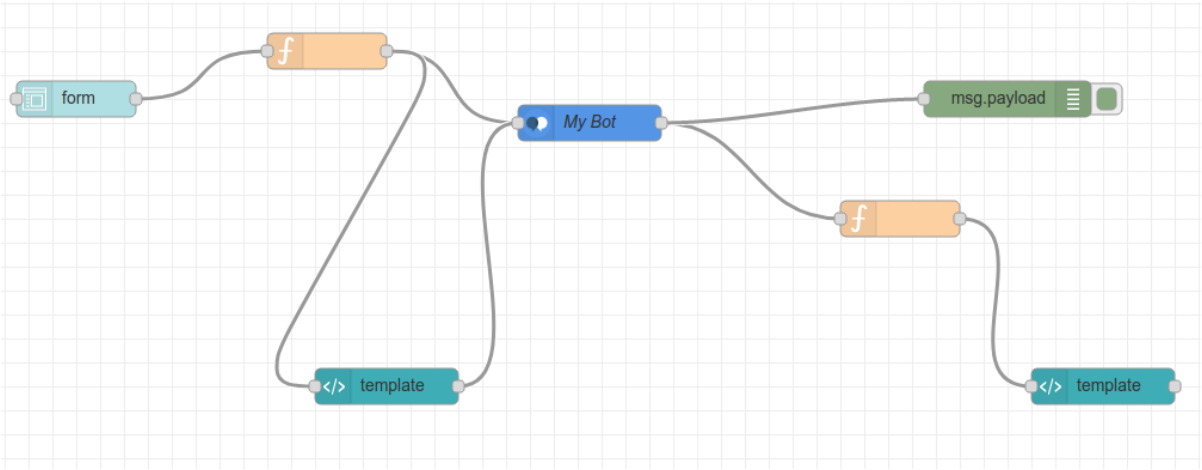
5.



5. FlowChart :-

I have inserted following nodes in my node-red flow editor

- Form Node
- Function Node
- Assistant Node
- Debug Node
- Template Node



6. Results :-

Finally Node-red User Interface is created and can be tested from this url

https://node-red-hpdbp.mybluemix.net/ui/#!/1?socketid=1uQYwcmEtAcyD3LOAACe

7. Advantages and Disadvantages :-

Advantages :-

- It can be used as a customer service in many E-commerce websites.
- It reduces manpower.
- Cost Efficient.
- No need to redirect calls directly to customer service agent as this chat bot uses smart document understanding feature.

Disadvantages :-

- Some times this chat bot can mislead users as it has some error while understanding the document.
- It can give same anwers to different questions.
- Sometimes it can’t understand user’s intention.

8. Applications :-

- It can be used in E-Commerce websites to solve the queries of the customer.
- It can be used to deploy in various social media sites such as telegram, facebook, slack, etc.

9. Conclusion :-

In this simple way, one can create a intelligent chatbot using IBM cloud, Watson Assistant, Watson Discovery and Node-red.

10. Future Scope :-

We can integrate various other features like speech to text and text to speech converter so that it can be used for an individual's personal assistant.

11. Bibilography :-

- **Node-red starter application :-**

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

- **Watson Assistant Guide :-**

  http://www.iotgyan.com/learning-resource/build-chatbot-using-watson-assistant-tool

- **Watson Discovery Guide :-**

  https://www.youtube.com/embed/Jpr3wVH3FVA

- **Watson Assistant with Webhooks :-**

  https://www.youtube.com/embed/5z3i5IsBVnk

- **Cloud Functions Guide :-**

  https://cloud.ibm.com/docs/openwhisk?topic=cloud-functions-getting-started

Appendix

A. Source Code :

For source code visit https://github.com/SmartPracticeschool/llSPS-INT-665-Intelligent-Customer-Help-Desk-with-Smart-Document-Understanding

For youtube video visit https://youtu.be/J6KEy8RTAl4