Smart Bridge Internship Project Report

Project Title: Intelligent Customer Help Desk with Smart Document Understanding
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Video Demo Link (on YouTube):https://youtu.be/DSwKLhkx5fI
Node-Red Dashboard Link: https://node-red-glkyu.eu-gb.mybluemix.net/ui

1.Introduction
1.1. Overview
A chatbot is an application of AI that is capable of mimicking human conversations. It finds many applications today. For eg., the use case

1.2. Purpose
The objective here is to build a Hospital Customer Care Chatbot using IBM watson services like Discovery and Watson Assistant. Discovery is to be used for its Smart Document Understanding for improved training. A web dashboard is to be built by integrating the mentioned services and then should be deployed on IBM Cloud Platform.

2. Literature Survey
2.1. Existing Problem
Customer care is necessary for any organisation to allow communication with customers.Efficiency of the customer care degrades when it is stretched thin for many reasons like customers may contact customer care multiple times for problems whose solutions are readily available in product manuals or like today with lockdown imposed, their staff strength may be reduced.This project explores the problem faced by a hospital customer care due to lockdown.
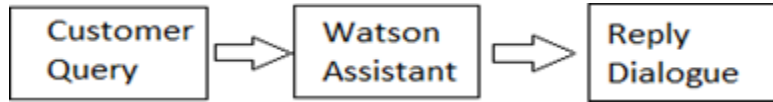
2.2. Proposed Solution
The proposed solution is introduce AI in customer service so as to handle common questions and tasks. ChatBot can be introduced for handling queries on text messages while a speec-to-text & text-to-speech conversion can be integrated for voice calls. Here we focus on the ChatBot only.
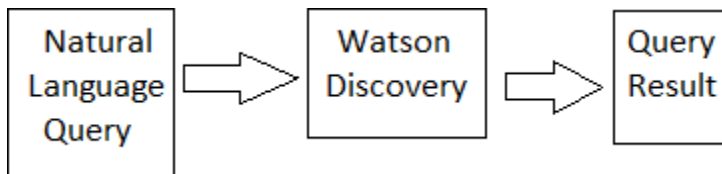
3.Theoretical Analysis
3.1. Block Diagram
Watson Assistant:

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│  Customer   │ ==>  │   Watson    │ ==>  │   Reply     │
│   Query     │      │  Assistant  │      │  Dialogue   │
└─────────────┘      └─────────────┘      └─────────────┘
```

Watson Discovery:

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│  Natural    │ ==>  │   Watson    │ ==>  │   Query     │
│  Language   │      │  Discovery  │      │   Result    │
│   Query     │      │             │      │             │
└─────────────┘      └─────────────┘      └─────────────┘
```
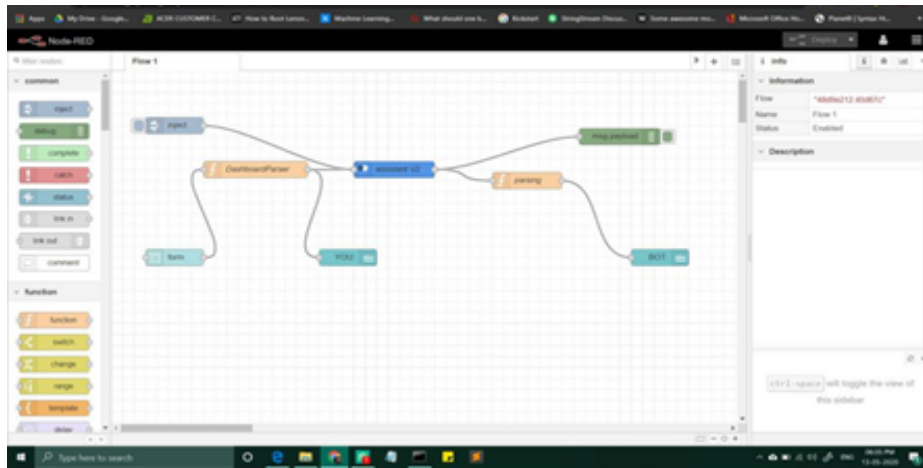
3.2. Hardware/SoftwareDesigning
The watson service required for this project i.e. "watson discovery" and "watson assistant" are readily available on IBM cloud.
Apart from them, "node-red service" and "IBM cloud function service" are also required for proper integration between these services.

4. Experimental Investigations
Watson Discovery was used to learn from a guidelines document issued by the government.
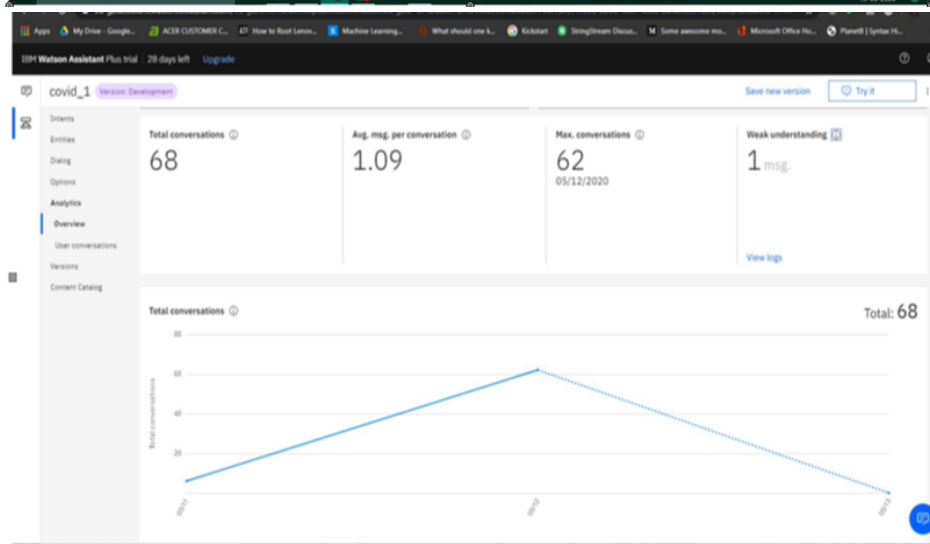To test the accuracy, a list of common natural language queries was made. The result of those queries was marked as accurate or not for training the machine. With this practice,the results were improved with relevant answers being returned.
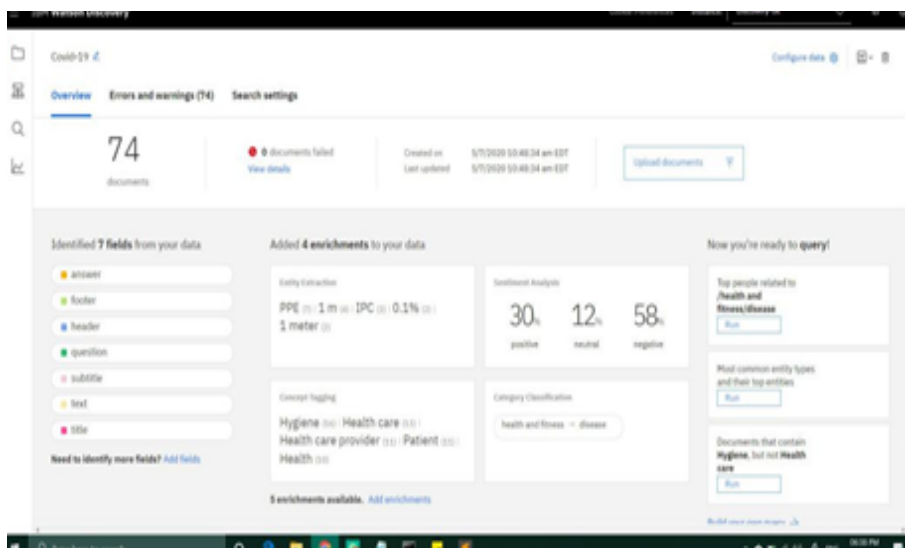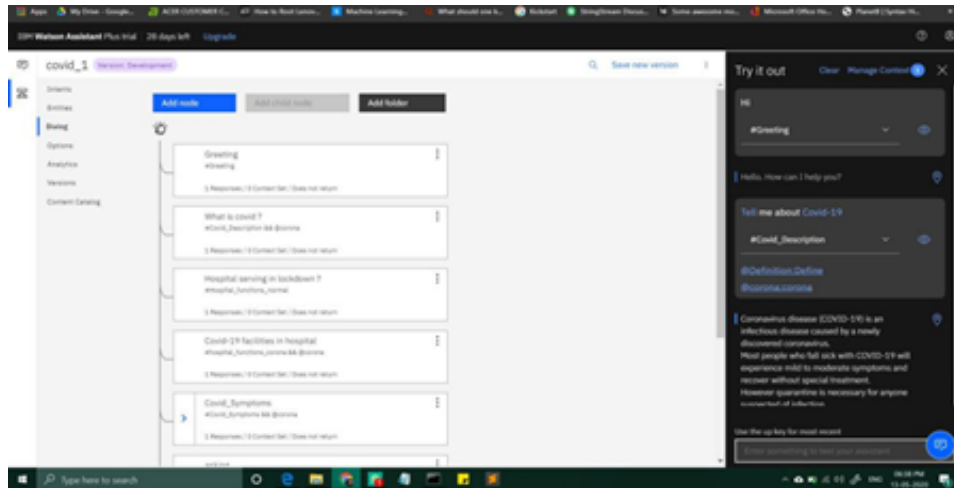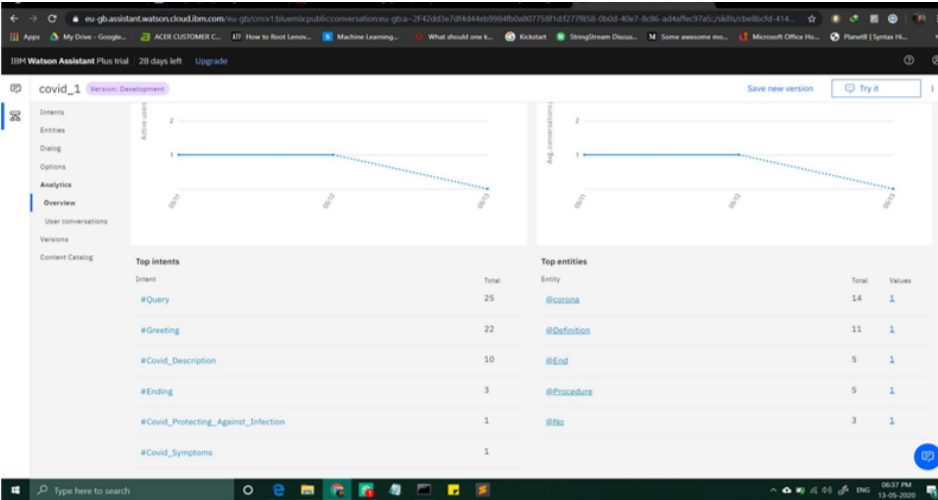
5. Flowchart

From the flowchart, we can see that the input is passed to the assitant service. If the "query intent" is determined in the input, it contacts the discovery service through webhook.
The appropriate output is then processed to the user.

6. Result

The chatbot was successfully made and a prototype of the chatbot was made available on node-red dashboard.
The dashboard link and demo video link have been provided in the beginning and have been provided below also.
Video Demo Link (on YouTube):https://youtu.be/DSwKLhkx5fI
Node-Red Dashboard Link: https://node-red-glkyu.eu-gb.mybluemix.net/ui

7.1. Advantages

- Introductionofchatbotintroducesautomationincustomerservice.
- A human team can handle a limited no. of customers. In contrast a chatbot can caterto1000sofcustomersatatimeasperitsresources.
- Scaling up a chatbot is easier than scaling up a customer care team for increaseddemands.
- Resolution time may be faster forchatbots.

7.2. Disadvantages

- A chatbot may not be able to handle complex customer queries that are new to it.
- It might not be able to resolve complaints and will thus need to transfer call to a human, increasing the resolution time.

8. Applications

a. It can be utilised by organisations with lack of resources to hire a customer care team.
b. It can be used by organisations to filter out trivial queries that may not necessarily require human employee attention.

9. Conclusion

The chatbot is an important implemetation of AI for human conversations. It enables a machine handle otherwise trivial tasks and resolve most of customer's questions. It is thus utilised by many organisations, resulting in saving time & money.

It can thus be concluded that a chatbot was successfully implemented in this project.

10. Future Scope

With advancements in NLP and Deep Learning, we might be able to train the chatbot so well enough that it may eliminate the requirement of humans to handle customer's queries and complaints.

11. BIBILOGRAPHY

1. https://www.ibm.com/cloud/architecture/tutorials/cognitive_discovery

2. https://cloud.ibm.com/docs/assistant?topic=assistant-getting-started

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

Appendix: Source Code

```json
[
    {
        "id": "48d9e212.40d67c",
        "type": "tab",
        "label": "Flow 1",
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        "type": "ui_tab",
        "z": "",
        "name": "Hospital Assistance",
        "icon": "dashboard",
        "disabled": false,
        "hidden": false
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        "id": "c3e962e1.32a56",
        "type": "ui_group",
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        "edited": false
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}
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    "tab": "e359ff8c.ebe95",
```

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        "type": "ui_spacer",
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        "group": "c3e962e1.32a56",
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        "assistant_id": "1208a25c-c7bb-42d2-807d-94d4721092f5",
        "debug": false,
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            ]
```

```json
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      ]
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  {
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        "624c342b.103ddc"
      ]
    ]
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  {
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```

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                "value": "text",
                "type": "text",
                "required": true,
                "rows": null
            }
        ],
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        "cancel": "clear",
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        "y": 340,
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                "f22eaaa6.7e4a08"
            ]
        ]
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        "type": "ui_text",
        "z": "48d9e212.40d67c",
        "group": "c3e962e1.32a56",
```

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        "order": 3,
        "width": 0,
        "height": 0,
        "name": "",
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        "layout": "row-spread",
        "x": 410,
        "y": 340,
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    },
    {
        "id": "51a43824.1531d8",
        "type": "ui_text",
        "z": "48d9e212.40d67c",
        "group": "7ef23fc2.d5f6",
        "order": 2,
        "width": "11",
        "height": "10",
        "name": "",
        "label": "BOT:   ",
        "format": "{{msg.payload}}",
        "layout": "row-spread",
        "x": 950,
        "y": 340,
        "wires": []
    },
    {
        "id": "efabcf63.f38f7",
        "type": "inject",
        "z": "48d9e212.40d67c",
        "name": "",
        "topic": "",
        "payload": "How to maintain hygiene ?",
        "payloadType": "str",
        "repeat": "",
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```

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      "once": false,
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      "x": 110,
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      "wires": [
        [
          "624c342b.103ddc"
        ]
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```