# SmartBridge Internship Project Report

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

## 1. Introduction

### 1.1 Existing Problem

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 locckdown imposed, their staff strength may be reduced.
This project explores the problem faced by a hospital customer care due to lockdown.

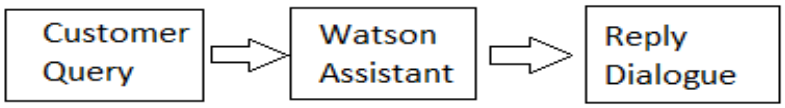
### 2.2 Proposed Solution

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.

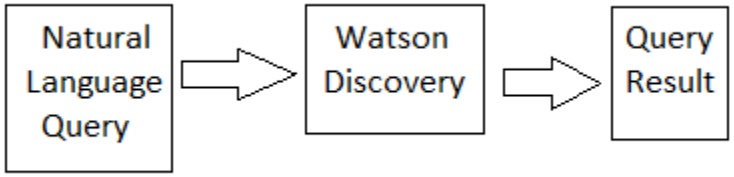
## 3. Theoretical Analysis

### 3.1 Block Diagram

Watson Assistant:




Watson Discovery:




### 3.2 Hardware/Software Designing

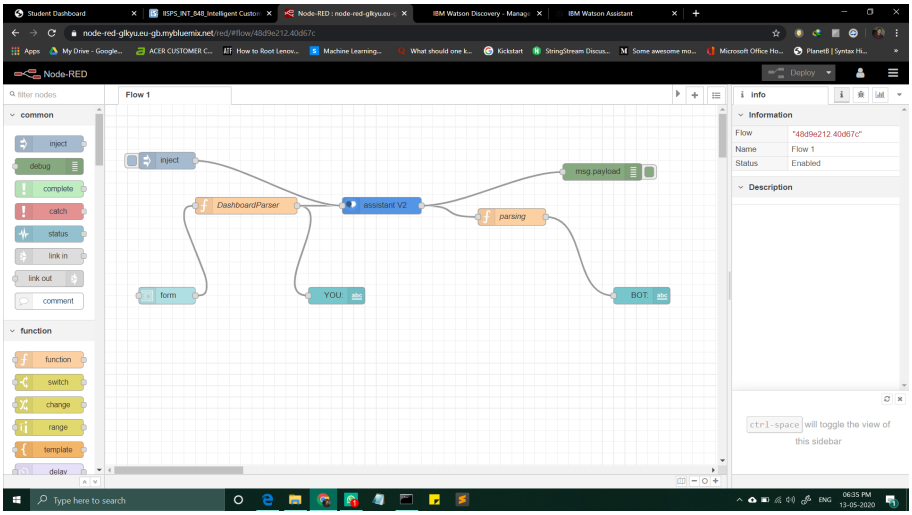
The watson service required for this project i.e. "watson discovery" and "watson assistant" are readily available on IBM cloud.

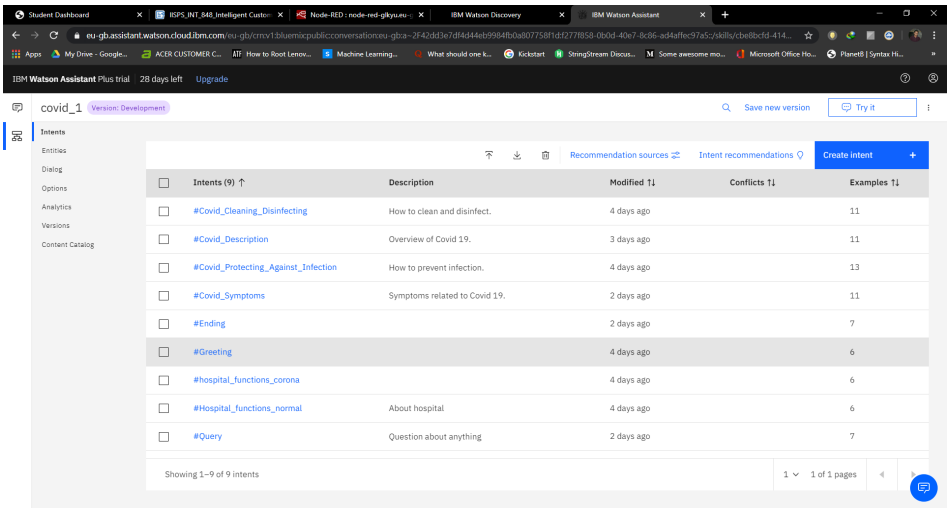
Apart from them, "node-red service" and "IBM cloud function service" are also required for proper integration between these services.

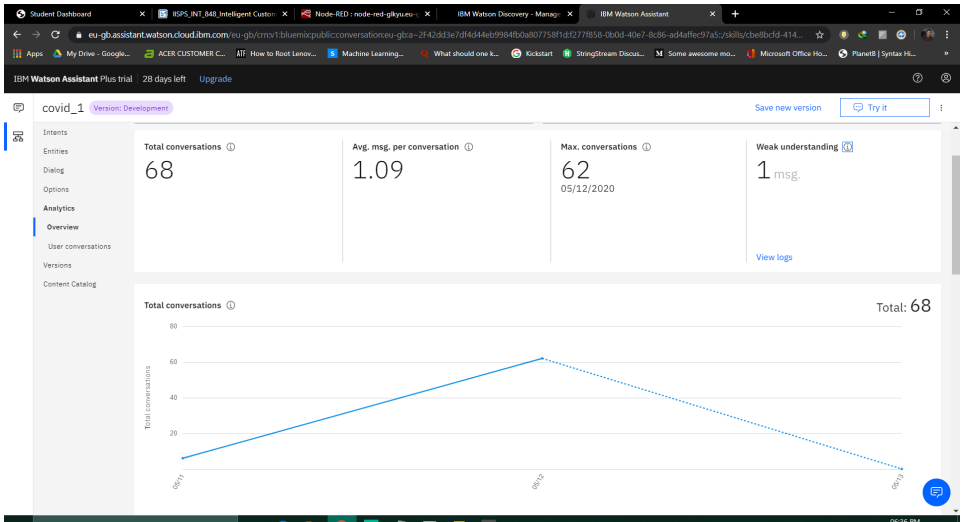
## 4. Experimental Investigations

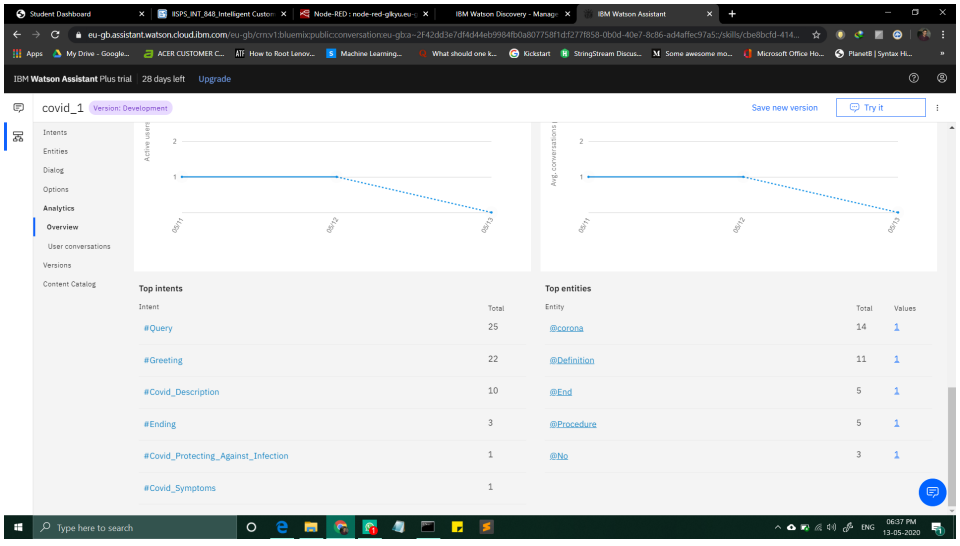
Watson Discovery was used to learn from a guidelines document issued by the government.

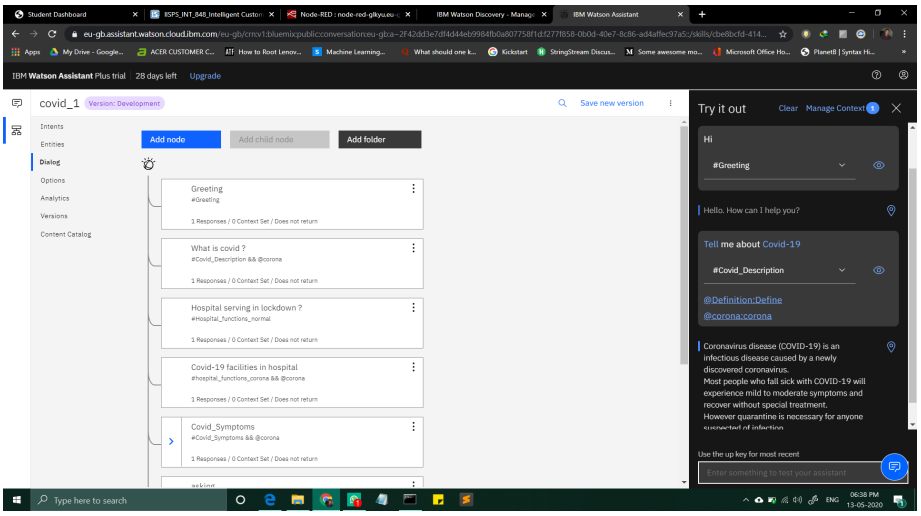
To test the accuracy, a list of common natural language queries was made. The result of those queries was marked as accurate or not for training the machine. With this practice, the results were improved with relevant answers being returned.

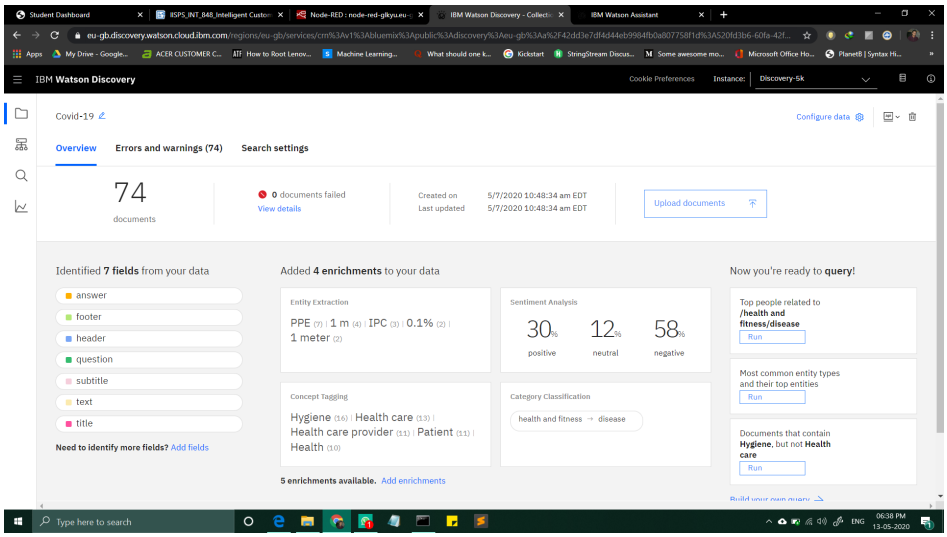



IBM Watson Assistant Plus trial 28 days left Upgrade
covid_1 Version: Development
Save new version
Try it
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Recommendation sources
Intent recommendations
Create intent
Intents (9)
Description
Modified
Conflicts
Examples
#Covid_Cleaning_Disinfecting How to clean and disinfect. 4 days ago 11
#Covid_Description Overview of Covid 19. 3 days ago 11
#Covid_Protecting_Against_Infection How to prevent infection. 4 days ago 13
#Covid_Symptoms Symptoms related to Covid 19. 2 days ago 11
#Ending 2 days ago 7
#Greeting 4 days ago 6
#hospital_functions_corona 4 days ago 6
#Hospital_functions_normal About hospital 4 days ago 6
#Query Question about anything 2 days ago 7
Showing 1–9 of 9 intents
1 of 1 pages

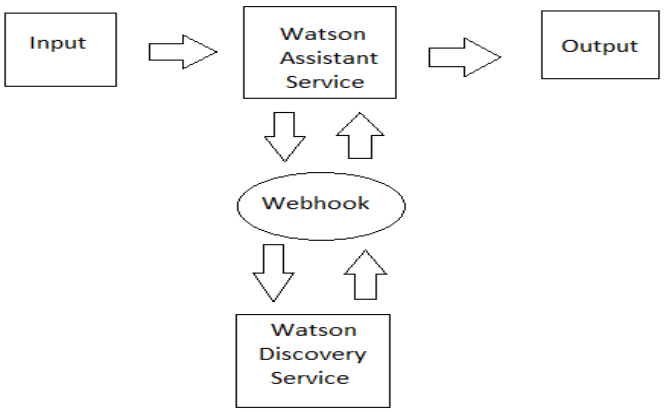

IBM Watson Assistant Plus trial 28 days left Upgrade
covid_1 Version: Development
Save new version
Try it
Analytics
Overview
User conversations
Total conversations 68
Avg. msg. per conversation 1.09
Max. conversations 62
05/12/2020
Weak understanding 1 msg.
View logs
Total conversations
Total: 68


IBM Watson Assistant Plus trial 28 days left Upgrade
covid_1 Version: Development
Save new version
Try it
Analytics
Overview
User conversations
Top intents
Intent Total
#Query 25
#Greeting 22
#Covid_Description 10
#Ending 3
#Covid_Protecting_Against_Infection 1
#Covid_Symptoms 1
Top entities
Entity Total Values
@corona 14 1
@Definition 11 1
@End 5 1
@Procedure 5 1
@No 3 1


IBM Watson Assistant Plus trial 28 days left Upgrade
covid_1 Version: Development
Save new version
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Add node
Add child node
Add folder
Greeting
#Greeting
What is covid ?
#Covid_Description && @corona
Hospital serving in lockdown ?
#Hospital_functions_normal
Covid-19 facilities in hospital
#hospital_functions_corona && @corona
Covid_Symptoms
#Covid_Symptoms && @corona
Try it out
Clear
Manage Context
Hi
#Greeting
Hello. How can I help you?
Tell me about Covid-19
#Covid_Description
@Definition:Define
@corona:corona
Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.
Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment.
Use the up key for most recent
Type here to search


IBM Watson Discovery
Cookie Preferences
Instance:
Discovery-5k
Covid-19
Configure data
Overview
Errors and warnings (74)
Search settings
74
documents
0 documents failed
View details
Created on 5/7/2020 10:48:34 am EDT
Last updated 5/7/2020 10:48:34 am EDT
Upload documents
Identified 7 fields from your data
answer
footer
header
question
subtitle
text
title
Need to identify more fields? Add fields
Added 4 enrichments to your data
Entity Extraction
PPE (7) | 1 m (4) | IPC (3) | 0.1% (2) | 1 meter (2)
Sentiment Analysis
30% positive
12% neutral
58% negative
Concept Tagging
Hygiene (16) | Health care (13) | Health care provider (11) | Patient (11) | Health (10)
Category Classification
health and fitness → disease
5 enrichments available. Add enrichments
Now you're ready to query!
Top people related to /health and fitness/disease
Run
Most common entity types and their top entities
Run
Documents that contain Hygiene, but not Health care
Run
Type here to search

## 5. Flowchart


Input
Watson Assistant Service
Output
Webhook
Watson Discovery Service

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/pwWBAxwwtSE
Node-Red Dashboard Link: https://node-red-glkyu.eu-gb.mybluemix.net/ui

**7.1 Advantages**

- Introduction of chatbot introduces automation in customer service.
- A human team can handle a limited no. of customers. In contrast a chatbot can cater to 1000s of customers at a time as per its resources.
- Scaling up a chatbot is easier than scaling up a customer care team for increased demands.
- Resolution time may be faster for chatbots.

**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**

- It can be utilised by organisations with lack of resources to hire a customer care team.
- 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.