

Chatbot To Shop For Essentials During Pandemic Using Watson Assistant

Project Report

**Submitted
for**

**SMART INTERNZ GURUCOOL
PROJECT BUILD - A - THON**

by

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ABSTRACT

Today, because of social distancing and other issues it can be risky for some people to shop for essential items in person. People prefer online shopping and wish to take home delivery. For this purpose, chatbots are preferred which help the user to provide the list and price of items available in the store, take orders for home delivery. Thus, the main aim of this project is to develop a shopping charbot that helps with this issue by giving people an online option to shop for essentials. The chatbot is built with the help of IBM Watson assistant. The developed chatbot have the capabilities such as providing the list of items in the store and their price, display if there are any offers or discounts. The bot also takes details like name, contact number, address, and the items to place the order.

1. INTRODUCTION

1.1 Overview

With the recent advancements in artificial intelligence, deep learning, computers and machines have started to work smartly and they are capable of impersonating human being. Chatbots are conversational software agents developed by natural language processing. Nowadays, supermarkets started to use such software agents to help their customers find their requirements, place orders and provide door delivery. As supermarkets and shops are turning into online shops, it is necessary to build software applications such as chatbots to suit their needs.

1.2 Purpose

Development of chatbots have become necessary to provide 24x7 service to the customers thus providing hassle free shopping service. Thus customers need not travel to the markets instead get their needs at doorstep. Over and above, the entire world is suffering due to COVID 19 pandemic which further restricts people to move out of their home even for their daily essentials. This situation has forced the people to stay safe at home and buy their daily essentials online. Hence, this project proposes a chatbot application to shop for essentials during this pandemic. The chatbot is developed using IBM Watson Assistant, a powerful AI product that helps to build, train and develop conversion into an application.

2. LITERATURE SURVEY

Chatbots can be goal based, knowledge based and service based. Goal based chatbots are designed for a specific task and used for conversation to get information from the users. Knowledge based bots provide information to the user based on the knowledge they get from their trained data sources. Service based bots provide personal or commercial service to the users. Shopping bot is an example for service based chatbot category. Chatbots can be developed using many available assistant services such as Microsoft LUIS, Chatfuel, Google Dialogflow, Amazon Lex and IBM Watson.

2.1 Existing Problem:

There are many chatbots available for ecommerce applications. However, most of them have lack of training and lead to errors during conversation.

2.2 Proposed Solution:

This project proposed a well trained chatbot suitable for online shopping of daily essential items for a particular area.

3. THEORITICAL ANALYSIS

Chatbot : A chatbot provides interaction between machines and human being in the form of a question answering system. The main tasks performed by a chatbots are:

- a. Analysis of user inputs
- b. Response to users

A chatbots analyses user requests and should appropriate response to the users. To perform these tasks effectively the chatbots should be trained well. The chatbot developed in this project is well trained to perform the task expected as required for a shopping. The services used in this chatbot are

- a. IBM Watson Assistant
- b. Node-Red

3.1 Block Diagram

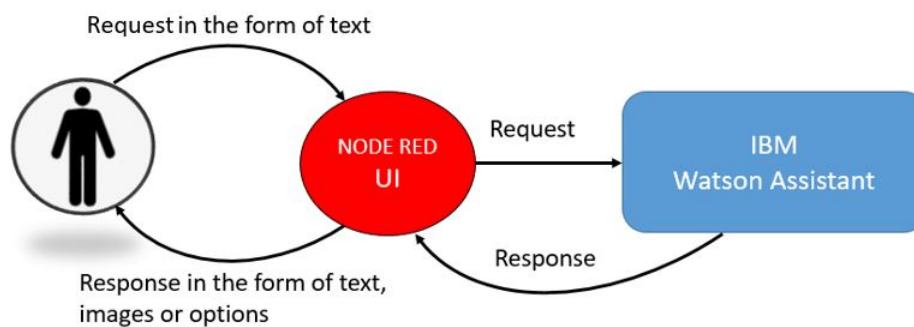


Fig 1. Block Diagram - Work Flow

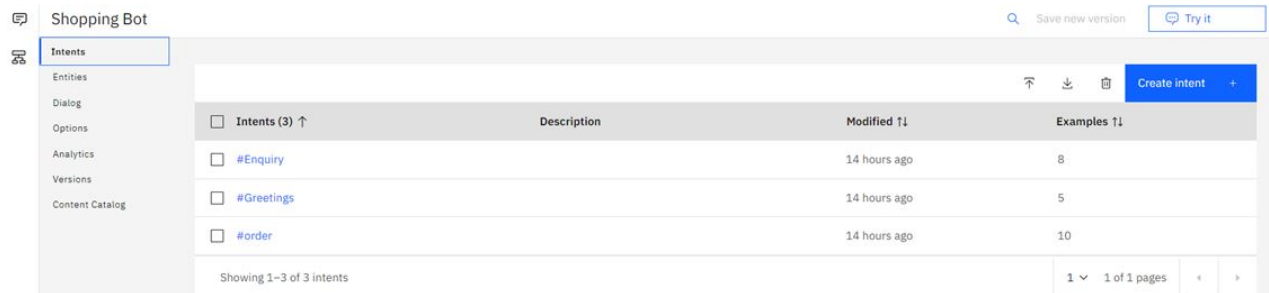
3.2 Software Design and Implementation:

The components used to build the chatbot include

1. Intent: An intent represents the purpose of a user's input. Intents are defined for each type of user request depending on the application.
2. Entity: An entity is an object that is relevant to the intents and provides a specific context for an intent.
3. Dialog: A dialog is a branching conversation flow that defines responses to the defined intents and entities. The dialog builder is used to create conversations with users and provide responses.

The following intents and entities are used to build the bot. The system entity @sys-number is also used.

Intents:



	Description	Modified ↑↓	Examples ↑↓
<input type="checkbox"/> Intents (3) ↑			
<input type="checkbox"/> #Enquiry		14 hours ago	8
<input type="checkbox"/> #Greetings		14 hours ago	5
<input type="checkbox"/> #order		14 hours ago	10

Showing 1–3 of 3 intents

1 of 1 pages

Fig 2. Intents from Shopping bot Skill

Entities:

Entity (12) ↑	Values	Modified 11
<input type="checkbox"/> @combo	Cut pack I, Pack V, Pack IV, Pack III, Pack II, Pack I, Cut pack II	12 hours ago
<input type="checkbox"/> @confirm	confirmveg, notconfirmveg, notconfirmfruit, confirmfruit	14 hours ago
<input type="checkbox"/> @covid	gloves, shield, face mask, sanitizer	12 hours ago
<input type="checkbox"/> @deliveryarea	Adyar, Guindy	13 hours ago
<input type="checkbox"/> @deliverystreet	First Cross Street, Second Main Road, Third Main Road, First Main Road, Second Cross Street, Third Cross ...	13 hours ago
<input type="checkbox"/> @email	email	14 hours ago
<input type="checkbox"/> @Enquiry	items, Thank you, offers, Price chart, no, safety, combo, fruits, veggies	11 hours ago
<input type="checkbox"/> @fruits	pomegranate, papaya, grapes, banana, apple, orange	14 hours ago
<input type="checkbox"/> @Greetings	Good Afternoon, Good evening, Good Morning	14 hours ago
<input type="checkbox"/> @order	yes, order	14 hours ago
<input type="checkbox"/> @payment	UPI, Card, COD	14 hours ago
<input type="checkbox"/> @veggies	peas, cabbage, chilli, coconut, beetroot, beans, carrot, potato, tomato, onion	14 hours ago

Showing 1-12 of 12 entities

1 of 1 pages

Fig 3. Entities from Shopping bot Skill

The following entities are prebuilt by IBM to recognize references to things like numbers and dates in user input. Turn on a system entity to start using it. You cannot edit system entities. [Learn more](#)

New system entities are available that are even better at detecting dates, times, and numbers. Go to [Options>System entities](#) to enable them.

Name (5)	Description	Status
<input checked="" type="checkbox"/> @sys-number	Extracts numbers mentioned from user examples as digits or written as numbers. (21)	On
<input type="checkbox"/> @sys-percentage	Extracts amounts from user examples including the number and the % sign. (15%)	Off
<input type="checkbox"/> @sys-currency	Extracts currency values from user examples including the amount and the unit. (20 cents)	Off
<input type="checkbox"/> @sys-date	Extracts date mentions (Friday)	Off
<input type="checkbox"/> @sys-time	Extracts time mentions (at 10)	Off

Fig 4. System Entity from Shopping bot Skill

Dialog Flow:

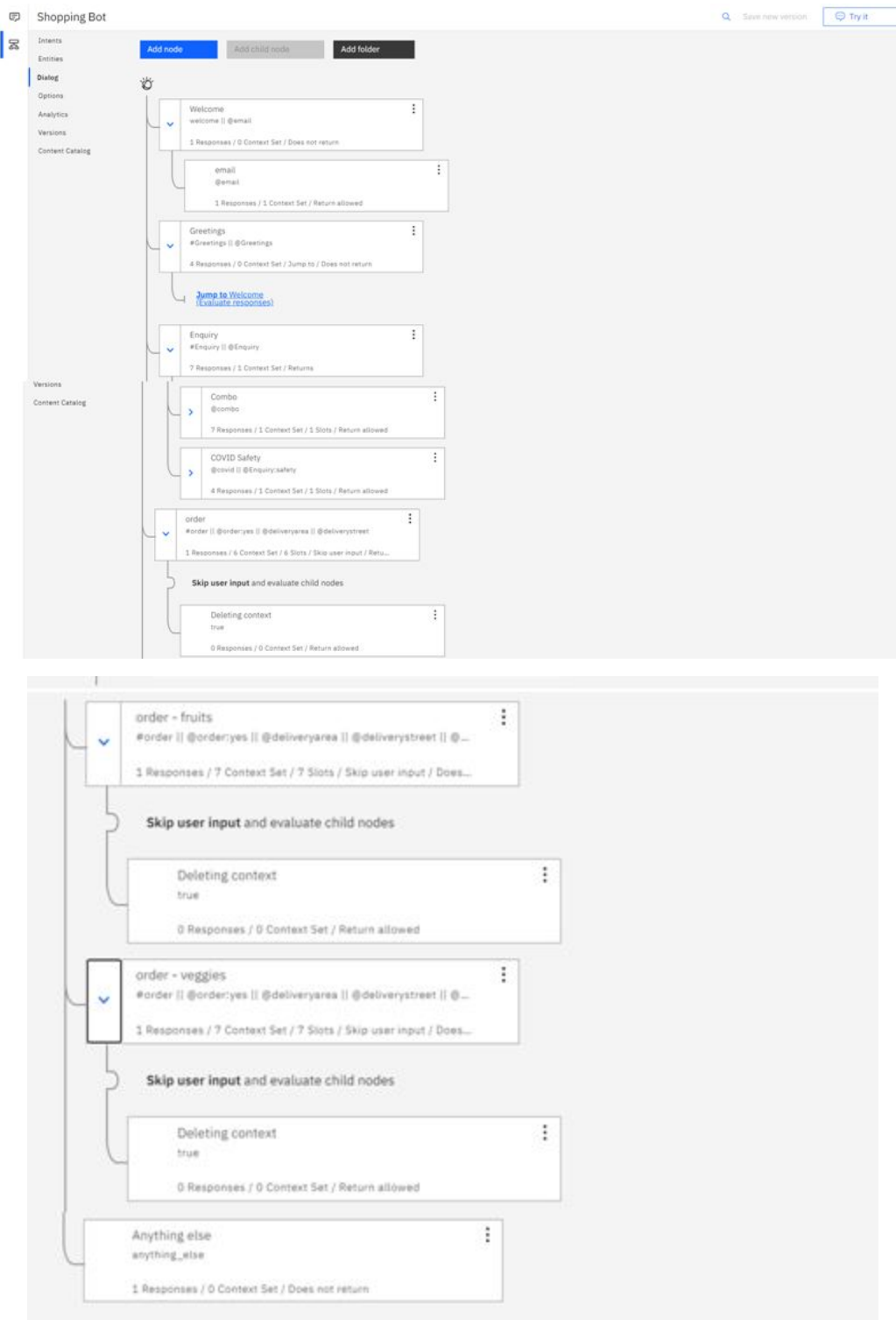


Fig 5. Dialog from Shopping bot Skill

4. EXPERIMENTAL INVESTIGATIONS

The chatbot is developed using IBM Watson. The services uses are assitant and skill. A skill is developed and the flow of conversation is experimentallu verified at every step. A sample experimental investigation is shown below.

The image displays two side-by-side screenshots of a chatbot interface titled 'Try it out'. The interface includes a 'Clear' button, a 'Manage Context' button with a blue circle containing the number '2', and a close button (X).

Left Screenshot:

- Welcome to Garden:** A banner with the text 'Welcome to Garden for Fresh Fruits and Vegetables'.
- Initial Message:** 'Hello Sir/Madam, I am PEPPER, the Chatbot of Garden. Kindly provide your Name and email id.'
- User Input:** 'My name is Meenakshi and my id is meena@gmail.com'.
- Response:** 'Thank you. Your mail id meena@gmail.com is taken for future reference. I am capable of providing the list of items, offers and take orders. How may I help You?'
- Item List:** A section with a dropdown menu set to '#Enquiry'. Below it are links: '@Enquiry:email', '@Enquiry:items', and '@Enquiry:Price chart'.
- Item List:** A section with the text: 'Please go through the menu for vegetables, fruits, combo and COVID essentials. What do you like to go with?'

Right Screenshot:

- Welcome to Garden:** A banner with a list of categories: 'Vegetables', 'Fruits', 'Combo', and 'COVID Needs'. Below the list is a promotional message: 'DON'T MISS IT!! 1% OFF on Purchase of Rs.1000/- & above. 5% OFF on Purchase of Rs.1500/- & above.'
- User Input:** 'combo'.
- Response:** '@Enquiry:combo'.
- Special Combo List:** A section with the text: 'All the packs in the combo are available. Enter your choice of pack.'
- Table:** A table with two columns: 'Combo' and 'Price (Rs.)'.

Combo	Price (Rs.)
Pack I (onion, tomato, potato, beans, carrot)	60
Pack II (onion, tomato, cabbage, peas, carrot)	65
Pack III (onion, tomato, beetroot, beans, peas)	70
Pack IV (apple, banana and pomegranate)	140
Pack V (apple, banana and orange)	120
Cut Pack I (For pulav / biryani)	60
Cut Pack II (For meal)	80
- Footer:** 'Use the up key for most recent' and an input field with the placeholder 'Enter something to test your assistant'.

Fig 6. Output Verifications

5. FLOW CHART

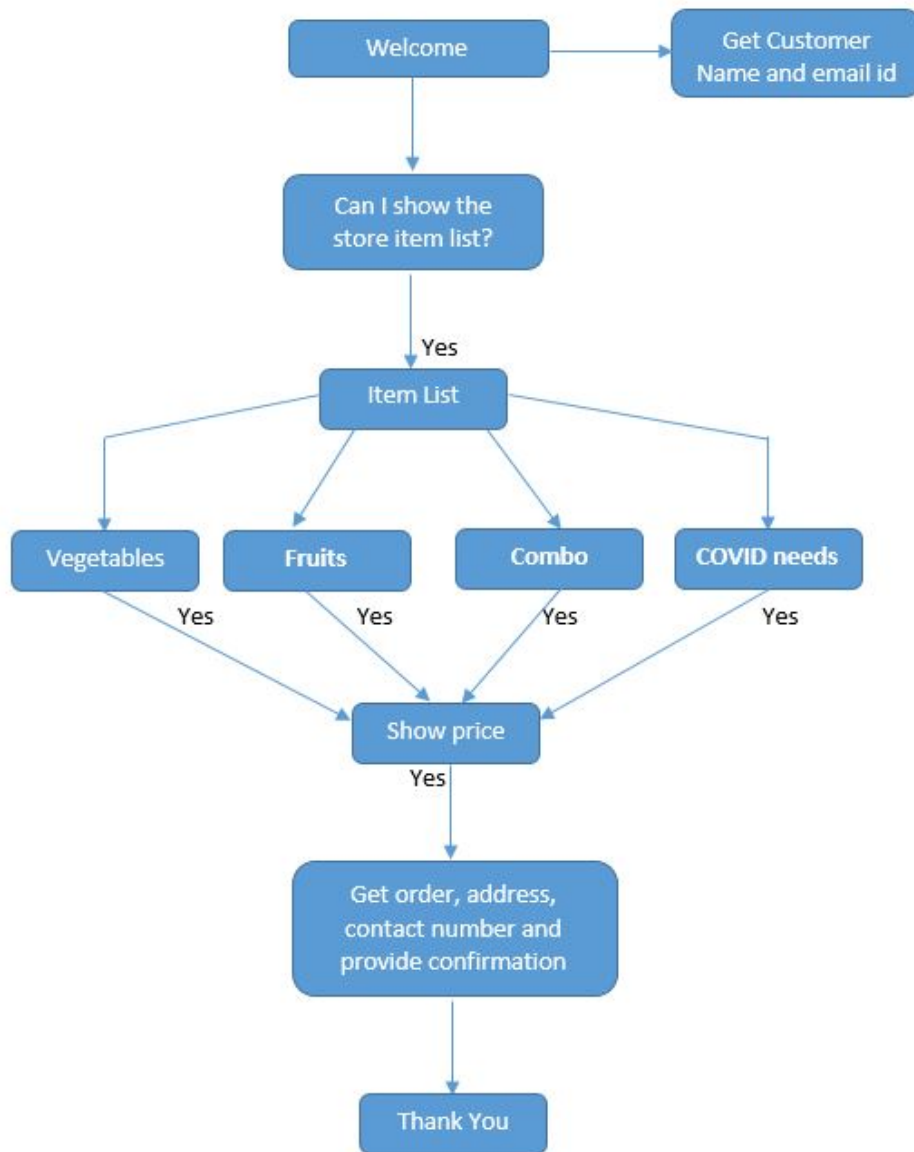



Fig 7. Flow Chart - Work Flow

6. RESULTS

Build your own assistant using
IBM Watson Assistant

Assistant preview




Welcome to Garden
Hello Sir/Madam, I am PEPPER, the Chatbot of Garden. Kindly provide your Name and email id.

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview



Welcome to Garden
Hello Sir/Madam, I am PEPPER, the Chatbot of Garden. Kindly provide your Name and email id.

My name is Meenakshi. My email id is meena@gmail.com


Thank you. Your mail id meena@gmail.com is taken for future reference. I am capable of providing the list of items, offers and take orders. How may I help You?

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview

Show me the item list



Item List
Please go through the menu for vegetables, fruits, combo and COVID essentials. What do you like to go with?

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview

Item	Price (kg)
Apple	125
Orange	90
Pomegranate	150
Banana	80
Papaya	75
Grapes	80

List of Fruits
All the fruits in the list are available. Enter your choice of fruit.

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview

Item	Price (kg)
Onion	75
Tomato	50
Potato	60
Beans	72
Carrot	68
Cabbage	45
Beetroot	55
Peas	90
Coconut	30
Chilli	45

List of Vegetables
All the vegetables in the list are available. Enter your choice of vegetable.

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview

How many kgs do you want

Potato

2 kg

We accept COD, Card, Net banking and UPI payments. Which mode of payment do you prefer?

UPI

For home delivery, Enter your door no

234

Enter your street

I main road

[Type something...]

Build your own assistant using
IBM Watson Assistant

Assistant preview

Enter your street

I main road

Enter your area

Adyar

Enter your contact number

9444320048

Thank you. Your order 2 kg of potato is successfully placed. Offers, if applicable will be included. Your invoice will be sent to meena@gmail.com. Please pay using UPI. Your item will be delivered to 234, First Main Road, Adyar, Chennai. Confirmation SMS for Delivery and Payment will be sent to 9444320048. Thank you for shopping with us. Have a nice day.

[Type something...]

Fig 8. Output Snapshots from Watson Assistant

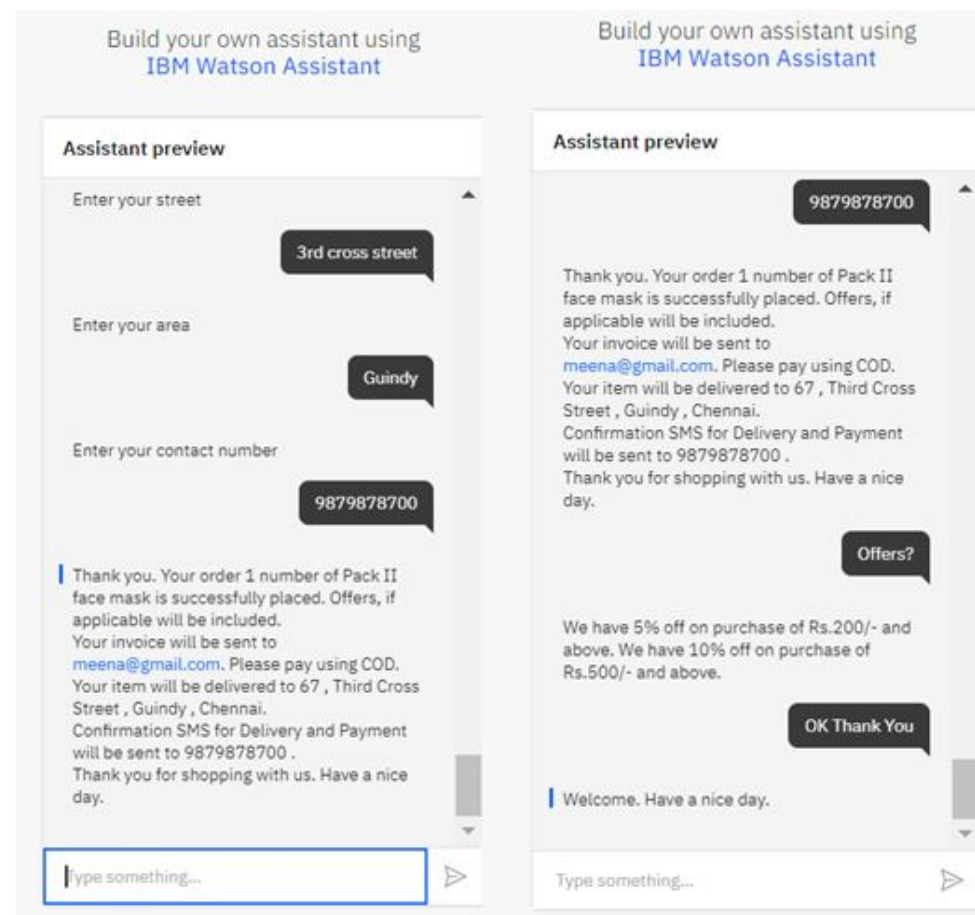
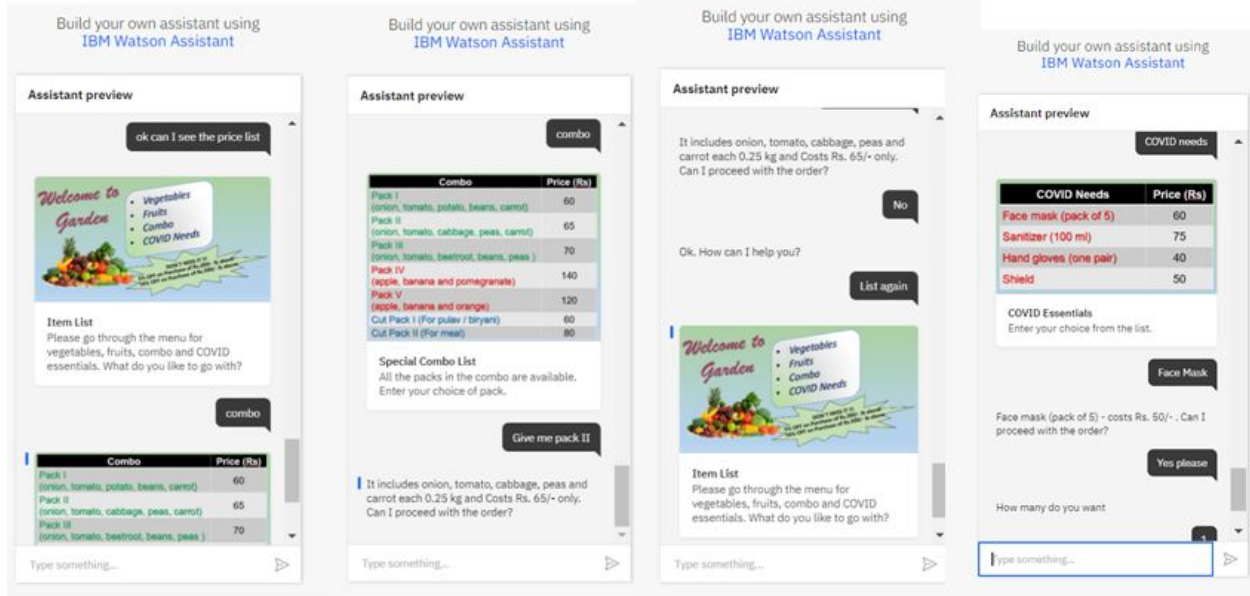


Fig 8. Output Snapshots from Watson Assitant (contd...)

Node-Red Integration:

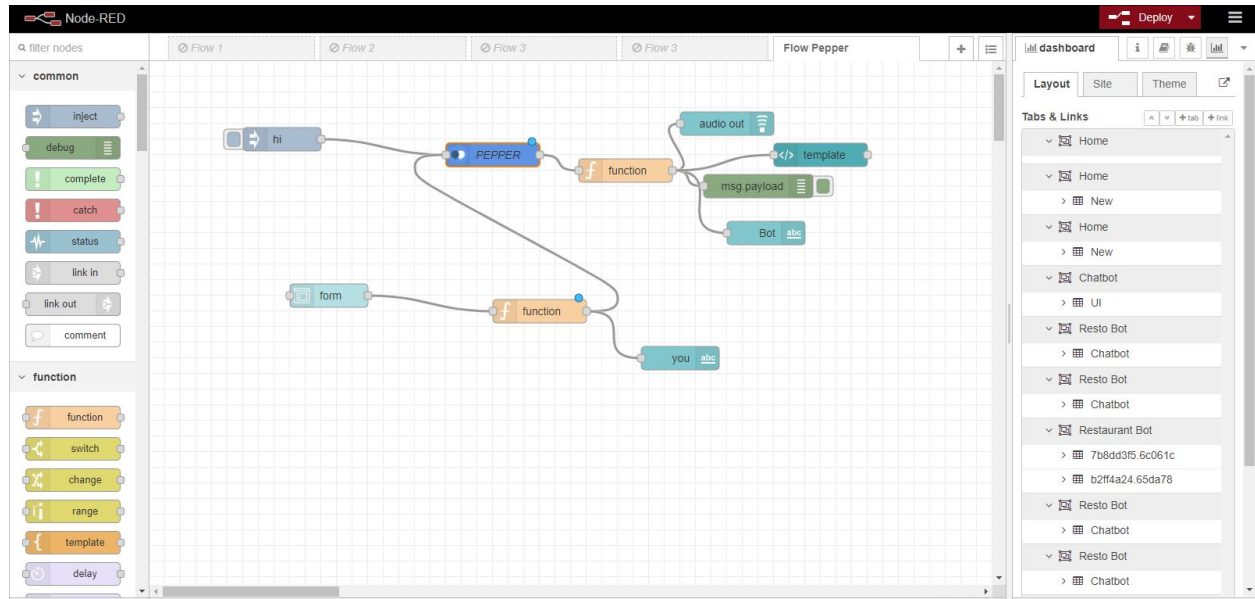


Fig 9. Node-RED flow

Output from Node-Red:

The first snapshot shows the 'PEPPER Bot' header and a 'Chatbot' input field with the text 'item list'. Below the input field are 'SUBMIT' and 'CANCEL' buttons. The second snapshot shows the 'Chatbot' input field with the text 'vegetables'. Below the input field are 'SUBMIT' and 'CANCEL' buttons. The third snapshot shows the 'Chatbot' input field with the text 'hi'. Below the input field are 'SUBMIT' and 'CANCEL' buttons.

The 'List of Vegetables' table is displayed in the middle snapshot:

Item	Price (kg)
Onion	75
Tomato	50
Potato	60
Beans	72
Carrot	68
Cabbage	45
Beetroot	55
Peas	90
Coconut	30
Chilli	45

The 'Welcome to Garden' banner is shown in the first and third snapshots. The banner text is: 'Welcome to Garden for Fresh Fruits and Vegetables'. The banner also lists: 'Vegetables', 'Fruits', 'Combo', and 'COVID Needs'.

Fig 10. Output Snapshots from Node -RED

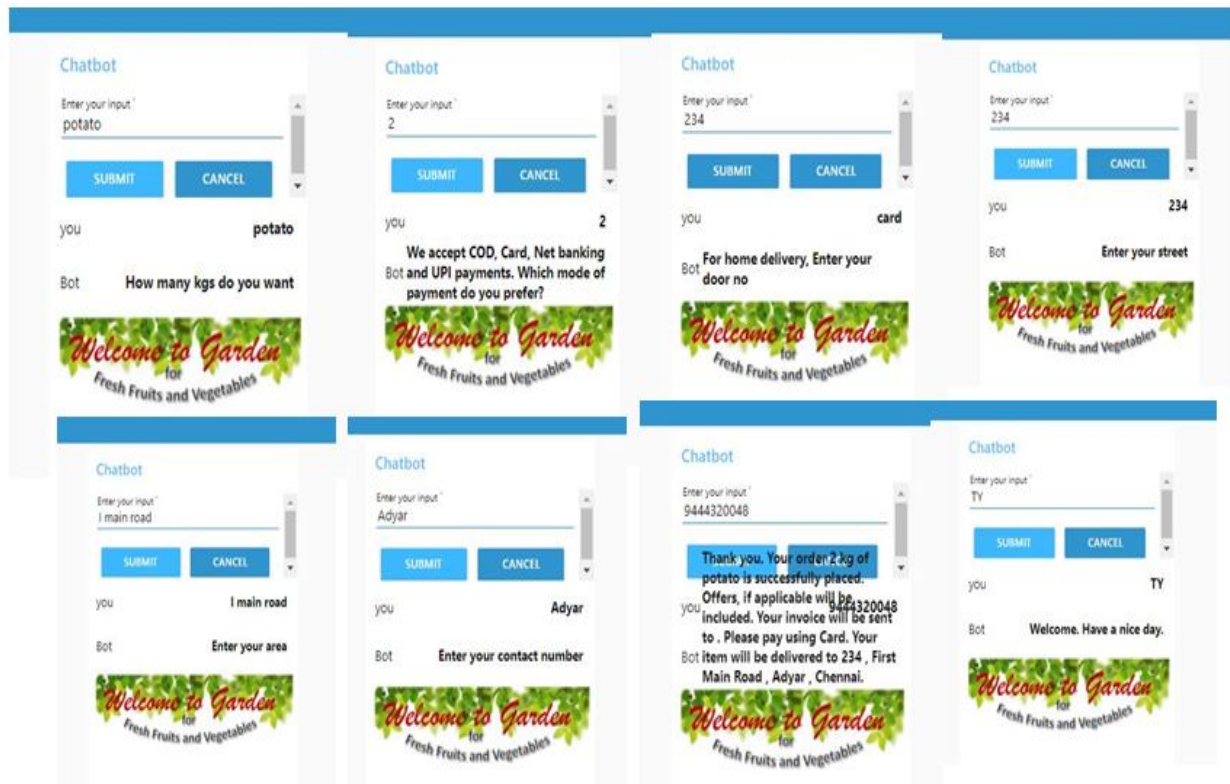


Fig 10. Output Snapshots from Node -RED (contd...)

7. ADVANTAGES AND DISADVANTAGES

The chatbot has the following advantages:

1. Saves time for the customer. During this pandemic, use of this chatbot helps them to be safe at home.
2. Available 24x7.
3. Provides responses via email and mobile.

Few disadvantages are

1. Does not have the capability to take multiple orders simultaneously.
2. Can misunderstand requests for untrained phrases.

8. APPLICATIONS

Applications of shopping chatbot include

1. ecommerce
2. Store shopping
3. Supermarkets

9. CONCLUSION

This project proposes a chatbot which can be used for online shopping. It uses IBM Watson assistant and Node-RED. The chatbot is capable of providing items available, show price list and take orders from the customers. Particularly, this chatbot will be very useful for online shopping during this COVID pandemic as it will be risky common public to move out of their home.

10. FUTURE SCOPE

As a future extension, this chatbot can be modified to take multiple orders from the user in one conversation.

11. BIBLIOGRAPHY

1. https://www.ibm.com/cloud/architecture/tutorials/watson_conversation_support/
2. Phd, Mohammad & Hussain, Omar. (2018). A Survey on Chatbot Implementation in Customer Service Industry through Deep Neural Networks. 54-61. 10.1109/ICEBE.2018.00019.
3. Adam, M., Wessel, M. & Benlian, A. AI-based chatbots in customer service and their effects on user compliance. Electron Markets (2020). <https://doi.org/10.1007/s12525-020-00414-7>.
4. www.google.com

APPENDIX

A. SOURCE CODE

Function nodes of NODE-RED:

```
msg.payload=msg.payload.text;  
return msg;
```

```
if(msg.payload.output.generic[0].response_type=="image"){  
    msg.url = msg.payload.output.generic[0].source  
    msg.payload = msg.payload.output.generic[0].title  
}  
else{  
    msg.url="https://i.ibb.co/XZ13xj6/welcome1.jpg"  
    msg.payload = msg.payload.output.text[0];  
}  
return msg;
```

Deleting context-JSON Editor:

```
{  
  "output": {  
    "deleted":  
    "<?context.remove('number')?><?context.remove('payment')?><?context.remove('fruits')  
?><?context.remove('delivery_street')?><?context.remove('delivery_area')?><?context.re  
move('number_2')?><?context.remove('number_3')?>",  
    "generic": []  
  }  
}
```


Preview Link for Watson Assistant:

<https://web-chat.global.assistant.watson.cloud.ibm.com/preview.html?region=eu-gb&integrationID=2523d07f-4aa8-444e-b42f-8b51412ea01b&serviceInstanceID=d130743d-702a-4684-a359-73e6e979f391>

Node-RED Webchat Link:

https://node-red-ijqwz-2020-10-20.eu-gb.mybluemix.net/ui/#!/0?socketid=fPfzv4BN339_kKgTAABB

(Note: The store delivers the daily essentials only to a restricted zone which includes First Main Road, Second Main Road, Third Main Road, First Cross Street, Second Cross Street and Third Cross Street of Adyar and Guindy)

B. Additional Chatbot Implementation using Watson Assistant

An additional / alternate chatbot has been implemented using Watson Assistant. The preview link for the same is given below for reference.

<https://web-chat.global.assistant.watson.cloud.ibm.com/preview.html?region=eu-gb&integrationID=f4352a8f-350f-4889-9d19-14eb5e2309a4&serviceInstanceID=d130743d-702a-4684-a359-73e6e979f391>