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

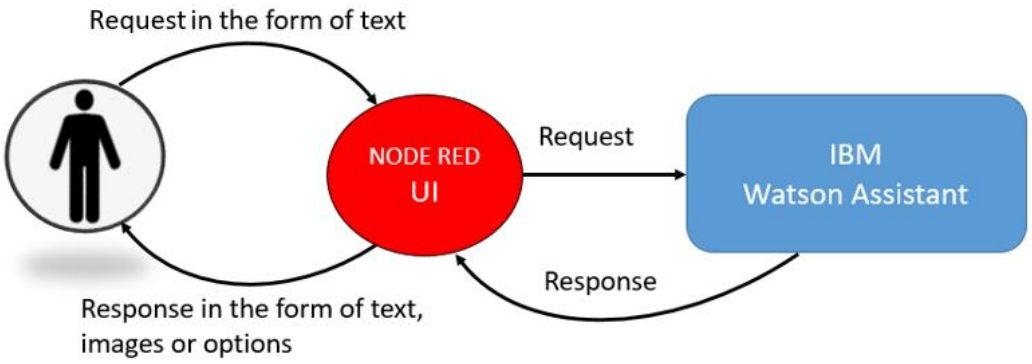
Chatbot : A chatbot provides interaction between machines and human being in the form of a question answering system. The main tasks performed by a chatbots are:

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



3.2 Software Design and Implementation:

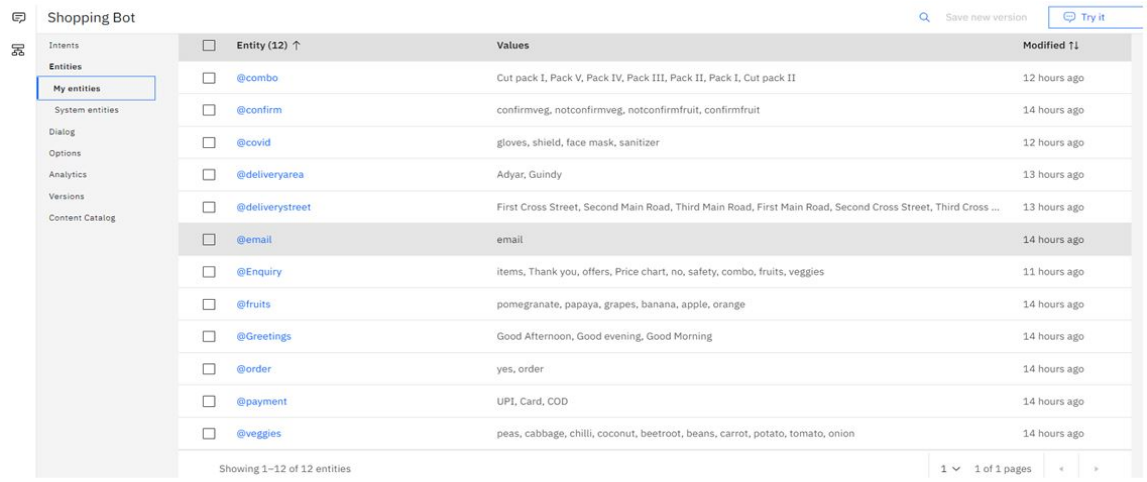
The components used to build the chatbot include

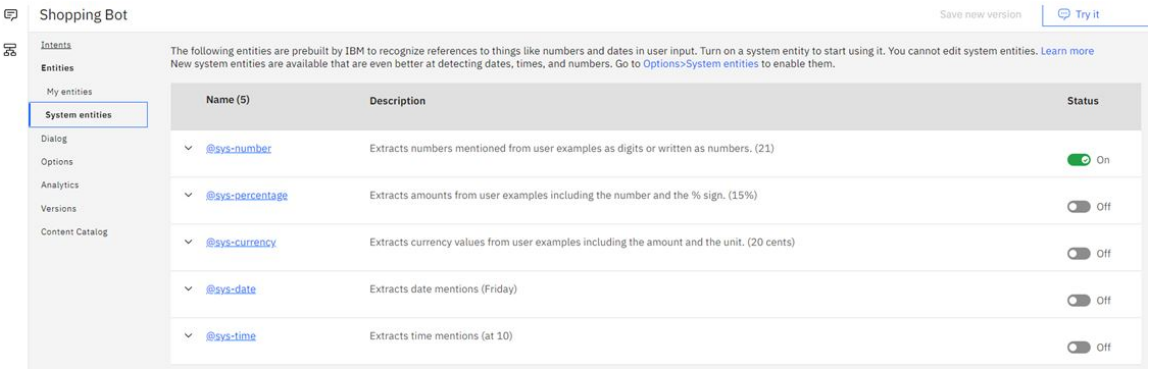
1. Intent: An intent represents the purpose of a user's input. Intents are defined for each type of user request depending on the application.
2. Entity: An entity is an object that is relevant to the intents and provides a specific context for an intent.
3. Dialog: A dialog is a branching conversation 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.

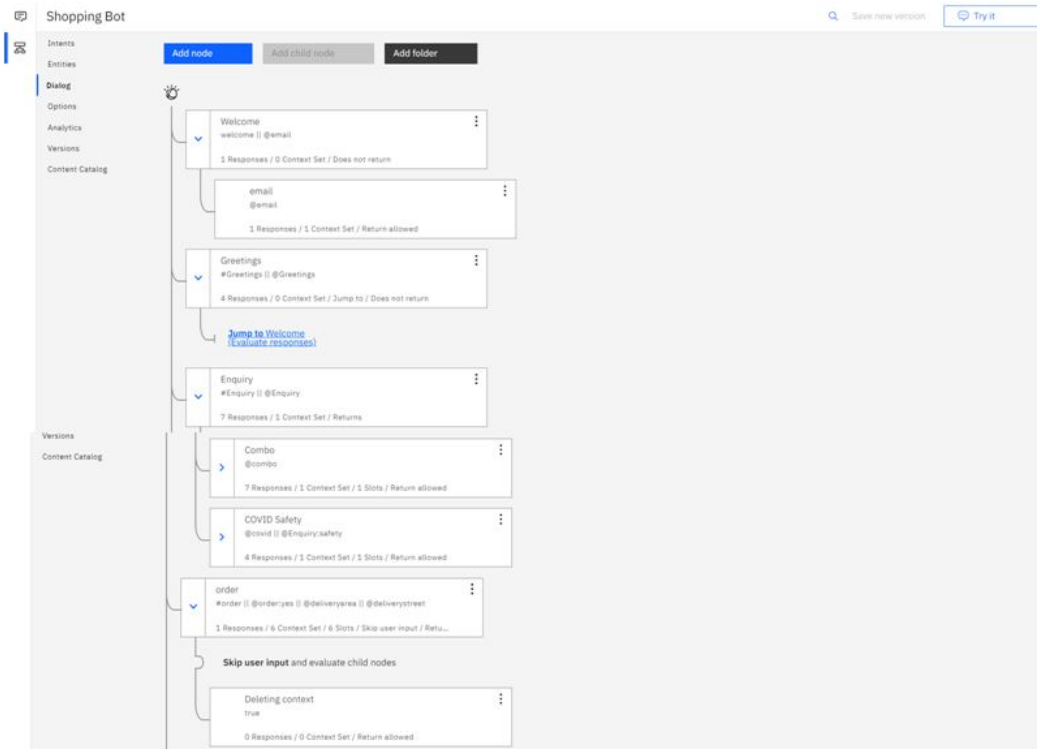
Intents:

Entities:


Shopping Bot
Save new version
Try it
Intents
Entities
My entities
System entities
Dialog
Options
Analytics
Versions
Content Catalog
Entity (12)
Values
Modified
@combo
Cut pack I, Pack V, Pack IV, Pack III, Pack II, Pack I, Cut pack II
12 hours ago
@confirm
confirmveg, notconfirmveg, notconfirmfruit, confirmfruit
14 hours ago
@covid
gloves, shield, face mask, sanitizer
12 hours ago
@deliveryarea
Adyar, Guindy
13 hours ago
@deliverystreet
First Cross Street, Second Main Road, Third Main Road, First Main Road, Second Cross Street, Third Cross ...
13 hours ago
@email
email
14 hours ago
@Enquiry
items, Thank you, offers, Price chart, no, safety, combo, fruits, veggies
11 hours ago
@fruits
pomegranate, papaya, grapes, banana, apple, orange
14 hours ago
@Greetings
Good Afternoon, Good evening, Good Morning
14 hours ago
@order
yes, order
14 hours ago
@payment
UPI, Card, COD
14 hours ago
@veggies
peas, cabbage, chilli, coconut, beetroot, beans, carrot, potato, tomato, onion
14 hours ago
Showing 1–12 of 12 entities
1
1 of 1 pages


Shopping Bot
Save new version
Try it
Intents
Entities
My entities
System entities
Dialog
Options
Analytics
Versions
Content Catalog
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
@sys-number
Extracts numbers mentioned from user examples as digits or written as numbers. (21)
On
@sys-percentage
Extracts amounts from user examples including the number and the % sign. (15%)
Off
@sys-currency
Extracts currency values from user examples including the amount and the unit. (20 cents)
Off
@sys-date
Extracts date mentions (Friday)
Off
@sys-time
Extracts time mentions (at 10)
Off

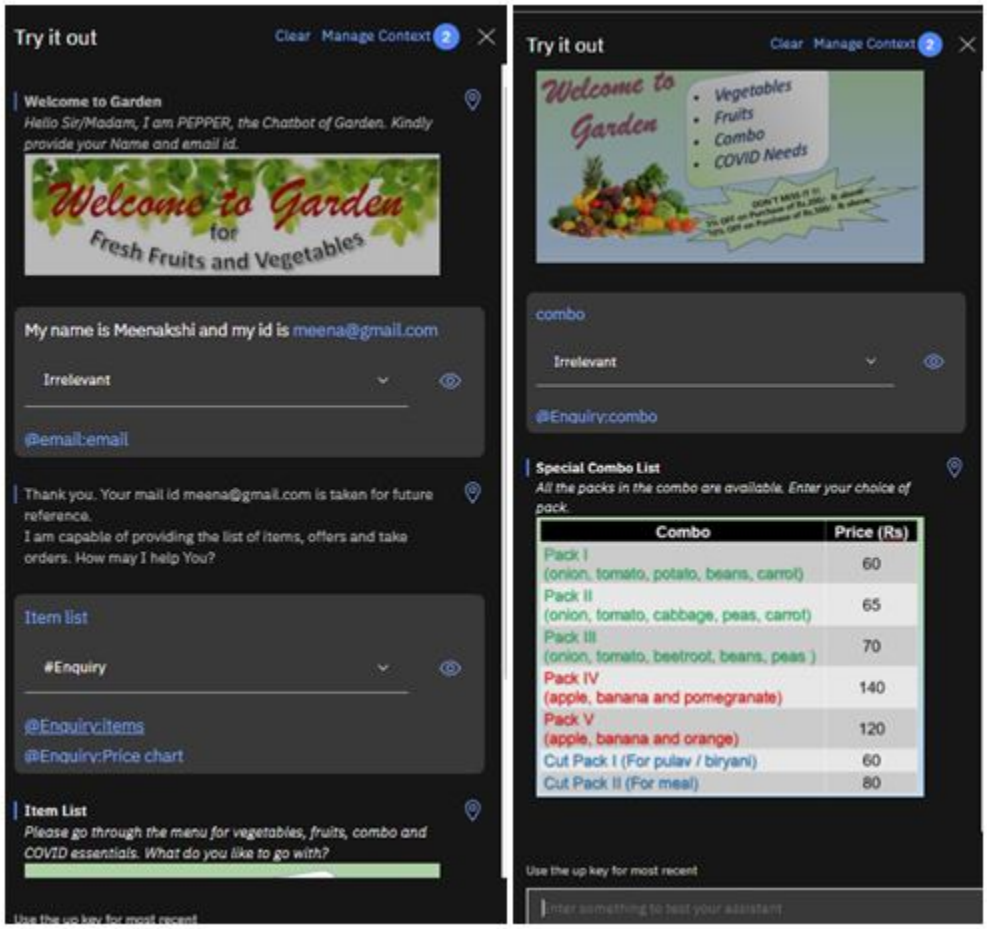
Dialog Flow:


Shopping Bot
Save new version
Try it
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Add node
Add child node
Add folder
Welcome
welcome || @email
1 Responses / 0 Context Set / Does not return
email
@email
1 Responses / 1 Context Set / Return allowed
Greetings
#Greetings || @Greetings
4 Responses / 0 Context Set / Jump to / Does not return
Jump to Welcome
(Evaluate responses)
Enquiry
#Enquiry || @Enquiry
7 Responses / 1 Context Set / Returns
Versions
Content Catalog
Combo
@combo
7 Responses / 1 Context Set / 1 Slots / Return allowed
COVID Safety
@covid || @Enquiry:safety
4 Responses / 1 Context Set / 1 Slots / Return allowed
order
#order || @order:yes || @deliveryarea || @deliverystreet
1 Responses / 6 Context Set / 6 Slots / Skip user input / Retu...
Skip user input and evaluate child nodes
Deleting context
true
0 Responses / 0 Context Set / Return allowed

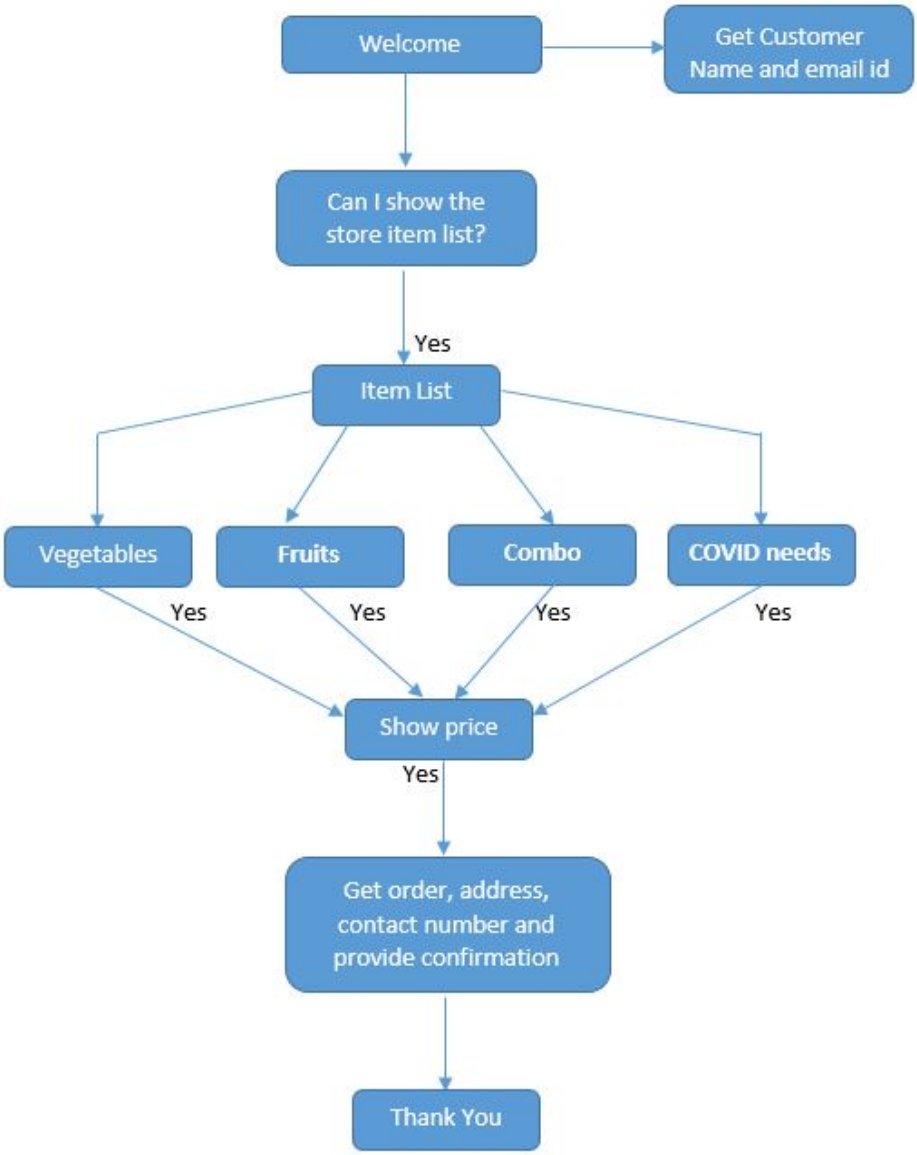
order - fruits
#order || @order:yes || @deliveryarea || @deliverystreet || @...
1 Responses / 7 Context Set / 7 Slots / Skip user input / Does...
Skip user input and evaluate child nodes
Deleting context
true
0 Responses / 0 Context Set / Return allowed
order - veggies
#order || @order:yes || @deliveryarea || @deliverystreet || @...
1 Responses / 7 Context Set / 7 Slots / Skip user input / Does...
Skip user input and evaluate child nodes
Deleting context
true
0 Responses / 0 Context Set / Return allowed
Anything else
anything_else
1 Responses / 0 Context Set / Does not return

4. EXPERIMENTAL INVESTIGATIONS

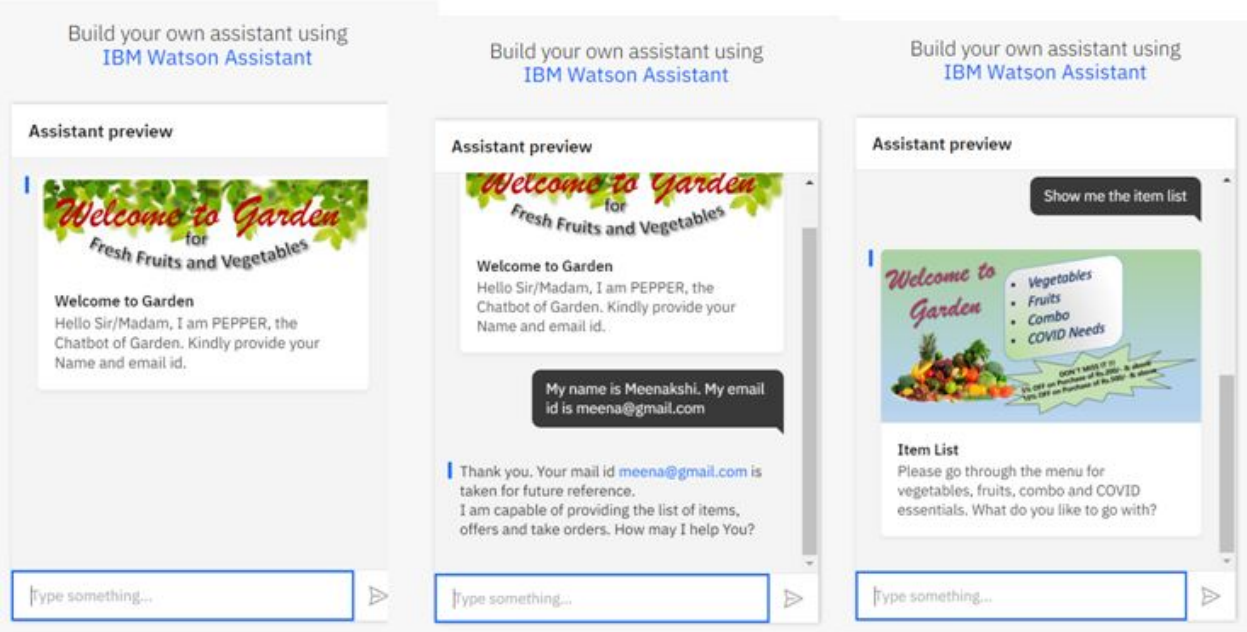
The chatbot is develped using IBM Watson. The services uses are assitant and skill. A skill is developed and the flow of conversation is experimentallu verified at every step. A sample experimental investigation is shown below.

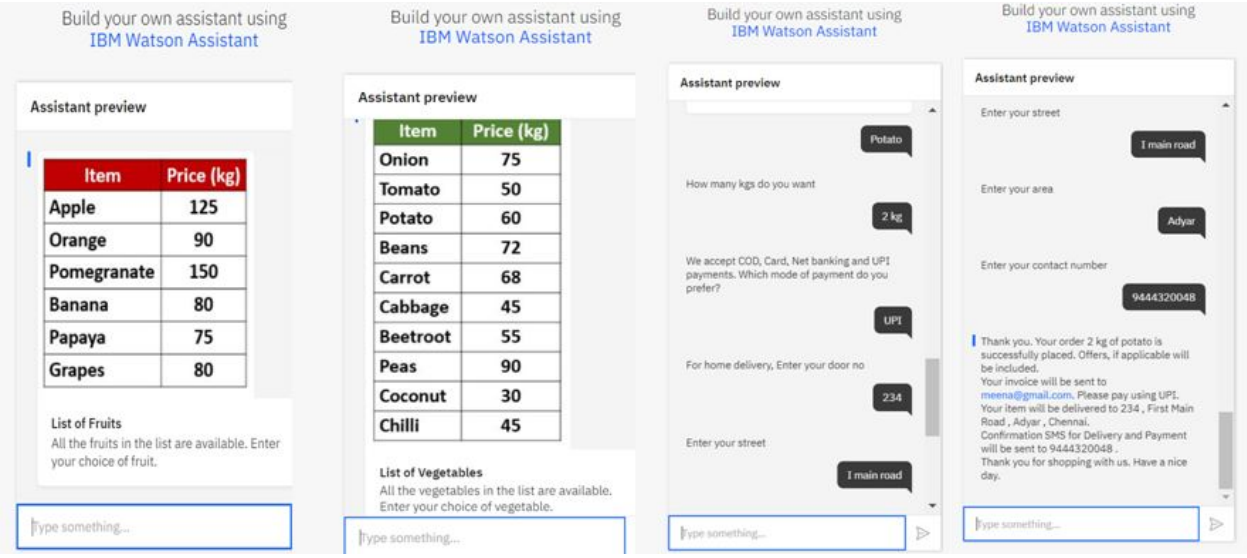


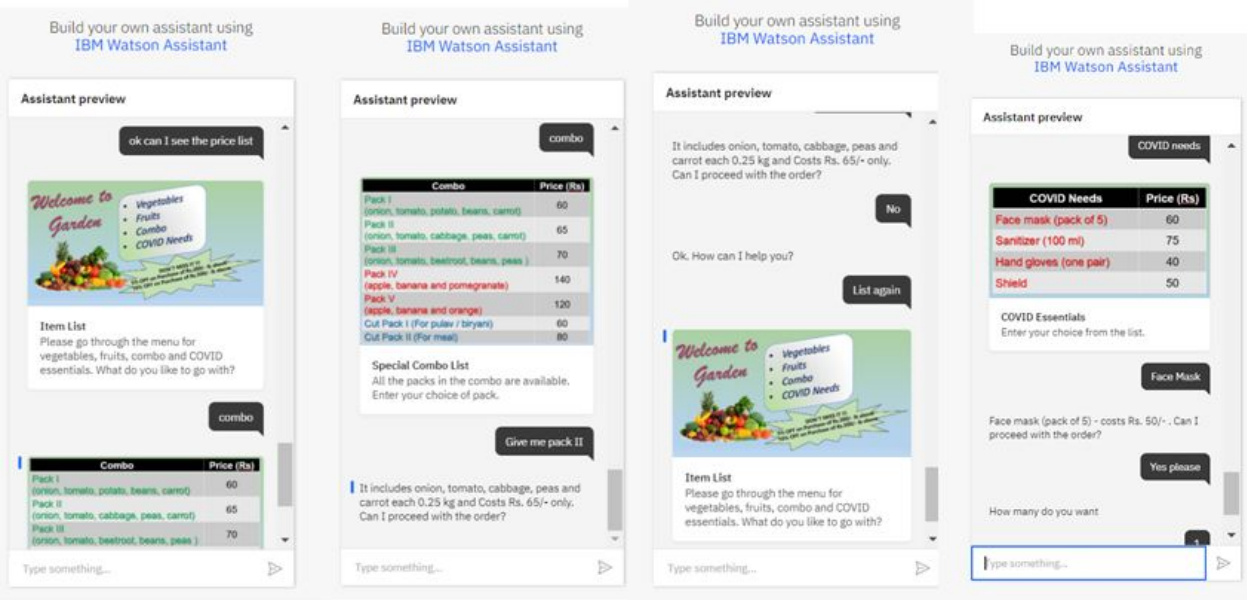
5. FLOW CHART

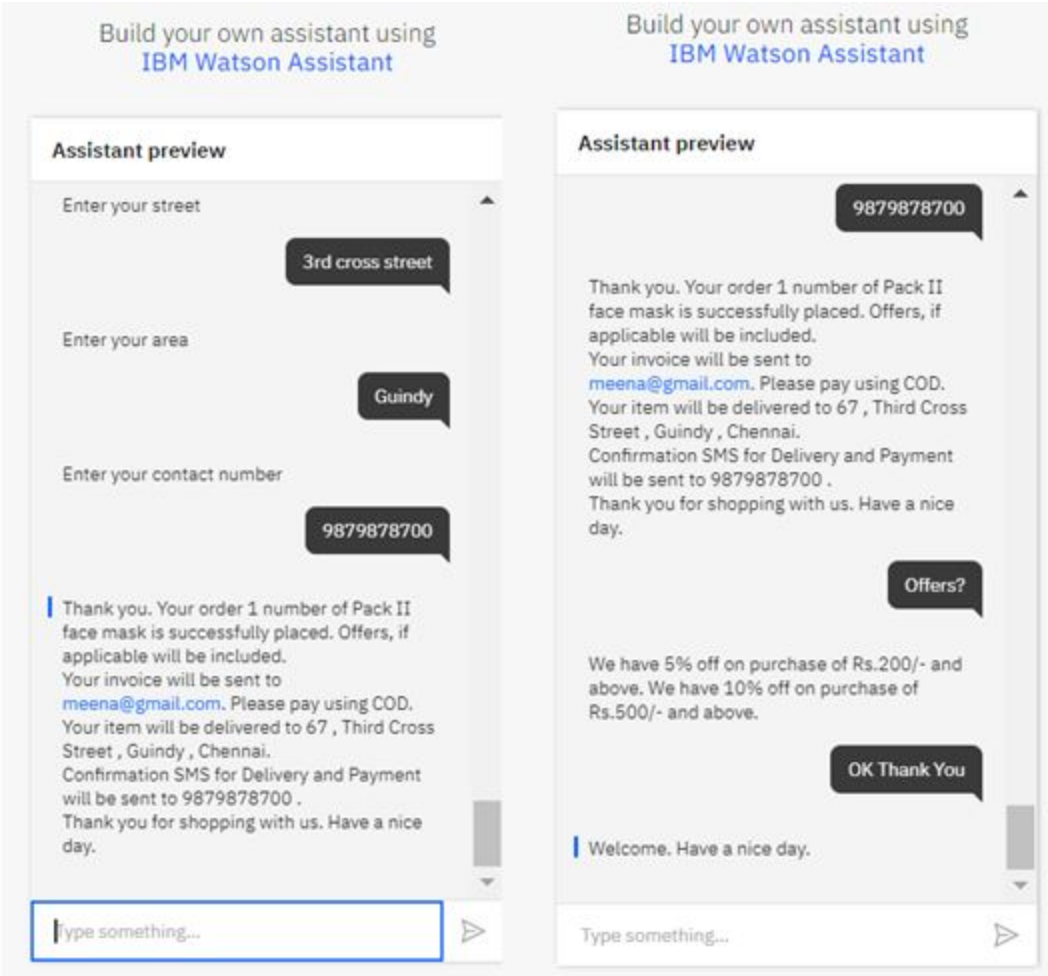

Welcome
Get Customer Name and email id
Can I show the store item list?
Yes
Item List
Vegetables
Fruits
Combo
COVID needs
Yes
Yes
Yes
Yes
Show price
Yes
Get order, address, contact number and provide confirmation
Thank You

6. RESULTS

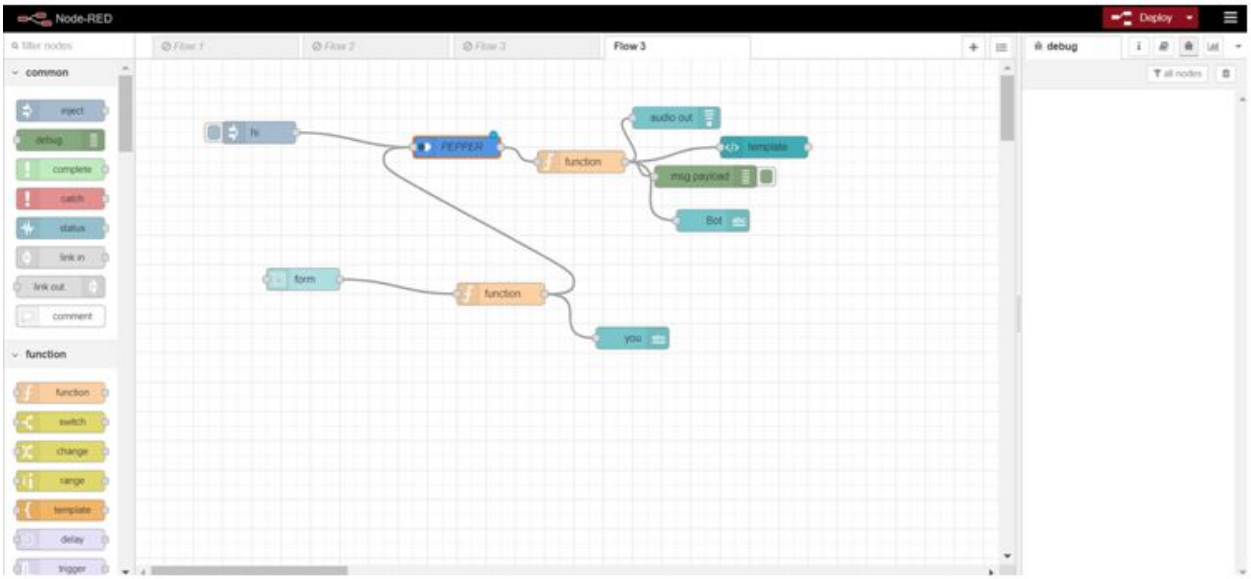

Build your own assistant using
IBM Watson Assistant
Assistant preview
Welcome to Garden
for
Fresh Fruits and Vegetables
Welcome to Garden
Hello Sir/Madam, I am PEPPER, the Chatbot of Garden. Kindly provide your Name and email id.
Type something...
Build your own assistant using
IBM Watson Assistant
Assistant preview
Welcome to Garden
for
Fresh Fruits and Vegetables
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
Welcome to Garden
Vegetables
Fruits
Combo
COVID Needs
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
Potato
How many kgs do you want
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...

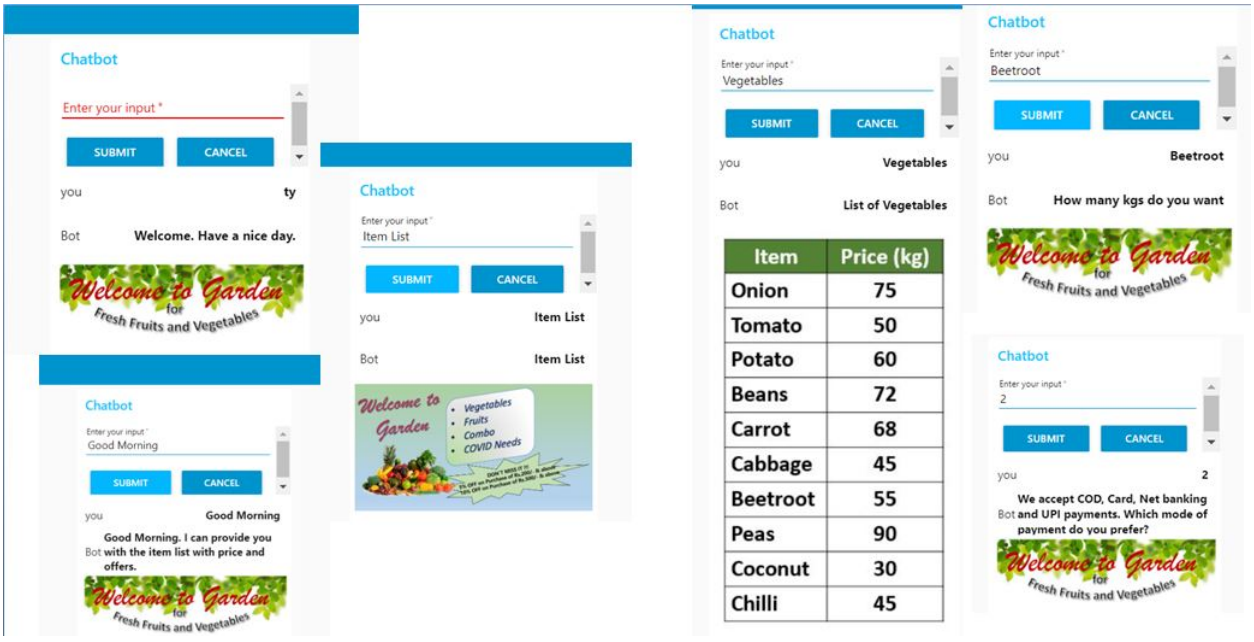

Build your own assistant using
IBM Watson Assistant
Assistant preview
ok can I see the price list
Welcome to Garden
Vegetables
Fruits
Combo
COVID Needs
Item List
Please go through the menu for vegetables, fruits, combo and COVID essentials. What do you like to go with?
combo
Combo
Price (Rs)
Pack I
(onion, 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
Special Combo List
All the packs in the combo are available. Enter your choice of pack.
Give me pack II
It includes onion, tomato, cabbage, peas and carrot each 0.25 kg and Costs Rs. 65/- only. Can I proceed with the order?
No
Ok. How can I help you?
List again
COVID needs
COVID Needs
Price (Rs)
Face mask (pack of 5)
60
Sanitizer (100 ml)
75
Hand gloves (one pair)
40
Shield
50
COVID Essentials
Enter your choice from the list.
Face Mask
Face mask (pack of 5) - costs Rs. 50/- . Can I proceed with the order?
Yes please
How many do you want
Type something...

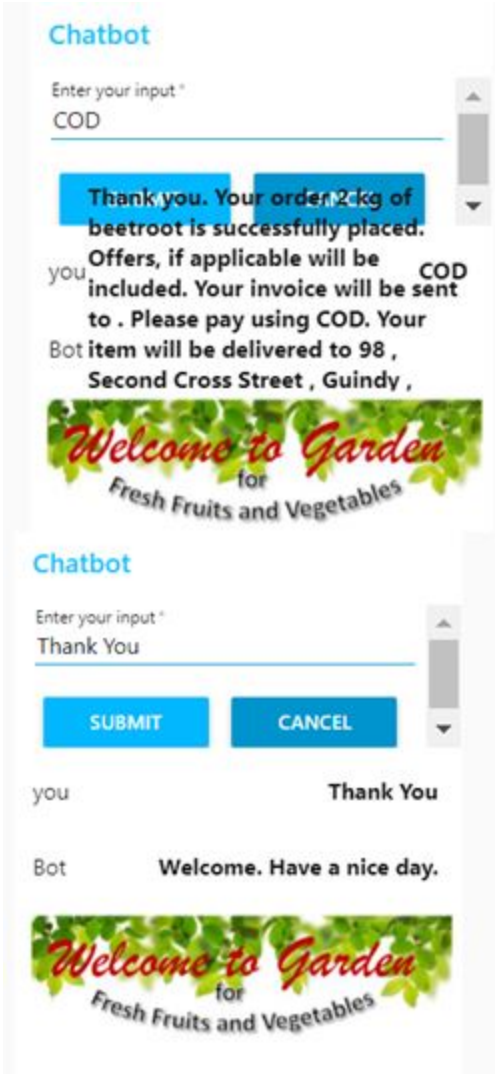

Build your own assistant using
IBM Watson Assistant
Assistant preview
Enter your street
3rd cross street
Enter your area
Guindy
Enter your contact number
9879878700
Thank you. Your order 1 number of Pack II face mask is successfully placed. Offers, if applicable will be included.
Your invoice will be sent to meena@gmail.com. Please pay using COD.
Your item will be delivered to 67 , Third Cross Street , Guindy , Chennai.
Confirmation SMS for Delivery and Payment will be sent to 9879878700 .
Thank you for shopping with us. Have a nice day.
Offers?
We have 5% off on purchase of Rs.200/- and above. We have 10% off on purchase of Rs.500/- and above.
OK Thank You
Welcome. Have a nice day.
Type something...

Node-Red Integration:



Output from Node-Red:





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

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

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;
```

Webchat Link:

https://node-red-ijqwz-2020-10-20.eu-gb.mybluemix.net/ui/#!/0?socketid=t1U7_oIxIzYrMB_MAAAw

(**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