Chatbot to shop for essentials during pandemic using Watson Assistant

Introduction:

Chatbots are some of the most exciting new tools in the customer experience environment. With bots and chatbots, businesses can automate the process of answering repetitive questions for their customers, speeding the time to resolution for clients, and reducing the pressure on agents.

What are Bots and Chatbots?

A bot is a program that automatically completes an action based on specific triggers and algorithms. A chatbot is a computer program that is designed to simulate human conversation. Users communicate with these tools using a chat interface or via voice, just like they would converse with another person. Chatbots interpret the words given to them by a person and provide a pre-set answer.

Chatbots, like regular applications, have application layers, databases, conversational user interfaces (CUIs) and APIs.

There are 3 common kinds of a chatbot available today:

Rule-based chatbots: The most straightforward option, these bots simply provide a pre-defined answer to very specific questions. These bots are great for things like qualifying leads or offering customers an interactive FAQ experience

Intelligent chatbots: These intelligent bots use machine learning or "ML" to learn from the user's requests and information. Intellectual bots are trained to understand specific words and phrases that trigger a reply. They teach themselves over time to understand more questions and deliver better answers

AI-powered chatbots: These bots combine the benefits of rule-based bots with the power of intellectually independent programs to solve user problems. They can remember the context of conversations and understand user preferences. These bots use a combination of natural language processing, machine learning, and AI to understand customers. Natural language processing helps the interactions between humans and computers to feel more natural

How do Bots and Chatbots Work?

There are 3 fundamental classification methods used to run a chatbot.

The first option is to create a pattern-matching bot. These bots classify text and produce a response based on the keywords they see. A standard structure for these patterns is AIML (Artificial Intelligence Mark-up Language). In pattern-matching, the chatbot only knows answers to questions that exist in their models. The bot cannot go beyond the patterns already implemented into its system.

Another option for today's chatbots is to use algorithms. For each kind of question, a unique pattern needs to be available in a database for the bot to provide the right response. With various combinations of trends, it is possible to create a hierarchical structure. Algorithms are how

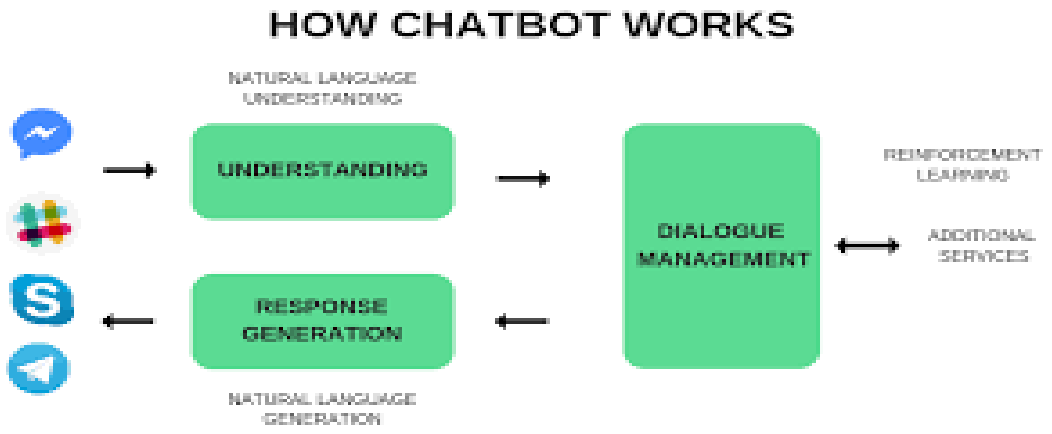
developers reduce the classifiers and make the structure more manageable. The classic algorithm for NLP and text classification is Multinational Naïve Bayes.

The final crucial methodology for chatbots is to use artificial neural networks. These are solutions that give the bots a way to calculate the response to a question using weighted connections and context in data. With artificial neural networks, each sentence provided to a bot is broken down into different words, and each word is used as an input for the neural network. Over time, the neural network becomes stronger and more advanced, helping the bot to create a more accurate set of responses to common queries.

There are many different types of variations in neural networks. Often, businesses that use these tools will need to train their bots over time to become more efficient and effective. Fortunately, training for a chatbot happens at a much larger and faster scale than teaching for a human. A customer support chatbot, for instance, can be fed thousands of conversation logs, and use the information from those logs to support its neural network.

What is more, when a chatbot is ready to interact with live customers, businesses can implement smart feedback loops. This means that during a conversation, when customers ask a question, a chatbot can deliver a couple of intelligent answers with options like “Did you mean a, b, or c”. The way the customer respond will help to reinforce the bot’s understanding and train the machine learning model.

AI-powered chatbot:



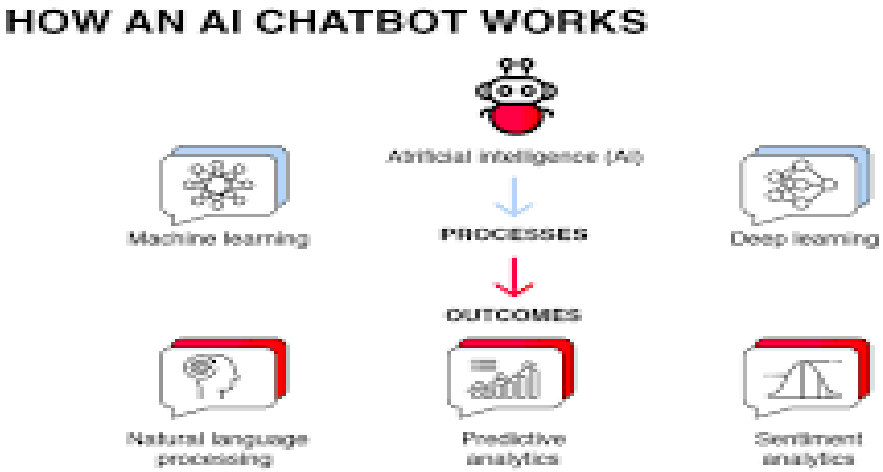
NLU (NATURAL LANGUAGE UNDERSTANDING)

It has 3 specific concepts like:

Entities: Entity basically represents a concept in your Chatbot. It might be a payment system in your Ecommerce Chatbot.

Intents: It is basically the action chatbot should perform when the user say something. For instance, intent can trigger same thing if user types “I want to order a red pair of shoes”, “Do you have red shoes? I want to order them” or “Show me some red pair of shoes”, all of these user’s text show trigger single command giving users options for Red pair of shoes.

Context: When a NLU algorithm analyses a sentence, it does not have the history of the user conversation. It means that if it receives the answer to a question it has just asked, it will not remember the question. For differentiating the phases during the chat conversation, it is state should be stored. It can either be flags like “Ordering Pizza” or parameters like “Restaurant: ‘Dominos’”. With context, you can easily relate intents with no need to know what the previous question was.



CHAT BOT using IBM Watson Assistant:

Chatbot to shop for essentials during pandemic using Watson Assistant:

Today, because of social distancing and other issues it can be risky for some people to shop for essential items in person. This project helps with this issue by giving people an online option to shop for essentials. With the help of Watson assistant, a chatbot is built. This chat should have the following capabilities:

1. Initially bot greets the customer and asks the details
2. The bot takes details like name, contact number, and email id
3. Give the list of items in the Store
4. Shows the prices of vegetables also able to display the offers, discounts, and special items.
5. Able to take the order and mode of payment.

Services Used:

1. IBM Watson Assistant
2. Node-Red

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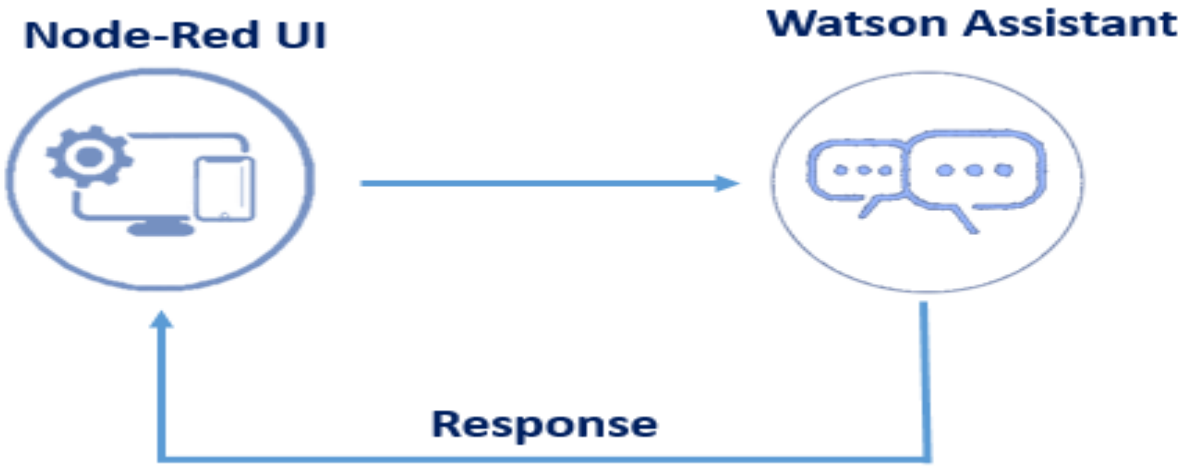
Architecture:



The procedure using IBM Watson Assistant

There are 3 steps to create

1. **Creating Intents:** Intents are the objectives of every bot. A chatbot that answers questions about you has the broad objective of providing information about a human being. Therefore, it helps to think of this information as it pertains to where, what, and when. In other words, the intents would answer “where did you x”, “what is your y” and “when did you z”. The actual intents would simply be “where”, “what”, and “when” (or location, general info, and time). I have created intents shown below-

Discounts today	Enquiry
I want to see the list	Enquiry
What are items available	Enquiry
What are the offers available	Enquiry
Any offers please	Enquiry
today's deals	Enquiry
Show me the list of Items	Enquiry
Hello	Greetings
Good Morning	Greetings
Good Evening	Greetings
Good Afternoon	Greetings
Hi	Greetings

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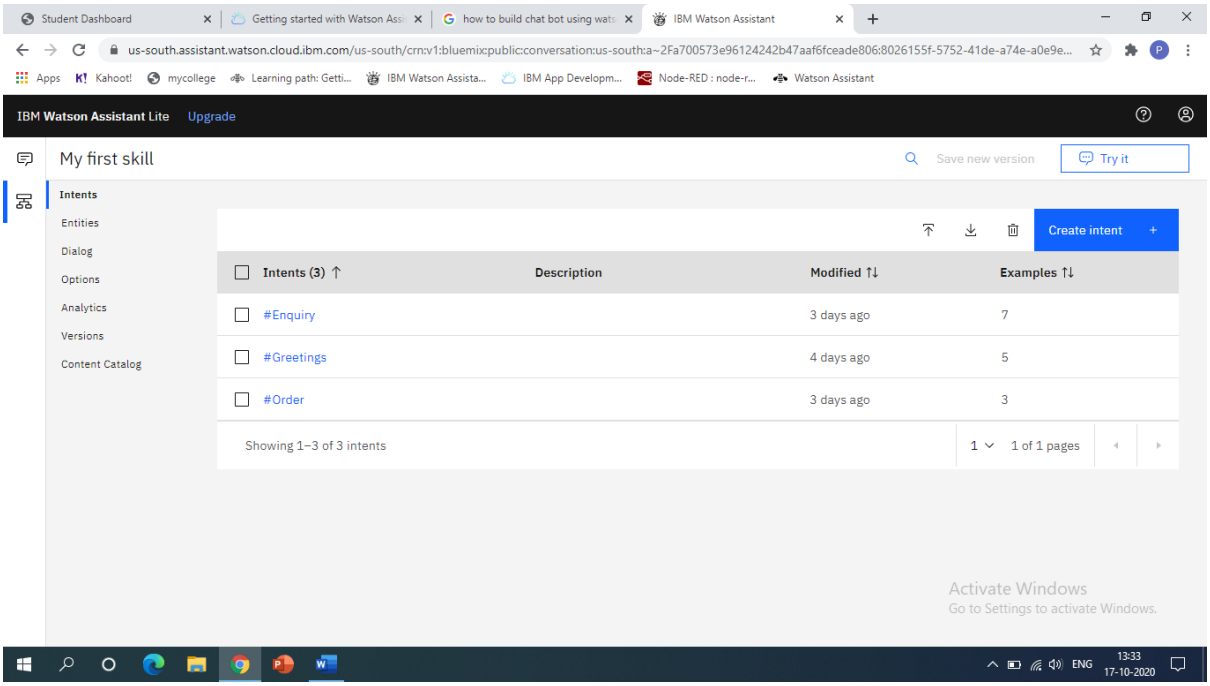
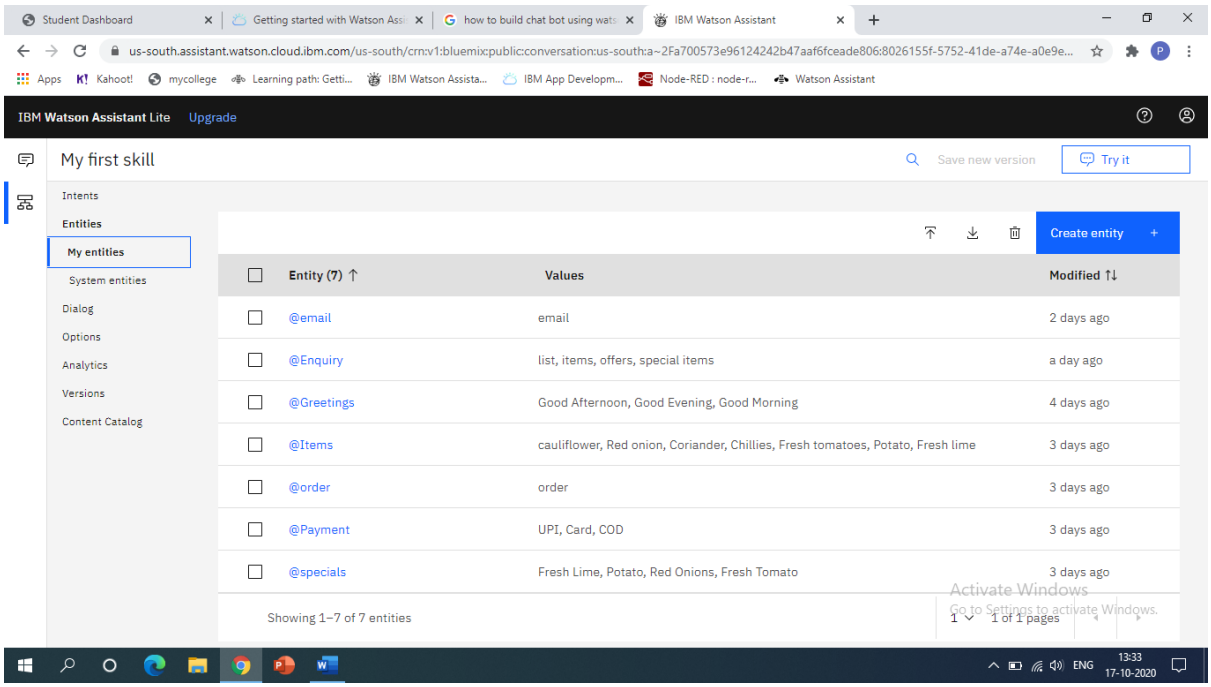


2. **Define Entities:** This allows single entities to apply to multiple intents. In this example “college” could apply to both the “where” and “when” intents. Under each entity, you will also want to add values. Values are sub-subjects of entities. For the above chatbot entities created are shown below-

email	email	/ [a-z0-9._%+-]+@[a-z0-9.-]+\.[a-z]{2,}$/			
Enquiry	special items				
Enquiry	items				
Enquiry	list				
Enquiry	offers	delivers	deals	discounts	
Greetings	Good Mor	Gm	gud mrng	good mrng	
Greetings	Good Ever	Ge	gud evng	good evng	
Greetings	Good Afte	Ga	gud atrnu	good aftrnun	
Items	Coriander				
Items	Chillies				
Items	cauliflower				
Items	Fresh tomatoes				
Items	Potato				
Items	Fresh lime				
Items	Red onion				
order	order	orders	buy	purchase	
Payment	Card				
Payment	UPI				
Payment	COD	Cash on delivery			
specials	Fresh Lime				
specials	Fresh Tomato				
specials	Potato				
specials	Red Onions				



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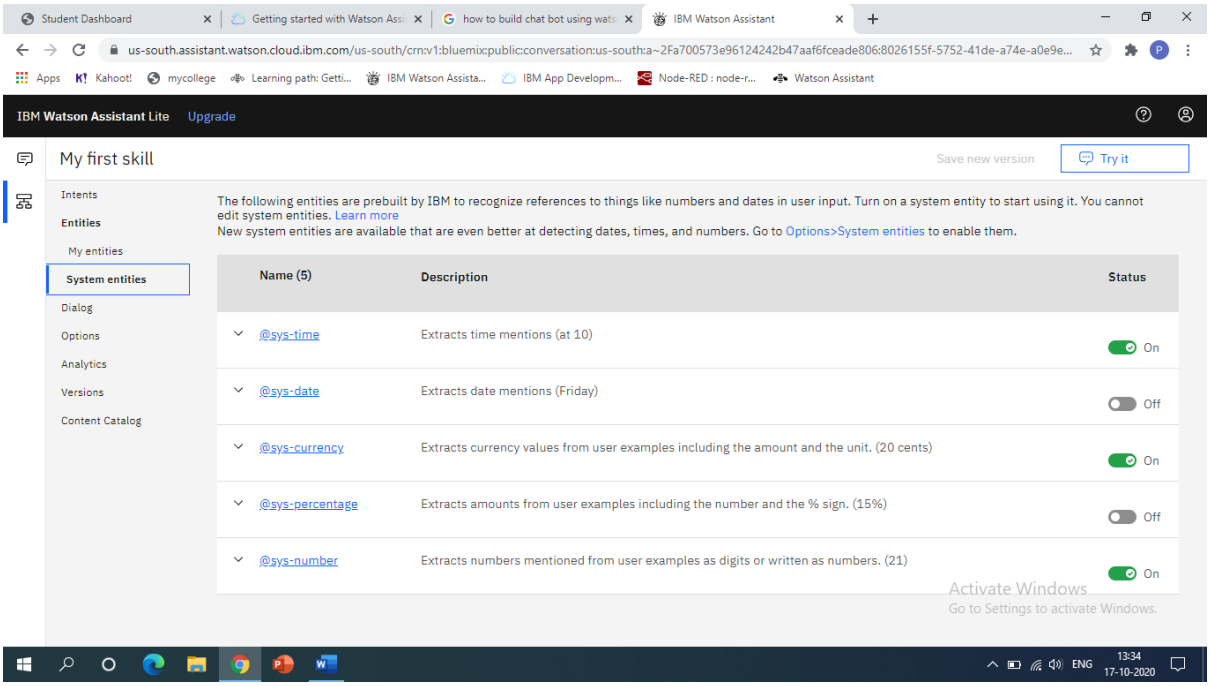
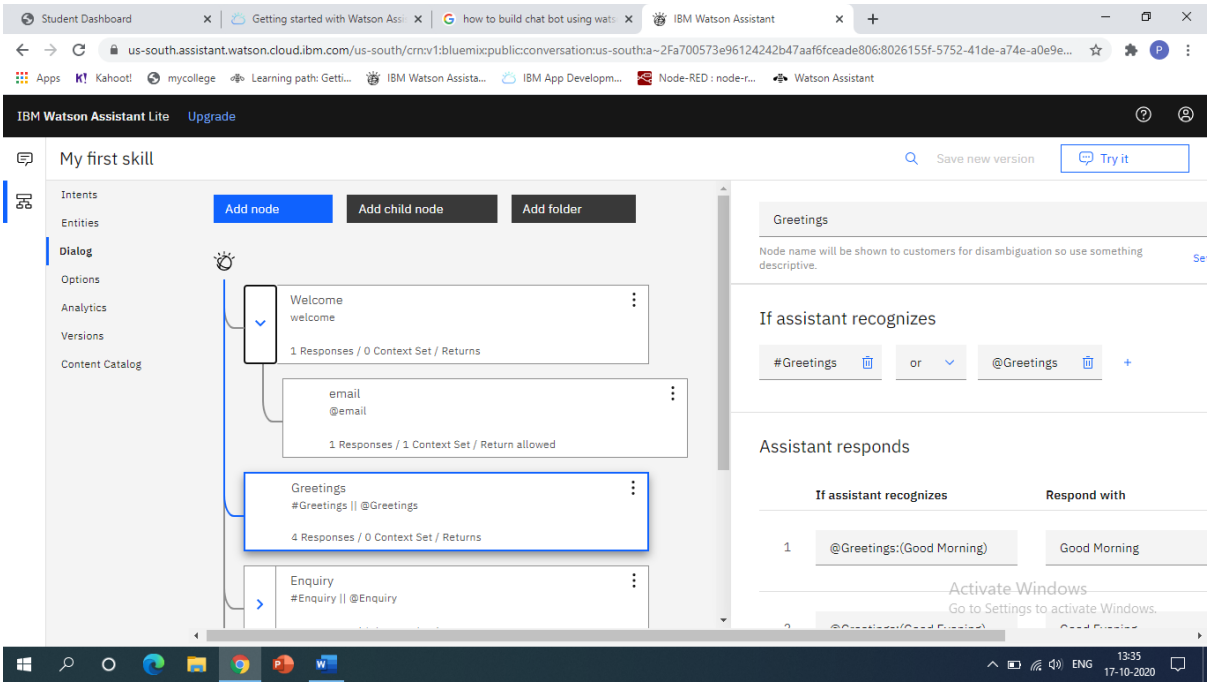
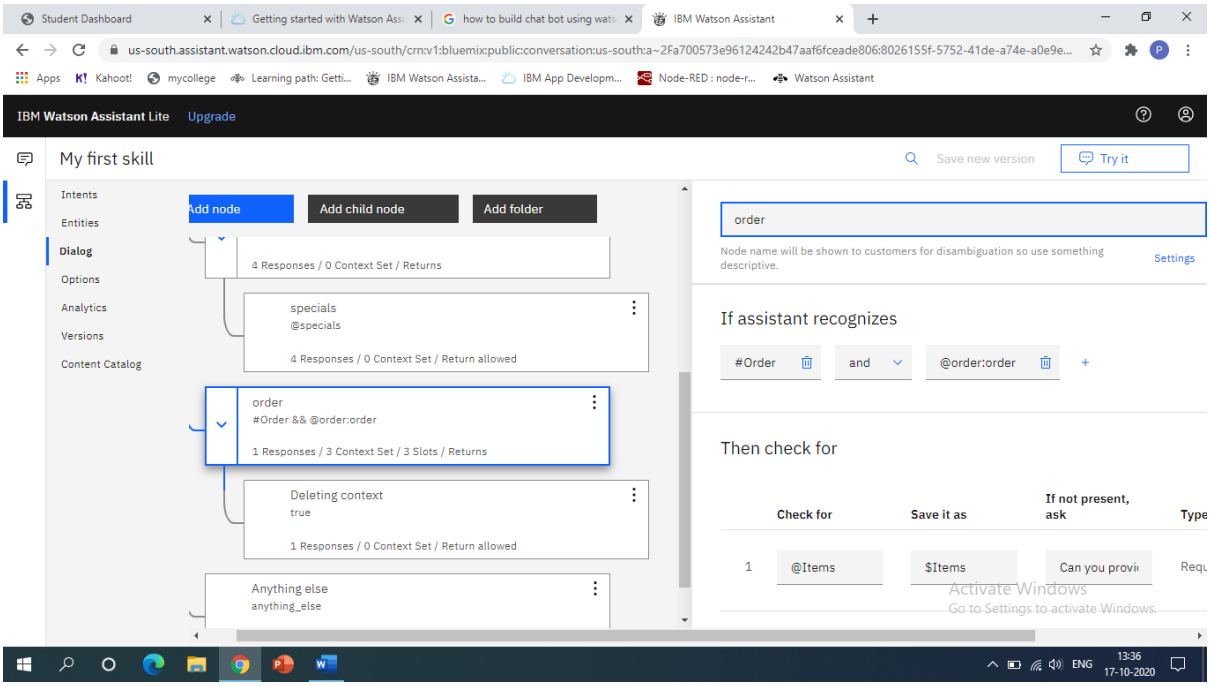


3. **Creating Dialog:** Setting up your dialog flow is all about logic. The dialog in the Conversation API is set up like a logic tree with many "if then" conditions. Each intent begins a node on the left and the logic flows from the top down through your intents. If a certain intent is triggered by an utterance, its node is opened, and the logic continues to entities. The logic within each node (i.e. through entities) also flows from top to bottom. A specific combination of #Intent and @Entity:value triggers a certain response to a question – this combination is referred to as the response condition. So, for "what was your major" the "what" intent would be triggered and then the response associated with the response condition #what and @college:major would be returned. The dialog tree for above chatbot is shown below-





Output of CHATBOT with Watson Assistant:

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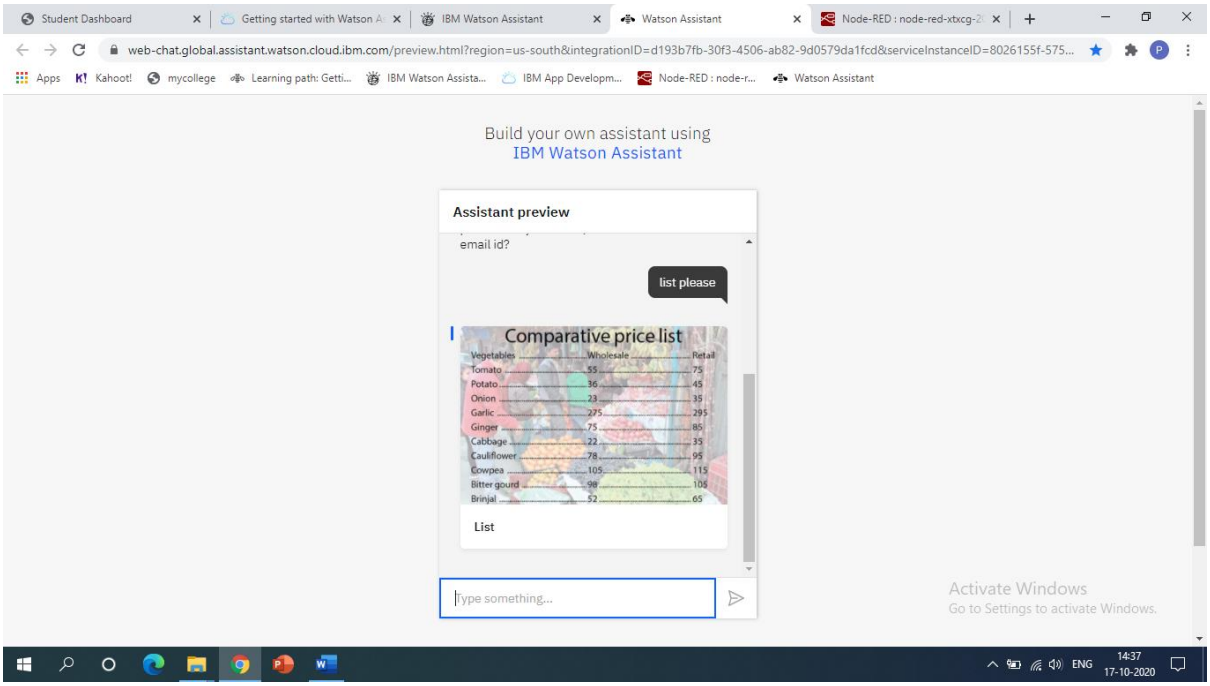

Integrate Chatbot with Node Red

1. Open the Node-RED flow created earlier
2. Add another flow with the following connection sequence of nodes and connect the output of the node to the input of the next node. Following nodes are created in Node Red-
   1) Inject
   2) form
   3) function
   4) Assistant
   5) function
   6) Debug
   7) 2 text nodes

   The flow is shown below-

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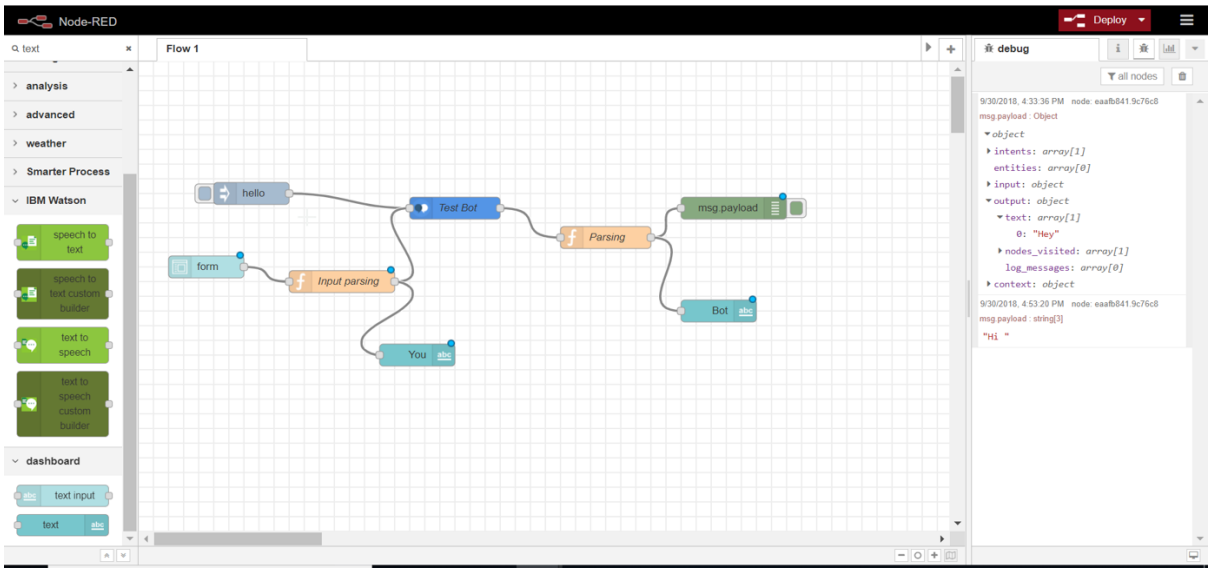
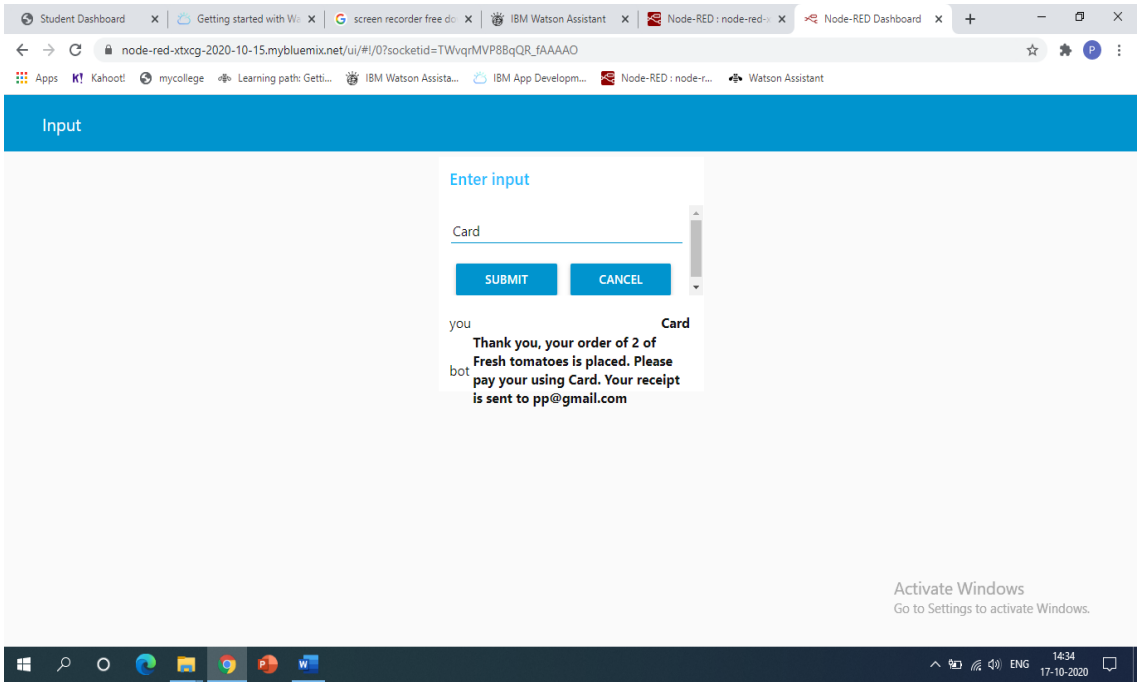


Output with Node Red integration:



Conclusion:

The above designed CHATBOT can greet, show the item list, and take orders from the customer. The chatbot is also taking Name, address, and email id for reference

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