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SERVE ME-A SMART BOT

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ABSTRACT

With rapid development of technology for strong AI chatbot, the role of chatbot has been extended from conducting simple tasks to being a friend or personal assistant. We are going to create a chatbot which gives information about the items available in our restaurant. When we go to any restaurant, the main problem is that the service executive may not receive us or take order properly. With this chatbot, the customers no longer need to make a call to reserve a table, wait in line for tables to free up.Bots can be programmed to carry out a myriad of tasks ranging from answering FAQs, making a reservation, ordering food or processing payment. The bot can carry out these tasks in manner similar to a service executive. If the customer wants to order some food, the chatbot provides some options of dishes which is available in the restaurant. While the staff focuses on preparing and serving food, this chatbot engages with the customers by answering questions related to open and close times. With customer contact details, past orders, preferred method of payment etc ,this chatbot can not only personalize a customers experience but also reward loyal customers in order to increase repeat business all through a well designed chatbot conversation.

Keywords: *Artificial intelligence, chatbot, restaurant.*

I. INTRODUCTION

A chatbot is a service or tool that you can communicate with via text messages. The chatbot understands what you are trying to say and replies with a coherent, relevant message or directly completes the desired task for you. These act as an artificial brain, using sophisticated cognitive and natural language processing capabilities. It not only understands requests but also context, intent, emotion and it continuously gets smarter as it learns from conversations it has with users.

However, most of the bots today are rule based bots that give the user a menu and the user navigates through the menu like telephonic complaint booking systems but in text. Secondly, most of the bots are closed domain bots meaning they are focused on one particular task and are trained for that field only. Alexa, Siri are examples of open domain bots. However, bots for restaurant booking are closed domain bots. Closed domain bots can be both, powered by artificial intelligence or be rule based. While the users expect open domain bots that are intelligent in all aspects, the goal of a bot system isn't just that. The goal of a bot system remains to automate a service using a conversational interface that allows the user to access the service from the platforms they frequently visit. This goes to say one mustn't be dissuaded from building a rule based bot that indeed works for the reason that the bot isn't intelligent like a super human. That being said, we must pursue building intelligent systems since the more intelligent they are in terms of understanding the end user, more will they be useful. With chatbots becoming mainstream, several industries are utilizing them as they offer greater and less intrusive opportunities when it comes to customer engagement (esp. hyper connected millennials). It is only a matter of time before chatbots in restaurants make their way to the forefront. Designed to communicate in a meaningful manner with customers, chatbots can be integrated with any interface. For e.g., the pizza bot from Domino's take delivery orders directly from Facebook Messenger with a mere emoji. Given that customer retention and loyalty is at the core of any service based business, it is paramount for restaurants to fulfil and exceed expectations when it comes to guest service. Everything from running marketing campaigns, their website to online and offline services is a means to attaining the very goal of impeccable service. However, be it ordering food, making a reservation or even getting recommendations, it is impossible for service staff to meet everyone's standards consistently which can result in a negative brand image for the restaurant. With chatbots, your customers no longer need to make a call to reserve a table, wait for staff to attend to them or wait in line for tables to free up. Restaurants don't need to have a exclusive

service executive for the customers either. Bots can be programmed to carry out a myriad of tasks ranging from answering FAQs, making a reservation, ordering food or processing payment. The bot can carry out these tasks in manner similar to a service executive, difference being—it can execute round the clock with zero downtime.

II. LITERATURE SURVEY

Chatbots are the latest buzz around the globe. With the rise of messaging, chatbots are becoming more and more popular every day. Every business sector seems interested in adopting chatbot.Big brands have already started launching their chatbot from last year. But what about the retail industry? Restaurant business is an integral part of the retail industry and I strongly believe they will benefit most from this technological advancement. But how?Facebook is right now the biggest platform for connecting businesses all around. People like to search for restaurants in Facebook first before even visiting their website or their outlet. As the way of marketing has evolved, so more or less, most of the restaurants have been equipped with Facebook Page to be present in the trend.But being digital is not the game changer for a business. Facebook page opens the opportunity to connect with people around. Sending direct message from FB pages to restaurants are getting more and more popular. But are the restaurants ready enough to embrace the new way of connecting with customers.No doubt, the big restaurant chains are well aware of the messaging connection power and they respond fast enough to customers for any FAQ. But medium and small restaurants are not much up to date to respond to their customers. In a more competitive digital market, they are actually losing more potential customers at the end of the day.

I ran a survey in Denmark this year to see how fast the restaurants respond back to customer FAQs. I sent messages (a 'Hi' followed by 'What's the opening hours?') to almost 100 restaurants over Facebook Page. As per 2017 global mobile survey, organizations use to take around 600 minutes to respond back to customers FAQ over Messenger. In my case, in around 70% of the cases, I didn't even got a response. For the rest 25%, I got response after more than a week. The fastest response from 5% restaurants took around 2–12 hours. As a matter of fact, 2 hr response was only from 1 restaurant. Chatbot is the ultimate solution for such situations. With the capacity of responding to hundreds of customers simultaneously, bots gain customer satisfaction resulting in more customers turnaround in restaurants. With more advancement, chatbots are getting cheaper to build and integrate for businesses.

Restaurants of all sizes should focus right now to have their own chatbots. Because bots are the new websites. Bots even can lead to better sales funneling. As end users, this gives a feel good factor as well. Thus from the first interaction, a personal bonding between digital customers and their favorite restaurant starts to grow. After all, over a good food, it is the customer service that makes the customers feel special. However, the US research and advisory firm providing information technology related insight, more than 50% of businesses will spend more per annum on bots and chatbot creation than traditional mobile app development. Customers will manage 85% of their relationship with a restaurant without a single human interaction. This also means restaurant operators will only have a small 15% window to ensure their technology is now all chatting.

Digital gaints such as Amazon, Apple, Facebook and google are disrupting and seducing consumers into a whole new way of thinking. We cant ignore the fact that consumers are becoming increasingly lazy about downloading apps, together with creating user profiles and passwords. It therefore makes sense that a more convenient, direct link in form a social-media channel would be their preferred choice. Just look at IBM Watson: there are currently 100000 chats on the platform alone, with new ones being introduced daily.

Its only a matter of time before tech-savy diners view chatbots as an expectation,which will form an important part of their cutomer journey with an operator. As we enter an era of uncertainity, with staff shortages already an issue for many, restaurant operators should be looking for smart way to alleviate the pressure points across their business. For example, consider the expense of manning a land line and driving traffic to messaging channels, when a chatbot can deliver this service to create high levels of customer engagement.

Chatbots are already relatively established in US restaurants. Pizza hut, Taco bell, Burger king are all on the case, and we know interest is growing in the India. Pizza express has launched a booking bot and opentable released an

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Amazon Echo Show skill to alow customers to make a table booking voice-first. As with any technology, it will be important for operators to ensure their chatbot can integrate across existing technologies. The sweet spot is enquires handled by a bot, with bookings then linked instantly to front of house.

III. PROPOSED CHATBOT

In this Code Pattern, we will use the Watson Assistant Slots feature to build a restaurant chatbot. The needed information such as timings, specials, menu, offers can all be entered within one Assistant Node, unlike with previous versions of Assistant.

When the reader has completed this Code Pattern, they will understand how to:

1. Create a chatbot dialog with Watson Assistant.
2. Use the power of Assistant Slots to more efficiently populate data fields.
3. Use Assistant Slots to handle various inputs within one Node.

Step 1: Define Intents

Intents are the objectives of every bot. If a chatbot helps users handle expenses, the intents would be things like greetings, enquiry, offers, order, menu, reservation etc.

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 'I want to reserve a table.' 'Show me the menu.', 'Can I place my order?' etc.

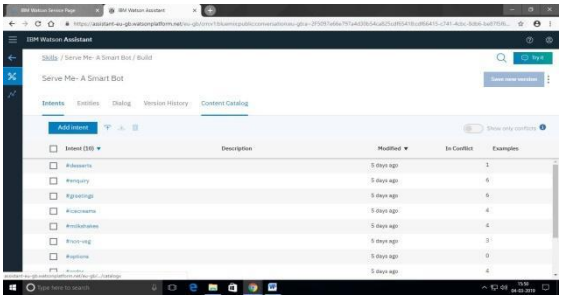

Figure 2: Intents

After you have your intents, the next step is to add utterances. Utterances in the Conversation API refer to the different questions your end users ask your bot. Under each intent, add questions that would pertain to them. Under the "reservation" intent you would add phrases like "I want to book a table.", "reserve a tabe", "booking a table" and all. As soon as you create an intent, you can test it by clicking Ask Watson icon in the top, right-hand side of the conversation editor.

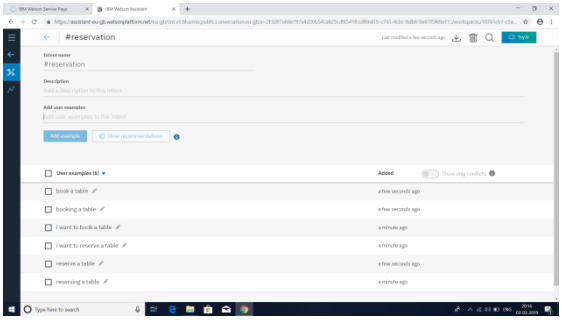

Figure 1: Creating an intent

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Not only would you want to add as many as you can, but you would want to add the different ways each of these questions could be phrased. So, not only would you want to create the utterance "I want to reserve a table" but you would also want to add "Can u reserve a table for me?.", "Book a table" etc. In this way we have to create intents for specials, offers, menu, timings and all.

Step 2: Define Entities

When we were building restaurant Chatbot, understanding the difference between intents and entities was our biggest challenge. An entity is a portion of the user's input that you can use to provide a different response to a particular intent. The best way to think about entities is that they are the subjects of intents. Click Entities. On the Entities page, click Create new.

Adding values and synonyms to entities helps your chatbot learn important details that your users might mention. Each entity definition includes a set of specific entity values that can be used to trigger different responses. Each value can have multiple synonyms that define different ways that the same value can be specified in user input.
So we created entities to represent to the application what the user wants to access.

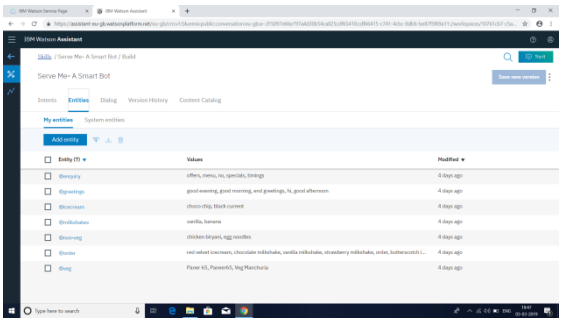

Figure 3: Entities

So, in "what are the timings of the restaurant?" the intent would be "what" and the entity would be "timings". This allows single entities to apply to multiple intents.

Under each entity, you will also want to add values. Values are sub-subjects of entities. So, under reservation you would have things like reservation, timings, specials, offers, menu, order etc, along with synonyms for each of these. The more synonyms you add for each entity value the better. That way someone can ask "what are the specials of this restaurant?" and "what are the profession of this restaurant" and get the same correct answer.

Another tip here is to add descriptive words before certain entity values that could have more than one meaning. In this example "timings" could be the verb or the noun. So, to help clarify the meaning in the context that it's being used, you could add "timings of restaurant" as a synonym for major, and "waiting time" as a synonym for restaurant. As you did for intents, you can reuse entities' definitions through the export and import capabilities.

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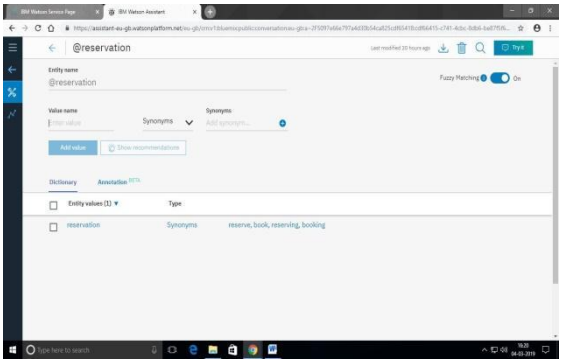

Figure 4: Creating an entity

In the same way, we have to create entities for timings, specials, offers, menu, order etc.

Step 3: Creating a Dialog

We ’ve got intents, we’ve got utterances, we’ve got entities, and we’ve got entity values and synonyms. Now it’s time to build exactly how our bot is going to interact with users. In the Watson Conversation API this part is your 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 t 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. A dialog is made up of nodes that define steps in the conversation.

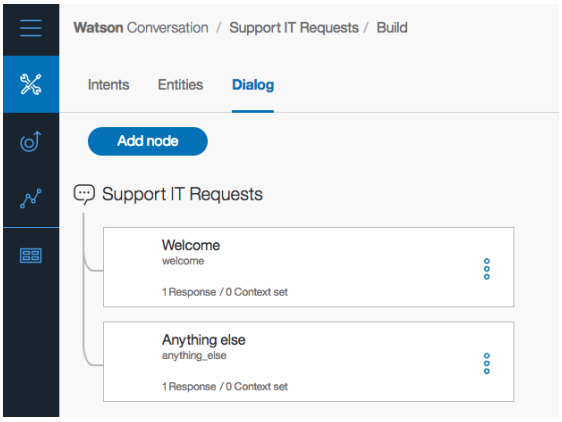

Figure 5: Dialog page

In the previous image, two dialog nodes are shown. The first node is the standard welcome message. The other node is a catch-all node named "Anything else." Dialog nodes are chained in a tree structure to create an interactive conversation with the user. The evaluation starts at the top, so the welcome node is assessed before the "Anything else" node.

If you click the welcome node, the standard Watson response is "Hello. Welcome to Hams-Tech Restaurant!!!How can I help you?" To validate how the flow works, you can click the Ask Watson icon.

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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 are the timings of the restaurant" the "what" intent would be triggered and then the response associated with the response condition #timings and @enquiry would be returned.

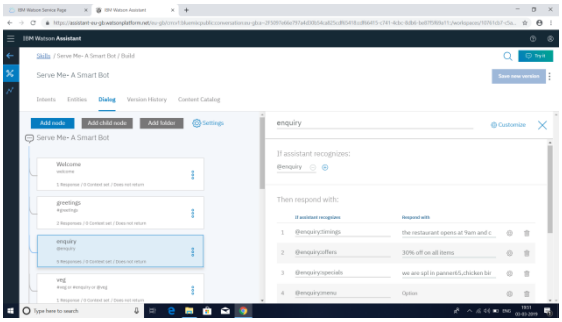

Figure 6: Creating a Dialogue

Architecture of node-red

Once the node red is created, the following can be done.

1.Add an inject node: The inject node allows you to inject messages into a flow either by clicking the button on the node, or setting a time interval between injects. Drag one onto the workspace from the palette. Open the sidebar and select the Info tab. select the newly added Inject node to see information about its properties and a description of what it does.

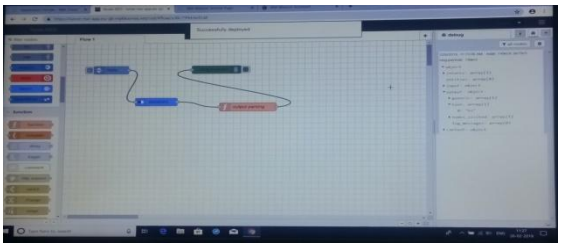

Figure 7: Creating basic flow

2. Add a Debug node

The Debug node causes any message to be displayed in the Debug sidebar. By default, it just displays the payload of the message, but it is possible to display the entire message object.

3. Wire the two together

Connect the Inject and Debug nodes together by dragging between the output port of one to the input port of the other.

4. Deploy

At this point, the nodes only exist in the editor and must be deployed to the server.

Click the Deploy button. With the Debug sidebar tab selected, click the Inject button. You should see numbers appear in the sidebar. By default, the Inject node uses the number of milliseconds since January 1st, 1970 as its payload. Let's do something more useful with that.

5. Add a Function node

The Function node allows you to pass each message though a JavaScript function. Wire the Function node in between the Inject and Debug nodes. You may need to delete the existing wire.

The connections are completed by connecting the flows to each other.

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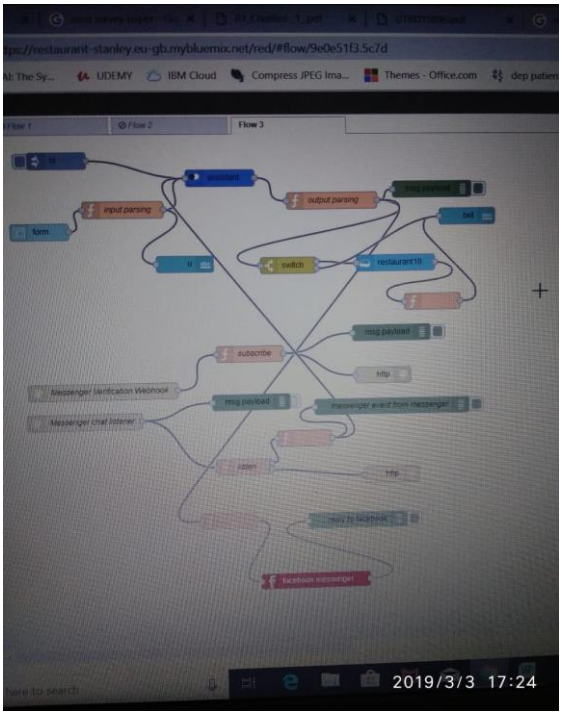

Figure 8: Complete flow

IV. RESULTS AND DISCUSSION

In the IBM Watson assistant we can create our own assistant .The assistant responds in the following manner. Firstly the greetings are given to the assistant bot when we open the preview link it directly gives that Hello!!!Welcome to Taj Krishna restaurant! How can I help you? If the user says hello or good morning or any greetings the bot responds what the user says.

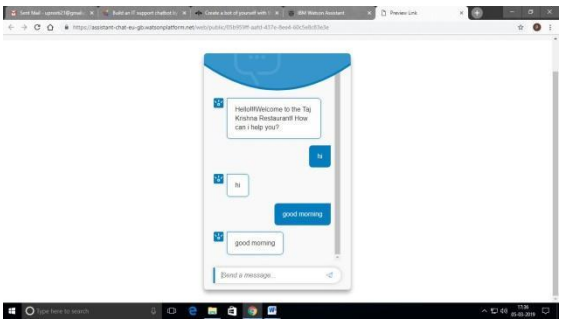

Figure 9: Welcome message

Then if the user asks about the restaurant timings, the bot gives answer as the restaurant opens at 9am and closes at 11pm. And if the user wants to know about the offers available in the restaurant or specials of our restaurant or want to reserve any table, the bot immediately responds to the customers questions. This bot can replace the service executive and works same as the service executive. The customer need not wait for the service executive or call any waiter. When the customer comes to the restaurant, the link will be provided on the table and by clicking that link the bot gets opened.

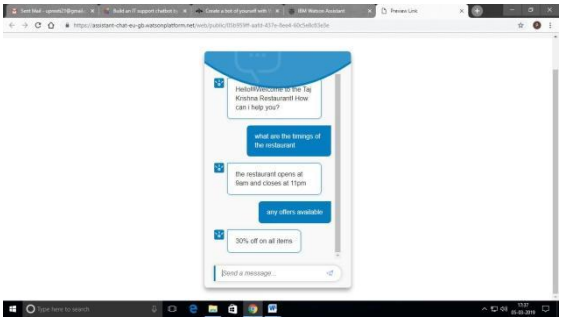

Figure 10: Knowing the restaurant details

If the customer wants to know the menu of the restaurant, the bot itself shows the menu and the customer can see the menu in the bot itself. There is no need of the menu card. We need to select the options as per our necessity. The menu shows the options of veg, nonveg and desserts in which the user has to select one of the option.

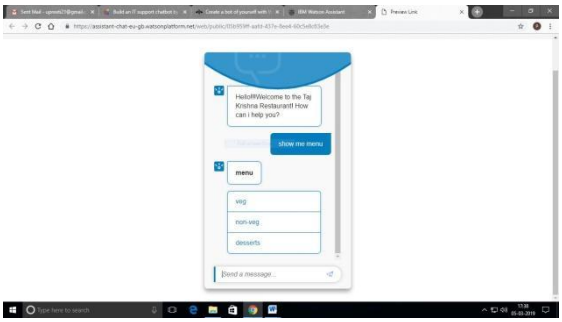

Figure 11: Shows the menu

After seeing the menu, the customer can place the order by entering the item name and quantity. So that order will be reached if the restaurant has the panel in the restaurant. And the order of which table will be directly placed.

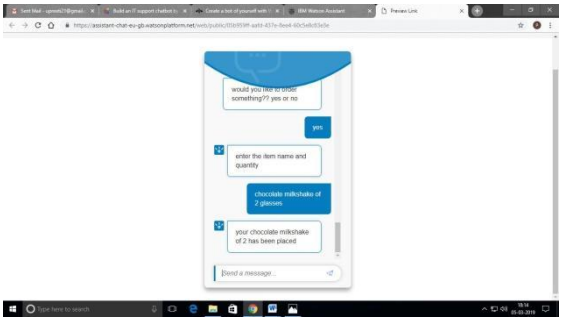

Figure 12: Ordering of an item

V. CONCLUSION

I hope you enjoyed working through all the projects building exciting and interesting chatbots and voicebots. Great work! But remember, we have barely scratched the surface of what is yet to be unleashed. There is more to building chatbots and conversational UI than just plugging tools, services, and data together. It takes practice and a deeper understanding of underlying concepts to get the design right and build bots that give users a great experience. The user should be able to get the job done by having a conversation with the bot without having to think too much and with a smile on their face. Great conversational experience, the experience that the user gets when interacting with

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or at the thought of doing so, is what we should always aim for. And only with practice and mindful design can we achieve that.

Remember that this technology is evolving at a rapid pace and so are the tools, services, and our collective understanding of underlying concepts. As we look back on our results, and on the simulation model itself, given the right equipment, and willing restaurants, our design could become a fairly simple addition to the growing technical side of running a restaurant. The key distinction of our system being the collection and dispersion of the given inputs from hosts and waiters. The longer the system is in place the more accurate the system becomes, to the point where no longer will the host need to be a job of finding the best location for the guest. While our system runs the data on when and where the guest is likely to be seated, the host is freed up to interact with guests. While many restaurants are starting to implement a computerized system for the seating and ordering of guest, most still do this manually. It's interesting looking at this system, and knowing that most of which is very simple, that this has yet to be put into action. While this started off as our senior design project, and will end as our senior design project, we have very little doubt that in the near future a similar program will be common in restaurants.

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