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WEB BASED CONVERSATIONAL CHATBOT DESIGN

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ABSTRACT

Chabot's are computer program that interact with users using natural languages. It is a technology that makes interaction between man and machines in natural Language. The main goal is interaction between Chabot and human Human-Computer Speech is gaining momentum as a technique of computer interaction. They can be used as an information Retrieval tool, in order to answer a user's question on any topic. However, Chabot's are not only built to mimic human conversation and entertain users. With slightly higher intelligence we find the virtual assistant, which has more integration with enterprise systems and therefore can perform basic actions, such as looking up personal information. Virtual Assistants decrease service desk workload by, for example, looking up vacation days of an employee, for enabling an employee to by vacation days through the Chatbot. We can also to make college chatbot to answer student's queries. The user can query any college related activities such as date and timing of annual day, sport day, and other activities.

Keywords: *Chatbot, Interaction, Language, Human conversation, Virtual Assistants, Technology, Information,*

I. INTRODUCTION

There are a lot of aspects to consider when implementing a chatbot. The large Varity of vendors complicates this process further. The need of conversational agents has become acute with the widespread use of personal machines with the widespread use of personal machines with the wish to communicate and the desire of their makers to provide natural language interfaces. Just as people use language for human communication, people want to use their language to communicate with computers Zadrozny et al. (2000) agreed that the best way to facilitate Human Computer Interaction (HCI) is by allowing users to express their interest, wishes, or queries directly and naturally, by speaking, trying, and pointing. This was the driver behind the development of chatbots. A chatbot system is a software program that interacts with user using natural language. Different terms have been used for a chatbot such as: machine conversation system, virtual agent, dialogue system, and chatbot. The purpose of a chatbot system is to simulate a human conversation; the chatbot architecture integrates a language model and computation algorithms to emulate informal chat communication between a human user and a computer using natural language.

Speech is one of the most important and powerful forms of communication between humans; hence it is the researchers ambition in the human computer interaction research field to improve speech interaction between human and the computer in order to simulate human-human speech interaction. Speech interest in the past few years with contribution from Google, Android and IOS. Because they are more natural than graphic based interfaces, spoken dialogue systems are beginning to form the primary interaction method with a machine. Therefore, speech interaction will play a significant role in humanizing machines in the near future such that it is exactly looks like human speaking. Speech is standout amongst the most effective types of communication between people ; henceforth, it is the researchers aspiration in the human computer interaction research field to enhance speech communication between the human and the computer with specific end goal to reproduce human- human speech cooperation. Hence speech cooperation acknowledgement rates of human voice and the innovation is currently drawing nearer responsibility for speech based human computer cooperation. Nine studies that made identifiable commitments in chatbot outline in the most recent ten years are chosen and after that, checked on. The success of research engines has shown that users are particularly interested in accessing specific information in accordance with their short or long term goals. Google, Yahoo, Bing and other search engines use complex algorithms to return documents and web pages which may or may not contain the answer to a user search query. This system can be

improved by creating chatbot interface that can interact with the user to reduce their search. This application will enable a natural dialogue between the system and the users.

In this survey of chatbot design techniques in speech conversation between human and computer is presented. Nine studies that made identifiable contribution in chatbot design in the last ten years are selected and then reviewed. The different techniques used for chatbots in the selected works are compared with those used in Loebner price chatbots. The main purpose and idea of the so called chatbots is that the computer is performing a natural language conversation with human clients which should be as human like as possible based on task bot was made for , the conversation then usually serve some specific function such as searching the web, organizing files on the computer, setting up appointments etc. Most chatbot programs approach the problem with a form of Case Based Reasoning. CBR is the process of solving new problems based on the solutions of similar past problems. Of course, there are many varieties to CBR, such as how to store past cases and how to determine which cases are most similar to a new case. A common implementation is pattern matching, in which the structure of the sentence is identified and a stored response pattern is adjusted to the unique variables of the sentence. In this implementation, past cases are not explicitly stored. Rather, past cases are put into a generalized form.

1.1 About the project:

Online food ordering is the process of food delivery or takeout from a local restaurants or food cooperative through a web page or app. Much like ordering consumer goods online, many of these services allow customers to keep accounts with them in order to make frequent ordering convenient. A customer will search for a favorite restaurant, usually filtered via type of cuisine and choose from available items, and choose delivery or pick-up. Payment can be amongst others either by credit card, PayPal or cash, with the restaurant returning a percentage to the online food company.

In May 2015, Eric Kim, a contributing writer for Tech Crunch and CEO of Rush order, reported that "of the $70 billion [takeout and delivery market], only about $9 billion (roughly 13 percent) is online".However, in China, online food delivery services are the one of the fastest and most frequently used services, especially in tier 1 and 2 cities, growing 23% in 2017.

1.2. Objectives:

Online food ordering is a process of ordering food from any local or higher restaurants or food cooperative through a web page or through any application.

Payment can be among others either by credit card(or debit card) or by cash on delivery process with the restaurant returning a percentage to the online food company.

Whereas food delivery is a courier service in which a restaurant, store, or independent food delivery company delivers food to a customer.
This is the main objective of online food ordering.

1.3. Scope:

The first online food ordering service, World Wide Waiter (now known as Waiter.com), was founded in 1995.The site originally serviced only northern California, later expanding to several additional cities in the United States. During the dotcom boom, startups like Webvan, HomeGrocer, and Kozmo started online grocery delivery, but ended up closing in 2001 after the dotcom crash. Seamless was also founded during this time. GrubHub was founded in 2004. By the late 2000s, major pizza chains had created their own mobile applications and started doing 20-30% of their business online.

With increased smartphone penetration, and the growth of both Uber and the sharing economy, food delivery startups started to receive more attention. Instacart was founded in 2012. In 2013, Seamless and Grubhub merged By 2015, online ordering began overtaking phone ordering. As of September 2016, online delivery accounted for about 3 percent of the 61 billion U.S. restaurant transactions.

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1.4. Advantages :

1. Ordering food online has enhanced convenience by enabling customers to order wherever they want using whichever device they choose. Apart from bringing convenience to customers, restaurants also reap many benefits from having an online food ordering system. Several of these benefits include: Enhanced Efficiency.
2. It?s just one click away:Today, more than ever, people can easily order online thanks to the smartphones and tablets.
3. It?s fast, easy and comfortable:In a nutshell, your customers choose to order food online because it?s literally at their fingertips.
4. Because it?s visually appealing and stimulating to ALL of the hungry customers.
5. As the saying goes, the first bite is with the eye. So enabling your customers to go online and see the entire menu when they?re hungry pushes them towards ordering more food that they wouldn?t normally order over the phone.
6. No grammtical or meaning less errors as we store the answers
7. Works 100% well for the business problems and customer satisfaction and attention can be gained.
8. Super easy to build these models as we don?t require huge data.

1.5. Disadvantages:

1. Biggest problem ever facing by food ordering app is the place or exact location of the customer. Its really difficult to deliver food in remote area.
2. Limited Number of menu choices.
3. Due to time constraint mostly frozen meal can be cooked it in over flame and deliver it.
4. Food may not be good as it appears to be in food ordering app.
5. Facing Low Food Delivery Budget Because of its feasible for long distances.
6.These systems don?t generate any new text, they just pick a response from a fixed set.
7. A lot of hard coded rules have to be written so not much intelligent.

1.6 Application:

1. Accessible anytime:I?m sure most of you are always kept on hold while operators connect you to a customer care executive. On an average people spend around 7 minutes until they are assigned to a person. Gone are the frustrating days of waiting in a queue for the next available operative. They are replacing live chat and other forms of slower contact methods such as emails and phone calls.
2. Handling Capacity: Unlike humans who can only communicate with one human at a time, chat bots can simultaneously have conversations with thousands of people. No matter what time of the day it is or how many people are contacting you, every single one of them will be answered immediately.
3. Flexible attribute: Chatbots have the benefit that it can quite easily be used in any industry. Unlike other products where you have to do a lot of development and testing to change platforms, chatbots are relatively easy to switch. One has to just train the bot by giving the right conversation structure and flow to switch its current field or industry.
4. Customer Satisfaction: Humans are bound to change of emotions. Chatbots, on the other hand, are bound by some rules and obey them as long as they?re programmed to. They will always treat a customer in the perfect way no matter how rough the person is or how foul language the person uses.
5. Cost Effective: Hiring a human for a job is never a cheap affair, and it will be expensive if your revenue are not high or sales targets are not met and would create havoc in the business. Due to the boundaries of human beings, a single human can only handle one or two people at the same time. More than that would be extremely tough for the employee.
6. Faster Onboarding : Before you want to accomplish a task, you first must learn how to work on the task and complete it. Only then will they be considered fit for the job. There is a continuous teaching involved in every level of hierarchy the employee will go through. Also, there will be a lot of change in the employees, some stay, some get fired, some more join in etc.

What we want to say is, employees will change; it?s a fact. And this would require you to allot a lot time of your employees into grooming the new joinees. Chatbots could eliminate that time to almost zero, but provide a very clean and easy to understand conversation flow and structure that needs to be maintained by the chatbot. No doubt

there will be changes in this too, but it will rather take a fraction of your time to resolve as compared to human employees.

7. Work Automation: People tend to be less productive when given a recurring job or work. We humans usually get bored doing the same thing over and over again. Chatbots can now automate tasks which are to be done frequently and at the right time. And now there are already numerous slack bots which automate repetitive tasks. This helps people save time and be more productive.

Suppose there are new items bought from your e Commerce site or there is a bug reported then it sends a short summary to a slack channel. Or consider a financial bot whom you can train to inform you when the share prices fall so that you can take preventive measures. Two popular AI-based health chatbots which automate work of Doctors are Dr.A.I. by HealthTap and Melody by Baidu.

8. Personal Assistant: People could use Bots as personal fashion advisor for clothing recommendations, or ask trading tips from a finance bot, suggest places to visit from a travel bot and so forth. This would help the users get a more personal touch from the chatbot. Also, the chatbot will remember all your choices and provide you with relevant choices the next time you visit it. Notable examples are Trim, a personal finance bot; Taylor □ travel assistant, CNN bot for personalized news.

1.7 Organisation of thesis:

A chat bot typically has 3 things in it

Intent (Intention of the query asked by the user).

Entities (Named entities in Query like , Location names, People names, date and etc□) #NamedEntityRecognization.

Action or Response (the result to throw back to the user)

Ex: what□s the weather in **Seattle tomorrow**??

Here Intent → Weather check

Entities → Seattle (Location), tomorrow (Date)

Response → "The weather in {Location} {Date} is so and so".

The chat bot has always canned responses depending upon the problem/service you provide.

Note : NLP is hard at this moment. Computers started generating text with the help of deep learning recently so it can□t produce a meaning full response so Chat bots always have canned responses (For User/Customer services)if you are not a programmer, there are a lot of chatbots frameworks where you can build a bot very easily without coding.

1.8 Software Requirement Specificaion:

- Watson is an IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical softwarefor optimal performance as a "question answering" machine .The supercomputer is named for IBM's founder, Thomas J Watson.
- The computer system was initially developed to answer questions on the quiz show Jeopardy and, in 2011,the Watson computer system competed on Jeopardy! against legendary champions Brad Rutter and Ken Jennings winning the first place prize of $1 million.
- Most of the data in business are unstructured , written in paragraphs, spoken - data etc. IBM Watson helps to arrange this unstructured data in a systematical order to producemeaningful information from it. The processing rate of IBM Watson is 80 teraflops to double the human's ability to answer the questions.

Software Devices

IBM Watson uses DeepQA software and Apache UIMA frame work. The operating system on which it runs is SUSE Linux Enterprise Server 11 and use Apache Hadoop to provide distributed computing.

Programming Languages

It is written in various programming languages such as Java,C++,and prolog.

Hardware

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IBM Watson has a power 7 processer, it has 16 terabytes of RAMand use 3.5GHz POWER 7 eight-core processor.it can process 500 GB per second that is equal to a million books.

II. LITERATURE SURVEY

2.1 Background

A. Human-Computer Speech interaction: Speech recognition is one of the most natural and sought after techniques in computer and networked device interaction has only recently become possible (last two decades) with the advent of fast computing.

B. Natural Language Toolkit (NLTK): In order to deal with and manipulate the text resulting from speech recognition and speech to text conversion, specific toolkits are needed to organize the text into sentences then split them into words, to facilitate semantic and meaning extraction. One of these toolkits is the widely used NLTK which is a free plug in for Python.

C. Chatbot strategies: To give suitable answers to keywords or phrases extracted from speech and to keep conversation continuous, there is a need to build a dialogue system (program me) called a Chatbot(Chatter-Bot).

Chatbots can assist in human computer interaction and they have the ability to examine and influence the behavior of the user [8] by asking questions and responding to the user's questions.

The Chatbot is a computer program me that mimics intelligent conversation. The input to this programme is natural language text, and the application should give an answer that is the best intelligent response to the input sentence. This process is repeated as the conversation continues and the response is either text or speech.

Chatbots: Chatbot (also known as e.g. virtual assistants, conversational agents, virtual agents, dialogue systems) have been around for over 30 years. The first chatbot in history was Eliza, a program representing a psychologist (Weizenbaum, 1966). Originally, chatbots only responded to written text. In the last decade chatbots became more versatile and included speech synthesis and recognition, and affective state detection and responses.

In this study, however, in line with the ease of use of EMERGO we decided first to look at relatively simple, rule based approaches for chatbots and to trial to what extent they can be used (e.g. strength and limitations) and are useful (e.g. motivating, improved learning outcomes). This as opposed to rather complex research software and prototypes based on data driven methods or deep semantic parsing (Graesser, Jeon and Dufty, 2008; Dzikovska et al, 2008). The results were interesting and despite the small dataset they showed a lot of diversity. The publication details themes showed the most diversity, implying that the subject of chatbots in education is of interest to a wide array of authors, institutions, and journals/conferences. It also showed a broad interest and usability in the application of the chatbot technology, with the high amount of unique keywords discovered in the papers. This finding was also backed by the high amount of chatbot features discovered, really showing the diversity of the tool.

Figure 1:

Human-Computer Speech Interaction

2.2 Loebner Prize Competition2:

(Loebner prize for artificial intelligence) is an annual competition for conversational agents (chatbots), where they are being tested via a method called Turing Test (Turing 1950). Loebner Competition is known to be the first formal instantiation of a Turing Test. There is a controversy whether this competition is really contributing to the

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development of AI, or it is blocking it (Shieber, 2006; Maugham, 2002; Hutchens, 1997; French, 1990). The doubt is because the competition is forcing chatbots to pretend to be a human which causes bots to simply pretend they are thinking without real intelligence. Some of the chatbots even fake the spelling mistakes and corrections. Another stated flaw is that the competition causes people to work apart instead to collaborate and thus lead to many incompatible chatbot technologies.

Nevertheless, gaming and in the same line also serious gaming, still make little use of one of people□smost common type of interactions i.e. using natural language (Bertomeu and Benz, 2009). Interfaces are focused on giving access to control the parameters of the algorithmic or rule based processes behind the game (or at most to create scripts or personas). The required input per transaction (though itself potentially being complex given the interdependencies of the transactions, the complexity of the processes or principles behind the game and the stress connected to giving the desired input in terms of time or consequences) goes rarely beyond selections or simple (alpha)numeric input.

Language approaches and tricks:
1. Non Sequitur: Non sequitur (Latin) is an argument that has conclusions which does not imply from its premises. Example from everyday speech would be: Life is life and fun is fun, but its all so quiet when the goldfish die".
2. Simulating keystrokes and typing errors: The chat protocol that is used in Loebner Competitionsworks in a way that the judges see the sentences as they are being typed. This forces the chatbots to □pretend□ they are tying word by word. Some of the bots even fake the spelling mistakes and backspacing. This protocol is one of the most debatable.
3. Canned responses: Canned responses are predefined (hard coded) responses to questions. To some extent all of the chatbots patterns could be counted as canned responses if bot only uses these. This would vastly increase the number of patterns and would make them even more unmanageable, so these responses are usually used only for things which cannot be covered with the main chatbot technology.
4. Model of personal history: With the goal for a chatbot to appear more convincing, developers are inserting a personal story (imaginary or based on a real person) into chatbot responses. This includes memories from the past, childhood stories, parents, interests, political and religious views etc.

2.3 Platform:=
The platform of the chatbot seems to have little relevance, other than it being connected to the Internet in some way. The platforms used were either the □Web□ or some □Mobile OS□, or it was not specified in the papers. The conclusion from this theme is thus that Internet connection is a crucial function for any chatbot, since otherwise it will not be easy to reach for the students who need to use it.

I conclude that a chatbot which employs both statistical NLP methods as well as heuristic methods, such as pattern matching rules, functions more realistically than a chatbot which only uses one approach or the other. This is because purely heuristic models, such as ELIZA, tend to reuse simple patterns, causing very little variation in response types. Responses are always quite general, with little show of emotion in relation to content. While purely statistic models solve this problem by introducing real emotional content and response variety, they also introduce new problems such as increased randomness and inability to generalize. For instance, they may be well versed in discourse about their favorite music, but unable to say anything intelligible about a different type of music, simply because no such discourse was likely to be in the training corpora. My solution was to try to find a statistically relevant response, but revert to pattern matching responses if none could be found.

We also hope to extend memory capabilities throughout a session. Right now, my bots are limited to only remembering one username and which responses they have already used. It would be fascinating, however, to add the ability to learn more content during conversations. For example,a bot could learn to recognize sentences describing close relations to the speaker or what the speaker is doing at the moment, and later ask about those people the speaker mentioned, or how the previous projects and activities went.

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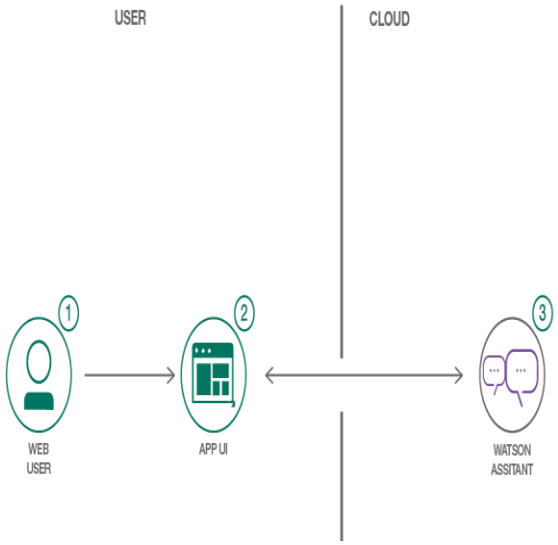
III. PROPOSED CHATBOT

In this Code Pattern, we will use the Watson Assistant Slots feature to build a chatbot that takes a pizza order. The needed information such as size, type, and ingredient choices 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:

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

Figure 2:



Information passed through chatbot to cloud

Flow
User sends messages to the application (running locally or on IBM Cloud).
The application sends the user message to IBM Watson Assistant service, and displays the ongoing chat in a web page.

Watson Assistant uses the Slots feature to fill out the required fields for a pizza order, and sends requests for additional information back to the running application.

Included Components
IBM Watson Assistant: Build, test and deploy a bot or virtual agent across mobile devices, messaging platforms, or even on a physical robot.

Featured technologies
Node.js: An asynchronous event driven JavaScript runtime, designed to build scalable applications.
Perform steps 1-4:

1. Clone the repo
2. Create IBM Cloud services
3. Configure Watson Assistant
4. Get IBM Cloud credentials and add to .env
5. Run the application

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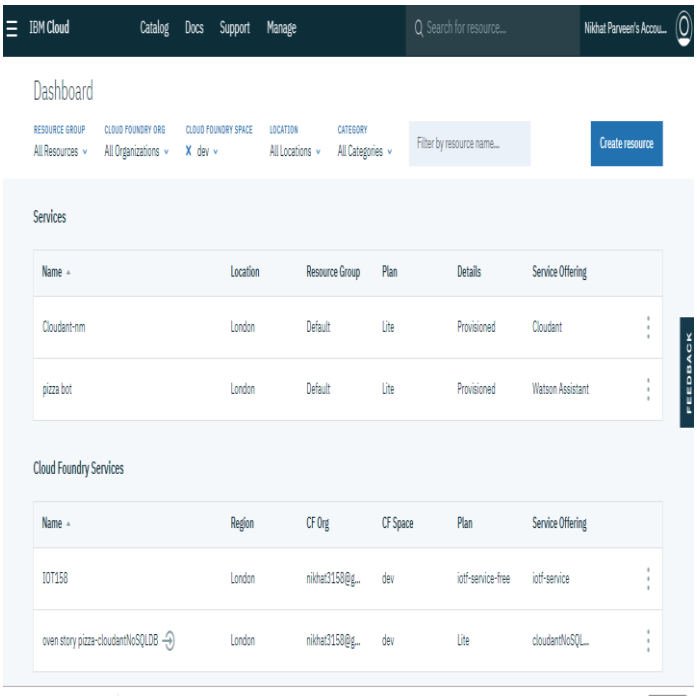
1. Clone the repo
Clone watson-conversation-slots-intro locally. In a terminal, run:
$ git clone https://github.com/ibm/watson-conversation-slots-intro
We'll be using the file data/Watson-pizzabot.json to upload the Assistant Intents, Entities, and Dialog Nodes.

Figure 3:



2. Create IBM Cloud services
Create the following service and name it wcsi-conversation-service:
Watson Assistant

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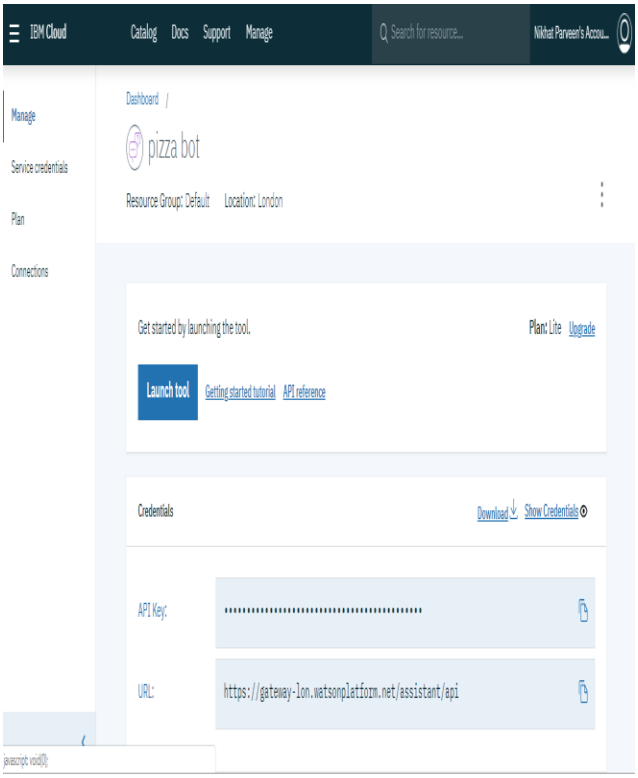
Figure 4:



3. Configure Watson Assistant

Import the Assistant workspace.json:

Find the Assistant service in your IBM Cloud Dashboard.

- Click on the service and then click on Launch tool.
- Go to the Skills tab.
- Click Create new
- Click the Import skill tab.
- Click Choose JSON file, go to your cloned repo dir, and Open the workspace.json file in data/Watson-pizzabot.json
- Select Everything and click Import.
- To find the WORKSPACE_ID for Watson Assistant:
- Go back to the Skills tab.
- Find the card for the workspace you would like to use. Look for WatsonPizzeabot.
- Click on the three dots in the upper right-hand corner of the card and select View API Details.
- Copy the Workspace ID GUID.

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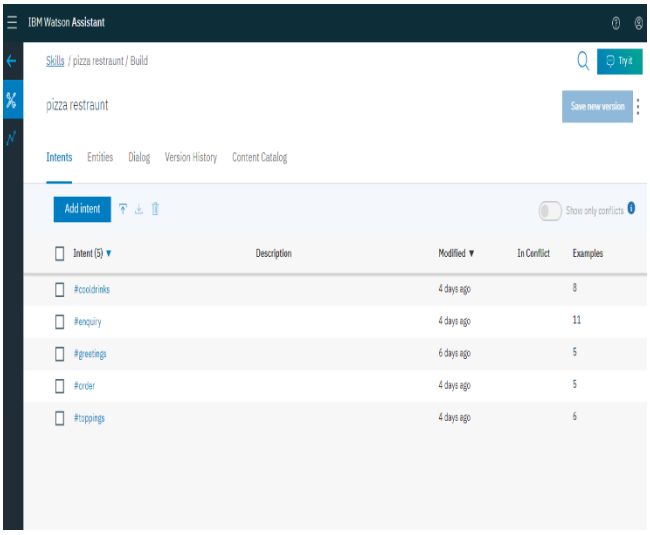
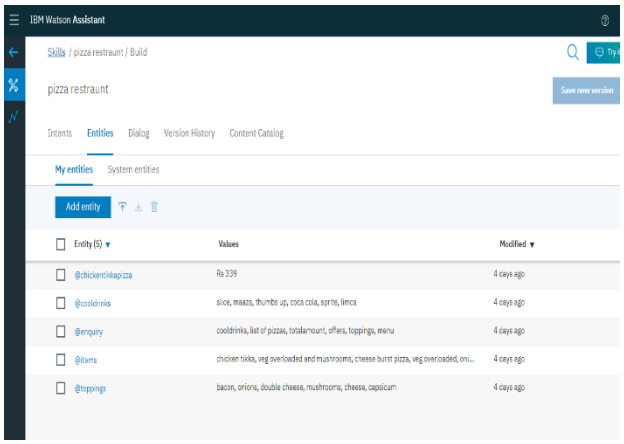
Figure 5:



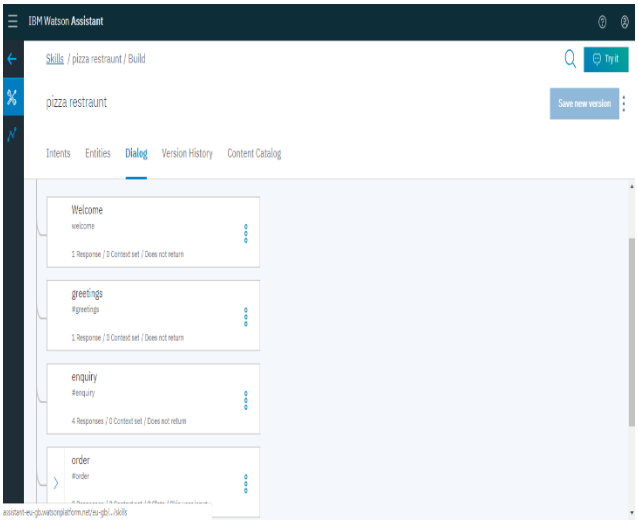
Adding Intent

Figure 6:



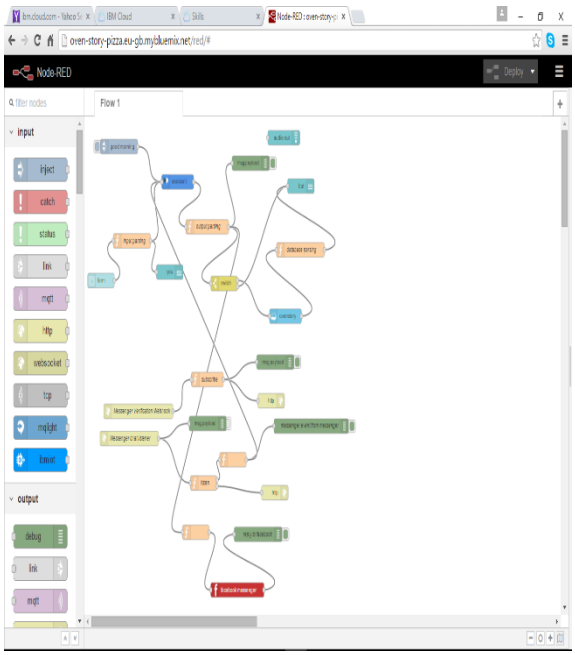
Adding Entities

Figure 7:



Dialog to be given by chatbot

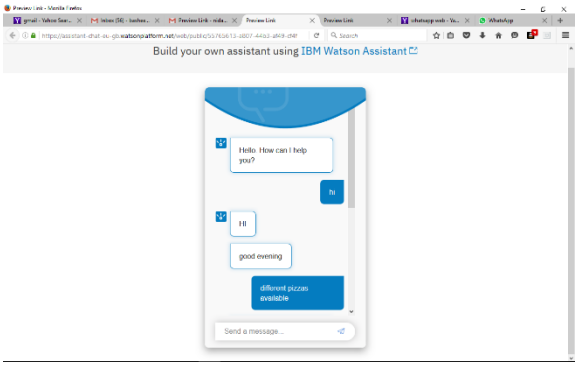
Figure 8:



Node red

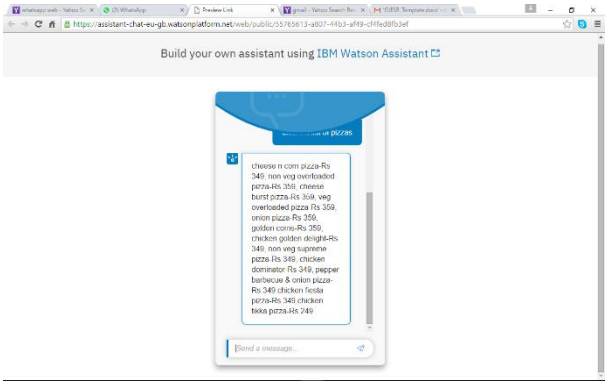
IV. RESULT & DISCUSSION

Figure 9:



Here is the discussion and result of a process of chatting with the bot.First we should create an account in IBM cloud then further the process goes on . Firstly we try to insert the inputs in the intent context. Then the outputs are inserted into the dialog context, whereas if we want to group any of the things then we insert them into the entities context. This was the brief discussion before starting to chat with a bot. Now we insert "hi" in the intent context then we have to put output into the dialog context as to get output as "hi" back. In the above figure we can see that firstly t will ask "hello, how can I help you" ,this has to be written in the intent . output we put as "hi" by which it is showing as "hi", "good evening" thus we this to as input from the chatbot by giving this inputs into the intent context. Here we can also notice that we get two outputs from the chatbot , this is possible by grouping them which is done in the entities. Then, thirdly we can see that if we type different types of pizzas available then it will show us the list of pizzas which is shown in the next page. Thus this different list of pizzas has to be written in the dialog . This is the brief discussion of the first page of chatting with a bot in a previewlink.

Figure 10:



Here tis the second page or continuation of the bot chatting. In the above page we have seen that if we type different list of pizzas available then it is the list pizzas available in the store . This list contains cheese n corn pizza, non veg overloaded pizza, cheese burst pizza , veg overloaded pizza, onion pizza, golden corn pizza, chicken golden delight pizza, non veg supreme pizza, chicken dominator pizza, pepper barbecue and onion pizza, chicken fiesta pizza, chicken tikka pizza with the amount added to it accordingly. This complete list has to be put as input into the intent context then it has to be grouped accordingly , which can be done in the entities context. Therefore, by this process we can further chat with a bot. we can give more options as input instead of typing only as different list of pizzas available. This also has to be done in the intent context. We can name them as examples menu or list of pizzas or different pizzas or list of pizzas or give me list of pizzas ,etc .

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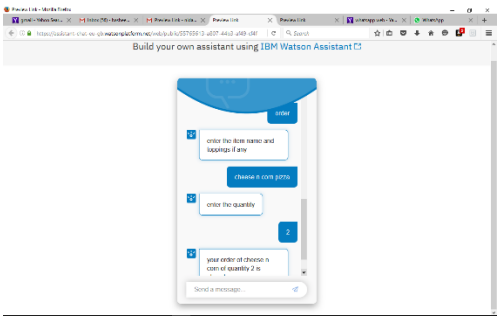
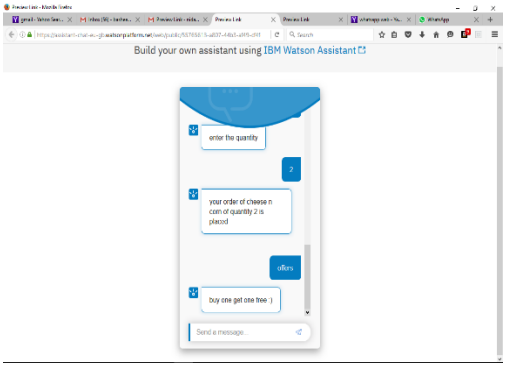
Figure 11:



Once the menu it has shown then if we type order as input then it show "as enter the item name and toppings if any". Therefore, "order" has to be entered into the dialog context and "enter the item name and toppings if any" will be written in the intent context and the process goes on. The next step is once we type "cheese n corn pizza" as the output then it will ask for enter the quantity , this has to added in the intent context. Therefore we type 2 as output this has to be added into the dialog context. The next input it will show as "your order of cheese n corn pizza of quantity 2 is placed". This will be added in the intent context. Therefore we can see that it is really easy to chat with a bot accordingly by putting input in intent context and output in the dialog context.

Figure 12:



Hence this the last part of our result where we can see that our pizza bot has shown that our order of cheese n corn pizza of quantity2 is placed. We have also shown some of the offers or discounts available which has to be added in the intent as well as dialog context. Thus if we put input as offers or discounts then it will show the output as buy one get one free which we have added in the intent context. This is the result of our pizza bot which shows the chatting with a bot .

V. CONCLUSION

A task oriented conversation system was implemented using a sequence -to -sequence model. The modelwas trained end- to -end on Pizza reservation and compared against several baselines. The goal of this project was to develop a prototypical chatbot. Acknowledging that chatbots are here to stay is an insight of great importance given the number of users already active in messaging platforms, which are estimated to be more than 1 billion only one the Facebook messenger platform alone, only proves the significance of opportunities for all, software developers and users in general. In Conclusion, our model cannot be used as a standalone system to successfully conduct full conversations with the goal of making pizza reservation. The review has however contributed with a through examination of the failures of a such a system and shown where future work might make the most difference. The results could also provide baseline for future work

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