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A SMART QUERY BASED BANQUET BOT

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ABSTRACT

In today's world where technology is increasing rapidly, simple tasks can become very mundane and redundant, and we don't generally feel like doing them. To solve this, something called a chatbot came into picture, but what exactly is a chatbot? A chatterbot often known as a chatbot is basically a computer program that is developed to carry out a conversation with the user such that the conversation is indistinguishable from that of a human. Chat bots tend to make the work of a human much easier; they relieve humans from the responsibility of performing the regular tasks and can do it much more efficiently. We all are dependent on chat bots in our daily lives without even realizing it. In our paper we have tried to implement a chatbot that answers the queries of users relating to a banquet hall. We all love to celebrate occasions and rejoice on the happy moments in our life, but it becomes hard to get information about the place, so to solve this problem we have designed a smart bot that answers questions relating to the various queries that may be asked by the user while he/she is deciding to book a hall for a particular occasion

Keywords: *Chatbots, Artificial Intelligence, Machine Learning, Pattern Matching, IBM Watson.*

I. INTRODUCTION

Artificial intelligence can be defined as the study of computations provided to a programmed system that gives it the power to think like a human i.e. it might be able to perceive, think, learn and act just like a human. It can also said to be a branch of computer science that can be used to create intelligent machines that can recognize human objects, speech and can learn, plan and solve problems just like a human being may. Artificial Intelligence can be used to make the mundane and burdensome tasks of a human simpler, faster and efficient.

Now the question arises how do we make the machines think like humans? For this task we generally use the concept of machine learning. There's a lot of data being exchanged these days due to wide access and high speed of internet. This data is called Big Data, which is analyzed by the machines and an appropriate output is produced. Machine learning is basically a subset of the Artificial Intelligence technique in which the machines use statistical methods to improve their knowledge.

Kaplan and Haenlein classified Artificial Intelligence into three different categories .They are analytical, human-inspired, and humanized artificial intelligence. Analytical AI has only cognitive intelligence i.e. educating itself based on its past experiences to inform future decisions. Human-inspired AI has elements from cognitive as well as emotional intelligence, i.e. in addition to cognitive elements human emotions are also taken into consideration during decision making. Humanized AI shows characteristics of all types of intelligence i.e. It has cognitive, emotional and social intelligence due to which it may be able to be self-conscious and self-aware. In today's world we all are surrounded by Artificial Intelligence without even being aware of it. From the maps we use to reach our destinations to the food delivery app that gives you the suggestions of which restaurants you may like all use Artificial Intelligence to function. Here we have trained an analytical artificial intelligent bot.

Artificial Intelligence is being vastly used in today's modern world. Some of the fields where it is being used are listed as follows. Drones are now being used in the army and they are indeed, very helpful as they are able to reach places which the army men are unable to reach. Some specific drones are able to take their own decisions by capturing photos of activities that may seem suspicious and then send them to the control room of satellites. Many applications have incorporated a visual search option, in which a photo of the required item is clicked and scanned and the AI then shows something similar to the image, to the customer thereby making it easier for the customer to

shop. This technology has made shopping easier and faster for the customer. NASA is already using AI to look for the existence of life on other planets which will also be the key for "MARS 2020".The devices that will be sent, better known as "Rovers", will be able to explore Mars' terrain in more detail and reveal the properties of the planet's elements which may further determine the plausibility of life on Mars.

In the past few years, online booking and shopping has gained immense popularity. Through predictive analysis driven by AI,these applications are able to predict price patterns, suggest restaurants, suggest deals and many such tasks can be performed by this type of AI thereby enhancing the customer-company relationship. Through AI and deep learning doctors are able to promptly diagnose cancer, before the disease becomes hazardous. The Chinese startup, InterVision is using Deep Learning and Image Recognition technologies to diagnose possible signs of lung cancers with X-Rays.

Chatbot is Artificial Intelligence software that can simulate a conversation with a user in natural language through messaging applications, websites, and mobile applications or through the telephone. It is often described as one of the most advanced and promising expression of interaction between humans and machines.

A chatterbot often known as a chatbot is basically a computer program developed to carry out a conversation with the user such that the conversation is indistinguishable from that of a human. Chatbot can also be referred to as a program that generates response based on given input to simulate human conversations in text or voice mode. These applications are designed to simulate human-human interactions. Chat bots are widely being used from enterprise to medical fields.

Chat bots tend to make the work of a human much easier, relieve humans from the responsibility of performing the mundane tasks and can do it much more efficiently. Using chatbots has immense advantages especially in the field of business Using chatbots saves a lot of time that can be utilized in doing something more productive and they don't require breaks like a human does and it also helps increasing customer base in a business because the answers are provided to the customer almost immediately when he/she is interacting with a chatbot. Chatbots can also help know users choices by taking the users' data and analyzing it by using a concept called big data to provide greater customer satisfaction.

Many of these chatterbots are designed using the concepts of rule based techniques, pattern matching, big data and machine learning. In pattern matching, the bot recognizes some specific keyword in the input and searches the database likewise and generates the most appropriate answer for the user.Big data is nothing but large amount of data that can't be processed or analyzed by a human being but the bot can give some meaning to the large amount of data. The bot chats with you and collects your likes and dislikes over time and can give you a suggestion depending on what you'd like the best. Machine learning is a branch of artificial intelligence (AI) that focuses on providing the systems with the ability to automatically learn and improve from previous experience (data) without being programmed externally. Machine learning focuses on the execution of computer programs that can access data and use it learn for themselves.We have used pattern matching technique to design our bot.

The chatbots can be further classified into three types, i.e. support chatbots, skills chatbots and assistant chatbots. We have designed a support chatbot. Support chatbots are built to master a single domain, like knowledge about a company or a site. Support chatbots need to have a personality and context awareness. The bot should be able to answer all the queries of the user related to that specific domain. The chatbot developer should try to spend time making sure it is as easy as possible to navigate the bot. One can just train the bot by giving the right conversation model and switch its current field or industry to another according to their requirement. So a chatbot is quite flexible. They are cost efficient. We humans usually get bored doing the same thing over and over again. Chatbots can automate tasks which are to be done frequently and can answer to many people at a time. We have tried designing a chatbot that answers queries of the user related to a banquet hall booking. It answers questions like the capacity of the hall, the timings the hall can be booked, the permit of having alcoholic drinks on the occasion, the types of functions that can be hosted, facilities for the physically disabled/elderly etc.

This bot reduces the work of the manager as it answers all the queries of the user almost instantly and even reduces the cost of the manager as it can interact with multiple users at a time and requires no breaks as a human does.Our main objective is to help small businesses manage their businesses more efficiently.Occasions are the main source of income for many people, especially in India and with the chatbot answering most of the queries of the user lessens the burden of the manager and also provides people more time to plan out the occasion in a better way by answering all their queries.

This chatbot can be used for other small businesses by changing its domain, i.e. it is quite pliable. Unlike human beings who can only communicate with one human at a time, chatbots can have conversations with vast amount of people simultaneously and can provide instant replies to them. One can just train the bot by giving the right conversation model and switch its current field or industry to another according to their requirement. We humans usually get bored doing the same thing over and over again so the chatbots can automate tasks that are to be done frequently and save us the worry and boredom of doing the repetitive tasks.

People could use Bots as personal fashion advisors for clothing recommendations, or for asking trading tips from a finance bot, suggest places to visit from a travel bot and so forth.The only drawback of a chatbot is that it is generally domain specific and can't answer queries related to anything else. Our bot is very discrete and has a small database which makes it less intelligent but its database can be expanded in the future. Updating the bot is necessary as the business expands. Chatbots are often complicated and require a lot of time to understand the user requirement. Every chatbot needs to be programmed differently for each domain which might add to increased costs.

This bot can be used for all management purposes just by changing the domain.It can be proved to be very useful in increasing the sales rapidly It can also be utilized to track the customers experience and provide suggestions likewise.It can also be used with speech recognition in the future to help people with visual impairments**.**

II. RELEVANT WORK

In paper [1], Kshitij V.Wadanka, Rahul Y Waghulde and Uma Taru review the gaining pace of usage of chatbots in various fields and implement and plan a chatbot framework using Java programming. The chatbot executed is a very basic one and uses pattern matching technique to respond to the user. If the answer is present in the database it responds to the user with the most plausible answer that is present in the database and if the answer is not present in the database it generates a random response which may confuse the user. The text input given to the bot is processed by a classifier which checks for a keyword in the input and classifies it accordingly and generates a response. In this paper the authors discuss how the chatbots are already gaining pace and how they can actually be quite useful in the near future.

In paper [2], Hemin Joshi, Vidhi Agarwal, Amol Ghodke, Dolly Gupta and Sharmila Gaikwad talk about the usage of a chatbot in online shopping. They have implemented a chatbot which enables the user to interact with the e-commerce website through an intelligent assistant. The bot will track your previous orders and helps you shop better by giving you suggestions based on previous orders. It also allows the users to track their orders. This Cartbot saves us time, stress and the tediousness by automating the most regular customer interaction tasks. If the user has no clear idea of what he/she wants to purchase, the chatbot can't provide an accurate answer. The chatbot is in the form of an Android application. The agent program will use the input you've provided and search it in the engine and give a response.

In paper [3], D. Balakrishnan talks about the execution of an artificially intelligent agent which responds either in textual or vocal way. The user can get a response from the bot just by speaking to it. He talks about how a chatterbot can be used to ease our work in various fields. He says chatterbots can be used in various fields such as education, healthcare, route assistance, enterprise, etc. AIML, Microsoft speech recognition and bot engine are used to design and execute this bot. Pattern matching technique is used to provide the user with the most appropriate response. Large amount of data is required for more appropriate and human like responses.

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Paper [4] describes the role of deep learning in executing a chatbot. A chatbot has to be able to determine the best response for any received input, understand the intentions of the sender of the message, the type of response message required and check if its grammar and lexical structure is correct. In this paper the authors were inspired by the LSTM (Long Short-Term Memory) to map the input sequence to the database and then a deep LSTM was used to decode the target from the input.

In paper [5], the authors develop a semi-automatic intelligent chatbot called Chappie. The important things a chatbot should possess are understandability of the user's input, ability to handle repetitive queries, AIML based response mechanism. Chappie uses NLP tools to get the intent according to the input and uses AIML and a counting machine to generate a response. It categorizes the input depending on the topic like food, travel, utilities are classified differently. Though Chappie's performance is descent it needs more sophisticated algorithms to extract intent and classify more accurately.

In paper [6], the authors have described the extension of an existing web-based interface in the tourism domain with natural language interface. This virtual agent allows the user to interact with the system in form of a written natural-based dialog. In contrast to common systems, the authors provide a mixed-initiative approach, which allows the user to control the dialog and allow the system to guide the user. The bot provides facultative attributes like hotel-class, type of accommodation, name of hotel and fare. The paper focuses on mixed initiative dialog, which guides the process through the booking process.

The paper [7] describes a model that has been executed in a dialogue manager that operates within an interactive question answering system, making it possible to develop complex dialogue act generation mechanisms that employ the rich information provided. The context update is based on the specification of the preconditions of the dialogue acts in the DIT(Dynamic Interpretation theory) taxonomy, which describes the assumptions of an agent to interact with a user, and on the representation of several types of effects that utterances have in the belief state of dialogue participants. The rich information in the context allows the researchers to experiment with dialogue act generation mechanisms for dialogues that are more complex both in the sense of flexible task execution and dealing with communication problems.

The purpose of paper [8] is to explore the concept of mobile messenger chatbots as the next interface for mobile commerce. A research model is proposed based on the Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT).The study made an effort to explore the concepts of conversational commerce, messenger chatbots and its consumer acceptance. Other audience and measurement tools could be used in the future to obtain a better understanding regarding the concept of messenger chatbots and conversational commerce.

Paper [9] discusses about Internet shopbots that are automated tools which allows customers to easily know the prices of products and their characteristics from online retailers. In this view, shopbots will drastically reduce consumer search costs and also reduce retailer opportunities to differentiate their products from the one showed online. Product information is queried directly to their chosen retailer. Shopbots also raise a series of interesting questions for marketing researchers who are analyzing electronic markets. One disadvantage of stand-alone shopbots is that customers should go to a different site to learn about the products' characteristics. With regards to customer behavior at Internet shopbots, recent research has shown that while some shopbot consumers are price sensitive, shopbot consumers also tend to prefer heavily branded retailers.

The authors discuss the advantages of using a mobile retail app for commercialization rather than using websites in paper [10]. Mobile retail apps can help in getting a greater user base by providing additional features such as code scanner, product evaluation, mobile payments, a virtual agent. Adding all these features make it more efficient. A virtual agent can help widely in getting more customer as a bot can engage with the user at almost any point of time and the user can get his/her queries get sorted in no time.

In paper [11], the authors discuss the role of IT in the field of hotel management. They carry out a study revealing the advantages of increasing technology in the industry. This study aims to examine the role of information

technology in hotel industry. The hotel industry is the major contributor to the economy of the country. The guests are god in the hotel industry so it is very important to satisfy them. In this modern era due to global competition each and every hotel wants to give unique and quality services as well as unforgettable experience to the guests. Nowadays the more use of technology allows more competition for hotels. The study also revealed various reasons for using information technology in hotel industry. Information technology helps hotel industry in various ways like it maintains the accuracy, reduce the labor costs, increasing efficiency, smooth functioning increasing sales, maintains the quality of services and also helps in guest's satisfaction. Chatbot is a computer enabled program which helps the guests to communicate with the hotel staff online and provide quick answers to their queries and it saves time and increase the efficiency of the hotel which in turn increases its customers.

Paper [12] shows how chatbots can be used by providing quick answers, they can promote offers and increase cross- and up selling, and they can make individual recommendations to customers, increase convenience, save overall costs and maximize customer engagement and outreach. Likewise, inculcating chatbots can bring along great potential to open up new opportunities related to customer service. The thesis provides a comparative study between different chatbot platforms in order to evaluate which one will be more convenient and most appropriate to use for the enquiry handling process. The survey also shows how chatbots are useful for the service industry and why an organization should or should not use chatbots.

In paper [13], the authors portray the role of online conversational agents in increasing sales of a certain business. A conversational agent is nothing but a virtual agent which can interact with a human at any point of time. The main task of a conversational agent in online sales is to interact and persuade the users into buying a product and answering their queries as fast as plausible. Implementing a conversational agent in business not only increases the sales of the business but also provides better customer interaction and satisfaction. They have proposed a prototype of the system and the results prove that the system implementation was successful. With the era of online businesses increasing a chatbot will soon become a necessity. One of the opportunities of deploying a conversational agent as a retailer agent is that it is available all the time and can reduce the cost of hiring human personnel. However, the main challenge of creating a conversational agent is to make it so intelligent that it should be able to recommend and negotiate with online customers without human intervention.

The paper [14] explains about the utilization of mobile messenger chatbots. The first section in the survey elaborates on the constructs used in the research model; including the hypothesis development. The utilization of artificially intelligent messenger bots or conversational agents for commercial purposes is part of development called conversational commerce. Using the chatbots in commercial fields is highly beneficial.

In paper [15], the authors have described different types of User Assistance Systems and how they will impact the industrial world in the near future. Advanced User Assistance Systems (UAS) is the advancement of the systems to enable the users to perform their tasks better. Advanced UAS comprises the following characteristics, they allow their users to decide whether to follow the given assistance or not, provide proactive assistance, are embedded with adaptation capabilities regarding assistance behavior, detect users' needs while providing them with assistance, provide context-aware assistance, etc. Research on advanced UAS can have a significant impact on businesses.
In paper [16], the authors present the design and implementation of an intelligent agent based framework for collaborative ecommerce applications. They try to develop Multi-Agent System (MAS) architecture for large collaborative e-commerce environments where a number of customers/merchants can participate. By focusing on consumer protection and privacy principles as a significant feature, a value centered design process was created so that important policy and legal values are preserved; recognizing that respecting end-user privacy in fact shows a good business sense. This voice-enabled assistant interacts with the customer using voice synthesis and helps him/her navigate through the bot quite efficiently.

In paper [17], the authors discuss the role of virtual agents in transaction support. Peak load management is an application that relies on dynamic sourcing of grid services and is characterized by instantaneous, dynamic needs that must be served on short notice which is done by the help of virtual agents. Therefore, decision support by virtual systems is not an option but a must on a grid market. To achieve efficient resource utilization, customization

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must be automated by software agents. Grid and agent technology are increasingly being regarded as necessary and are emerging as a combined field of research.

In paper [18] the authors present a natural language interface that allows easy and interactive access to tourism information. In particular, they have described the knowledge representation model the information retrieval system is based on. The network structure is used to define associations between information items and how the system is enriched by a search strategy. A constrained spreading activation algorithm implements information retrieval on the associative network. They took the relatedness of the information items into account to show how the search strategy yields results related to users' queries. They have proposed an approach based on past user interactions for identifying semantic relations between information items.

In paper [19] the authors describe how philosophies are used to mediate between languages and to give answers to users' questions in the multilingual ecommerce mediation system Mkbeem. As an example, the paper discusses on how generic stratergies of colors and materials are used to infer additional facts about clothing products in order to facilitate information access. We also present how the strategies are applied in selling travelling services. The Mkbeem system prototype is in principle language independent but it has been so far tested in Finnish, French, English and Spanish. So it covers a larger user base.

In the paper [20] the author describes the hotel industry as a business venture for the owner and a place to find solace for the traveler/ tourist. A customer can get stuck in the quest to secure a hotel room to pass the night if he has not made adequate plans prior. Through this study, it was realized that for a customer to be guaranteed a room, he or she has to physically come to the hotel. There is nothing to provide an interface between the hotel and the customer in person that he has indeed booked for a room. So to meet this requirement the idea of creating an online reservation system came into picture which enabled customers to choose the room t after giving a virtual tour of the room.

III. PROPOSED CHATBOT

We have implemented a smart query based bot using IBM Watson Platform. IBM cloud account was the first step carried out during the creation of the bot. The IBM cloud account was created using the website cloud.ibm.com.The chatbot is then created using IBM Watson assistant.An IBM Watson Assistant screen opens up when clicked on the launch button after specifying an appropriate name to the service. Then we create a skill based on our requirement A skill can be called as a functionality which enables a chatbot perform the way we want it to and likewise give a name to it.

A skill comprises of several intents, entities and dialogues. Intent can be defined as the goal or the input provided by the user to the chatbot in order to resolve his/her query. The chatbot will determine what output must be given to the user, by carefully analyzing the entity or the intent. Intent names begin with'#' on the IBM Watson Assistant. Example:'#greetings'may includes greetings such as 'hi', 'hello', and 'goodmorning'etc. We use entities to divide the user input of similar kinds into groups by using one reference word such that it provides the same output i.e. if different inputs of similar kind are given but the output is same we use entities. For example-cost/price must be given same type of response. The name of an entity starts with '@' .Entities are of two types: System and user entities. System entities are the entities predefined in the system and user defined entities are the entities defined by the user/Bot Programmer. Some examples of the system entities are @sys-number and @sys-location. Dialog is the response/output offered to the user for a given input. The output is given based on the input provided by the customer.

The output is given using Pattern Matching Technique. The bot takes the user inputs and searches for the specific entity/intent and matches it with the output provided for the specific intent/entity and presents it as a response at the Presentation Layer/User Interface.

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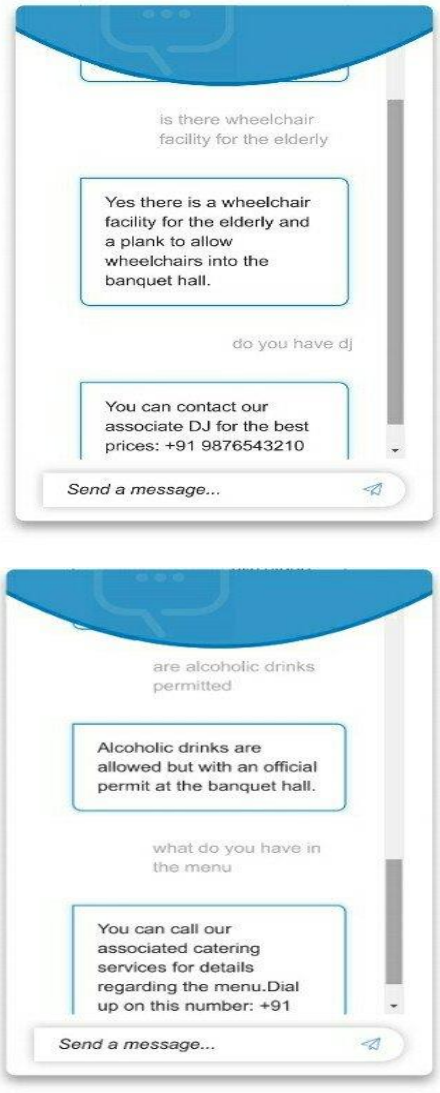
Babot is a chatbot which resolves queries that a user may have while booking a Banquet hall. The chatbot provides the customer with the necessary information needed by the customer while booking a hall. The queries make it easier for the customer to know the location, area, timings etc of the hall.Tedious tasks of booking can be highly reduced for both customers and the Manager.The bot provides with necessary information like parking space, accommodation, location, branches etc.

It also resolves queries related to restrictions such as permission for alcoholic drinks, music and availability of DJ, Photographers and various other facilities. It also deals with queries relating to availability of the hall, Power backup facilities; wifi facilities etc. The bot gives the user a clear cut idea about how the hall looks inside out visually with the help of images. It can answer almost any question the user asks relating to the banquet hall making the user interested to book the hall.
It also tries its level best to convince the user for booking the hall by providing him/her different suggestions if the user's requirements are not fulfilled as per the queries and can answer to many people at once. The bot has been integrated using the IBM Watson Service Node Red and even with Facebook's messenger.



Screenshots of the bot

IV.DISCUSSION

Our project can be expanded as the business expands by feeding the bot with the necessary data, i.e. increasing the database. It can be embedded with the concept of big data to provide better customer satisfaction and increase sales. This bot has been created for answering the queries of a banquet hall; it can be expanded for a chain of hotels by providing more information in the future. It will be a great help in the management industry, it will also reduce the cost of hiring a person to answer the queries of the person and can answer to many customers at once.

This project can also be modified for other small businesses by changing the domain of the bot. Small scale businesses which do not have enough funding can also utilize this method to expand their sales and ensure more advertisement of their business. This bot can be embedded into a robotic system in the future which can further more take your customers' orders, provide them with the information related to your business and even analyze what would they like to purchase on their next visit and provide suggestions.

The bot can not only serve for one banquet hall but can also be implemented for a chain of halls by providing a larger database. The location of different convention centers can be provided by linking it to Google maps. This way it makes it easier for the user to find routes to the banquet hall. Natural Language Processing and machine learning techniques can be improved in order to make the bot more efficient. By changing the domain of the bot,it can be used to increase the sales and reduce the cost of several small businesses.

V. CONCLUSION

Chat bots tend to make the work of a human much easier, relieve humans from the responsibility of performing the mundane tasks and can do it much more efficiently. The chatterbots are widely being used in all fields in today's modern world. We all are dependent on chat bots in our daily lives without even realizing it. From asking Siri to set our alarm in the morning to using the Google maps to reach to our destination we are all surrounded by chatbots. In our paper we have tried to implement a smart query basedchatbot. The use of chatbots has helped humans in the past few years a lot mostly in the enterprise field. The chatbots might prove to be quite beneficial for us humans and after a period of time may also become a necessity like the other technologies introduced before such as the mobile and computers.

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