Building an artificially intelligent, interactive and online chatbot

Sai Kiran Chintalapudi
chintalapudisai.kiran2015@vit.ac.in
Vellore Institute of Technology, Vellore, Tamil Nadu

Akhil Bharadwaj
akhilbharadwaj.mateti2015@vit.ac.in
Vellore Institute of Technology, Vellore, Tamil Nadu

Siddharth Kolagatla
kolagatla.siddharth2015@vit.ac.in
Vellore Institute of Technology, Vellore, Tamil Nadu

Reddy Nikhil Sampara Harsha
bjose.nikhilpriyathamreddy2015@vit.ac.in
Vellore Institute of Technology, Vellore, Tamil Nadu

Swarnalatha P
pswarnalatha@vit.ac.in
Vellore Institute of Technology, Vellore, Tamil Nadu

ABSTRACT

Now a day's people tend to seek knowledge or information from internet that are discerned with wide range of applications and followed through online services. The main aim of this Chat based system, or the way is to bridge the gap between the knowledge sources by providing instant replies to the questions and queries that get posted. A chatbot's main aim is to make a conversation between a human and a machine feasible. The machine gets embedded with this knowledge for the identification of the sentences and making a decision within itself, as a response to answer questions.

Keywords: *Chat-Bot, Conversation, API, Retrieval Based model, Artificial Intelligence.*

1. INTRODUCTION

Consumers generally look to access information that is on-demand, and do not generally prefer when brands get to decide to schedule their emails. This is being powered by machines (namely artificial intelligence and the mobile internet related machines, in particular) and while some have been getting good response, in majority of the cases the technology is not being able to keep up with expectations.

Consumers no longer want to talk to a business by their phone or through email, they have moved to social media, and thus messaging has become their main tool in their personal lives. Convenience is hence winning. People do not want to wait or search for an answer, they want answers to come to them automatically.

Hence, here Conversational interfaces, or the chatbots, are the fuel, and hence personalised ways have come, 24/7 communication in any language and in any time zone.

2. LITERATURE SURVEY

A. Literature Survey

A chatbot is intelligent when it becomes aware of the user important needs. Its knowledge is what gives the chatbot ability to handle various types of scenarios, relating to a conversation with utmost ease. It could be a wonderfully designed conversation built interface, which is smooth and easy to use. It could also be a natural language processing scheme or variant, and understanding where it is able to get the meaning of the sentences, even when it is structured in a wrong way.

Sentimental analysis in its most fundamental form involves working i.e whether the user is having a good experience or not. If a chatbot is able to recognize these aspects of the game, then it would get to know when to offer or, even when to pass the conversation over to a human operator, which product's users are generally more excited about.

We could use sentiment based - opinion analysis, to identify and determine if these interactions are positive or negative.

Regardless of these situations, it is the human's nature to be looking out for the next big thing. This is the way we keep evolving in general, as species. We have even evolved in the way - how we have stayed connected with each other from mails to telephone to the computers. This shift in how we stay connected to each other took a fascinating turn with the widespread adoption of the internet resources and artificial intelligence.

This concept is not very new nowadays. The art of knowing the minute structured details of customer's journey is the foundation or root for success in any organization or a company. As Artificial Intelligence is taking a larger and larger role in commericial applications and operations, it is not just about getting it, but it is mainly about having a visible foresight into things and experience to program our robots to understand them. For chatbots to actually be effective in customer or the client communications, they need to be designed with the bent of mind as that of a genuine humane experience with authentic brand voice. At the end of the day, it is actually about how businesses and commercial applications are being able to build stronger and stronger relationships with their customers or clients.

B. Recent Survey

Many AI chatbots are built using Artificial intelligence / Machine Learning programming languages and they use keywords for natural language understanding, these days. That proves that we are still in the early days of some general AI principles that is able to communicate freely. [4]

There are some chatbots that use AI extremely well, effectively, they are:

•**Mitsuku:** Mitsuku is one of the best AI chatbots around. It was considered by the judges of the all famous Turing competition to be the most human alike. You can basically talk with Mitsuku for hours and hours without even getting bored. It replies to all of your questions in the most human way and automatically tries to get your mood with the language you use with it. It is a chatbot made to chat about anything, which is one of the main reasons that makes it so humane like—in major contradiction to many other chatbots out there that are made for performing a specific task.

•**Right Click:** It is a startup that introduced an artificially intelligent chatbot that is extremely powerful, that creates automatic auto-websites. It asks the user general questions during the conversation like "What industry do you belong to?" and "Why do you want to make this version of a website?" and creates customized templates as per the given answers. By replying to each of its queries and questions, the actual job of website creation is done in very limited time by it. This process is short but keeps the user engaged.

•**Melody- By Baidu:** This one lives inside the existing Biadu Doctor application. This application collects the medical information from people, and then passes it on to doctors in a form like application that makes it easier to use for diagnostic purposes, or to otherwise give responses to.

•**Microsoft's Tay:** The poll that was conducted by Microsoft was run on twitter and also on its website, which showed us that the chatbots are easy to train. But not exactly in a sense truly that, it is easy to train them exactly as per the needs properly.

•**Replica:** Promising app from Silicon Valley that allows you to create a replica of yourself, and chat with this AI all day whenever you need, it is a big success.
In fact, it's your AI friend that teaches and grows in conversations.

•**Foxcy:** Foxsy is a matchmaker for finding new friends with common interests. This chatbot basically tries to offer you different suggestions and opinions of the people who are also searching for someone of their own to chat to, and also shows you their basic profile with fundamental public information. Then, you can choose to send a letter to the individual in person and have a conversation.

These are just some of the simple versions of some of the intelligent chatbots around us. There are other and many more intelligent chatbots out there which provide a much smarter and logic like approach to responding to the user's queries and questions. Since the process of building a chatbot is not a big task, most of us can achieve it with the most basic of the technical knowledge available open on the internet. Majority of which will be very helpful, and be used to give out a better experience.

The most important part of any chatbot creation is the conversation. Therefore, more and more efforts have to be put into designing chatbots.

3. METHODOLOGY

Chatbots are some of the best artificially intelligent systems that we interact with, with the help of text or voice interfaces.

These interactions can be very straight forward activities to also complex works, like asking a chatbot about the weather that day, or more even more complex activities, like having a chatbot troubleshoot a random spiral problem with the help of some internet service.

The following steps will be helpful when required to develop a chatbot:

- Identifying some of the opportunities for an Artificially intelligent chatbot

- Understanding what the goals are for building a proper chatbot

- Designing a parallel chat conversation

- Building a chatbot using some of the basic frameworks or for non-coding platforms.

For this particular type of work activity, Artificially Intelligent solutions could be usually considered based on two criterion:

- Work Complexity, and
- Data Complexity

This double analyses of work complexity and data complexity here is that it is often used in results in three primary types of activity models that are:

- Efficiency

- Expert

- Effectiveness
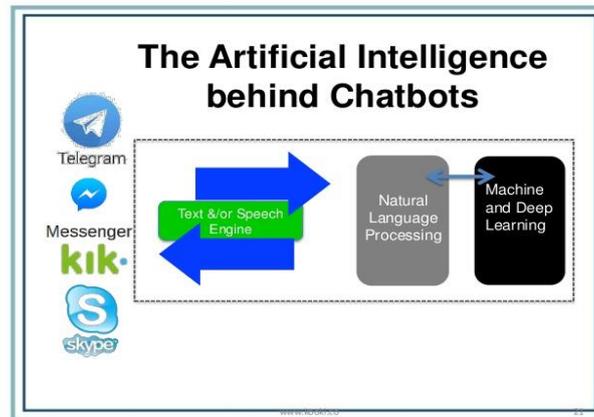
A. Understanding the Goals of Customers

To be particulary more specific, understanding exactly why the client or the customer wants to build a chatbot and also what the customer or the client wants their chatbot to do for them or to their business. Finding answers to this query will guide the designer to create maeningful and beautiful conversations that are appropriately aimed at meeting the goals. When the designer get to know why the chatbot is being built, they are obviously at a better placed position to formally design the conversation set interface for the chatbot.

B. Designing a Chatbot Conversation

For designing chatbot conversations, Chatbot interactions are generally the most important and are segmented into structured and unstructured interaction formats. As the names suggest, the structured type is more and more about the logical flow of the information, including the choices, and various forms into consideration. The unstructured conversation flow here includes the free format of plain text. Conversations with family, colleagues and acquaintances fall into this type of segment. Developing scripts particularly for these type of messages will follow suite. While developing the script for these types of messages, it is important to keep the conversation topics relevant to the purpose of conversation being served by the chatbot. For the designer, interpreting what the user's answers' are, is extremely important to develop their scripts for a conversation of the user interface system. The designers also turn their attention to close ended conversations that are easy to handle and open ended conversations that allow customers to communicate among themselves naturally. [5]

4. TESTING

A chatbot works in such a way that at places where the user types in some random question, the answer for the question is sent by the chatbot automatically. The NLP object which the chatbots use here process the questions, which are then next provided by the user and give out relevant replies. Defining these replies to work on par with the answers provided is the job of the undertaking developer. The developer testing here is generally here verification and validation. In understanding terms, i.e, testing this whether or not the chatbots provide the correct answers to the questions.

A. Functional Testing

As we known to the fact here that, the chatbots are mainly focused on some randomized special functions. Therefore, it is a mandation that those specific functions are carried out at their self-best. These types of testing of chatbot's performance can be carried out by using mechanisms such as the boundary value analysis or even the equivalence partitioning. The free form of input could be seen as a major discern among the chatbots.

However, a chatbot can answer a question thrown at him, in different ways:

1. No response at all
2. An invalid response
3. An invalid response for a valid question
4. A valid response for a valid question

Chatbots are based on conversations. Therefore, it is utmost important for us to properly test the conversational flow of a particular chatbot's functionality. The exact personality of a chatbot's character, which is a very vital attribute when building a chatbot is tested over this point or fact.
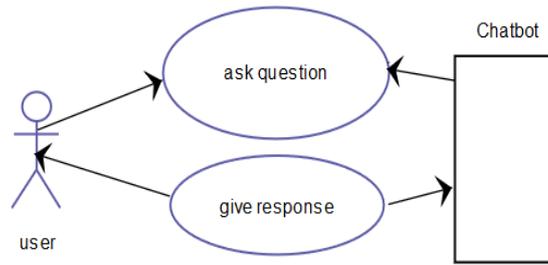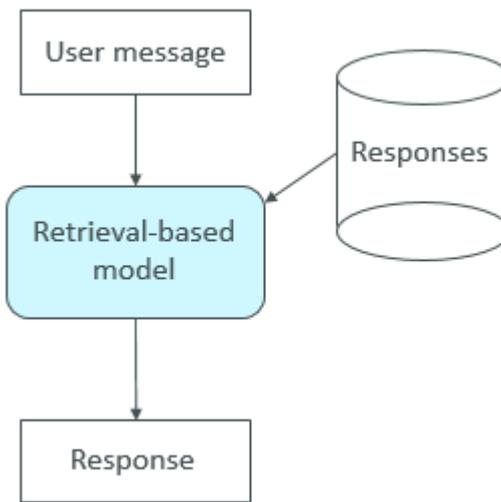

Fig.1. Responses Generation System

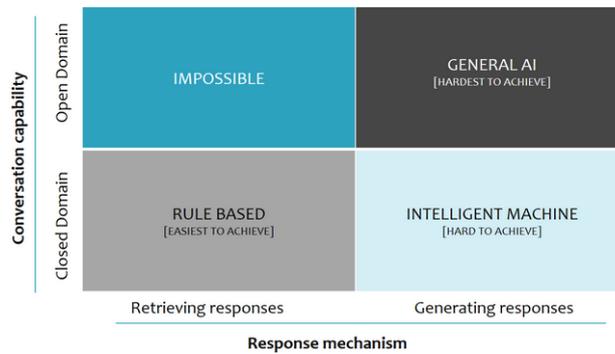**Fig.2. Response Retrieval Model**

Fig.3. Functional Mechanism

B. Documentation

A Chatbot is a specialist virtually guiding assistant type program that allows the consumers or the clients to communicate with it via messsaging applications such as SMS or messenger applications and/or voice meesaging. Chatbots allow the consumer or the client to fulfill the specific tasks, such as: ordering of pizza online, booking tickets online, or for that matter offline by call, (re-) ordering items, managing new and old subscriptions and other applications.

The advantage of using a Chatbot over a conventional Application here is that the consumer or the client does not need to download the Application to fulfill the desired task. Instead, the consumer or the client will just use the SMS or a messaging application (e.g. WhatsApp, Messenger from facebook, Google Allo or even Google Plus and others) to send messages to the Chatbot. The desired task will then be performed through a dialogue occurrence between the Chatbot and the consumer or the client.

A Chatbot does not in it's most neccesity require what is nowadays considered to be AI (artificial intelligence). For instance, let's take the case of IBM's Watson, which is using neural networks and also self-learning modules to accumulate and accommodate logic in order to resolve important tasks and problems around the world. Watson is currently being trained by IBM to perform cancer diagnosis and learning by processing medical diagnosis data and it's prognosis. This kind of sophisticated development is not required to order pizza or cinema tickets. Under this bonnet, the Chatbots in use here are workflow automation programs which identify and manipulate the set of workflows from inputs and then orderly execute them.

Testing is a universal discipline that uses proven logic and methods to prove the correct functional behavior of the software. Even sophisticated ideas like Chatbots can be tested using proven methods. Testers shouldn't be concerned about new technologies, but should always look for ways of applying what they already know to newer situations.

5. RESULTS AND DISCUSSIONS

In a brief, a chatbot is actually just a computer program in orientation, but the difference between the chatbot and other of its competitors is that - it requires the users' to interact visually and logically, it generally mimics the human conversation majorly, either through text or audio logically. Instead of going through analyses, to locate information on the website, users, I.e customers or the clients can find what they need by asking a chatbot.

And if you could incorporate the Artificial Intelligence modules and if possible the machine learning modules as well, then your chatbot can get even smarter and smarter, the longer it is in put in regular and daily use. It can learn from previous conversations and get some valuable experience, and become more effective as time passes by.

A chatbot can therefore be termed as a computer program which conducts and executes a conversation via audio or textual methods or sometimes even the video methods, but all of which in a logical manner. Such programs are often designed to properly simulate - How a human would most likely behave as a partner in open conversations. To build an intelligent chatbot, there are a lot of program inputs out there that are accessible in open, and make constructing a chatbot simpler. You will have to make a proper sense of what issue you need to discover with the chatbot, and then pick which stage your chatbot will live on, set up a server accordingly to serve your purpose, and run your chatbot from, and then select which benefit/benefits you would use to make your chatbot effective.

Here, in this explanation we have made use of an API, called the duck-duck-go API.

As consumers or the clients continue to shy and go away from the covential and very basic, traditional forms of communication, chat based communication methods are expected to rise and rise even more. Chatbot based virtually connecting assistants are increasingly being used to handle simpler tasks, freeing up humans and making them to focus on higher-profile services. [6]
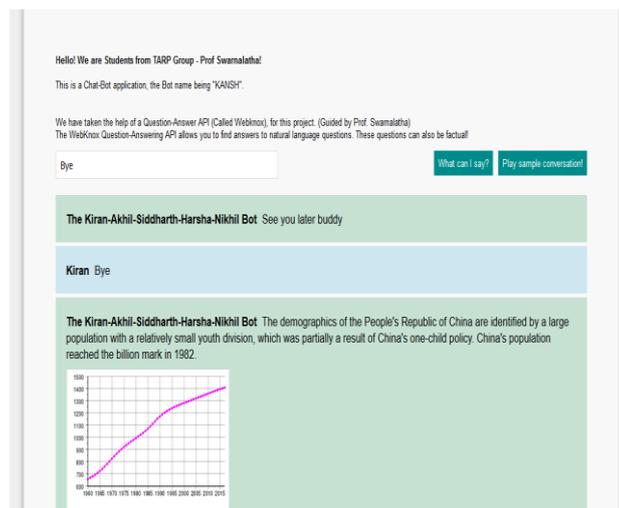

Fig.4. Result (Application)

6. CONCLUSION

Chatbots are here to stay but 2018, and further years need to be of maturity for them. We will still see a lot of experimentation but sooner or later they would need to face the reality and the results.

There is more to having chatbots properly built with rich conversational Interface content, than to just plugging the tools, services and connect pieces of data together. It takes a deep and a heavy practice and a deeper understanding of the underlying concepts to get the design right and build chatbots that give users' a greater experience. The user should be able to get the job done by having a conversation with the chatbot without having to think and ponder too much. Great conversational experience, the experience that the user gets when interacting with the bot, or at the thought of doing so, is what we should always aim for here.

The API put to use in this explanation is called the duck-duck-go API. This is a simple multi web based search API, any such APIs can be put to use for simple bot building, for chat applications.

With the prevalence of Chatbot and Bot related Technologies and their public APIs curated by several of the large IT companies like Google, IBM, Microsoft and Amazon, developers should now find it much more easier than before to make one. Because, the API's in themselves take care of all the functioning parts automatically. Yet in some cases, even then, building an extremely successful and intelligent chatbot, that which can understand the human language, and also handle extremely long, sometimes meaningless conversations is definitely one of the areas that needs heavy improvements. This is where the future is to come, in Chat friendly based bots and in their API's.

7. FUTURE SCOPE

Being able to understand when and where the conversation would take place and their context, will help to have a better understanding of what the users' need. Understanding the chatbot's context here is very more, rather the most important point, as this will increase the success ratio of the chatbots and reduce the losses that tend to get produced by them to the users. In 2018, and further years we will likely see a makeshift here, and see solutions working on this side, which would lead us to a very interesting dilemma next.

Creating and making, putting to effect successful conversational flows for each and every kind of scenario is a really hectic task, and that is why most of the messaging platforms out there count on high end interactive elements in their applications. The last step on this situation has been the inclusion of webviews on their platforms where any interface can be loaded as if it were any application.

Whether or not one views this type of a technology as a passing fad, or in actual rather believe that chatbots will revolutionize - it would become important to realize - How people would communicate and interact with each other, the impact chatbots are having on online experiences is for real, and it will keep continuing... and it is immeasurable.

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