



Chatbot as an Expert System

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Abstract. This paper focuses on an emerging tool for learning from Chatbot, which is a learning cum-assistant tool. A Chatbot is an artificial created visual system that interact with the user's queries using interactive textual skills. This system directly communicates with the people using A.I. and Machine Learning concepts. This paper reviews the technique, terminology, and different platforms used to design such system. The utility software for Event Tracking System is proposed from this review.[1]

Keywords. Chatbot, Assistant, Expert System, Machine Learning, Event Management/Tracking, Artificial Intelligence,

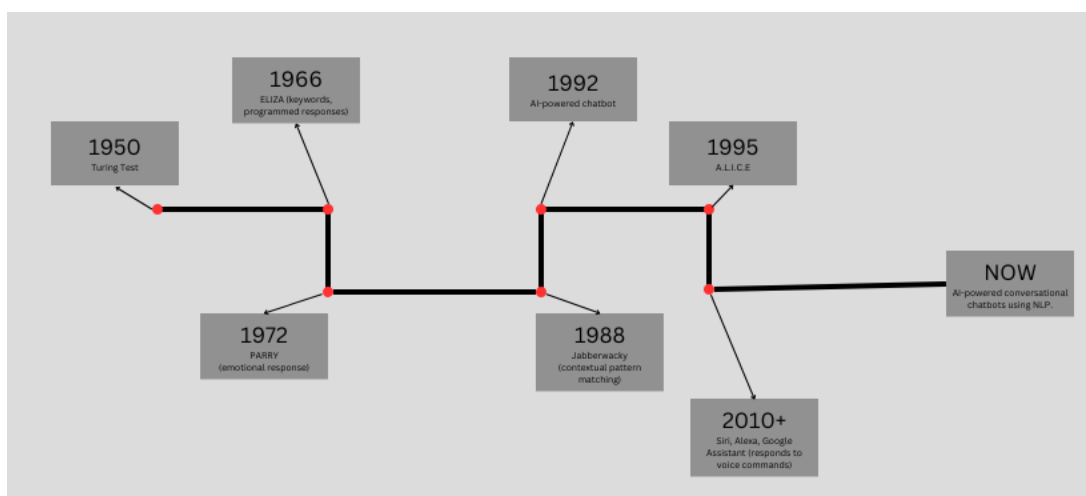
1. Introduction

Event Management/Tracking system are the web-based application which helps event organizer and event participators throughout the world. In the beginning, it used to analyze the dataset for event organizer and provide walkthrough for the participants. The technologies of 21st century is emerging day by day and the engineers working to develop such chatbot for people who are visiting such websites. These systems are easy to use and operate without any kind of knowledge. The most used expert systems are Google Assistant, Alexa, Siri, Cortana, Bixby are being used most of the time in entire world. Chatbot are another kind of assistant that is direct to the specific task.

While learning Expert system for a specific problem, users may face and get stuck when a new event management system design problem is issue for assessment. For new problem, users need to implement the procedural rule for solving, using the same commands and tools repeatedly, which results in the neglect of new commands provide by the users to identify and reply for the related queries asked.

Speech and textual forms of information plays an important role in communicating among peoples. Nowadays, speech and textual conversation are primary means of communication forms between humans and computers that occur through different approaches. The intension of Chatbot is to deal with queries provided by a user's and to provide feedback using the analysis of the entire queries using different classification method which are used in machine learning. Chatbot is a deep learning program that processes a user's natural language input and generates relatively smart and interactive response sent back to the user. They allow them to communication 24x7 and improve productivity by controlling all the activities where humans are not required to perform. Some common examples of chatbot are ASK DISHA for IRCTC inquiry, Amazon chat customer service, Scripbox Assistant for Scripbox website, Ask Julie for Amtrak.

1.1 Evolution of Chatbot



In evolution of chatbots have evolved to include upcoming technologies. Generally, three evolutionary chatbot phases that include basic chatbots, conversational agents and generative AI.[1]

1.1.1 Basic Chatbots: -

It was the first generation from 1950-2001 of chatbots used machine learning algorithm like keyword-recognition to generate scripted responses. While these chatbots can only process limited number of queries. Basic chatbots are usually develop for small working in the industries. It includes ELIZA, A.L.I.C.E, Jabberwocky, PARRY, Turing test.

1.1.2 Conversational agents: -

It was the second generation from 2010 – 2014 of chatbots that use advanced natural language processing and Machine Learning to solve complex human problem (like real-entity problem), process voice commands and learn from past interactions. It includes chatbots like Siri from Apple, Alexa from Amazon, Google Assistant from Google, Bixby from Samsung etc.

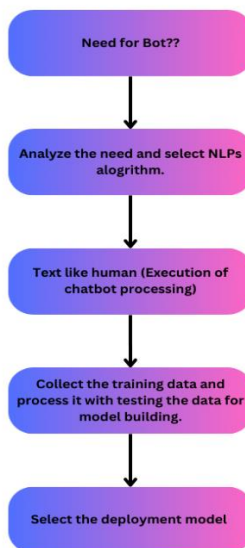
1.1.3 Generative AI chatbots: -

It was the evolutionary era of chatbots that deal with more complex problems and providing feedbacks to the users after executing the queries by itself using the given algorithms used in making and under the protocols. It uses the advanced algorithm of NLP and machine learning using generative transformers (GPT) etc. It can perform task easily and provides much more accurate outcomes. It includes chatbots like Dribbble.ai, ChatGPT 4, Jasper AI, Bard and so on.

1.2 Design and Development of Chatbots

Basically, programmer performs following steps before designing Chatbot.

1. To determine the purpose of customers, need a bot?
2. Then design analyze the need of customers and decide between a platform based on rules on natural language processing.
3. From the above step designer design the step-by-step execution of chatbot processing using decision tree.
4. He used different intention for training the chatbot to solve complex problem.
5. After training and testing of chatbot, designer need to select the platform for deployment of chatbot over different platforms like WhatsApp, Messenger, Facebook, Telegram, Specific Website.



During the development of chatbot using some machine learning concepts and natural language processing. As we know that the chatbots are build in terms of need of customer.

For building basic chatbot that can analyze the queries and matches it with the inter-related pattern given in the intents of Json file. We generally apply neural network algorithm and natural language processing concept like stemming, bag-of-words, tokenizer and used some of Pytorch for implementations.

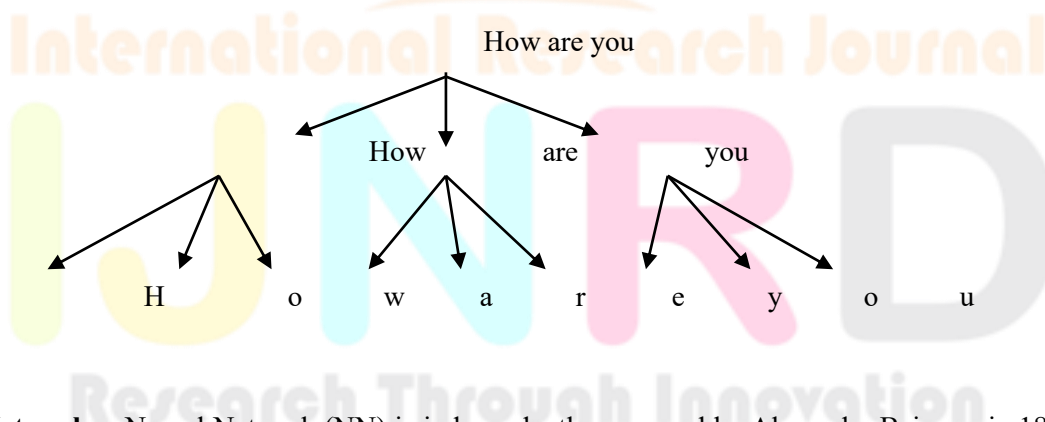
Natural language processing (NLP): - It is a machine learning technology that deal with the ability to interpret manipulation of human language. NLP gives the ability to the computer system to analyze the human language by which they can provide feedback to user as needed.

In natural language processing we used NLTK (natural language toolkit) in which we applied some tools like stemming, tokenizer, bag-of-words.

Stemming: - It is a text processing system that deal with the reduction of words to their base form.

Tokenizer: - It is a used to split the sentences into smaller parts units that can be more easily assigned meaning.

Bag-of-words: - It is a model of text processing/representation as a unordered collection of words in the bag. It ignores the grammar and information retrieval.



Neural Network: - Neural Network (NN) is independently proposed by Alexander Bain in 1873 and William James in 1890. In their work, both thoughts and body activity resulted from interactions among neurons within brain.

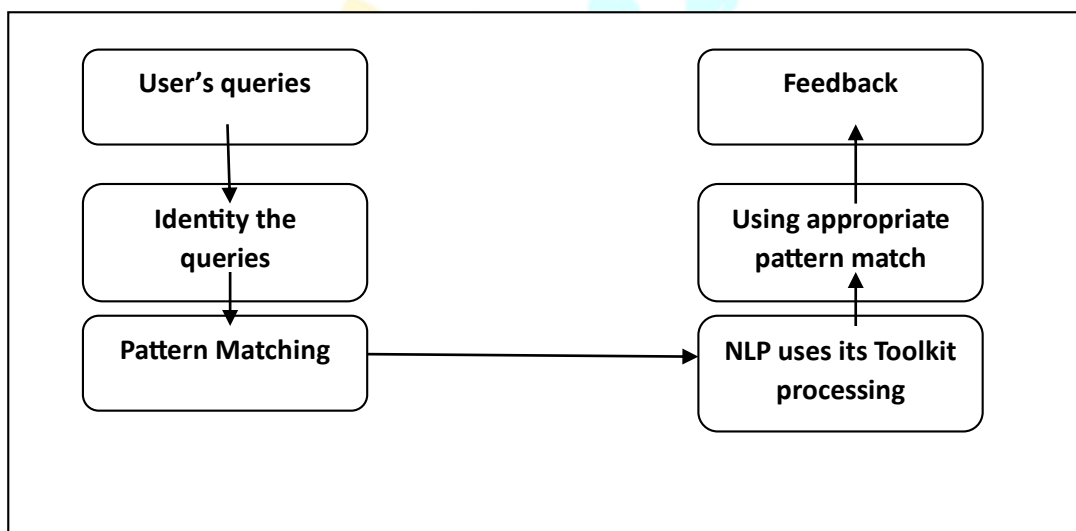
In context of Bain, each activity performed by human body have a certain set of neurons. As the time passes activities were also repeated, then the connections between those neurons are strengthened. Due to this concept, the rapidly repetition of activities (neurons) in brain are causing the formation of memory. Human brain forms different patterns in its neurons that causes inordinate number of neural connections within the brain. Brain is difficult to study in deep way but it is possible with use of modern technology.

James's theory was much like Bain's, because he claimed that memories and actions resulted from electrical currents flowing around the neurons in brain which represent the flow of memory. Neural Networks used under artificial

intelligence, have been simplified model of neural processing in the brain. Consider there are some general models for analysis of variance or regression and perform to process the set of data that mimics the way the human brain operates. Neural Network deals with different number of operation where we can develop a model who can think, create, or define any features by itself. In other word, it is replica of human brain system.

One of the strengths of Neural Network is to accommodate the flexibility in linear and non-linear relationship and have capability of handling unorganized data. It processes large volumes of raw data, enabling them to handle upcoming data challenges. But the technology is the not so developed in today's industries. Neural Networks are having two areas of study:

- (a) **Feed-forward networks (FFN)** also known as multilayer perceptron. It is a type of ANN where the nodes do not form loops. Information flows in one direction from input end to output end.
- (b) **Symmetric recurrent networks (SRN)** known as attractor neural networks or Hopfield nets, that used as associative memories. It is a design principle in ANN to capture regularities in the world.[2]



2. Literature Review

There are many web services who did not provide better means of chatbot that can resolve the queries asked by the users. In major cases the information used for conversations in chatbot are already stored in the chatbot database with the help of developers. By using Artificial intelligence, we can develop such system that can perform any complex task easily where human being cannot do appropriately. Using these tools, a developer can develop different kind of AI textual/voice command system that can interact with human being like a real person for listening their queries and provide them accurate result. In upcoming days AI will have boom in the technology industry where every person is interacting with AI and performing their task in an efficient manner. Some AI tools are also used for the growth of organizations. We surveyed that many of the event tracking website are not providing such services for event organizers and for event participators. There are approx. 40-60% of website are having such facilities but their bots are not providing or resolve the user's queries appropriately.

3. Proposed System

An Event tracking system is a web-based software that deal with global event management system which are organizing by the host and monitors the activity of event participators. In Event Tracking system we are implementing one chatbot who deal with the normal queries at the base level for both form of user's (host & joiner). This makes easy to manage many of the queries without any interruption of outside world. This chatbot also have ability to entertain user like saying some jokes. The feedbacks are depend on the user's queries. The event participators do not go directly to the event host for the solution regarding their queries.

The chatbot takes input from the user then it will analyze the given statement is in the correct format of not. If yes, it will start pattern matching with the given knowledge(intents) base and provide appropriate response. If no, then it straightly replies "I did not understand."

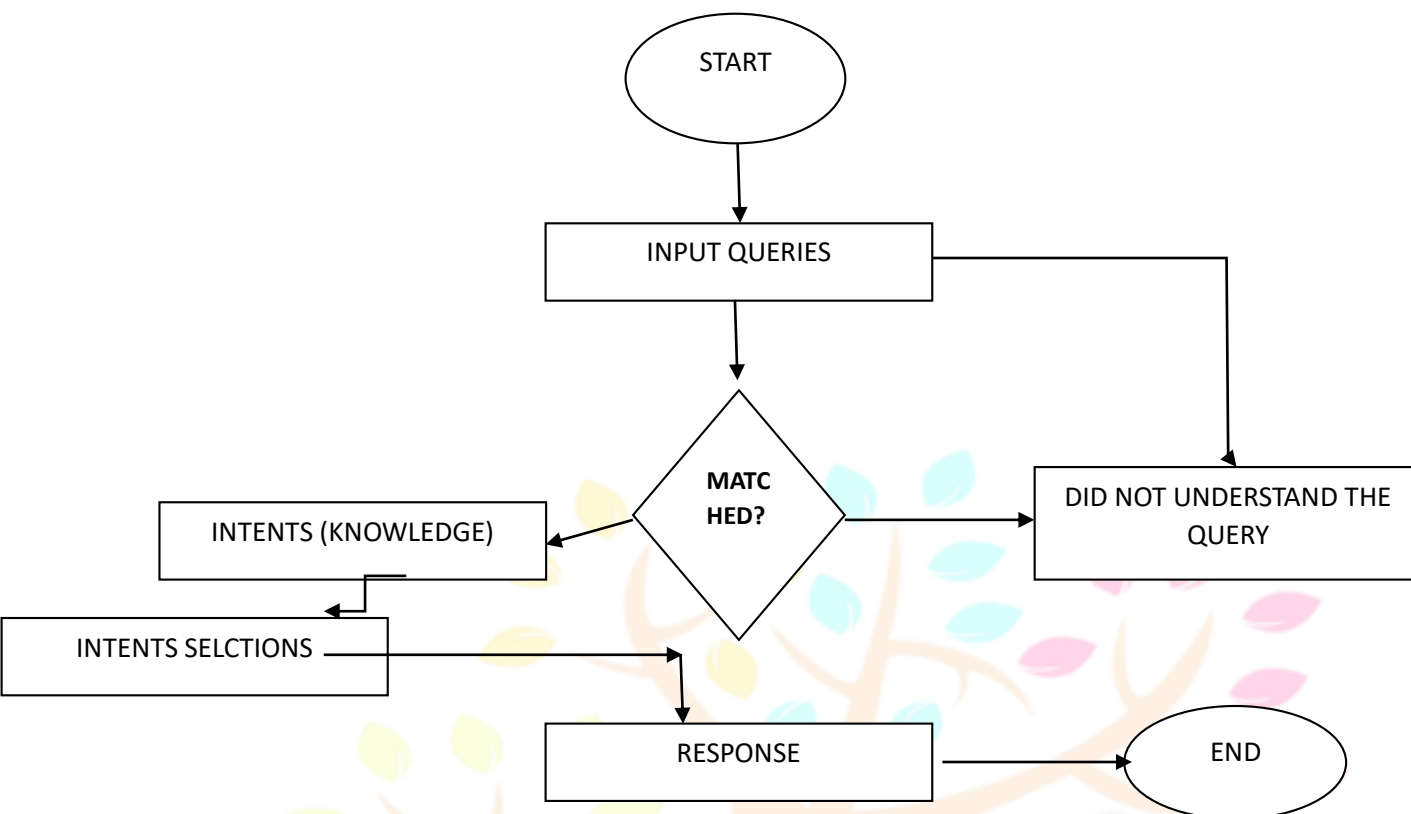


FIG: - FLOW CHART DIAGRAM FOR CHATBOT PROCESSING

4. Applications

- Event tracking chatbot helps the user to get the accurate solution for their queries.
- Any chatbot can be applied in this system and they can provide them with good response.
- AI based chatbot system can be used by event host and participants.

5. Results Output

This chatbot is a trial version where it only talks by using supervised learning algorithm.

```

85     "responses": [
86         "Why did the hipster burn his mouth? He drank the coffee before it was cool.",
87         "What did the buffalo say when his son left for college? Bison."
88     ]
89 }
90 ]
91 }
  
```

```

PS E:\Code\chatbot> python -u "e:\Code\chatbot\chatbot.py"
Let's chat! (type 'quit' to exit)
You: Note down the event list?
Shivum: 1.Moives || 2. Festivals || 3. Sports || 4. Concert
You: Do you know a joke?
Shivum: What did the buffalo say when his son left for college? Bison.
You: bbye
Shivum: I do not understand...
You: thank you
Shivum: Any time!
You:
  
```


6. Future Scope

In the future Artificial intelligence will take over the industries in every field. In event tracking system chatbot can able to analyze more than one language and it can deliver the solution regarding the experience which are solved already, in future, this chatbot are able to navigate the user to their destination.

7. Conclusion

The main objective of this chatbot was to develop a friendly environment between the AI and human being which use some little amount of algorithm to identify the user's question and provide them feedback accordingly. To develop a database were all the queries are stored and matched with the questions when it is raised.

8. Literature Citation

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