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Intelligent chatbot using machine learning

Tridib Chakraborty

tridib.chakraborty@gnit.ac.in

Guru Nanak Institute of Technology, Kolkata,
West Bengal

Chowdhury Md Mizan

chowdhurymd.mizan@gnit.ac.in

Guru Nanak Institute of Technology, Kolkata,
West Bengal

Trishita Ghosh

trishita.ghosh@gnit.ac.in

Guru Nanak Institute of Technology, Kolkata,
West Bengal

Indrani Dey

indranidey004@gmail.com

Guru Nanak Institute of Technology, Kolkata,
West Bengal

ABSTRACT

The aim is to create a program chatbot will be designed to simulate an intelligent conversation with one or more human users. The ability of this program or the chatbot will be to learn and gather knowledge on its own, and with every passing conversation, it will grow itself to be more intelligent and reply with sophistication and charming manner. The main idea behind this whole program is to teach the program to learn, adapt and respond accordingly on its own. We will be using some basic databases to give it a head start but after that, it will do its work on its own. The users will interact with the bot and find it to be not much sophisticated but after using it for few days the bot will learn and find a pattern and will reply with more perfection and better understanding on the subject. Our final aim is to implement this program on Facebook as a messenger app for companies which deals with high user request and questions and find it difficult to help everyone, but this as can do the work for them and that too with multiple users at the same given time.

Keywords— Supervised, Unsupervised learning

1. INTRODUCTION

A chatbot is a program that communicates with you. It is a layer on top of, or a gateway to, a service. Sometimes it is powered by machine learning (the chatbot gets smarter the more you interact with it). Or, more commonly, it is driven using intelligent rules (i.e. if the person says this, respond with that). The services a chatbot can deliver are diverse. Important life-saving health messages, to check the weather forecast or to purchase a new pair of shoes, and anything else in between. The term chatbot is synonymous with text conversation but is growing quickly through voice communication. The chatbot can talk to you through different channels; such as Facebook Messenger, Siri, WeChat, Telegram, SMS, Slack, Skype and many others. Consumers spend lots of time using messaging applications (more than they spend on social media). Therefore, messaging

applications are currently the most popular way companies deliver chatbot experiences to consumers.

Machine learning is an application of Artificial Intelligence (AI) that provides systems with the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves.

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human intervention or processing of location (or position) data such as those from Global Positioning System (GPS) or differential assistance and adjust actions accordingly. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it. Many researchers also think it is the best way to make progress towards human-level AI.

2. SUPERVISED LEARNING

This algorithm consists of a target/outcome variable (dependent variable) which is to be predicted from a given set of predictors (independent variable). Here the human experts act as the teacher where we feed the computer with training data containing the input/predictors and us how it the correct answer (output) and from the data, the computer should be able to learn the patterns.

What are the Inputs and Labels (Targets)?? For example addition of two numbers $a=5$, $b=6$ result $=11$, Inputs are 5, 6. We first train the model with lots of training data (inputs & targets). Then with new data and the logic we got before we predict the output.

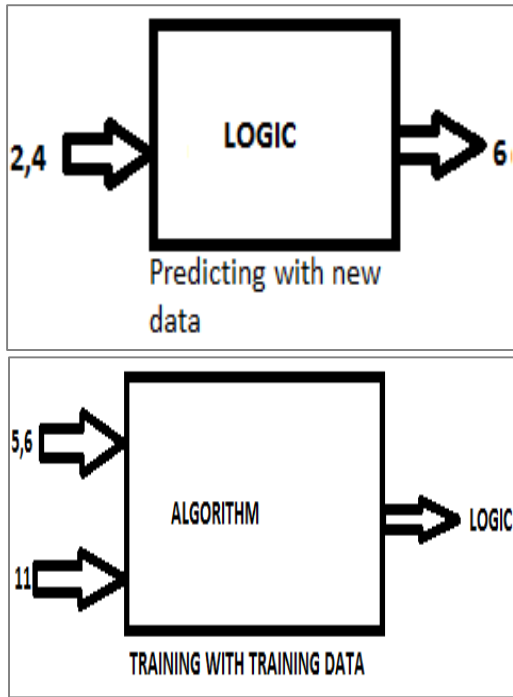


Fig. 1: Supervised learning

(Note: We don't get exact 6 as answer we may get a value which is close to 6 based on training data and algorithm). This process is called Supervised Learning which is really fast and accurate. Examples of Supervised Learning: Regression, Decision Tree, Random forest, KNN etc.

3. UNSUPERVISED LEARNING

The training data does not include Targets here so we don't tell the system where to go, the system has to understand itself from the data we give. Here training data is not structured (contains noisy data, unknown data and etc.) Ex: A random article from different pages. Example of Unsupervised Learning: Apriori Algorithm, K-means.

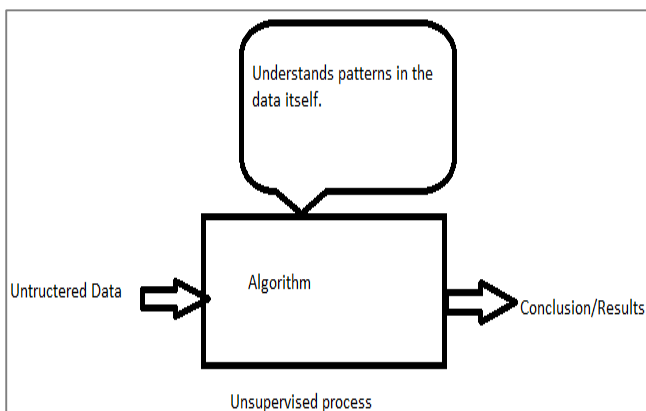


Fig. 2: Unsupervised learning

4. REINFORCEMENT LEARNING

Reinforcement learning is a type of Machine Learning, and thereby also a branch of Artificial Intelligence. It allows machines and software agents to automatically determine the ideal behaviour within a specific context, in order to maximize its performance. Simple reward feedback I required for the agent to learn its behaviour; this is known as a reinforcement signal. It works this way: the machine is exposed to an environment where it trains itself continually using trial and error. This machine learns from past experience and tries to capture the best possible knowledge to make accurate business decisions. Example of Reinforcement learning: Markov Decision Process.

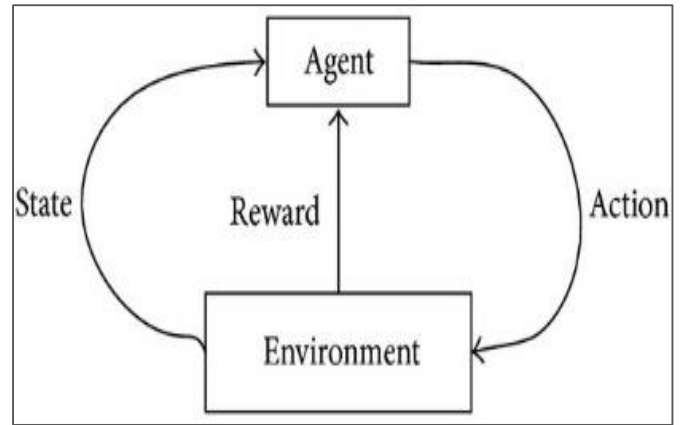


Fig. 3: Reinforcement learning

5. PROPOSED STRATEGY

How Do Chatbots Work:

- Don't have a good understanding of the conversation
- Are based on pattern matching
- Chatterbots have a set of input and output rules
- Recognize cue words from the user and responds with a pre-calculated response
- For example: Human: "I am feeling very worried today."

Chatterbox: "Why are you feeling worried lately?"

- Other chatterbots learn through user interactions

6. PROCESS DIAGRAM

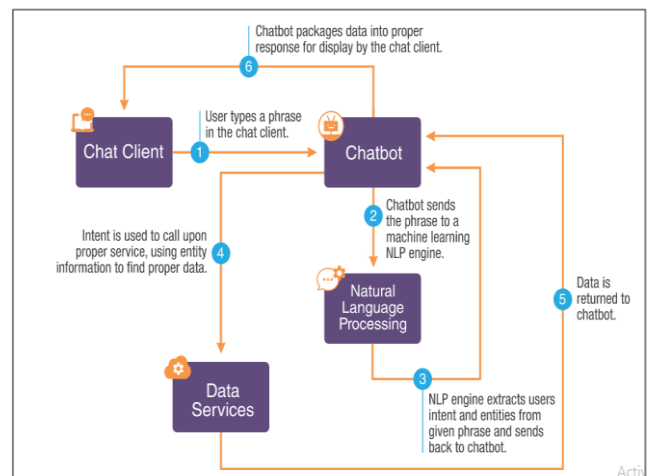


Fig. 4: Process diagram

7. FLOWCHART

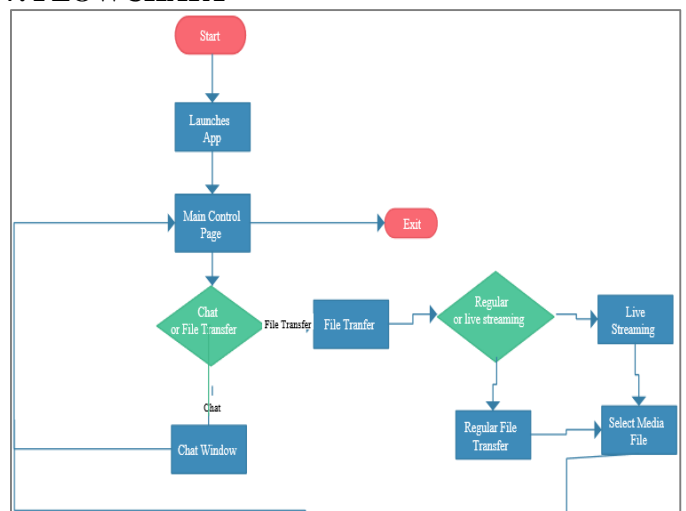


Fig. 5: Flowchart

8. CONCLUSION

Chatbots are effective tools when it comes to education, IR, e-commerce, etc. The downside includes malicious users as in yahoo messenger. The aim of chatbot designers should be: to build tools that help people, facilitate their work, and their interaction with computers using natural language; but not to replace the human role totally, or imitate human conversation perfectly.

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BIOGRAPHY



Trishita Ghosh

Assistant Professor
Guru Nanak Institute of Technology, Kolkata, West Bengal, India



Tridib Chakraborty

Assistant Professor
Guru Nanak Institute of Technology, Kolkata, West Bengal, India



Chowdhury Md Mizan

Assistant Professor
Guru Nanak Institute of Technology, Kolkata, West Bengal, India