Project Report

Baymax – AI ChatBot

Batch – I | Summer’19
AdHawk 7 | ML

Table of Contents

Abstract

This project is an attempt at developing a ChatBot that conducts conversation with people having extreme emotional surges and try to solve their problem. If the person is not emotionally well and wants someone to talk to or is in need for some upliftment, can use this bot to play songs suited to their state.

Chapter 1: Introduction

A chatbot (also known as a spy, conversational bot, chatterbot, interactive agent, conversational interface, Conversational AI, ‘talkbot’ or artificial spy entity) is a computer program or an artificial intelligence which conducts a conversation via auditory or textual methods. Such programs are often designed to convincingly simulate how a human would behave as a conversational partner, thereby passing the Turing test. Chatbots are typically used in dialog systems for various practical purposes including customer service or information acquisition. Some chatbots use sophisticated natural language processing systems, but many simpler ones scan for keywords within the input, then pull a reply with the most matching keywords, or the most similar wording pattern, from a database.

Today, most chatbots are accessed via virtual assistants such as Google Assistant and Amazon Alexa, via messaging apps such as Facebook Messenger or WeChat, or via individual organizations' apps and websites. Chatbots can be classified into usage categories such as conversational commerce (e-commerce via chat), analytics, communication, customer support, design, developer tools, education, entertainment, finance, food, games, health, HR, marketing, news, personal, productivity, shopping, social, sports, travel and utilities.

1.1 Problem Statement

With exponential growth of world, humans are getting more sophisticated and with increasing workload, stress is inevitable. So, there is a need for a companion that could understand what we feel – pain, joy, anxiety, etc. Not everyone can handle emotions, but a bot maybe about right to do it.

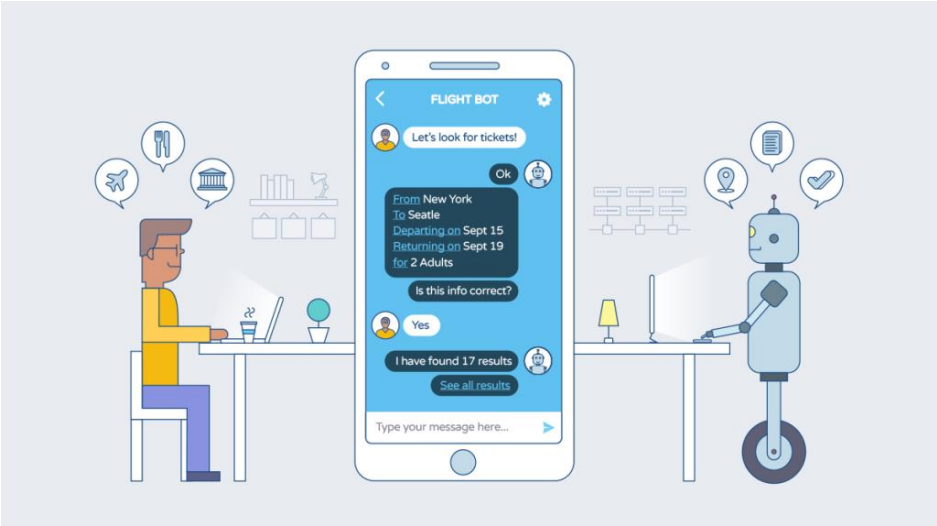

Fig.1. *An example of a Chat Bot*

When people are in extreme emotional states, they are often cast aside for being low. When not taken care of, these thoughts isolate the victim and end up eating them from inside – often resulting in suicides or depression. Its imperative that we take care of these people and prevent them from being isolated.

Not everyone has people who can look after them, hence there is a need for an assistant that could do the needful.

1.2 Abbreviations and Definitions

In this essay we have tried to use the same terminology, which is commonly used in other journals and research papers. In the following paragraph, there is a brief description of some the abbreviations and definitions that are used in the text.

NLU and NLP – Natural Language Understanding and Natural Language Process are the input and output process for understanding language and creating a response.

ML – Machine Learning is how machines are programmed to autonomously learn from experience i.e. data. It technically reduces the writing of code and creates an effective model.

AI – Artificial Intelligence, is the end-goal of these processes, a computer system that works on the algorithm of understanding and processing data, then working out a similar problem autonomously in the most efficient way.

DL – Deep Learning, is one of many ways to approach machine learning. Instead of task algorithms, a machine learns experientially and more comprehensively based on learning data sets or representations.

Chapter 2: Background

This section starts with an explanation about Chatbot. Then a research is carried out on the previous works about this subject. Later, we discuss further about evaluated algorithms and finally a description of how the work is being carried out is presented.

2.1 Short Note about Chatbot

In 1950, Alan Turing's famous article "Computing Machinery and Intelligence" was published, which proposed what is now called the Turing test as a criterion of intelligence. This criterion depends on the ability of a computer program to impersonate a human in a real-time written conversation with a human judge, sufficiently well that the judge is unable to distinguish reliably—on the basis of the conversational content alone—between the program and a real human. The notoriety of Turing's proposed test stimulated great interest in Joseph Weizenbaum's program ELIZA, published in 1966, which seemed to be able to fool users into believing that they were conversing with a real human. However, Weizenbaum himself did not claim that ELIZA was genuinely intelligent, and the introduction to his paper presented it more as a debunking exercise:

“In artificial intelligence, machines are made to behave in wondrous ways, often sufficient to dazzle even the most experienced observer. But once a particular program is unmasked, once its inner workings are explained, its magic crumbles away; it stands revealed as a mere collection of procedures - The observer says to himself "I could have written that". With that thought he moves the program in question from the shelf marked "intelligent", to that reserved for curious.”

ELIZA's key method of operation (copied by chatbot designers ever since) involves the recognition of clue words or phrases in the input, and the output of corresponding pre-prepared or pre-programmed responses that can move the conversation forward in an apparently meaningful way (e.g. by responding to any input that contains the word 'MOTHER' with 'TELL ME MORE ABOUT YOUR FAMILY'). Thus, an illusion of understanding is generated, even though the processing involved has been merely superficial. ELIZA showed that such

an illusion is surprisingly easy to generate, because human judges are so ready to give the benefit of the doubt when conversational responses are capable of being interpreted as "intelligent".

2.2 The Working

2.2.1 Coding a Chatbot

Identify the Opportunities For an AI-Based Chatbot

Before building a chatbot, you should first understand the opportunities for an AI-based chatbot.

Diagram 2. *A logical flow.*

We need a way to think about which types of work can be automated or augmented by Artificial Intelligence solutions. For a particular type of work activity, Artificial Intelligence solutions can be considered based on two criteria:

- Work Complexity
- Data Complexity

This dual analysis of work complexity and data complexity results in four primary types of activity models:

- Efficiency
- Expert
- Effectiveness
- Innovation

Understanding the Goals of Customers

To be more specific, understanding the sole purpose to build a chatbot and what the people want their chatbot to do. Finding answers to this query will guide the designer to create conversations aimed at meeting end goals. When the designer knows why the chatbot is being built, they are better placed to design the conversation with the chatbot.

Designing a Chatbot Conversation

Chatbot interactions are segmented into structured and unstructured interactions. As the name suggests, the structured type is more about the logical flow of information, including menus, choices, and forms into account. The unstructured conversation flow includes freestyle plain text. Conversations with family, colleagues, friends and other acquaintances fall into this segment. Developing scripts for these messages will follow suit. While developing the script for messages, it is important to keep the conversation topics close to the purpose served by the chatbot.

2.2.2 The Flow of Logic

- The system first offers a login and signup page (structured using HTML) then stores the user data in the database (MariaDB) maintaining their original profile.
- The user then can access the UI that allows an interaction with the chatbot (HTML).
- User's inputs are sent as a request to Dialogflow (JavaScript) and at the same time stored in database managed under their credentials.
  ➔ Dialogflow sends a response to the request.
  ➔ This data is then used for sentimental analysis and the user is provided with media content resonant to his mood.

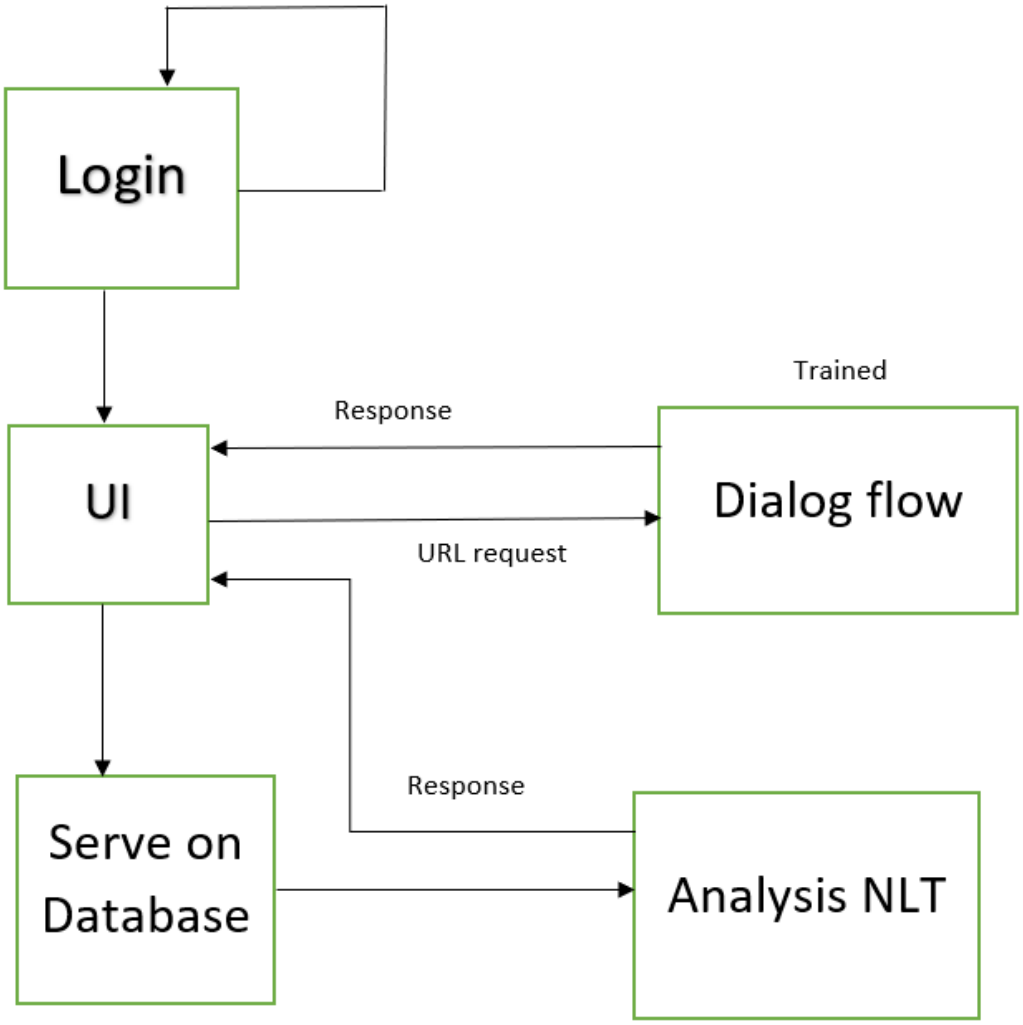

Diagram 3. *flowchart.*

Chapter 3: Analysis

3.1 Training

When creating an AI, people often face the problem of training the model. Feeding as large data as possible to train the model is a humongous task. One needs to enter all sort of phrases that could trigger a particular intent.

In this case, we are using Google's DialogFlow. DialogFlow is the platform where you can create and train an 'Agent' i.e. we specify the task to the model and teach it various phrases (data) that it needs to response. When the data is fed, it applies ML algorithms to train itself and cover all different possibilities that could be thrown at it. ML logic varies with the type of data – Decision Tree, Random Forest, SVM etc.

We access DialogFlow by requesting it via JavaScript and it generates and send a response back to us.

3.2 Sentimental Analysis

Sentiment analysis (also known as opinion mining or emotion AI) refers to the use of natural language processing, text analysis, computational linguistics, and biometrics to systematically identify, extract, quantify, and study affective states and subjective information. Sentiment analysis is widely applied to voice of the customer materials such as reviews and survey responses, online and social media, and healthcare materials for applications that range from marketing to customer service to clinical medicine.

Baymax keeps the response from the user in a database. It then accesses the responses and runs a sentimental analysis. We used NLTK (Natural Language Tool Kit) library in python. NLTK has predefined negative, positive and neutral set of words. It skims through the text and classify the words according to polarity. If the overall result is negative i.e. sad or negative feelings – the bot asks if the user wants to listen to music, and plays uplifting music and videos best suited to user's mood.

Chapter 4: Conclusion

Chatbots are not the primitive tool to automate various tasks, but they can always be used to maximise the automation. These are domain specific, and can achieve a great result in reducing the complexity for a day-to-day task. With the increasing workload and duration of work, studies, and sometimes the society causes stress, anxiety and depression. If not taken care of can lead to poisonous life and serious diseases; in some cases, death!

Therefore, Baymax works to provide that attention to people who need it. It works its way and help overcome the effects of these mental illnesses due to extremities in emotions.

Chapter 5: References

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