

Research Paper Based on Artificial Intelligence Chatbot

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Abstract

A chat-bot is a piece of software designed to simulate human-to-computer communication through the use of natural language. Chat-bots converse with customers in a conversation based on human input and provide customer service. Even though they are actually conversing with a machine, it gives the user the impression that they are speaking with a human. The chat bot programme enables students to learn about the college admissions process from any location with an internet connection and to get prompt responses. This chatbot system lessens the workload of the admission process department by giving the necessary information to the students or parents, as well as the department's workload to continue to answer all of the questions of the students.

Keywords: Chat-bot, Conversational search, Node.js, HTML, CSS, JavaScript, NPM, Enquiry, Response, Query.

Introduction

In especially on mobile platforms, artificial intelligence (A.I.) has gained appeal for simulating conversations between bots and humans. It's common practise to develop new services and applications using open data. Government Open Data websites, which increase openness, let the general public keep tabs on events and exert control over how government agencies behave, continue to be the main sources of open data. Access to open data is anticipated to increase public awareness and citizen involvement.

Software with a conversational interface is known as a chat-bot. One use for chat-bots in conversational search is to give users access to a database or other information source. A piece of software called a chat-bot aids in the organic growth of a discussion with a user access to a database or other information source. Artificial Intelligence is capable of comprehending user questions and uncertainties and responding to them appropriately. They

are developed using the AI Markup Language for interacting or speaking with the user. A different name for chat-bots is answering engines. This application operates in a very simple manner because the knowledge has already been pre-programmed. Compared to traditional graphical interfaces, chat-bots have a number of benefits and associated difficulties:

- Particularly in compared to custom visualisations, lightweight and inexpensive to implement;
- Engaging and intuitive, requiring minimal user training.

Related Work

Chat-bots were developed as an alternate interface that may deliver a more engaging and user-friendly experience while also acting as a useful information access point to structured data sources, such as knowledge graphs and Open Data repositories [2, 6, 7]. For instance, the DBpedia chat-bot's

[1] reliance on a small number of pre-defined rules hinders it from performing a more in-depth query analysis, necessitates ongoing technical work, and makes it challenging to scale and adapt to new conversational patterns. The strategy we outline in this work makes use of machine learning models, which may be continuously enhanced by learning from end-user interactions. We

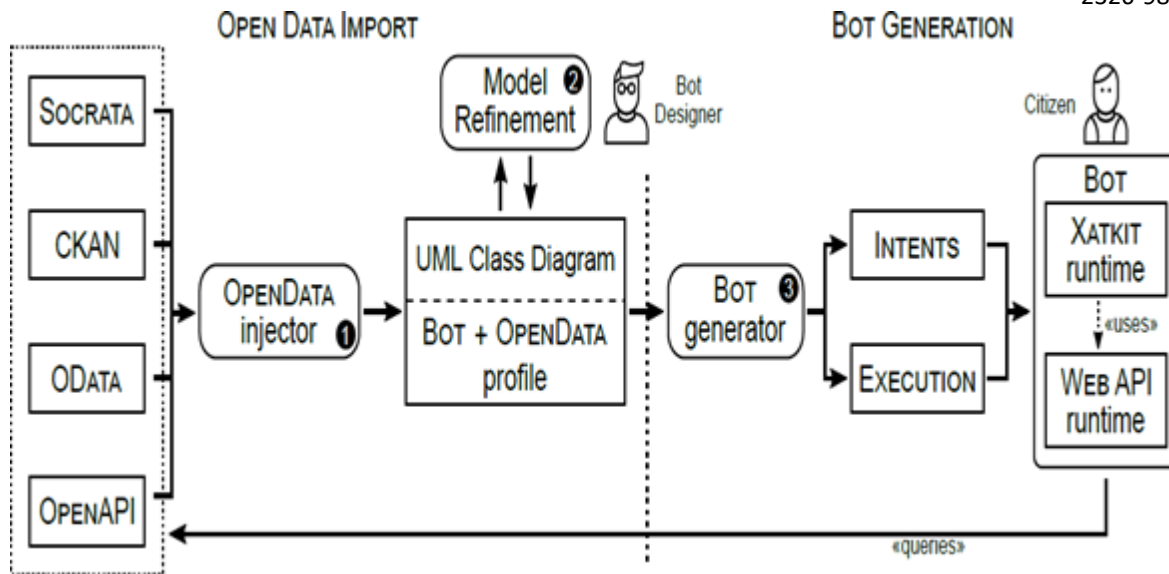
demonstrate how specific semantics, such as geographic entity (location) annotations, can help machine-learning-based dialogue systems understand natural language.

As it has previously been demonstrated to heavily rely on the geographic dimensions to enable effective search and discovery, Open Data makes a perfect use case for the integration of the spatial linked data source. Utilising these discoveries, we show how semantic geo-information linked data sources can improve user experience when used with automated dialogue systems. Our study is a continuation of the Open Data chat-bot architectures that were previously suggested. The primary distinction between this architecture and the one that was previously suggested [6] is the support for dataset discovery capabilities that goes beyond conversational search to enable conversational browsing of the underlying data structures. The system's intent detecting component initiates the mode changeover.

Similar to the chat-bot for geo-search and visualisation developed by Heil and Neumaier [2], our implementation also makes use of the outcomes of the semantic annotation approach suggested by Neumaier et al. By using the user's natural language input to build a supervised model for intent detection and entity recognition, we advance the situation.

Chat-bot Architecture

The Rasa framework serves as the foundation for our architecture design and offers an open-source Python library that implements a number of models for training specialised dialogue systems. The chat-bot architecture combines many parts into a single processing pipeline that receives a user input and generates a response. The major steps of the processing pipeline across the components are shown in figure.



Message Interpretation

Entity Identification. Topical keywords and geo-entities are two sorts of entities that our proof-of- concept prototype can identify. Entity mention extraction, the first stage, is an example of the sequence labelling task [4]. The text of the user's speech is provided as its input in the form of a word list. After that, a supervised machine learning model called conditional random fields (CRF) is trained to provide words labels. One of the topic keywords was present in 121 of the sample messages that were used to train the model, while one of the geo-entities was present in 18 examples. Following that, entity mentions are extracted using these labels. A text span that refers to one of the entities, such as "schools" or "Graz," is referred to as a "entity mention." Following that, relevant datasets from our Open Data repository are retrieved and ranked using entity mentions in the search query. The pre-trained model frequently fails to extract geo-entities that were missing from the training dataset, as we discovered. As an alternate unsupervised strategy for entity mention extraction, we created a look-up table that comprises a list of geo-entities in order to address this problem. The message interpretation module contains separate machine learning models for the purposes of entity recognition and intent categorization. To train these models, 250 sample messages were manually generated.

Intent-Classification Support vector machine (SVM) classifier was used to train Intent Classification to recognise nine intents: hello, goodbye, add keyword, add location, search, explore, thank you, affirm, and deny. For every one of the intentions, we created at least six sample texts.

Dialogue Management

The current discussion state is determined by the sequence of the chosen actions, which is logged. Ten specially created utterance-templates are included in our set of possible actions, along with a unique action to access the database. The dialogue management component gets the entities and the intent identified at the message interpretation stage before and chooses the subsequent action from a list of predefined options. Based on the user's goal and the present

state of the discourse, a neural network model that was trained on 14 hand-crafted stories makes this choice.

Problem Statement

In every company wants their customers to be aware of them so they can sell more goods or secure more projects. Therefore, in the sophisticated world of digital marketing, having a good interactive website is the most fundamental way to accomplish this. However, in today's technologically advanced world, having a website alone is insufficient because it does not contain all the information and cannot address the clients' questions. Perhaps a comment section is the solution, but since "time is money," your client won't want to wait too long for your response. Additionally, you cannot assign humans to answer all questions simultaneously, 24 hours a day, 7 days a week.

Therefore, you require an intelligent chat-bot with artificial intelligence technology, not just anychat-bot, for that.

Artificial intelligence chat-bots are a type of technology that allow people and machines to communicate naturally. A chat-bot might respond differently to the same input provided by the user depending on the topic of the current conversation. By employing our "Intelligent Chat-Bot," you can solve all the problems mentioned above, eliminate the need for workers to perform manual labour, and please your customers. A chat-bot is a typical agent that can have natural language conversations with operators. There are still some issues with developing data-driven systems despite the fact that there are several chat-bot platforms presently available because a substantial amount of data is needed for their creation.

Existing System

Many businesses use chat-bots instead of people when it's practical to do so. Systems like that are frequently based on the modes of communication used by ALICE.

ALICE:

Richard Wallace introduced ALICE in 1995. It makes use of pattern matching and stores the data in files called AIML, or Artificial Intelligence Mark-up Language. An AIML file was created to contain pattern knowledge for chat-bots and is comparable to an XML file. Default categories, recursive categories, and atomic categories are the three different types of AIML categories.

Atomic classes: is a class of AIML category when a match is exact.

```
<category>
```

```
<pattern> What is your name</pattern>
```

```
<template> Hello, I'm Nick.</template>
```

```
</category>
```

If the user enters "What is your name" in the example above, the chatbot will respond, "My

name is Nick." Typical categories: is a form of AIML category where any input can be matched using a wild character like *.

<category>

<pattern> What is *?</pattern>

<templates> This is me. </templates>

</category>

If ALICE is unable to solve the problem using the first category, it will go on to the second. In this scenario, if a user enters "What is a name?" ALICE will search for a match with the wild character and return the answer.

AIML categories known as recursive categories employ special tags to allude to recursion in order to persuade the user to be more detailed.

<category>

<pattern> Do you understand what a * is?</pattern>

<templates> >This is me. </templates>

<srail> What is star</srail>

</category>

In this case the wild character * is used to reduce the input submitted by the user. If the user submits "Do you know what the time is" then this becomes "What is the time". The following figure gives an example of a conversation between a human and ALICE:



Chat Bot – ALICE (AI Foundation)

- *Human: hi my name is Carla*
ALICE: How are you doing, Carla.
Human: what is your name?
ALICE: My name is ALICE.
Human: what is your full name?
ALICE: ALICE = Artificial Linguistic Internet Computer Entity.
Human: when were you born?
ALICE: I was connected to the net on November 23, 1995.
- *Human: Have you passed the Loebner Prize?*
ALICE: The Loebner Prize is an annual Turing Test sponsored by New York philanthropist Hugh Loebner. Dr. Wallace and ALICE won it in 2000. The ALICE program was ranked "most human computer" by the panel of judges.
- *Human: who is Dr. Wallace?*
ALICE: He is a famous computer scientist, the author of ALICE, and a graduate of Carnegie Mellon.
- *Human: Where does Dr. Wallace work?*
ALICE: he works from his home in San Francisco.

Carla P. Gomes
INFO372

A sample conversation with ALICE (Shawar and Atwell, 2007)

Results and Discussion

The proposed system was tested and found to be workable and efficient. It conserves both the owners and employees' time and labour. Additionally, it saves staff members the time and effort of making a special trip to the restaurant store to make a query. In this project, we created a chat-bot that would interact with users and provide all relevant information regarding food orders. The owner and customer can communicate with a chat-bot. Any questions that are not answered by the chat-bot will be updated by the owner admin.

Future Scope

We can make our inquiry chat-bot more engaging in a variety of languages for people in various locations when we upgrade it in the future. For those who are unable to read or type, we can add speech-based questions and answers. The next-generation chat-bot should offer the customer's problem both an answer and a solution.

Conclusion

This chat-bot's primary goal was to create an algorithm that could recognise user inquiries or requests and provide the appropriate response. To create a database where all pertinent information is kept and linked with inquiries as they are made. We were successful in creating a chat-bot that allows students or parents to ask questions about the application process, course information, eligibility requirements, or admission. The chat-bot evaluates the query and responds appropriately.

Demonstration plan we will involve conference attendees in the assessment of our system, which is intended to be a user research. The aim is to use our chat-bot interface to identify pertinent datasets on a broad topic, like Nature. At the conclusion, the participants will be urged to complete a brief questionnaire that asks them to rate their overall experience, offer any extra feedback, and list any wishes they may have.

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