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Development of Chatbots using AIML Concepts

[1]Thejashree R, [2]Dr. K.S Jasmine

[1]PG Student, Department of MCA, RV College of Engineering®, Bengaluru, India
[2]Associate Professor, Department of MCA, RV College of Engineering®, Bengaluru, India

***Abstract* - For the development of chatterbots, the AIML idea is used. Because the AIML uses a theoretical framework that is syntactic and semantic in structure. The main concepts in the Pattern Recognition area are given in order to achieve this. The AIML language is then explained, with each AIML command/tag being followed by an application tag. Pattern Recognition is one of the theories and technologies used to construct chatterbots. Pattern Recognition is based on representative stimulus-response type blocks, into which the user enters a sentence and the software generates a result based on that input. The discourse continues in this sequence. Chatterbots are written in the AIML programming language. The Pattern Recognition approach is used by the chatterbot.**

Keywords: AIML, Pattern Recognition, chatbot, Natural Language Processing, Natural Language Response.

I. INTRODUCTION

A chatbot is a conversational agent that uses computer software to simulate a natural dialogue. Artificial Intelligence Markup Language (AIML)-based chatbots are the most popular since simple to set up. The numerous types of enterprises are now interested in implementing AIML-based chatbots to engage in consumer conversations with minimal configuration and cost. The AIML programming language is used to create chatbots, and the chatbot uses the Pattern Recognition approach. The AIML language combines technical and theoretical Pattern Recognition infrastructure in its development and uses this to match word patterns.

II. RELATED WORK

There are several integrated systems that have introduced AIML based chatbot to their system to make interaction with users [1]. The system is more versatile and interactive to use in numerous fields, use of variety of APIs and packages with lightweight AIML files.

There exists current research and development in Chinese applications; the authors have provided a complete description of AIML concept that has been used in the application [2]. The authors suggest a chatbot that uses Artificial Intelligence Markup Language (AIML) and Latent Semantic Analysis (LSA) to automatically respond to users based on a data set of Frequently Asked Questions (FAQs) [3]. iAIML is a mechanism for dealing with intentional data that is based on AIML, a cutting-edge technology for chatbot development [4].

The main goal was to improve AIML chatbot dialogue. [5]The authors discuss a chatbot notion that is simple to build using the R programming language. There exists a study on motor insurance knowledge management system based on Mark-up Language (AIML) [6]. Application can use AIML chatbots for conversational services. Cultural heritage, e-learning, e-government, web base model, dialogue model, semantic analysis framework, interaction framework, humorous expert, network management, and adaptable modular architecture are among the applications [7].

III. METHODOLOGY

Artificial Intelligence Mark-up Language is XML based language. With the use of A.L.I.C.E (Artificial Linguistics Internet Computer Entity), human knowledge can be captured and turned into a knowledge base. It is used in chatbots to discover patterns in the words that are input and matches the patterns to get the correct answer in the system. The development of chatbot is done using the AIML programming language Chatterbots are written in the AIML programming language. The Pattern Recognition approach is used by the chatterbot.

The AIML language is one of the most extensively used technologies for chatterbot implementation that uses methods to combine technical and theoretical Pattern Recognition infrastructure. NLP (Natural Language Processing) NLR (Natural Language Response) AIML language for pattern matching are used in chatbot implementation.

The user input is converted to standard language using Natural Language Processing and Natural Language Response. The AIML was used to match word patterns where the voice was converted into text using a text-to-speech algorithm, and then the text was searched for a matching pattern in the search data, and the relevant output was returned.

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3.1 Block Diagram

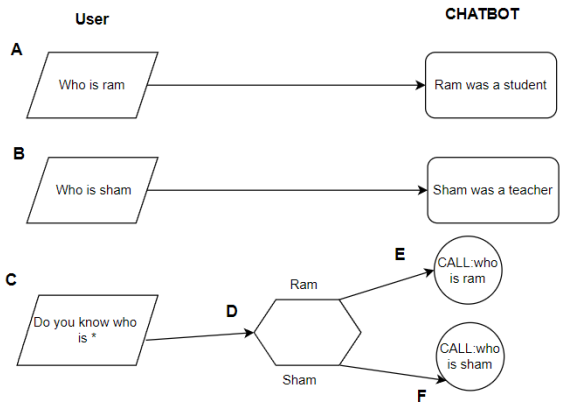

Figure 1: Block Diagram for the AIML system

Input: Voice input or user input

Processing: To detect languages and transform voice into text for the output process, the algorithms are used.

Output: Using the techniques outlined above, the system will return an accurate answer to the user input. The block diagrams of the algorithms employed are shown below.

Steps of Algorithm

Step1: Aiml chatbot takes the input from the user.

Step2: The input will be matched with the pattern templates and the pattern of words present in question asked by the user is checked with the frequently asked questions.

Step3: The system will fetch the answer from the database by matching all the words from the pattern available in the database. And by taking the user input the relevant answer for the input will be fetched and given to the user as the output.

3.2 Architecture Diagram

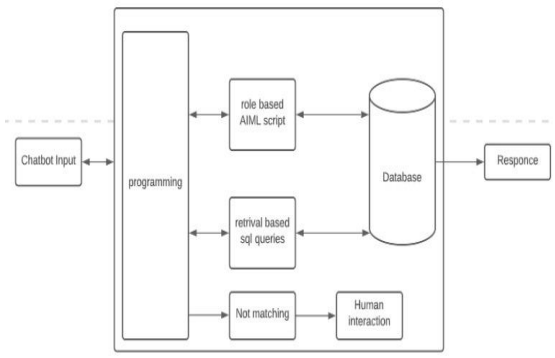

Figure 2: Architecture Diagram of the system

The architecture diagram depicts the AIML chatbot system. Initially, the chatbot is rule-based and retrieves information from a database. The chatbot receives the inputs from the users. It will go through the programming algorithms and the AIML script will be used to build the rules for the inputs, after which it will be sent to the database to retrieve the result for certain inputs. If no match is found in the database, it will return to the user interface. The rules are written to the database using AIML scripts. Only defined rules can be obtained from the database; otherwise, the output will not be fetched.

3.3 Challenges in implementation

The AIML chatbot must be able to answer the user's questions correctly. The system attempts to ensure that it is accurate in answering user questions and providing appropriate responses. The pattern matching algorithms should provide speedy and accurate results. The biggest problem in creating an AIML Chatbot system is that, while it can save money in terms of operation and labour, it can be costly due to the high level of coding required. Also the process involves scripting, which will increase the cost. It's possible that certain chatbots have a pre-programmed NLP pick that doesn't meet all of the needs. To solve such chatbot issues, one must choose a model before developing the chatbot. In order to construct the intelligent chatbot, should consider a variety of models, ranging from generative to retrieval-based models. Web data is usually secure, but when some chatbots are added to it, user can't be sure whether the API is secure or not. If sufficient security measures are not applied, data leaks and hacking are likely to occur. Each company must concentrate on encrypting its channels to ensure that no data is spilled through its method. It is important when it comes to sensitive information. Encryption, on the other hand, can play a safe role in data protection. If the chatbot does not capture the company's USP, even if it use a lot of data or use technologically complex tools, and will get no results. It is not only vital to feed your Bot with useful data, but it is also necessary to equip it with the ability to reach out to the target audience via brand identity and awareness.

3.4 Tools and Technology

The tools and technologies that are used:

1. AIML

Aiml is a language which is based on XML which is meant to create AI applications and can be used to create chatbots.AIML allows developers to construct human interfaces that are straightforward to write, comprehend, and maintain. The AIML script will help in recognizing the patterns, i.e. matching words using a pattern recognition algorithm, so that the system can respond to users more quickly.

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2. Natural Language Processing (NLP)

Natural language processing (NLP) is a part of computer science and it is specifically the part of artificial intelligence. It helps computer in understanding text and voice data. Developers can use natural language processing (NLP) to organise and arrange knowledge for tasks including automatic summarization, translation, named entity recognition, relationship extraction, sentiment analysis, speech recognition, and topic segmentation.

3. Database

The database is an important part of the system since it stores ready answers to some of the most common questions that users have. The system will respond to questions that have been stored in the database. Any relational database that will be integrated with the system can be used as the database.

Table 1: AIML v/s ChatScript

AIML	ChatScript
Aiml is a language which is based on XML which is meant to create AI applications and can be to create chatbots.	Chatscript is combination of natural language and the dialog management system. It is a scripting language. It is also used to create chatbots.
The implementation of Aiml is simple process of dialogue modelling.	The implementing of the chatscript is difficult.
The language is balanced between the technology and social requisites of the modem mobile era.	The language complexity of the system is manipulated by the natural language and the conversion agent.
The connectivity of the external sources like freebase, wikidata and WordNet.	The connectivity to the external sources is WordNet and conceptnet.

IV. RESULTS AND DISCUSSIONS

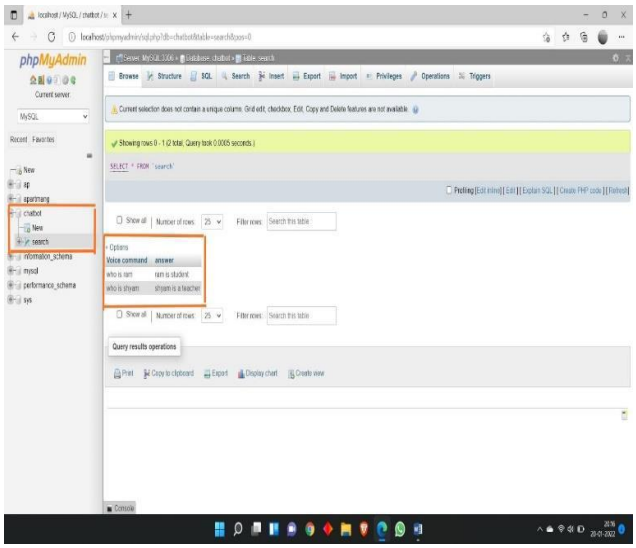

Figure 3: Screenshot of database

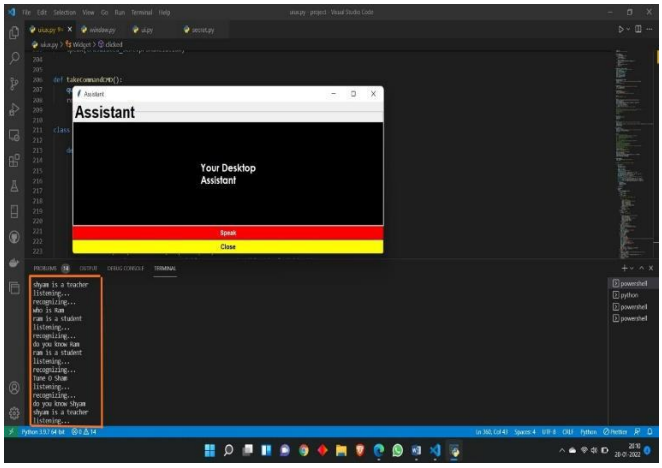

Figure 4: Screenshot of the implementation

Using AIML the voice chatbot is been implemented. The chatbot will search the pattern in the database and then gives the answer to the user. In the screenshot the command like “who is ram”, “who is shyam ” is been answered quickly as they are available in the database but when the command are like “do you know ram or sham” the chatbot then uses AIML pattern matching to search a word from the command and then give the answer. Here for the command “do you know ram” the AIML search for “ram” and gave the correct answer which was in the database. In the fig-3 the database data is been highlighted, the voice search results are shown in the fig-4 and the voice input and the output is been highlighted.

V. CONCLUSION

The methodology adopted to develop chatbots was a combination of AIML scripting with Pattern recognition alogorithm. The chatbot will assist the user in obtaining information by typing or delivering a voice command, and in exchange, the chatbot will provide the user with the appropriate output or answer. The AIML concept is utilized to construct the chatbot, which matches the pattern of words that the user provides as input, to provide an accurate output.

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