

## Personality-Driven Chatbot

### Description

My chatbot is built based on the archetype Sheldon's personality traits. It has a particular interest in the area of chatbots under the category of Artificial Intelligence.

### Architecture Overview

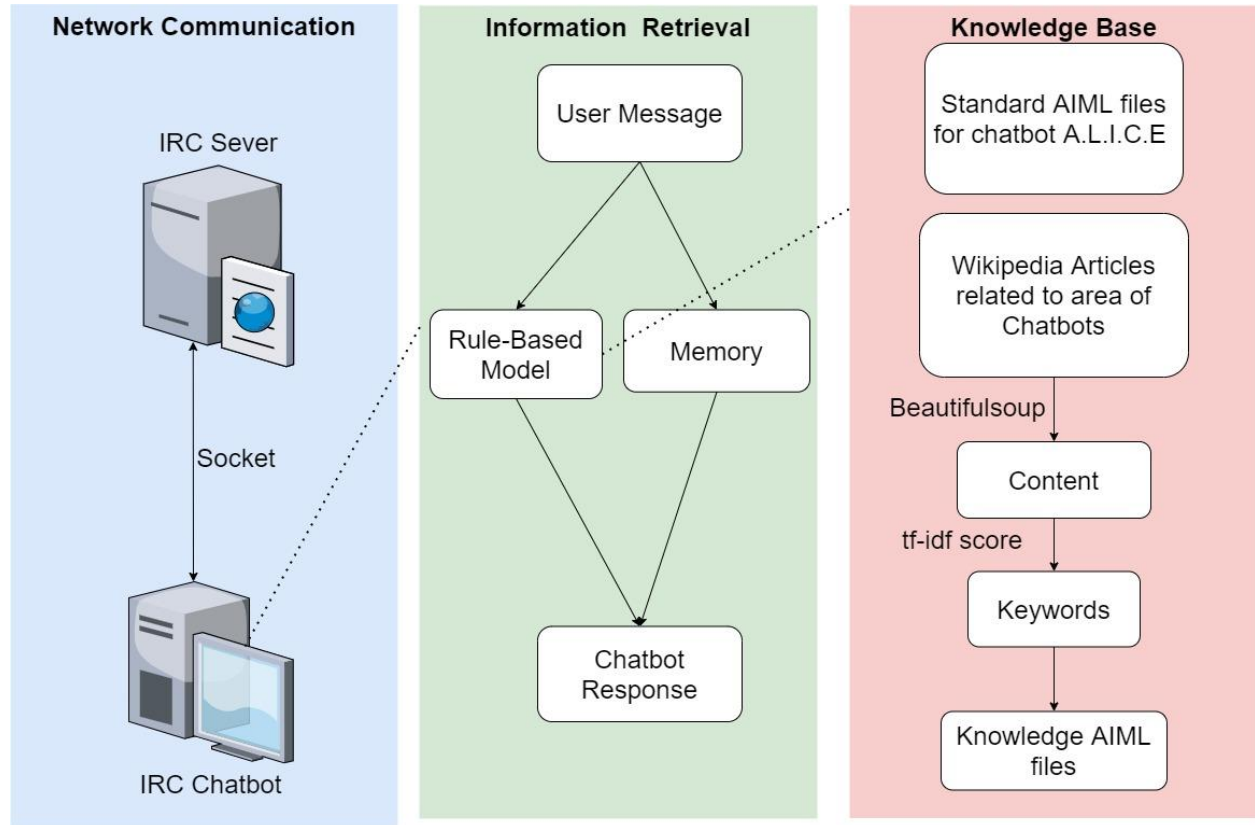


Figure 1: chatbot architecture

Figure 1 shows the general architecture for the chatbot. It consists of three components including network communication model, information retrieval model, and a knowledge base. I use the socket package for exchanging messages between the server and client. For the information retrieval model, I mainly looked into rule-based models including A.L.C.E. [1] and Eliza [2], reinforcement learning models [3], and Xiaolce [4]. Though Xiaolce looks interesting, the reachable resources are limited. The ensemble reinforcement model requires feedback from the crowd and it is hard to fulfill the prerequisites. Since the personality archetype I chose (Sheldon) mainly outputs random information of his particular interest, a rule-based model is easily justified. I modified an existing (outdated) AIML interpreter [5] to fit into the goal of learning the pattern recursively and runnable in Python3. An example of this is shown in Figure 2. As part of the information retrieval model, I added a memory class that keeps track of users' interest about chatbots to initiate the conversation. The external knowledge comes from web scraping chatbot-related information from Wikipedia [6]. Top k keywords (current k = 5) are

```
user>>>learn that the sun is bright
bot>>>Ok I will learn that that the sun is bright .
user>>>what is the sun
bot>>>bright
user>>>Gateau is a type of cake
bot>>>Ok I will add that fact aboutGateauto my database.
user>>>what is gateau
bot>>>type of cake
```

*Figure 2: learning input from the user*

extracted from the content per page with tf-idf score. The set of keywords and content then are converted to patterns in AIML format.

## Results

The current model is capable of basic conversation, learning new facts, keeping track of information about users for selection of conversation starters, and throwing out facts related about chatbots in the conversation or related chatbots information mentioned in the conversation. One of the shortcomings is definitely the limited pattern and limited responses from a rule-based model. It's not as natural because the corpus I use mainly serves as a knowledge based instead of the generation of natural dialogues. I'd love to try out some open-source NN models in the future. A fun fact I found is that there's no AIML-related extension available in VS Code, and I'm planning on making one for its syntax and language configuration just to fill that empty space in the market...

## References

- [1] <https://cys.cic.ipn.mx/ojs/index.php/CyS/article/view/2326/2089>
- [2] <https://dl.acm.org/doi/10.1145/365153.365168>
- [3] <https://arxiv.org/pdf/1709.02349.pdf>
- [4] <https://www.aclweb.org/anthology/P16-1049.pdf>
- [5] <https://github.com/cdwfs/pyaiml>
- [6] <https://en.wikipedia.org/wiki/Category:Chatbots>

## Appendix



**user333** 19:07:02

sheldon-bot: what you know about eliza



**sheldon-bot** 19:07:04

user333: There are many programs based on ELIZA in different programming languages.

user333: In 1980 a company called "Don't Ask Software" created a version called "Abuse" for the Apple II, Atari, and Commodore 64 computers, which verbally abused the user based on the user's input.

user333: Other versions adapted ELIZA around a religious theme, such as ones featuring Jesus (both serious and comedic), and another Apple II variant called I Am Buddha.

user333: The 1980 game The Prisoner incorporated ELIZA-style interaction within its gameplay.

user333: BTW, you never mention it, do you like chatbots?

user333: According to Mr Li Di, vice President of Microsoft (Asia) Internet Engineering School, Xiaoice started writing poems since last year.

user333: You never mention it.

user333: Do you like chatbots?



**@user333** 07:05:16

sheldon-bot: i don't like chatbots



**sheldon-bot** 07:05:21

user333: That's unfortunate.

user333: What do you like then?



**@user333** 07:05:36

sheldon-bot: i like math



**sheldon-bot** 07:05:41

user333: I'm not sure if I like it.

user333: Yes but only higher mathematics.

user333: It's a shame that you're not interested in chatbots.