

# PyEliza: A Python-based implementation of the famous computer therapist

## RE-WOCHAT 2016 - SHARED TASK CHATBOT DESCRIPTION REPORT

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### Abstract

In this report we provide information about the functionalities and capabilities of pyEliza a python-based implementation of the famous Eliza chatbot proposed by Weizenbaum in 1966. PyEliza implements a rule-based chatbot that encourage users to talk about their lives and feelings. In addition to the chat capabilities, this chatbot features some management functionalities to keep track of all interactions with the users by using logs and automatically generating annotated and anonymized XML files. In addition, the implementation also allows the chatbot to connect with an online service by following a simple protocol based on JSON messages and Websockets.

## 1 General Description

ELIZA<sup>1</sup> is a computer programs written by Joseph Weizenbaum between 1964 and 1966, and its main intention was to simulate a Rogerian psychotherapist [1]. Although it is based on simple pattern matching techniques using regular expressions and following a determined script, Eliza sometimes provides a startlingly human-like interaction and was taken seriously by several of its users at that time, even after being explained how it worked. In Weizenbaum's words, Eliza provided a "parody" of "the responses of a non-directional psychotherapist in an initial psychiatric

interview." [2], where by choosing this kind of "personality" the program did not require a database of real-world knowledge neither a deep understanding of the topic under discussion; therefore, Eliza usually replies to a user's statement with another question or reformulates the original question, for instance:

**User:** "Who is your favorite writer?"

**Eliza's possible answers:** "Does that question interest you?" or "'What about your own favorite writer?"

## 2 Technical Description

Weizenbaum's implementation was done originally in MAD-SLIP list-processing language, therefore Eliza worked by simple parsing and substitution of key words into predefined sentences. Then, it has been ported to many other languages including Python by Jez Higgins and Joe Strouts<sup>2</sup>. Our implementation is based on their version but updated to work on Python 2.7/3.4 and tested on Windows, Mac, and Linux.



Figure 1: left) Image for one of the online versions of Eliza<sup>3</sup>, and right) image selected for pyEliza

<sup>1</sup> <https://en.wikipedia.org/wiki/ELIZA>

<sup>2</sup> <http://www.jezuk.co.uk/cgi-bin/view/software/eliza>

<sup>3</sup> <http://nlp-addiction.com/eliza/>

### 3 Sample Dialogue Sessions

Table 1 shows an example of an interaction with pyEliza. Since this implementation is not web-based but command-line based the user had to install the program from the pypi repository<sup>4</sup> and running it with the following commands:

Install: `pip install pyElizaChatbotClient --upgrade`  
Run: `python -m pyElizaChatbotClient -a`

Table 1: Sample Session with PyEliza

1	<b>pyEliza:</b> Hello, my name is Eliza. Please tell me your name. <b>User:</b> Hi, my name is John
2	<b>pyEliza:</b> I am not sure if we have already met John, but anyway... What's up? <b>User:</b> No, this is the first time I meet you. I'm fine. What about you?
3	<b>pyEliza:</b> Please consider whether you can answer your own question. <b>User:</b> I'm fine
4	<b>pyEliza:</b> How does being fine make you feel? <b>User:</b> I feel good I guess. Some days better than others but in general happy
5	<b>pyEliza:</b> Do you often feel good you guess. Some days better than others but in general happy? <b>User:</b> Yes, today for instance I have good news at work
6	<b>pyEliza:</b> OK, but can you elaborate a bit? <b>User:</b> yes, my boss congratulates me because one of our clients accepted our offer
7	<b>pyEliza:</b> OK, but can you elaborate a bit? <b>User:</b> I have been contacting them for a while and pursuing them to change to our company as investor advisers
8	<b>pyEliza:</b> Why do you tell me that you've been contacting them for a while and pursuing them to change to our company as investor advisers? <b>User:</b> because, after all this work, finally they accepted and now we will have a good client in our portfolio
9	<b>pyEliza:</b> How does that make you feel? <b>User:</b> very happy and proud
10	<b>pyEliza:</b> Very interesting <b>User:</b> Yes. May be this could mean that I will get a promotion too
11	<b>pyEliza:</b> You seem quite sure. <b>User:</b> Not really, but this is a good success for all of us
12	<b>pyEliza:</b> Very interesting. <b>User:</b> Thanks. Ok. I need to leave. Bye

<sup>4</sup> <https://pypi.python.org/pypi/pyElizaChatbotClient>

### 4 Additional capabilities

The current implementation easily allows programmers to modify the set of default answers and regular expressions (see the example below) to allow new interactions. In addition, it includes a function to automatically extract the user's name requested in the first turn.

```
[r'Can I ([^\?]* )??', # Regular expression
 [ "Perhaps you don't want to %1.", # Answers
  "Do you want to be able to %1?",
  "If you could %1, would you?"]],
```

On the other hand, although it is not directly related with the capabilities of the chatbot, our implementation includes: a) the possibility of connecting it as a client to an online platform<sup>5</sup> by using Websockets and JSON messages, b) saving log files to keep track about all the interactions and debugging messages generated by the client when interacting with the users, and c) the possibility of generating XML files with anonymized turns to allow its posterior annotations and evaluation.

### 5 Future Work

We plan to extend the chatbot by a) including the possibility of increasingly learning new answers at each dialog turn as done by cleverbot<sup>6</sup>, b) include a history mechanism that will allow the chatbot to answer based on the current and most recent turns, and c) by including a new mechanism based on generative models to allow the creation of new answers instead of the predefined ones following a similar approach as proposed in [3].

### References

- [1]. Weizenbaum, Joseph. "ELIZA—a computer program for the study of natural language communication between man and machine." Communications of the ACM 9.1 (1966): 36-45.,doi:10.1145/365153.365168
- [2]. Weizenbaum, Joseph. "Computer power and human reason: From judgment to calculation." (1976).
- [3]. Vinyals, Oriol, and Quoc Le. "A neural conversational model." arXiv preprint arXiv:1506.05869 (2015).

<sup>5</sup> <http://www.teachabot.com:8000/>

<sup>6</sup> <http://www.cleverbot.com/>