

## Chatbot using common sense knowledge

Making artificially intelligent software that can hold conversations and understand human language has long been something the field of computer science has striven towards. While we are seemingly not quite there yet, there has been many attempts to create semi-intelligent chatbots, beginning with Eliza in 1966.

Eliza is a chatbot that simulates a conversation with a therapist, by initially asking how you are feeling today and generating further responses by simple text replacement and keyword recognition.

This can lead to the conversation getting stuck, since the bot doesn't introduce new concepts into the conversation. Using the Open Mind Common Sense semantic network we will try to inject new concepts into the conversation while still keeping the question related to the previous answer.

Since the original Eliza-bot was written in an obscure programming language (SLIP), and there are so many similar bots. We will, instead of trying to improve the original implementation of the bot, focus on another version made in a more modern programming language.

This leads us to our problem statement:

**Can a semantic network be used to improve the perceived intelligence of an Eliza-like chat bot, by providing new topics of conversation?**

### ***Approach***

There are many Eliza-like bots implemented in many different programming languages, we will choose one and use it as a baseline for comparing our implementation to. Our version will instead use natural language processing to figure out key words and use that information to get related concepts from the Open Mind Common Sense database. These concepts will then be used to construct new questions, hopefully moving the conversation along.

Test subjects will have conversations with both implementations, the dialogs will be saved. The subject will then evaluate the quality of the questions asked by both bots. The results will then be analysed to see if the quality of conversation has improved with the use of the semantic network.

There are many available tools to make processing natural language easier when programming. Since we

both are familiar with Python, we have decided to use the Natural Language Toolkit. It seems to be the most comprehensive and popular of all tools designed for our purpose.

## **References**

<http://www.cse.buffalo.edu/~rapaport/572/S02/weizenbaum.eliza.1966.pdf>

<http://aaai.org/Papers/AAAI/1994/AAAI94-003.pdf>

Artificial Intelligence - A Modern Approach [S. Russel / P. Norvig] ISBN978-0-13-207148-2

## **Time plan**

We hope to have collected data from all our sources and incorporated it into our draft report before the halfway meeting, including the chatbots we plan to make. The other dates of interest have already been set by the course schedule.

| <b>Date</b> | <b>Event</b>                                                                                                                                           |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 / 2      | The group has acquired material and preliminary noting of relevant sections in said material                                                           |
| 17 / 2      | The group has analyzed material and started preparation for producing a first draft version, including initial programming and testing of proj chatbot |
| 24 / 2      | The group has produced a preliminary draft version of the thesis essay                                                                                 |
| 5 / 3       | The group has produced a draft version of the thesis essay as per the halfway meeting requirements                                                     |
| 19 / 3      | The group has produced most if not all data required to finish the essay                                                                               |
| 31 / 3      | The group has produced a mostly complete document with all sections somewhat fleshed out                                                               |
| 10 / 4      | The group has produced the final draft version of the document, ready for proofreading in anticipation of the essay deadline                           |