

# IRBot: InadvisableRelationshipBot

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## ABSTRACT

Many graduate students struggle to deal emotionally with daily life stresses, ranging from overdue problem sets to not dying at sea. Additionally, computer scientists may feel more comfortable typing at a screen than engaging in human contact. Although therapy chatbots exist and in fact have reached millions of smartphone users, they run on remote servers, creating privacy concerns. In this work, we propose that a local chatbot can also provide useful advice and can reach the vulnerable sub-population of computer science grad students. We create InadvisableRelationshipBot (IRBot) using high-quality online commentary from [www.reddit.com/r/relationships](http://www.reddit.com/r/relationships).

## 1 INTRODUCTION

Chatbots (or "conversational agents") have fascinated computer scientists since the 1960s, with the famous ELIZA-bot (which, amount other possibilities, simulated talking to a psychologist). In more modern times, smartphone and app-based chatbots such as Woebot [2] and Wysa [3] have proven very popular, with millions of downloads. As reported in WIRED [9], these bots are in fact therapeutic chatbots that aim to help users practice cognitive behavioural therapy (CBT).

Why a chatbot? There are actually some advantages to having a therapist robot versus a real-life therapist (and not just being free and less daunting to engage in). Consider that people are often more frank with their search engines inputs than they are with even their closest friends.

For a review, both Wysa and Woebot provide small studies looking at the effectiveness of using their chatbot, as seen at [7] and [5] respectively. See also the more thorough [8] for comparison of Wysa [3], Woebot [2], and a few other chatbot therapists.

However, these chatbots bring up privacy concerns. Woebot uses Facebook Messenger to deliver chats. Messenger is known to not provide end-to-end encryption, in contrast to another messaging app, Whatsapp, now owned by Facebook. To the author, this removes the benefit of being able to chat freely with a robot in the expectation that not even the listening party can reveal any part of the conversation. Thus, this motivates creating a local chatbot which can address similar social needs.

In this paper, we move away from the therapeutic angle (e.g. cognitive behavioural therapy) and instead look at creating a chatbot that provides advice about relationships. Specifically, we sought to create a chatbot which could provide advice similar to strangers on the internet, as exemplified by [1].

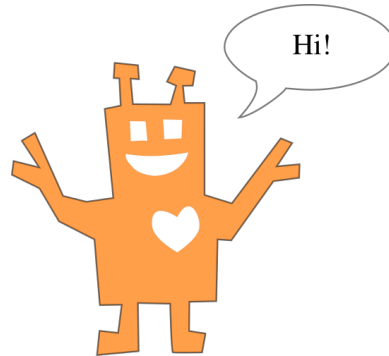


Figure 1: This is an orange robot icon so that the paper is not monochromatic.

## 2 METHODS

The author drank a lot of tea in order to stay up late avoiding real work, as described in the following equation.

$$\left[ \frac{dT}{dt} \right]_{peak} = \frac{3 \text{ bags}}{1 \text{ hr}} \quad (1)$$

### 2.1 Dataset

The best source of relationship advice is definitely the relationships subreddit [1]. Although the writer has not actually read a lot of advice from this forum, the forum's reputation precedes it. Plus, there is not just a convenient API but also a python wrapper for the API.

The Python Reddit API Wrapper (PRAW) was used to retrieve reddit data. Although [1] is already a high-quality source of life advice, the author chose to exercise caution and filter for top posts. Comments within the post were also sorted by 'top'. Also, posts are often very lengthy in comparison to comments. Since every post has a mandatory tl;dr ("too long didn't read", in other words a short summary), a regex was used to extract everything after "tl;dr". To provide more of a "chatbot" style dataset, both the "top-level" comments and then the replies to these comments were also recorded.

This ultimately resulted in a 16.5 MB plaintext file, with about 25k rows. Each row consisted of either a submisison-comment or comment-reply duo separated by tabs. This was done in order to mash it straight into the pytorch chatbot tutorial [6], which originally uses the Cornell Movie-Dialogs Corpus.

### 2.2 Model

As mentioned, the code was written in PyTorch. Specifically, the code used a seq2seq model model with a bidirectional

Gated Recurrent Unit (GRU) with gradient clipping and other things the author didn't look too deeply. Although a token-based approach such as used in previous SIGTBD preprint xxxwriter [10] would likely have made more sense, a machine learning approach was deemed more buzzworthy.

The author then trained on lab computer with a decent GPU and 16 GB of RAM. Due to time limitations, only 400 iterations were performed instead of 4000. Also, compared to the tutorial code, all punctuation from the input was removed, as otherwise the chatbot returned a lot of extraneous punctuation. The author hopes to never reproduce this work so no further details are provided.

### 3 RESULTS

We provide only qualitative results here, for obvious reasons. A few query-responses are provided in Fig. 2.

```
> Hi
Bot: removed

> Hello
Error: Encountered unknown word.

> Today, I had a fight with my friend, and I'm not sure what to do now.
Bot: wow your post and a first friend i d be sorry for your dad went the first part of your friends for marriage to it s going to be marriage into into but it doesn t have to be for you

> My friend broke my phone and I want to confront her but I'm not sure how
Bot: i m so sorry for your loss it sounds like you have a wonderful partner in life to help you through it his gf who he was cheating on me with cheated

> My cat died
Bot: i m so sorry for your post and my husband s first time for a good year and i can t be making by amends at all just admitting to all the sh**ty things he did you while you re doing well it

> It's my first time going to a party, what do I do there
Bot: the second your mom finds out you re doing the right thing but she did an awesome job good luck with you and your family you re pregnant together and your dad did good against a full on toxic manipulation stunt with christmas bells on people in the original post

> It's my first time going on a date, where should I go
Bot: the second your mom finds out you re going to get through the original post he d get out this is really troubling but i think you re doing the right thing but i think you re doing the right thing but i think you re doing the right thing

> I'm not sure how to be a good friend
Bot: i was in a similar of the story my boyfriend even though he s still terrible my child and i think you were mistaken never live but i think you were mistaken

> How do I find friends?
Bot: glad you re getting the best thing for yourself and for her is to get you through it his fault he isn t seeing you so don t think it s not to her and then i d be getting my husband is really sister but he you

> You're pretty helpful
Bot: i m so happy you to you it to get an reason to get through the same time he s going to get through this but it sounds like you have a copy of the emails to his front

> Bye
Error: Encountered unknown word.
```

**Figure 2: Sub-stellar results, robot stutters quite a bit.**

### 4 DISCUSSION

Although results were unequivocally mediocre, they could be improved by creating a better dataset. Many excellent pre-trained models exist for natural language processing, and

should be used. Additionally, it would help to train for longer mentally, spiritually, and physically.

Informally, one interesting thing the author found is that the top-rated comments on the top posts often involved "crying". Closer inspection showed that this happens for instance when when the original post author updates everyone with happy news.

Possible future work could include a chatbot that autorecommends appropriate images for reducing anxiety (e.g. cat pictures) or even one that responds by generating appropriate images (e.g. motivational posters) on the fly. The most immediate future work should be the creation of a go-the-heck-to-sleep-it's-not-going-to-work bot.

As a whole, the idea of using chatbots to help exercise social skills, provide assistance for cognitive behavioral therapy, or simply provide a quiet venting ground, seems worthy of pursuing further. The author remains excited about the idea of having a reasonable open-source chatbot which can be used locally, independent of a third party service such as Woebot or Wysa.

In conclusion the author had a lot of fun, yet feels anxious about not having done real work. Without a working chatbot, i.e. IRBot, the author must now go find real people to talk to.

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