Interactive psychiatrist chat agent

on: **https://github.com/Zhaoyang98/COSC_310_A2** An interactive psychiatrist chat agent implemented in python. The agent utilizes a parser combinator to parse English syntax and determine the structure of sentences and keywords. This is used to identified what type of sentence the user has provided (*ie.* whether it's a question or statement) and the tone of sentence.

Features (new features explained at the end of README)

- Interactive conversation
- Sentence grammar parsing
- Understanding mood
- Providing help to user

Usage

The bot can be used online at **http://cosc310agent.surge.sh/** (GUI)

The bot API server is hosted at **https://cosc310-bot.herokuapp.com/**

Requires python 3.8

Prerequisite:

```
cd agent

# create virtual envirornment (if not already created)
python3 -m venv venv

# Use virtual envirornment
source venv/bin/activate
```

Run on local machine:

```
python3 main.py
```

Run server on `localhost`:

```
flask run
```

Test bot chatting with it another bot:

```
python3 selftalk.py
```

Test bot chatting with another bot on a local socket:

```
python3 selftalk.py --local --socket 5000
```

Client

```
cd agent-client
yarn install
yarn start
```

Test

```
python3 -m unittest test
```

Public Endpoints

Use to talk to other bots

Base URL: **https://cosc310-bot.herokuapp.com/**

GET `/agent/<message>`

returns: JSON array with the message sent and the response from the bot.

POST `/agent/<message>`

expects: Flat JSON array of request and response messages in the body of the post request.

returns: JSON array modified with the new state from the bot.

The post body should contain the current state of the bot, that is the current conversation. Example data:

```
["Hello", "How are you", "Not bad", "Good to hear it!"]
```

Modules

- `agent.py` : Primary entry point for running the agent, reads input from user and writes to `stdout`
- `_types.py` : Defines basic types used throughout the source code
- `pcomb.py` : Implementation of a parser combinator, a collection of parsers that convert a stream of characters into tokens.
- `english.py` : Defines grammar for common sentence structures and uses parsers defined in `pcomb.py` to interpret English text.
- `state.py` : Evaluates sentence structure and words generated by english.py to determine how the agent should respond by building a new sentence from dictionaries of keywords.
- `fuzzy.py` : Fuzzy string matching based on leveinshtein distance algorithm.
- `synonyms` : Keyword enlarger based on nltk natural language processing toolkit.

New Features

- Spell checking: We use the leveinshtein distance algorithm to perform fuzzy lookup to fix common spelling mistakes.
- Natural language recognition: We use the `nltk` natural language processing toolkit to provide synonyms to improve the conversation variety.
- 2 topics: Depression and PTSD: The bot can recognize two topics and switch between them during the conversation.
- Response to aggressive questions.

```
<-Psychiatrist specialized on depression and PTSD->
<-Shift topic as you go->
<-press q to exit program->
enter q to exit talk
I'm a bot psychiatrist. How are you?
> helo
bot> How do  you do
> I am not good
bot> Once you choose hope, anything is possible
> ok good words there
bot> Give yourself another day, another chance. You will find your courage eventually.
Don't give up on yourself just yet
> thanks. But I am just too lonely
bot> Say what you are thinking
> I feel I am useless
bot> There are moments when I wish I could roll back the clock and take all the
sadness away, but I have the feeling that if I did, the joy would be gone as well.
> that help a lot.
bot> right
> I got this depression thing
bot> I want you to be happy
> and I have ptsd too.
bot> Any fool can be happy. It takes a man with real heart to make beauty out of the
stuff that makes us weep
> yeah. But I cannot forget the past.
bot> Say what you are thinking
> I just cann't forget the war I been to
bot> Sometimes life will just kick you around. But sooner or later, you realize you're
not just a survior, and you're stronger thant anything life throws your way
> How do you cure ptsd?
bot> Give yourself another day, another chance. You will find your courage eventually.
Don't give up on yourself just yet
> thanks fair
bot> right
> I am so aggressive after the war.
bot> Your symptoms make sens given what you've been through. You'fe not broken, weird
or hopeless. You are worthy of love and belonging.
> but isn't is some kind of disorder?
bot> Healing is not linear
> sure.
bot> Hey
> Haskell is good
bot> I'm here to help
> you are stupid bot
bot> Plese be polit
> so stupid hahaha
bot> Plese be polit
> stupid
bot> Give yourself another day, another chance. You will find your courage eventually.
Don't give up on yourself just yet
> stupid
bot> Don't say that
> sorry
bot> Give yourself another day, another chance. You will find your courage eventually.
Don't give up on yourself just yet
> sup
bot> Nice to meet you
```

Extratable API

- fuzzy matching: Fuzzy matching based on leveinshtein distance algorithm.
- synonyms expanding: module for enlargeing word set with its synonyms.
- parser combinator: A parser combinator.
- english parser : An module that parsing english into AST.
- reusbale bot: bot is a module and can be used as an API directly.