

# Reflection Chatbot

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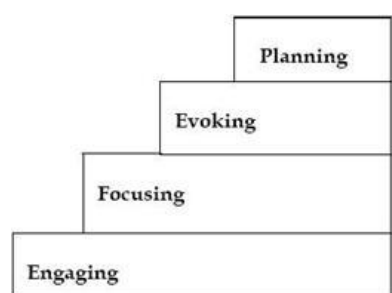
Section Number: 0101

## Motivation

- What is the problem?
  - People do not have the time, capability or willingness to self-reflect.
- What do we want?
  - We want people to be able reflect on their values and actions.
- Self Reflection is important!
  - Develops Self Awareness
  - Self Awareness is a very important aspect of mental health

## Background

- A style of conversing with a person
- Does not force change, but allows a client to organically find the need to change on their own
- The 4 Stages
  - Engaging : Connect with other person
  - Focusing : Agree to discuss one topic/issue
  - Evoking : Strengthen their inclination to change
  - Planning : Make concrete steps to achieve a goal



## Project Goals

To create a chatbot that helps people examine their core values and consider how they are reflected by their actions

Values	Actions
<ul style="list-style-type: none"><li>Knowledge</li><li>Romance</li><li>Power</li><li>Physical Health</li><li>Morality</li></ul>	<ul style="list-style-type: none"><li>Studying</li><li>Dating</li><li>Working</li><li>Watching Netflix</li><li>Volunteering</li></ul>

## Project Requirements

Chatbot Functionality:

- Direct the user through the motivational interviewing process and help users reflect on how their actions express their values
- Have minimum 75% accuracy in interpreting user's responses using Natural Language Processing (NLP)
- Have human-like speech

UI/UX:

- Have short response time (under 2 seconds)
- Be intuitive and aesthetically pleasing,
- Be easily distributable

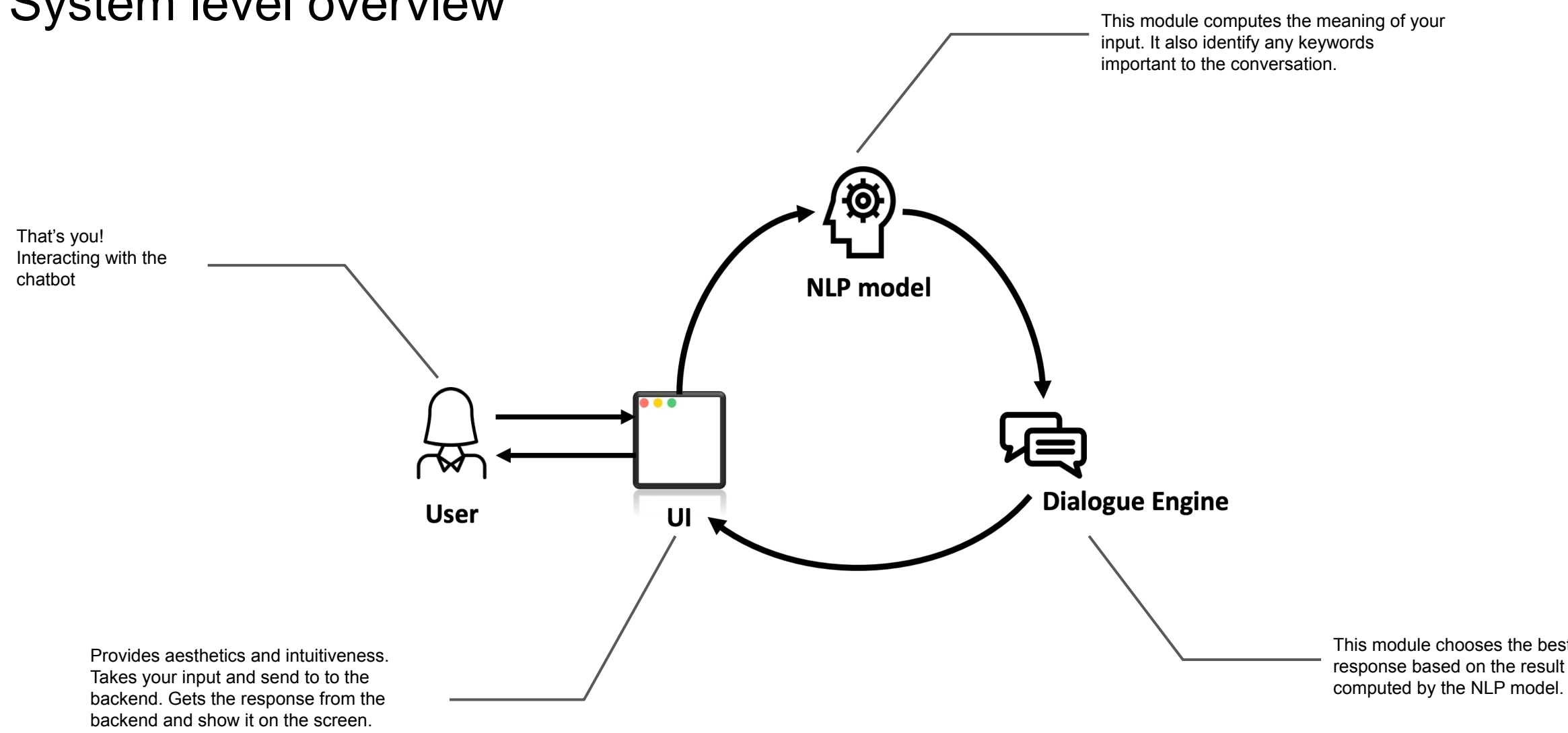
## Privacy and Ethics Constraints

- The implementation shall follow the Personal Information Protection and Electronic Documents Act (PIPEDA)
- Shall follow research guidelines issued by the University of Toronto

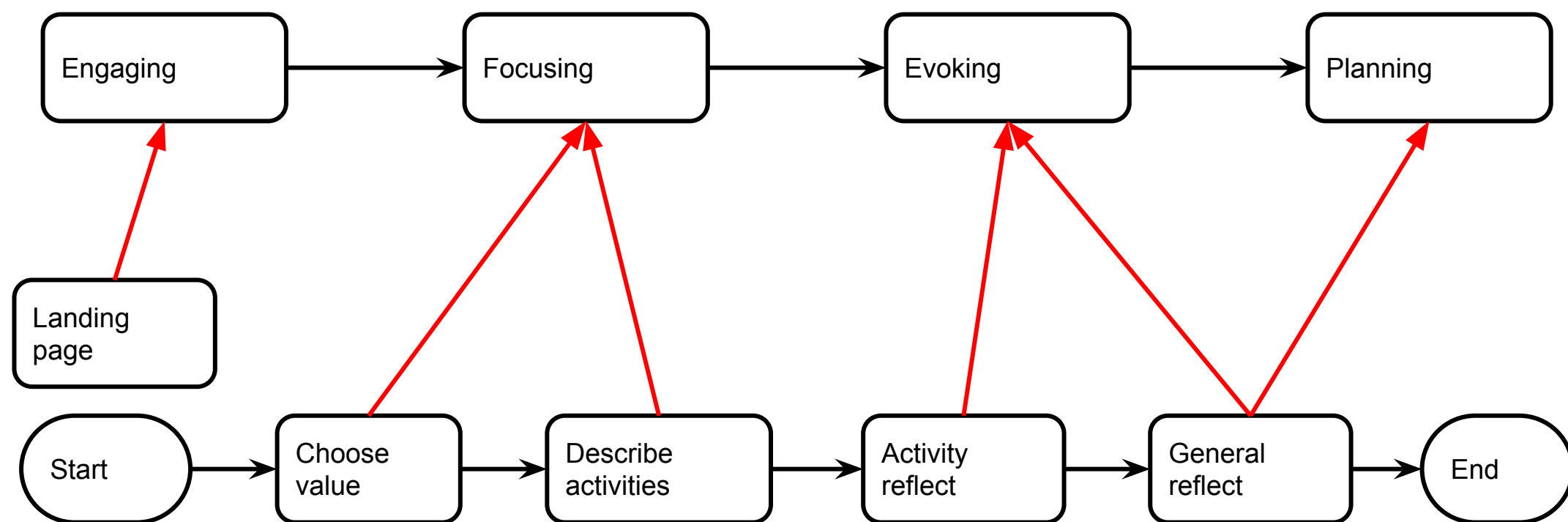
## Design

The project consists of two main aspects - one is the technical aspect of the chatbot, and the other is the conversational aspect, which follows the Motivational Interviewing process.

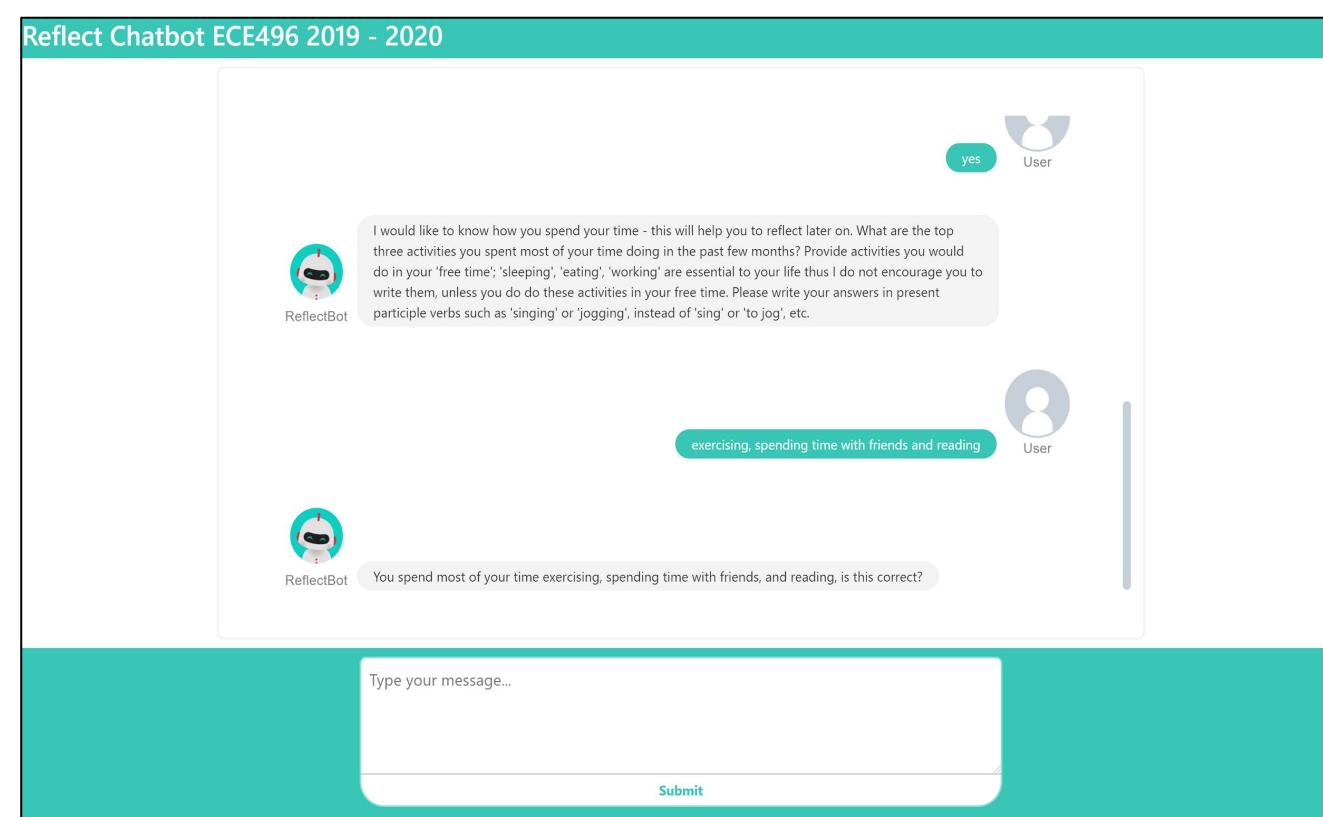
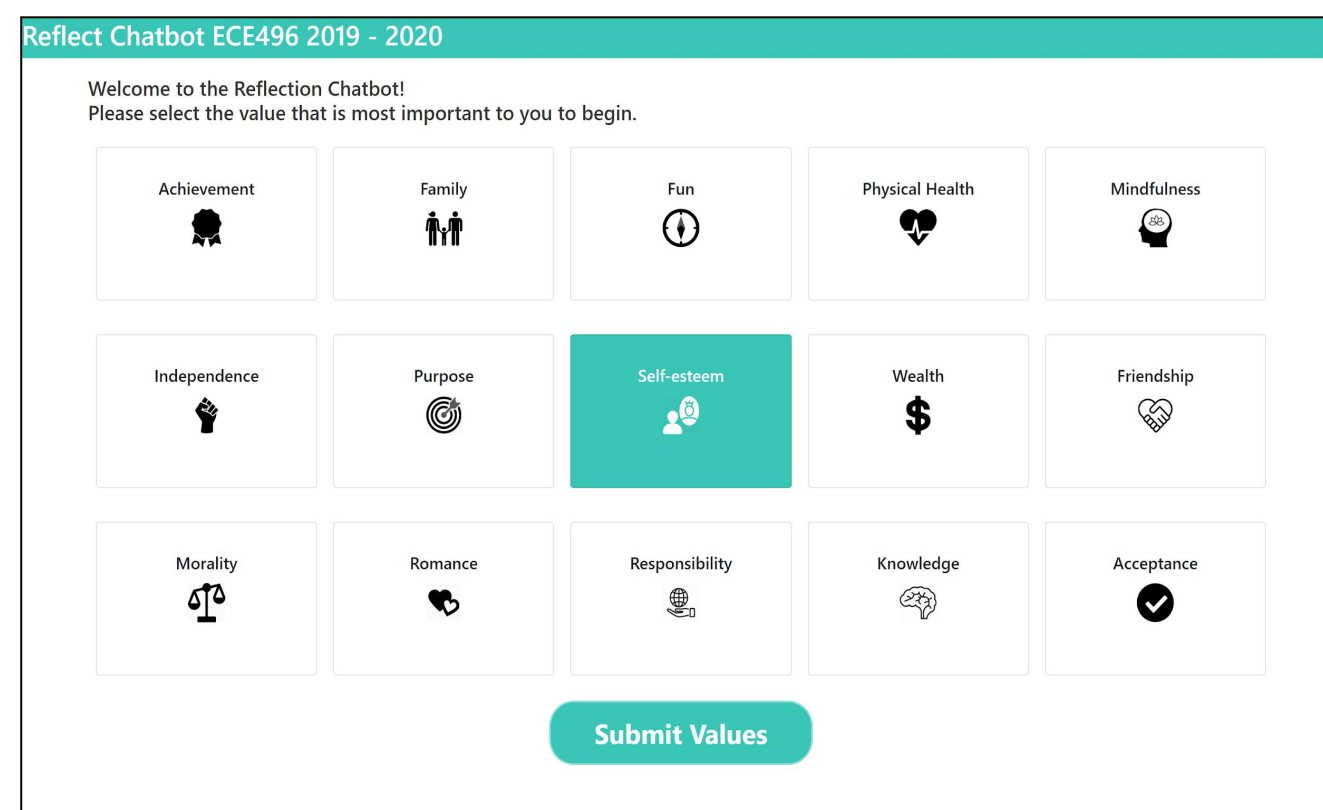
### System level overview



### Design of conversation



### Images of Final Design



## Results

In order to verify whether the project requirements were met, a total of 15 real users were asked to participate in the initial testing phase and provided feedback. The user scores and results corresponding results were obtained from this data.

### Application of Motivational Interviewing

- Successful in directing users through Motivational Interviewing process and helping them to reflect on how their actions express their values.
- Could be improved by performing additional analysis and providing deeper insights

#### User Feedback

"I found the conversation very helpful. By correlating hours ( a clearly define metric for actions) with ones intent, it creates an internal conversation - ie a point of reflection -- that in my case, suggested that I was spending my time on aspects that were purposeful to me."

"I felt like it could've offered me more. I answered the questions, it confirmed my answers and moved on. no real feedback, no leading to insight."

"I think that it didn't really give me new insights but it did help me to actually formulate words to describe what I've been feeling inside but never really thought about. This got me to actually confront that [some of my actions weren't aligned with my values]. It also helped to actually decide which value was most important to me."

User Score

7/10

PASS

### Natural Language Processing Accuracy

Testing was divided into two components as there are two main tasks NLP accomplishes in the application: activity detection accuracy and 'inform intent' detection accuracy.

NLP Component	Accuracy
<b>Activity Detection</b> Correctly identify the activities listed by the user	78.79%
<b>Inform Intent</b> Identify whether user input is an explanation (an answer to a question asking why/how)	82%

### Human-Like Speech

Unsuccessful, users found the conversation repetitive and robotic. Below are samples of user feedback we received:

"speech very repetitive. Even just slightly rewarding the questions each time would make it feel more human like. Or adding responses to what I say."

"A human would have asked questions in a different manner. Moreover, a human would have probed deeper on certain topics."

User Score

6/10

FAIL

### Intuitive and Aesthetically Pleasing

Successful, users feedback regarding the User Interface was positive. Below are samples of user feedback we received:

"10 out of 10. Very pretty and user friendly! I liked the colour scheme I thought it was very calming and pleasant to look at."

"The aesthetics and web application was excellent. Visually easy to follow and the experience was very positive."

User Score

8.7/10

PASS

### Privacy and Ethics

- Web Application does not ask for nor store any personal identification information such as name, age, occupation, etc.
- Servers hosting the application utilize SSL connections
- Application was approved by the University of Toronto's Ethics Review Committee

## Conclusions

- Many users found that the exercise helped them to reflect on and better align their values and actions
- Some felt that the application needed to perform deeper analysis of responses and provide unique insights and feedback (like a therapist would)
- Conversation felt repetitive and robotic. Steps should be taken to vary how the chatbot phrases the questions and the chatbot questionnaire should be expanded to ask more unique probing questions
- Users agreed that there is a lot of promise to AI-powered therapists and would like to see improvements be made to the application
- Users felt that ultimately human therapists have more intuition and insight into the human condition therefore cannot be completely replaced by AI