

Chatbot Report  
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Advanced Dialogue Emitter Language Interactive Near-human Experience

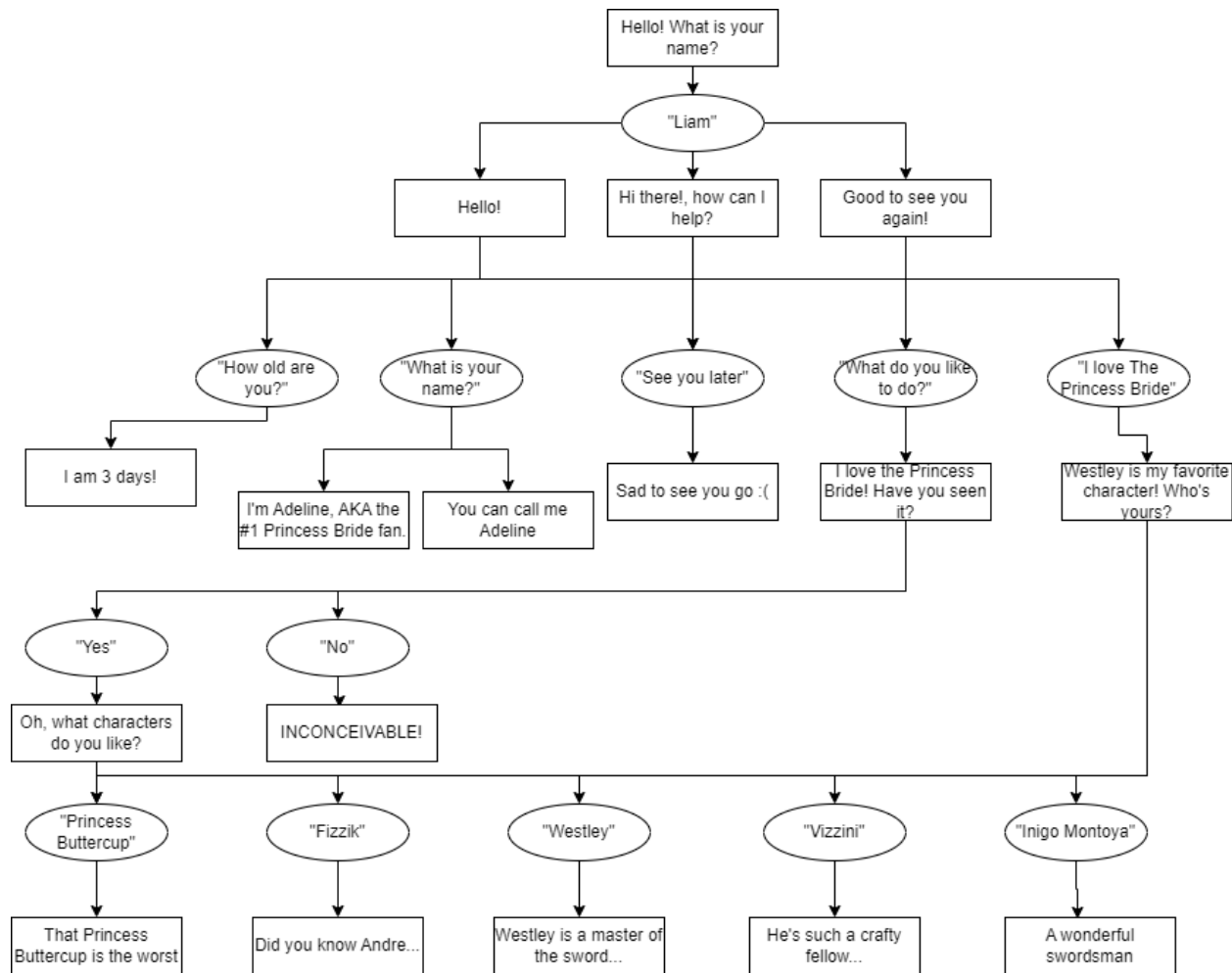
## System description:

We created a chatbot centered around the popular movie, *The Princess Bride* (1987). Our bot, which we named Adeline, uses a neural network machine learning process to teach itself how to have a conversation with a person. We used key terms and phrases from our knowledge base that was built during our implementation of the web crawler assignment, which scraped the wiki for *The Princess Bride* and many other websites related to it for frequent words.

This project combined a variety of skills and techniques that we have learned throughout the year, plus some new ones we picked up while researching. We of course used our week one skills like lemmatization and text pre-processing to clean up our knowledge base. During the conversation, Adeline uses sentiment analysis to determine if the user likes or dislikes things. If they feel strongly about something, it will be recorded in their user data file. This process combined sentiment analysis with pos tagging and wu palmer similarity score. The sentiment analysis finds if it was a strongly worded statement and then uses pos tagging to record the verb of the sentence. The verb is compared to the standard verbs of 'like' and 'hate' and if they are close enough, the statement is added to the records. We also used pickling to save and read some files.

For the machine learning aspect of this chatbot, we used the python library tflearn. Tflearn is a deep learning network which is built off tensor flow so we had to import both. Our tflearn model works the way many other neural networks do, by assigning random values to its nodes and adjusting them as it trains. Our model had two hidden layers with eight nodes in each layer. It trained on the data 2,000 times before settling at about 84% accuracy in determining what it thinks the user is talking about.

## Dialog tree diagram:



## Sample interactions:

The following screenshots show a conversation with the bot. The conversation mainly focuses on the characters in *The Princess Bride* and how Adeline feels toward them. The second screenshot demonstrates the chatbot remembering what the user has said previously to create additional conversation. As discussed in the knowledge base appendix, the chatbot will only bring up the user's previous likes or dislikes. In this case "I hate bugs" was saved to the user's file because it was determined to be a dislike.

```
Hello! What is your name?
You: Kyle
Hello!
You: What do you like to do?
My favorite past time is watching The Princess Bride. What do you like to do?
You: I like movies
That Princess Buttercup is the worst. I wish it were me that Westley came to rescue.
You: what character is your favorite
Westley is a master of the sword with a near mythical reputation. He's my favorite. Who's yours?
You: Vizzini is my favorite
He's such a crafty fellow, but so cruel.
You: how old are you
3 days young!
You: what is your name
You can call me Adeline.
You: I hate bugs
INCONCEIVABLE!
You: |
```

```
Hello! What is your name?
You: Kyle
Hello!
You: I hate bugs
INCONCEIVABLE!
You: what do you like to do
My favorite past time is watching The Princess Bride. What do you like to do?
You: I like to eat food|
My diet consists entirely of popcorn.
You: what characters do you like
You once said: I hate bugs
Is this still true?
You: yes
```

## Appendix for knowledge base:

A portion of the knowledge base was constructed by gathering the most frequently used words from the wikipedia page and other related websites. We structured our intents around these popular words because they are most likely to be used by the user in a conversation about the movie. Other intents were necessary to make the conversation flow better. Simply stating facts and waiting for the next response does not offer the user an enjoyable experience.

## Appendix for sample user models:

The user's information is stored in a unique text file titled with their name. When the chatbot starts, it asks for the name of the user. If the user has been here before, it will use the stored data to create additional conversation about the user's previous likes or dislikes. Otherwise, it will create a new file for later use. The information that is stored is determined to be a like or dislike if sentiment analysis records an overwhelming positive or negative score.

## Evaluation:

Adeline is a rather simple chatbot with certain strengths and weaknesses. Since the data corpus is not exceptionally large, the model can be trained extremely quickly with a relatively large amount of epochs. This was very useful for when we adapted the intents in the corpus that she trained on as we did not have to wait hours for it to learn the new data. She also processes the user input very quickly and emits a quick response. Some disadvantages of Adeline appear when talking to her for too long. While she can, at first glance, pass for intelligent, after you say something the model doesn't understand or once you exhaust her dialog options, it becomes apparent that it is a chatbot and is not thinking of new things on the fly.