Training Report Day-33

13 July 2024

➢ Basic Structure of a Chatbot in Python

Here's an elaboration of the steps involved in creating a basic chatbot structure in Python:

1. Import Libraries

In order to implement a chatbot in Python, you will need some libraries to handle text processing, pattern matching, and chatbot behavior. For a simple chatbot, you can use the nltk library for natural language processing and the Flask library for building a web-based interface.

Example:-

```
import nltk

from nltk.chat.util import Chat, reflections
```

- nltk (Natural Language Toolkit) provides text processing tools for tasks like tokenizing, stemming, and part-of-speech tagging.
- Chat and reflections from nltk.chat.util are useful for defining conversational behavior.

2. Define Pairs of Patterns and Responses

This is where the chatbot defines how it should respond based on certain user inputs. These "pairs" are simple rules that match the user's input to predefined patterns and give back corresponding responses.

Example of simple pairs of patterns and responses:

python
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```
pairs = [
   [
        r"Hi|Hello|Hey",
        ["Hello! How can I help you today?", "Hey! How can I assist you?"]
    ],
    [
        r"My name is (.*)",
        ["Hello, %1! How can I assist you today?"]
    ],
    [
        r"What is your name?",
        ["I am a chatbot created by [Your Name]. You can call me ChatGPT."]
    ],
    [
        r"How are you?",
        ["I'm doing great, thank you! How about you?"]
    ],
    [
        r"Quit",
        ["Goodbye! Have a nice day!"]
    ]
]
```

- The **pattern** is a regular expression (r"Hi|Hello|Hey"), which matches user input like “Hi,” “Hello,” or “Hey.”
- The **response** is a list of possible answers the bot can give.
- The %1 in ["Hello, %1! How can I assist you today?"] allows the bot to dynamically use a captured portion of the user input, such as their name.

3. Initialize the Chatbot

You can initialize a Chat object, which takes the pairs and reflections as parameters. reflections is a dictionary in nltk.chat.util that helps in converting words like "I" to "you" (and vice versa) for a more natural conversation.

```
chatbot = Chat(pairs, reflections)
```

4. Handle User Input

Now, you need to create a loop to interact with the user. The chatbot will keep accepting user input until the user types "Quit". You can use the chatbot.respond() method to get a response from the bot based on the user input.

Example:-

```
def start_chat():
    print("Hello! I am a chatbot. Type 'Quit' to end the conversation.")
    while True:
        user_input = input("You: ")  # Get user input
        if user_input.lower() == "quit":
            print("Chatbot: Goodbye!")
            break
        response = chatbot.respond(user_input)
        print(f"Chatbot: {response}")
```

- **input()** is used to get the user's message.
- The **chatbot.respond()** method processes the user's input and finds an appropriate response based on the pattern matching.
- The loop will continue until the user types "Quit."

5. Start the Chatbot

Finally, to start the chatbot, just call the start_chat() function. The conversation will begin and continue until the user ends it by typing "Quit."

Example:-

```
if __name__ == "__main__":
    start_chat()
```

Complete Example: Basic Rule-Based Chatbot in Python

```
import nltk
from nltk.chat.util import Chat, reflections
```

```
# Define pairs of patterns and responses
pairs = [
    [r"Hi|Hello|Hey", ["Hello! How can I help you today?", "Hey! How can I assist you?"]],
    [r"My name is (.*)", ["Hello, %1! How can I assist you today?"]],
    [r"What is your name?", ["I am a chatbot created by [Your Name]. You can call me ChatGPT."]],
    [r"How are you?", ["I'm doing great, thank you! How about you?"]],
    [r"Quit", ["Goodbye! Have a nice day!"]]
]

# Initialize the chatbot with predefined pairs
chatbot = Chat(pairs, reflections)

# Function to start chat
def start_chat():
    print("Hello! I am a chatbot. Type 'Quit' to end the conversation.")
    while True:
        user_input = input("You: ")  # Get user input
        if user_input.lower() == "quit":
            print("Chatbot: Goodbye!")
            break
        response = chatbot.respond(user_input)
        print(f"Chatbot: {response}")

# Start the chat session
if __name__ == "__main__":
    start_chat()
```

Explanation of the Code:

1. **Importing Libraries:**
    - nltk.chat.util: Provides classes like Chat for handling conversation patterns.

- reflections: Contains a dictionary that helps in converting “I” to “you,” making conversations feel more personal.

2. **Defining Patterns and Responses:**
    - pairs: A list of pairs where each pair contains a pattern (using regular expressions) and a list of possible responses.
    - The chatbot will match the user input to these patterns and select an appropriate response.
3. **Creating the Chatbot:**
    - chatbot = Chat(pairs, reflections): Initializes the chatbot with the given patterns and reflections.
4. **User Interaction:**
    - The chatbot waits for user input (input()) and provides a response using chatbot.respond().
5. **Looping the Conversation:**
    - The chatbot keeps the conversation going until the user types "Quit."