Modern Education Society's
Wadia College of Engineering, Pune-01
Department of Computer Engineering

NAME OF STUDENT:	**CLASS:**
SEMESTER/YEAR:	**ROLL NO:**
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EXAMINED BY:	**EXPERIMENT NO: 05**

TITLE: Develop an elementary chatbot for any suitable customer interaction application.

PROBLEM STATEMENT: Develop elementary chat bot for suggesting investment as per the customer needs.

OBJECTIVE:
1. To understand the NLP.
2. To understand the implementation of NLP.

THEORY:

What is chatbot?
The ***chatbot or chatterbot*** is a software application used to conduct an online chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent.

A chatbot is artificial intelligence (AI) software that can simulate a conversation (or a chat) with a user in natural language through messaging applications, websites, and mobile apps or through the telephone.

Why are chatbots important?

A chatbot is often described as one of the most advanced and promising expressions of interaction between humans and machines. However, from a technological point of view, a chatbot only represents the natural evolution of a Question Answering system leveraging Natural Language Processing (NLP). Formulating responses to questions in natural language is one of the most typical Examples of Natural Language Processing applied in various enterprises' end-use applications.

Types of Chatbots

There are many types of chatbots available, a few of them can be majorly classified as follows:

- ***Text-based chatbot***: In a text-based chatbot, a bot answers the user's questions via text interface.
- ***Voice-based chatbot***: In a voice or speech-based chatbot, a bot answers the user's questions via a human voice interface.

There are mainly two approaches used to design the chatbots, described as follows:

- In a Rule-based approach, the bot answers the queries based on some predefined rules on which it is trained. The rules defined can be very simple to very complex. The bots can handle simple queries but fail to manage complex ones.

  Advantages

  1. Rule-based chatbots are easy or faster to train
  2. Accountable, Secure, and not restricted to the text interactions

  Disadvantages

  1. It is not capable of handling complex queries
  2. Interactions are not conversational
  3. It requires a lot of manual work to generate or prepare rules for training the chatbots

- Self-learning bots are the ones that use some Machine Learning-based approaches and are definitely more efficient than rule-based bots. These bots can be further classified in two types: Retrieval Based or Generative. In Self-learn ***or AI-based*** chatbots, the bots are machine learning-based programs that simulate human-like conversations using natural language processing (NLP).

  Advantages

  1. Increase customer engagement by providing interactions conversational
  2. Increase productivity by providing quick data collection and better lead generations.

  Disadvantages

  1. It difficult to train as it requires high computational power for example GPU, and RAM
  2. The cost of installation is high as compared to rule-based chatbots
  3.

There are many types of chatbots available depending on the complexity, a few of them can be majorly classified as follows:

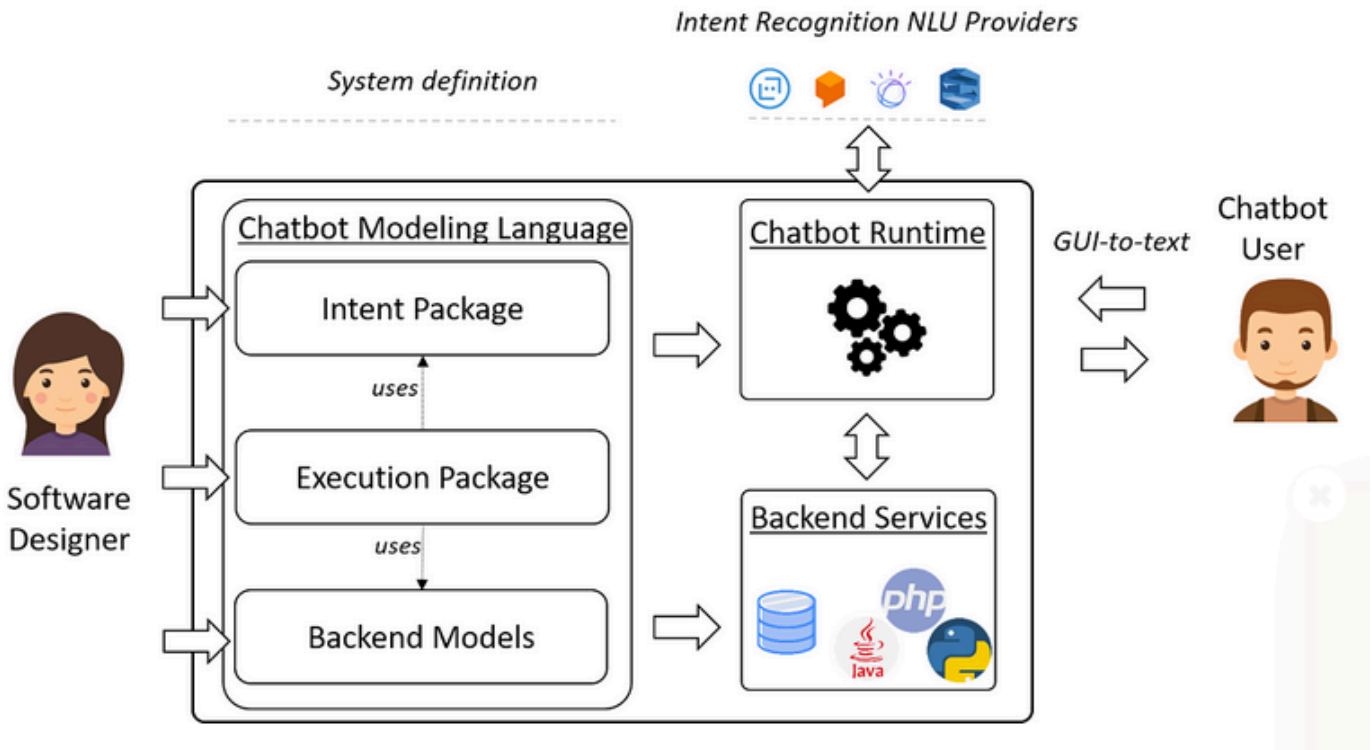
- ***Traditional chatbot***: Traditional chatbots are driven by system and automation, mainly through scripts with minimal functionality and the ability to maintain only system context.
- ***Current chatbot***: Current chatbots are driven by back and forth communication between the system and humans. They have the ability to maintain both system and task contexts.
- ***Future chatbot***: Future chatbots can communicate at multiple levels with automation at the system level. They have the ability to maintain the system, task, and people contexts. There is a possibility of introduction of master bots and eventually a bot OS.

The Architecture of chatbots

Typical chatbot architecture should consist of the following:

- Chat window/ session/ or front end application interface
- The deep learning model for Natural Language Processing [NLP]
- Corpus or training data for training the NLP model
- Application Database for processing actions to be performed by the chatbot

Please refer the below figure to understand the architectural interface:



Training Data/ Corpus

- Used to train the model to predict the desired output and fit the model.
- In this case, the corpus or training data are a set of rules with various conversations of human interactions.
- Corpus can be created or designed either manually or by using the accumulated data over time through the chatbot.
- The above image shows the structure of a corpus that includes intents, tags, patterns, responses, and context.

```
{"intents": [
        {"tag": "Intro",
         "patterns": ["hi",
                      "how are you",
                      "is anyone there",
                      "hello",
                      "whats up",
                      "hey",
                      "yo",
                      "listen",
                      "please help me",
                      "i am learner from",
                      "i belong to",
                      "aiml batch",
                      "aifl batch",
                      "i am from",
                      "my pm is",
                      "blended",
                      "online",
                      "i am from",
                      "hey ya",
                      "talking to you for first time"],
         "responses": ["Hello! how can i help you ?"],
         "context_set": ""
        },
```

NLP Model

- Natural language processing helps computers communicate with humans in their own language and scales other language-related tasks.
- For example, NLP makes it possible for computers to read text, hear speech, interpret it, measure sentiment, and determine which parts are important.

Chat Session/ User Interface

- A chat session or User Interface is a frontend application used to interact between the chatbot and end-user.

CONCLUSION:

QUESTIONS:

1. What is Chatbot?
2. Explain any one real time Chatbot.
3. Explain any 2 applications of NLP.