Computer Engineering Department

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UNIVERSITY OF MUMBAI

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A Project Report on

AI And Web-Based Interactive College Enquiry Chatbot

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in

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By

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1.Project Conception and Initiation

1.1 Abstract

Students have to visit colleges to collect various information like college fees, term schedule, college activities etc. during their admission process or as per their daily needs. This process is very tedious and time consuming, hence a chatbot is the best tool which provides quick way to interact with the users. The project deals with user's request in form of question-based message and processes it to deliver a desired response in form of message. The chatbot uses Artificial Neural Network(AI) and Natural Language Processing(NLP). User can ask College-related questions, then the query is applied as an input to algorithm, which processes the message and displays the corresponding response to the user. A chatbot can work 24x7 without getting tired. It is subjected to minimal errors thus increasing the productivity.

1.2 Objectives

- To create an interactive Chatbot using Natural Language Processing (NLP) in Artificial Intelligence (AI).

- To assist the students regarding college academic calendar, college fees, college timetable, etc.

- To give students information about ongoing events and activities in college.

- To provide 24/7 assistance for students queries.
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- The system will reply using an effective GUI which implies that as if a real person is talking to the user.

1.3 Literature Review

- The UNIBOT project is a web-based user-friendly chatbot which has minimal response time and database hits developed using HTML, CSS, jQuery and Ajax.

- This is a project on chatbot for college inquiry system using Artificial Intelligence Modelling Language (AIML), lemmatization and POS Tagging with a feedback system for unanswered queries.

- The chatbot is based on the survey of various chatbots that accepts natural language input in speech or textual form using AIML and applying natural language processing technologies like parsing, tokenizing, stemming and filtering.

- The chatbot which is based on Model View Controller (MVC) architecture aims to make a conversation between both human and machine which has been embedded with knowledge to identify the sentences and deciding itself as a response to answer questions.

- The chatbot uses AIML and applies appropriate mapping techniques to transform ontologies and knowledge into relational database and then using bigram to calculate the sentence similarity to drive its chat.

1.4 Problem Definition

- The complex nature of college website makes it difficult for an outsider to search for a particular piece of information.
- A human cannot handle several user requests at a single instance.
- Staff may not be present every time to answer user queries.
- Answering queries is a repetitive and tedious job which requires patience.

1.5 Scope

- In future we can include both text and voice-based queries.
- To provide a common and user-friendly interface to solve queries of college students and faculties and parents.
- Accuracy can be increased by providing more data to the database and training the neural model.
- To implement the chatbot in other domains like medical, forensic, etc.

1.6 Technology stack

- Python3
- NumPy
- PyTorch
- NLTK
- Flask
- JavaScript

1.7 Benefits for environment & Society

- Chatbots will continue to operate every day throughout the year without requiring to take a break thus requiring less manpower.

- Chatbots on the other hand can simultaneously have conversations with thousands of people at any time of the day.

- Chatbots are bound by some rules, resulting them to treat a customer in the most polite and perfect way.

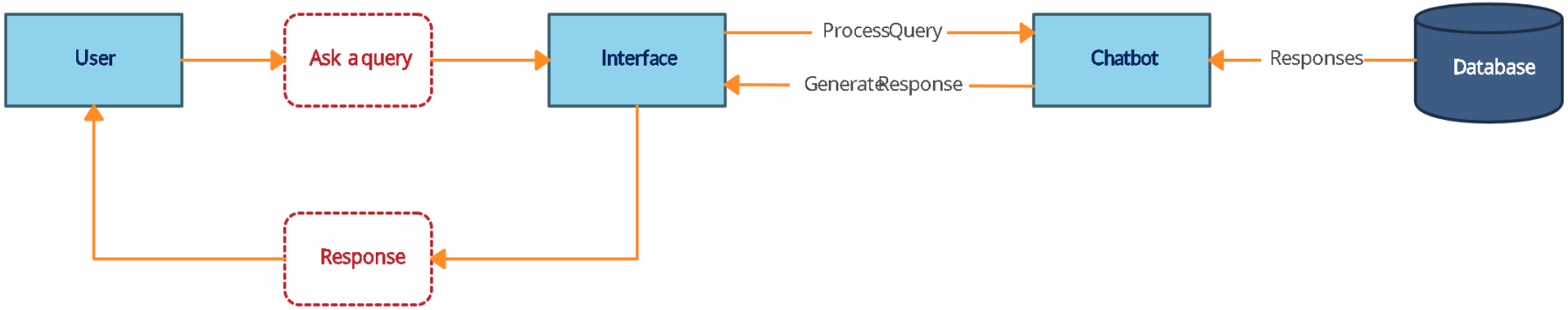
- Chatbots can do repetitive tasks without errors unlike humans which in turn helps people save time and increase productivity.

2. Project Design

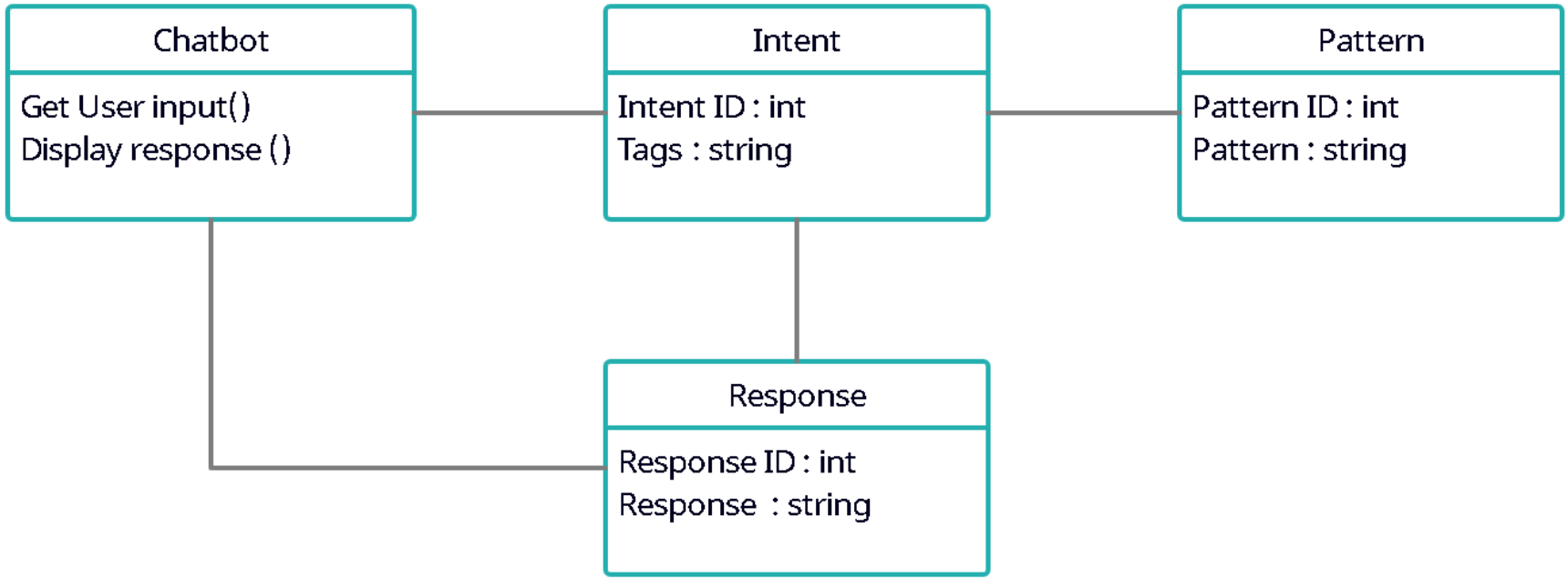
2.1 Proposed System

- The college enquiry chatbot is built using Machine Learning and Artificial Intelligence that analyzes user’s queries and answers to the them.
- The chatbot uses Natural Language Processing algorithm to answer the query.
- The chatbot uses feedforward neural network and machine learning algorithm to learn the database (.json file).
- The User can query any college related activities through the system.
- The chatbot provide 24/7 assistance for students queries.

2.2 Design(Flow Of Modules)



2.3 Class Diagram



2.4 Module-1

AI Chatbot

- A chatbot is a computer program that simulates human conversation through voice commands or text chats or both.
- It is an Artificial Intelligence (AI) feature that can be embedded and used through any major messaging applications.
- It functions through machine learning using an artificial neural network. Chatbots typically takes the form of a chat client, leveraging natural language processing to conduct a conversation with the user.
- The user’s message will be forwarded by API to trained model where trained model will process on the requested message and pick the appropriate response from the database and the response is forwarded to the user by API.

Module-2

Natural language processing (NLP):

- **Natural language processing** (NLP) facilitates human-to-machine communication without humans needing to "speak" Java or any other programming language as it allows machines to obtain and process information from written or verbal user inputs. In NLP there are various steps such as:

- **Tokenization:** Tokenization is a way of separating a piece of text into smaller units called tokens. Here, tokens can be either words, characters, or sub words. The formatting is based on spaces.

- **Stemming:** Stemming is the process of producing morphological variants of a root/base word. Stemming programs are commonly referred to as stemming algorithms or stemmers. The input to the stemmer is tokenized words.

- **Bag of Words:** Bag of Words model is used to pre-process the text by converting it into a bag of words, which keeps a count of the total occurrences of most frequently used words. This model can be visualized using a table, which contains the count of words corresponding to the word itself.

Module-3

Database

- The database of the chatbot is in **.json** format which contains the intents i.e., the goal the user has in mind when typing in a question or query to the chatbot application.
- Every intent has a tag name saved in a variable named '**tag**' which has different patterns for every tag stored in '**patterns**' variable in which a user can ask a query.
- The chatbot returns responses to the user as a message stored in '**response**' variable if the query asked is the most matched with the pattern from the patterns variable.
- The database is created studying the college website and analyzing what queries a user can ask and what responses he or she will expect.

2.5 References

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3.Planning for next semester

Planning

- **Creating AI chatbot :** Training a Neural Network model using machine learning on the Dataset created.
- **Connecting Chatbot with frontend :** Using Flask to connect the model with web application.
- **Testing Accuracy:** Increasing accuracy by adjusting the learning rate and adjusting other parameters of the model.
- **Result and Analysis :** Reviewing the final results of the product and analyzing it.

Thank You