PROJECT SYNOPSIS

COGNITIVE INTENT-BASED CHAT SYSTEM

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TITLE: Cognitive Intent-Based Chat System

Location: **Department of Artificial Intelligence & Data Science**
Jaipur Engineering College and Research Center, Jaipur.

1. Introduction

In the digital era, chatbots have become an essential tool for automating communication and enhancing user interaction across various domains, including customer service, healthcare, education, and e-commerce. A chatbot is a software application that simulates human-like conversations using artificial intelligence (AI) and natural language processing (NLP). Unlike traditional rule-based chatbots that rely on predefined responses, intent-based chatbots use machine learning models to understand user input, classify intents, and provide appropriate responses.

This project focuses on the development of an **intent-based chatbot** that leverages NLP techniques and machine learning to analyze user queries and generate meaningful responses. The chatbot is designed to understand natural language by processing user input through tokenization, lemmatization, and vectorization using **TF-IDF (Term Frequency-Inverse Document Frequency)**. A trained machine learning model predicts the intent of user messages, and based on the identified intent, the chatbot retrieves an appropriate response from a predefined dataset.

2. Objective

The primary objective of this project is to develop an **intent-based chatbot** that can accurately understand user queries and provide meaningful responses using **Natural Language Processing (NLP)** and **machine learning techniques**. The chatbot aims to enhance automated communication by analyzing text inputs, classifying user intent, and retrieving appropriate responses. By leveraging **TF-IDF vectorization** and a **pretrained machine learning model**, the chatbot ensures efficient text processing and intent detection. Additionally, it is deployed using **Streamlit**, providing an interactive and user-friendly interface for seamless conversations. This

chatbot can be applied across various industries such as customer support, healthcare, e-learning, and e-commerce to automate responses and enhance user engagement.

Key Objectives

1. **Develop an intent-based chatbot using NLP techniques**

   o The chatbot is designed to process and understand human language using **tokenization, lemmatization, and vectorization**. It extracts meaningful information from user queries, allowing for improved conversational accuracy.

2. **Implement an efficient text-processing pipeline to enhance chatbot accuracy**

   o To ensure high accuracy in intent classification, the chatbot preprocesses text using **NLTK (Natural Language Toolkit)**. This includes removing noise, standardizing words through lemmatization, and converting text into a structured format using TF-IDF for better machine learning performance.

3. **Deploy the chatbot using Streamlit for an interactive user experience**

   o The chatbot is implemented as a **web-based application using Streamlit**, which enables a user-friendly interface where users can type queries and receive instant responses. The application also includes additional features such as chat history and session management for an improved user experience.

3. Methodology/ Planning of work:

The chatbot system is developed using the following methodology:

- **Data Collection & Preprocessing:**
  - A dataset containing user queries and predefined responses is used.
  - Text preprocessing techniques such as tokenization and lemmatization are applied.

- **Model Training:**
    - A TF-IDF vectorizer is used to convert text data into numerical form.
    - A machine learning model is trained to classify user intent.

- **Response Generation:**
    - The chatbot selects an appropriate response based on the predicted intent.
- **Deployment:**
    - The chatbot is deployed using Streamlit for an interactive user experience.

4. Literature Review:

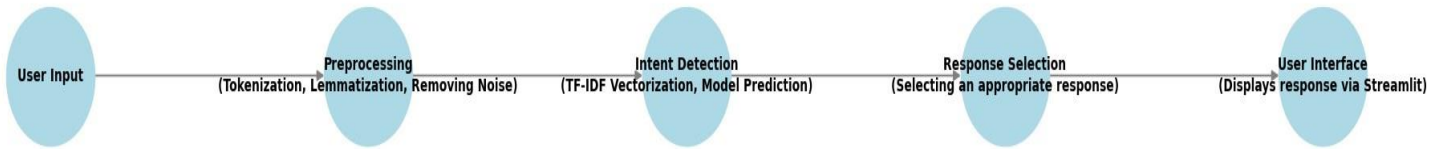Chatbots have been widely researched and implemented using various methodologies:

- **Rule-Based Chatbots:** These follow predefined rules and decision trees.

- **Retrieval-Based Chatbots:** They utilize NLP techniques to match user queries with stored responses.

- **Generative Chatbots:** These use deep learning models to generate responses dynamically.

- **Intent-Based Chatbots:** These leverage NLP and ML models to classify intent and select relevant responses.

5. Applications of Face Recognition Technology:

The chatbot system can be applied in various domains, including:

- **Customer Support:** Automating responses to frequently asked questions.
- **Healthcare Assistance:** Providing basic medical guidance based on symptoms.
- **E-Learning Platforms:** Assisting students with queries related to coursework.
- **E-Commerce:** Enhancing customer experience by providing product recommendations.
- **Banking & Finance:** Handling user inquiries related to account management and transactions.

6. Block Diagram

| User Input | Preprocessing (Tokenization, Lemmatization, Removing Noise) | Intent Detection (TF-IDF Vectorization, Model Prediction) | Response Selection (Selecting an appropriate response) | User Interface (Displays response via Streamlit) |

7. Requirements

Software Requirements:

1. Python

2. Streamlit (for UI)

3. NLTK (for text preprocessing)

4. Scikit-learn (for machine learning model)

5. Pickle (for model storage and retrieval)

Hardware Requirements:

➤ Minimum 4GB RAM

➤ Processor: Intel Core i3 or higher

➤ Storage: At least 1GB free space

8. References

[1] Official Documentation of Streamlit (https://docs.streamlit.io/)
[2] NLTK Library Documentation (https://www.nltk.org/)

APPROVAL OF PROJECT

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(…………..) Outline

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