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Project title:Revoluting customer support with an intelligent chatbot for automated assistance

1. Problem Statement

Modern businesses face increasing demands for rapid, efficient, and scalable customer service. Human support teams often struggle with repetitive queries, inconsistent response quality, and limited availability. This project proposes the development of an intelligent chatbot capable of automating customer support tasks using natural language processing (NLP) and machine learning, enabling businesses to enhance customer satisfaction, reduce operational costs, and ensure 24/7 assistance.

2. Objectives of the Project

- Develop an AI-powered chatbot that can handle common customer support tasks autonomously.

- Improve response time and consistency in customer interactions.

- Identify and route complex issues to human agents with relevant context.

- Integrate the chatbot into a real-time support environment (e.g., website or app).

- Provide insights into user behavior and recurring support issues.

3. Scope of the Project

Features to Implement:

- NLP for intent recognition and entity extraction

- Response generation based on a knowledge base

- Sentiment analysis for prioritizing negative feedback

- Integration with ticketing systems or CRMs

Constraints and Limitations:

- Limited to text-based support (no voice or video)

- Focused on English language in initial phase

- Relies on historical chat data or FAQs for training

- Initial deployment through web interface or chat widget

4. Data Sources

- Historical chat transcripts

- Frequently Asked Questions (FAQs)

- Product/service manuals

- User feedback and support tickets

5. High-Level Methodology

Data Collection & Cleaning:

- Collect chat logs, FAQ documents, and ticket data

- Remove PII, normalize text, handle typos and slang

Exploratory Data Analysis (EDA):

- Analyze common user intents, message lengths, time-of-day patterns

- Identify high-volume or high-friction topics

Model Building:

- Use NLP tools like spaCy, BERT, or GPT-based models

- Train intent classification and entity recognition models

- Implement fallback and escalation strategies

Evaluation Metrics:

- Accuracy of intent classification

- Response relevance and satisfaction rating

- Resolution time and reduction in support ticket volume

Deployment:

- Use frameworks like Rasa, Dialogflow, or BotPress

- Integrate with website via JavaScript widget

- Monitor performance through logs and user feedback

6. Tools and Technologies

- Language: Python

- NLP Libraries: spaCy, Hugging Face Transformers, NLTK

- ML Tools: scikit-learn, TensorFlow, PyTorch

- Deployment: Rasa, Streamlit, or Dialogflow

- Visualization: Streamlit, Dash, or custom dashboards