Customer Emotion Detector System

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Introduction

Understanding customer emotions is crucial for businesses to enhance customer experience and improve services. The Customer Emotion Detector System leverages natural language processing (NLP) and machine learning techniques to analyze customer reviews, extract key emotions, and generate sentiment scores (Adorescore). This helps businesses gain actionable insights from customer feedback.

Methodology

The Customer Emotion Detector System employs natural language processing (NLP) techniques to analyze customer reviews and extract insights based on emotions, topics, and sentiment scores (Adorescore). The methodology follows these key steps:

1. **Text Preprocessing** – The system cleans and processes input text using NLP techniques.
2. **Emotion Detection** – It classifies emotions using the DistilRoBERTa-base model.
3. **Topic Extraction** – It leverages the **Cohere API** to identify key topics and subtopics.
4. **Adorescore Calculation** – It computes a sentiment score based on extracted topics and sentiment intensity.
5. **Results Visualization** – The system presents data using interactive **charts** for better interpretation.

The system is built using **Streamlit** for the frontend and integrates **machine learning models and APIs** for backend processing.

Findings

After testing the system with various customer reviews, the following insights were observed:

- **Emotion Distribution** – The model effectively classifies emotions such as **joy, sadness, anger, and surprise**, providing a deeper understanding of customer sentiment.
- **Topic Extraction Accuracy** – The **Cohere API** successfully identifies key topics, but performance can be improved with domain-specific fine-tuning.

- **Adorescore Reliability** – The calculated sentiment scores align well with overall review tones, providing an effective summary of customer perception.
- **Performance & Speed** – The system processes reviews **quickly and efficiently**.

Recommendations

- **Enhance Emotion Detection** – Consider integrating **fine-tuned transformer models** to improve classification accuracy, especially for complex emotions.
- **Improve Topic Extraction** – Use a **custom-trained NLP model** alongside Cohere to enhance topic relevance and specificity.
- **Expand Multilingual Support** – Extend the system's capability to analyze reviews in multiple languages for broader usability.
- **User Feedback Mechanism** – Implement a feedback loop where users can rate the accuracy of detected emotions and topics to improve the model iteratively.
- **Sarcasm Detection** – Integrate a **sarcasm detection model** to enhance sentiment analysis accuracy, particularly in identifying misleading positive or negative sentiments.

How to Run the Project

Prerequisites:

- Install Python (>=3.8)
- Install dependencies using pip

Steps to Run:

- Create your Cohere API Key.
- streamlit run app1.py"

Tech Stack Used

- **Frontend:** Streamlit (for UI and visualization)
- **Backend:** Python, FastAPI (for API handling)
- **Machine Learning:** Hugging Face Transformers (`j-hartmann/emotion-english-distilroberta-base`)
- **NLP Processing:** NLTK, Spacy
- **External APIs:** Cohere API (for topic extraction)
- **Cohere API Key :** 3OX8jQ6maGWiw4KCbiQn95SS0t8aaDrhzwy318Xk
- **Data Visualization:** Plotly, Matplotlib

Conclusion

The Customer Emotion Detector System provides businesses with valuable insights into customer sentiments, allowing for better decision-making and improved customer engagement. By incorporating enhancements in NLP models, multilingual support, and user-driven improvements, the system can achieve even greater accuracy and usability in the future.