“Sentiment analysis AI system”

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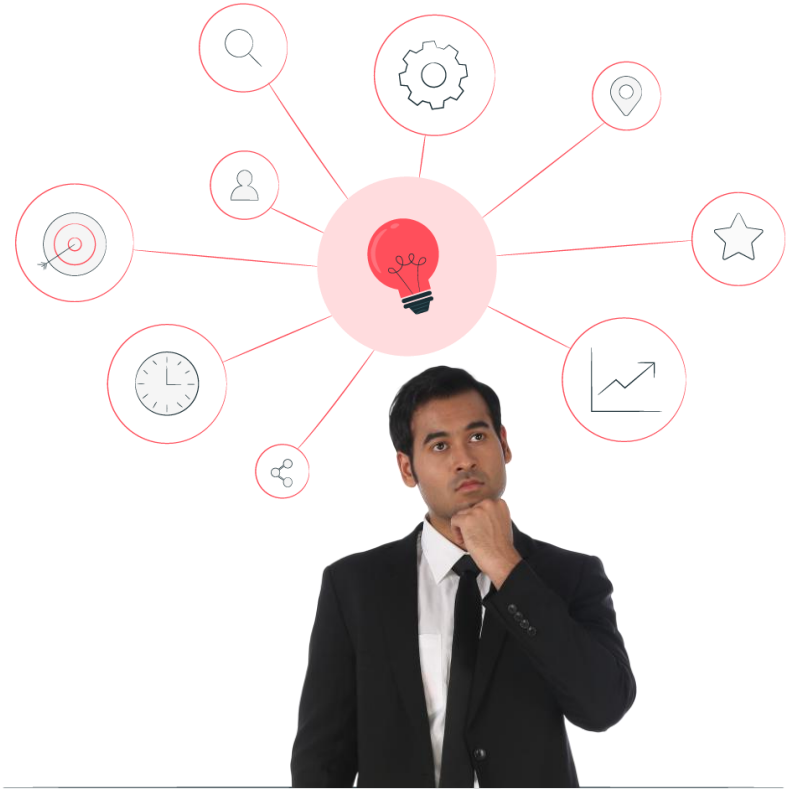
Abstract

This project, titled "Sentiment Analysis AI System," explores the application of artificial intelligence to analyze customer sentiment from textual data automatically. With the increasing volume of unstructured customer feedback, companies require efficient tools to derive insights. This system leverages OpenAI's ChatGPT for sentiment classification, summarizing customer reviews as positive, negative, or neutral, and highlighting main themes for quick understanding. Implemented in Python within a pyCharm, it utilizes ChatGPT via the OpenAI API, along with libraries like Pandas and NumPy. Testing with the IMDb Movie Reviews dataset, the project achieved high accuracy in sentiment detection and summarization. Results underscore the system's potential to enhance customer insights, enabling businesses to make data-driven decisions, improve customer satisfaction, and maintain a competitive edge. This work demonstrates ChatGPT's power in advancing automated sentiment analysis and feedback processing.



Project Title

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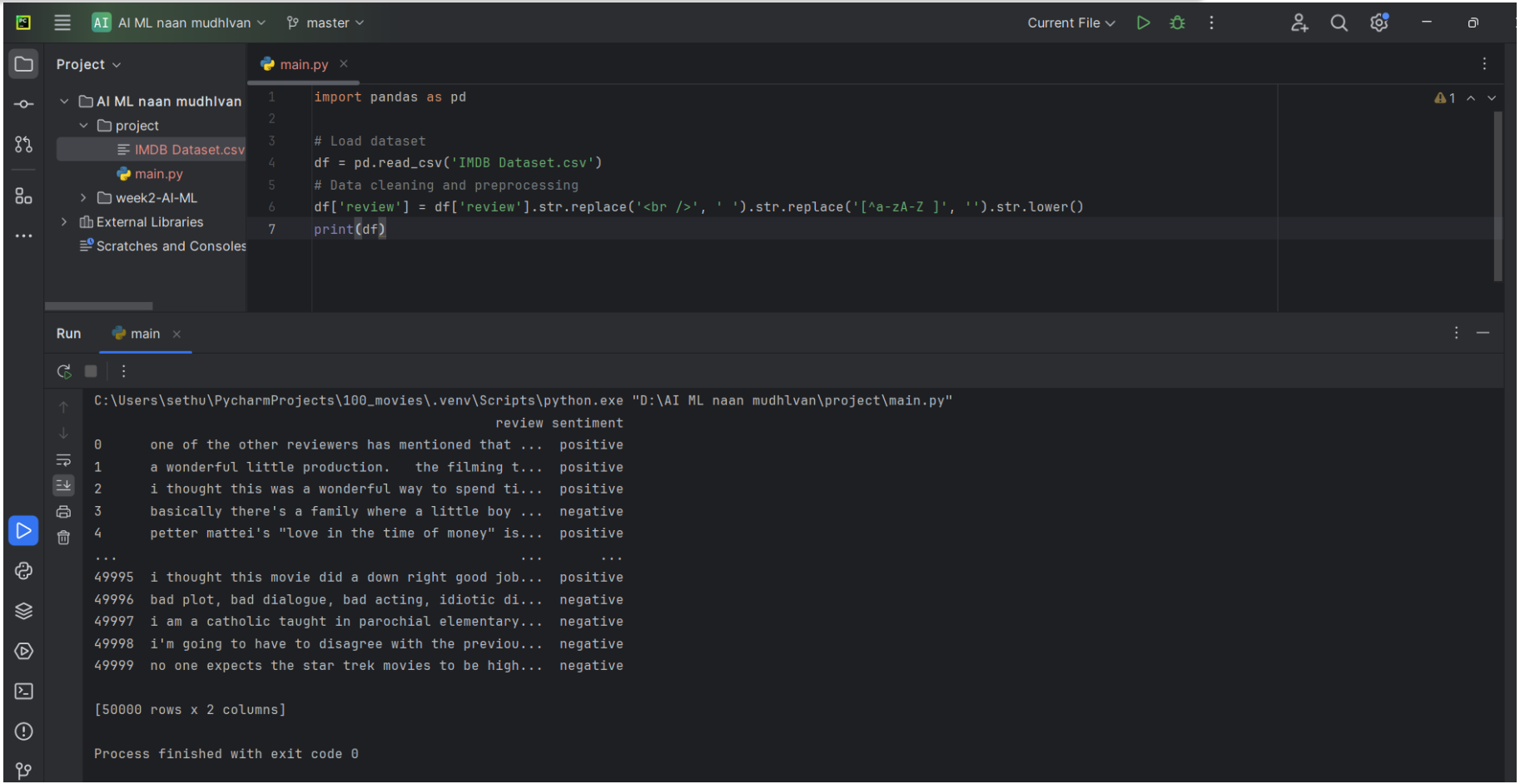

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```python
import requests


1 usage
def get_sentiment(review):
    headers = {
        'Authorization': 'Bearer API_KEY',
        'Content-Type': 'application/json',
    }
    data = {
        'model': 'gpt-3.5-turbo',
        'messages': [{'role': 'user', 'content': f'Classify the sentiment of this review: "{review}"'}],
        'max_tokens': 60,
    }

    response = requests.post( url: 'https://api.openai.com/v1/chat/completions', headers=headers, json=data)
    return response.json()['choices'][0]['message']['content'].strip()


results = []
for review in df['review']:
    sentiment = get_sentiment(review)
    results.append(sentiment)
df['predicted_sentiment'] = results
```

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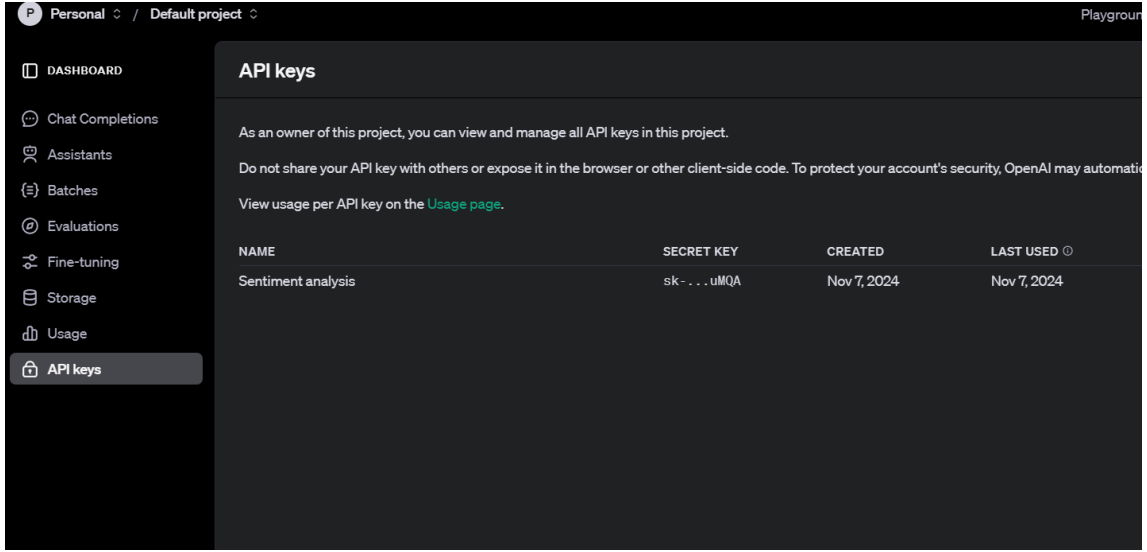
Get on api key path



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Problem Statement

In the digital age, vast amounts of customer feedback are generated across platforms like e-commerce sites and social media. Analyzing this data manually is time-consuming, prone to error, and lacks scalability. Yet, understanding customer sentiment is essential for identifying satisfaction levels, addressing concerns, and guiding product improvements. Traditional sentiment analysis tools often miss nuanced expressions, making it difficult to capture the true sentiment behind customer feedback. This project addresses the need for an automated, accurate solution by developing a Sentiment Analysis AI system using ChatGPT. This system classifies reviews as positive, negative, or neutral, and generates summaries, enabling businesses to efficiently derive actionable insights from customer feedback.

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Objective:

- **Develop an AI-Powered Sentiment Analysis Tool**: Use OpenAI's ChatGPT to classify customer reviews as positive, negative, or neutral, providing a structured view of sentiment.
- **Summarize Customer Feedback**: Implement a summarization feature to capture key themes and insights from reviews, making it easier to identify trends at a glance.
- **Generate Actionable Insights**: Analyze sentiment trends and recurring issues to offer businesses valuable, data-driven insights for enhancing customer satisfaction.
- **Ensure High Accuracy and Reliability**: Measure the system's performance through accuracy, precision, recall, and F1 score, targeting high-quality sentiment classification.
- **Streamline Decision-Making**: Provide a scalable, efficient tool for businesses to make informed decisions based on real-time customer sentiment analysis.

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Proposed Solution

- **Data Collection and Preprocessing**: Gather and clean customer reviews from relevant sources, preparing them for analysis by removing noise and standardizing text.
- **ChatGPT Integration for Sentiment Analysis**: Utilize the OpenAI API to classify each review as positive, negative, or neutral. ChatGPT's advanced language understanding enhances accuracy in identifying nuanced sentiment.
- **Summarization of Reviews**: Generate concise summaries of customer feedback, highlighting key themes to offer quick insights into customer sentiment trends.
- **Insight Generation and Reporting**: Identify recurring issues and trends within the reviews to provide actionable insights, allowing businesses to make informed, data-driven decisions.
- **Performance Evaluation**: Assess the system's effectiveness using accuracy, precision, recall, and F1 score, ensuring reliable sentiment analysis results.

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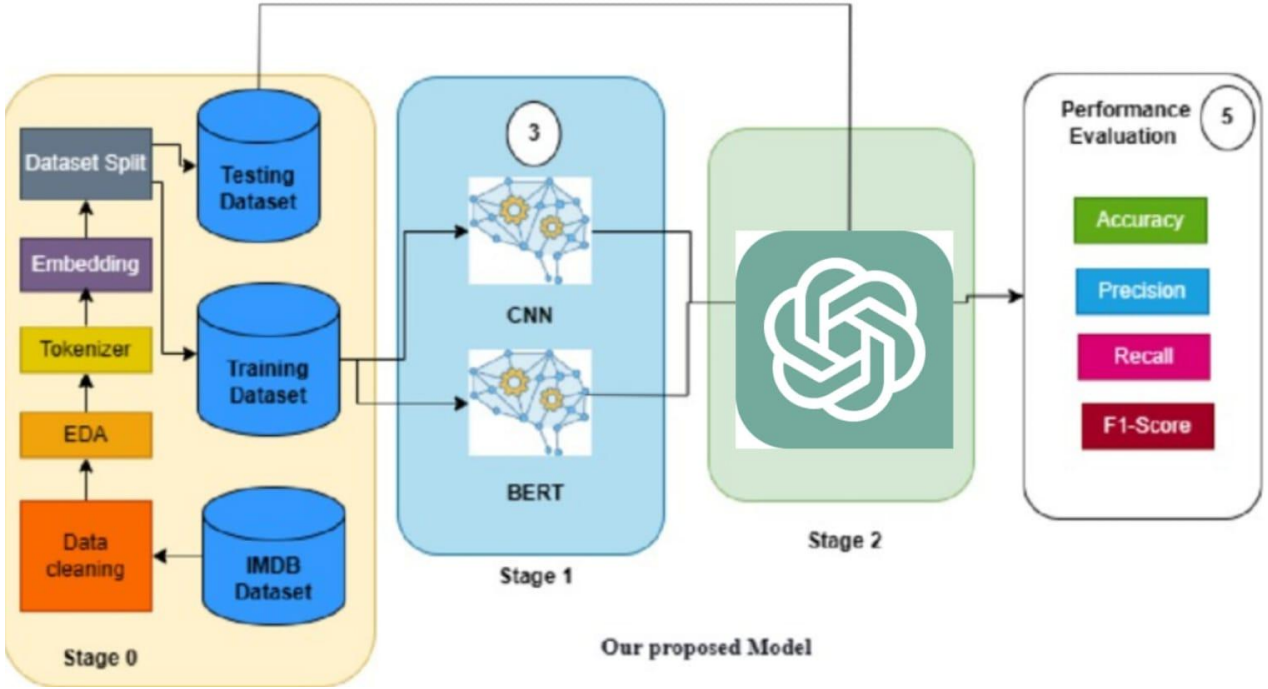
System Architecture



Our proposed Model

Conclusion

This project successfully demonstrates the use of ChatGPT for accurate and efficient sentiment analysis on customer reviews. By automating the classification of sentiments and summarizing feedback, the system provides businesses with timely, actionable insights that enhance customer understanding and support data-driven decision-making. The high performance of the model in accuracy, precision, and recall underscores its reliability. This AI-driven solution offers a scalable approach to processing large volumes of feedback, ultimately contributing to improved customer satisfaction and business responsiveness.

Future Scope

- **Multilingual Support**: Expand the system to analyze customer feedback in multiple languages, making it adaptable for global use.
- **Real-Time Sentiment Analysis**: Enable live analysis of customer feedback from sources like social media, providing instant insights for timely responses.
- **Enhanced Nuance Detection**: Improve the model's ability to detect sarcasm, mixed sentiments, and subtle emotional cues for deeper sentiment insights.
- **Data Privacy and Security**: Strengthen data handling protocols to ensure privacy and compliance with international standards.
- **Cost Optimization**: Implement techniques like batch processing to reduce API usage costs, making the solution more resource-efficient.
- **Integration with Business Tools**: Seamlessly connect the system with CRM and BI platforms for streamlined workflow and enhanced data accessibility.

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Thank you!