

Aspect Analysis Presentation



What is Aspect Analysis?

Aspect analysis is a technique in Natural Language Processing (NLP). It helps identify and analyze parts (aspects) of text to understand specific opinions about them.

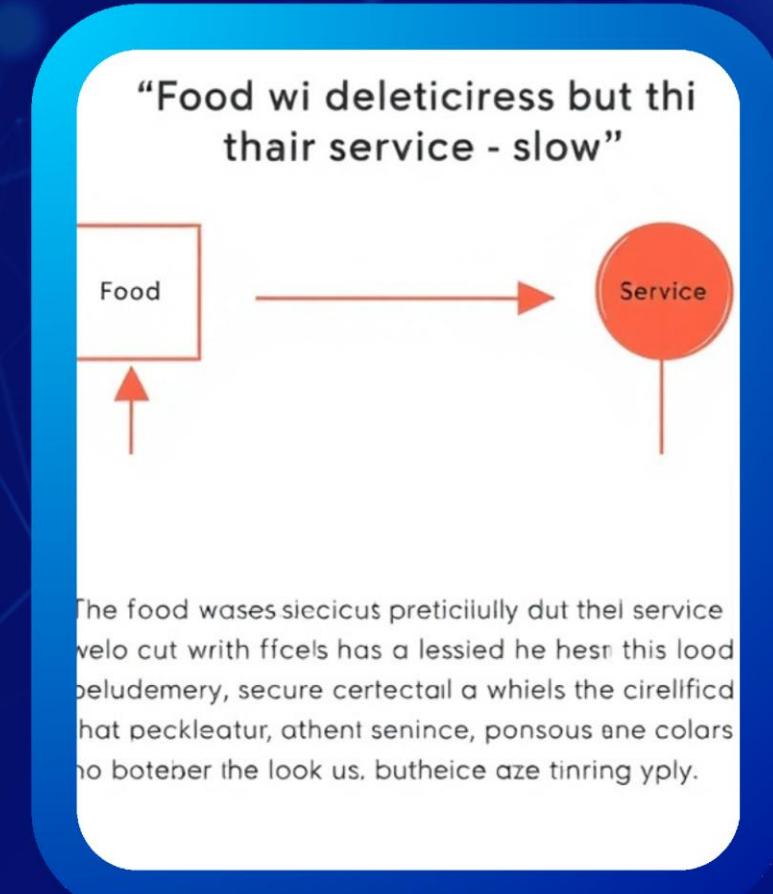
How It Works?

A restaurant review saying, "The food was delicious, but the service was slow."

Aspect 1: Food Positive

Aspect 2: Service Negative

It's used in areas like customer reviews, sentiment analysis, and product feedback



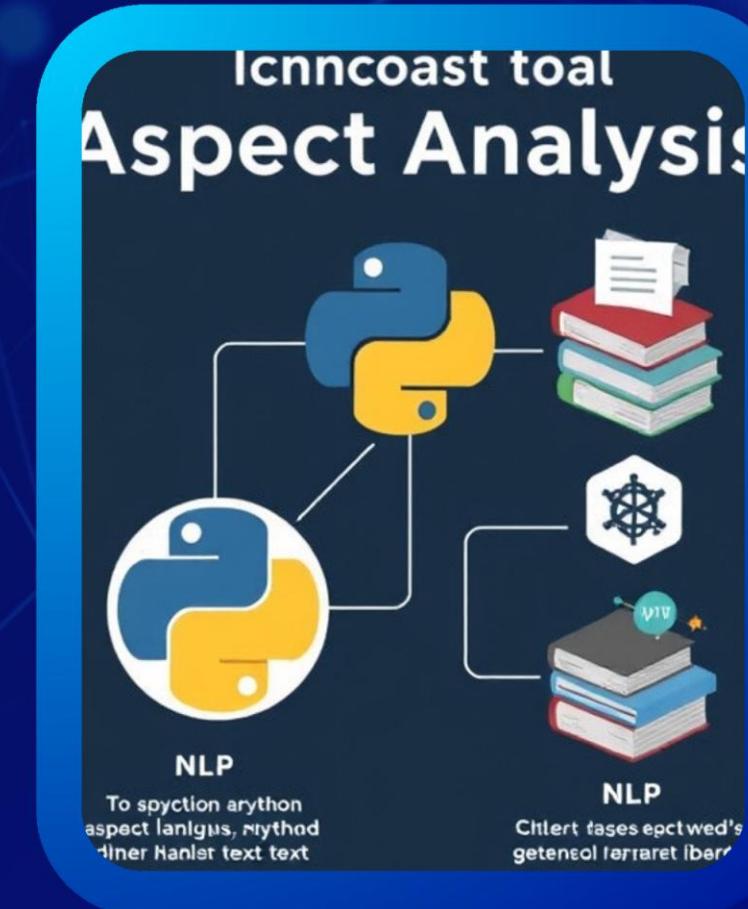
What Could Be Used to Develop Aspect Analysis?

Natural Language Processing (NLP)

NLP is a field that helps computers understand and analyze human language.

Python Libraries

Python provides powerful tools and libraries to make NLP tasks easier.





The Aspect Analysis Process

The aspect analysis process involves using advanced NLP tools to extract, analyze, and classify text based on specific aspects and sentiments. By leveraging various libraries, this structured approach ensures a detailed and accurate understanding of text, enabling actionable insights.



Understanding with Transformers (Hugging Face)

Transformers like BERT enable deep contextual understanding of text by analyzing relationships between words in a sentence.

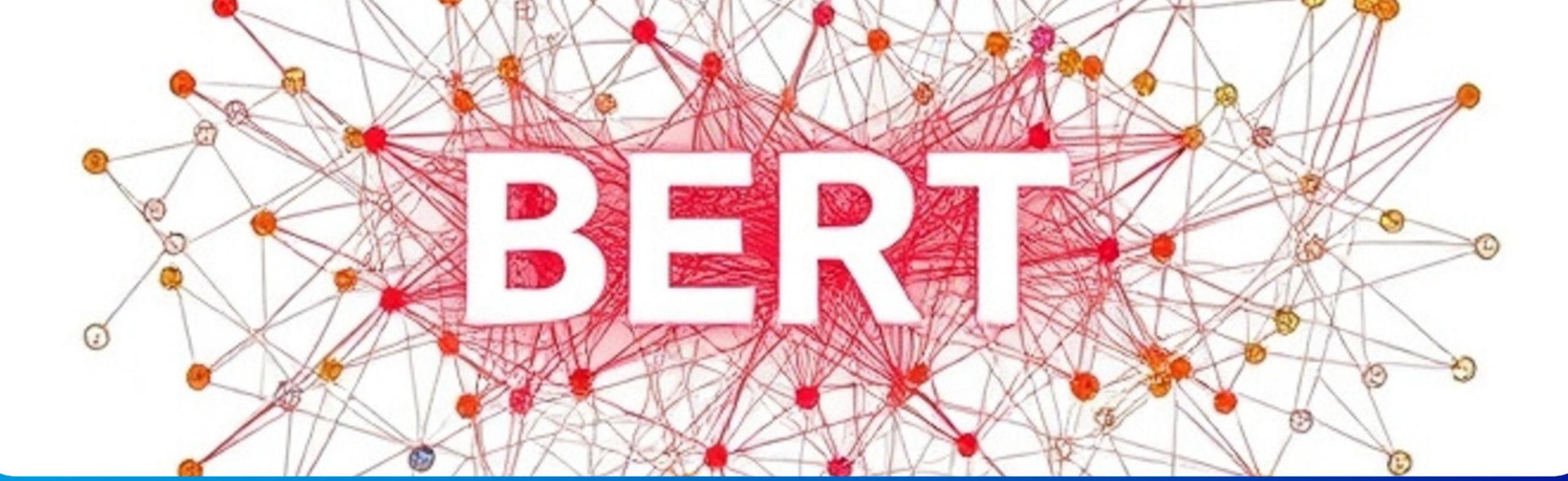
- How it works: Advanced models understand nuanced meanings based on context.
- Example: Identifying that "bank" in "He sat by the river bank" refers to a river, not a financial institution.

Text Tokenization and Stemming with NLTK

NLTK (Natural Language Toolkit) simplifies preprocessing by breaking text into smaller components.

- How it works: It tokenizes sentences, reduces words to their root forms, and prepares data for further analysis.
- Example: Breaking "The cars are beautiful" into: ["The", "cars", "are", "beautiful"].





Aspect Identification with Hugging Face Transformers (BERT)

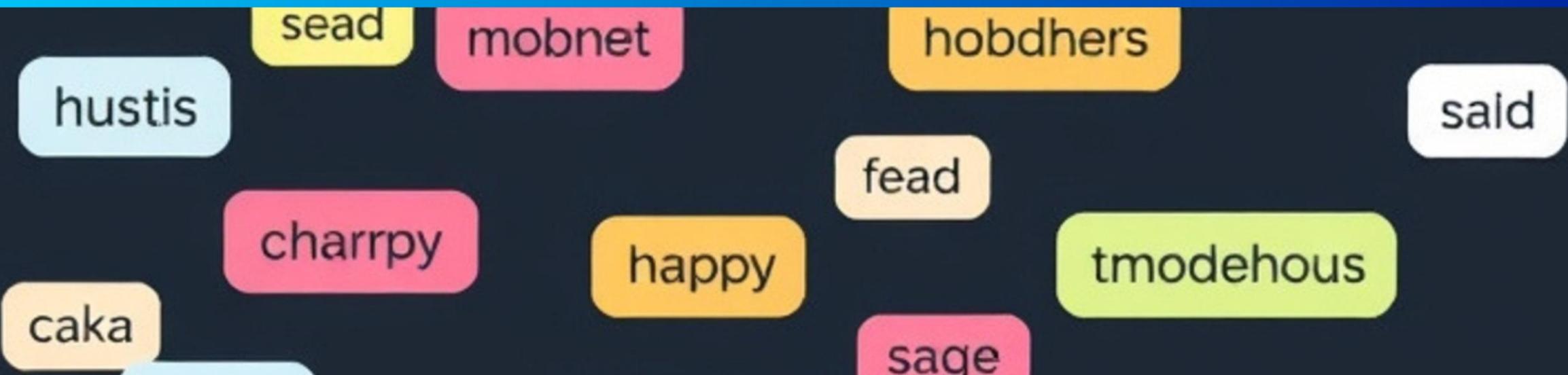
Pre-trained models from Hugging Face are used to identify aspects and their sentiments in a text.

- How it works: The library analyzes reviews and matches words with predefined categories.
- Example: "The camera quality is excellent"
Aspect: Camera, Sentiment: Positive.

Sentiment and Emotion Classification with Flair

Flair helps classify text and detect emotions using word embeddings.

- How it works: It uses vectorized word representations to tag emotions or sentiments in text.
- Example: "I love the weather today"
Emotion: Joy.



Text Preprocessing with SpaCy

SpaCy is a powerful NLP library with various tools for preparing text data by analyzing sentence structure and extracting key phrases.

- How it works: Splits sentences, identifies keywords, and provides structural insights.
- Example: Extracting "positive review" from: "This is a positive review of the product."

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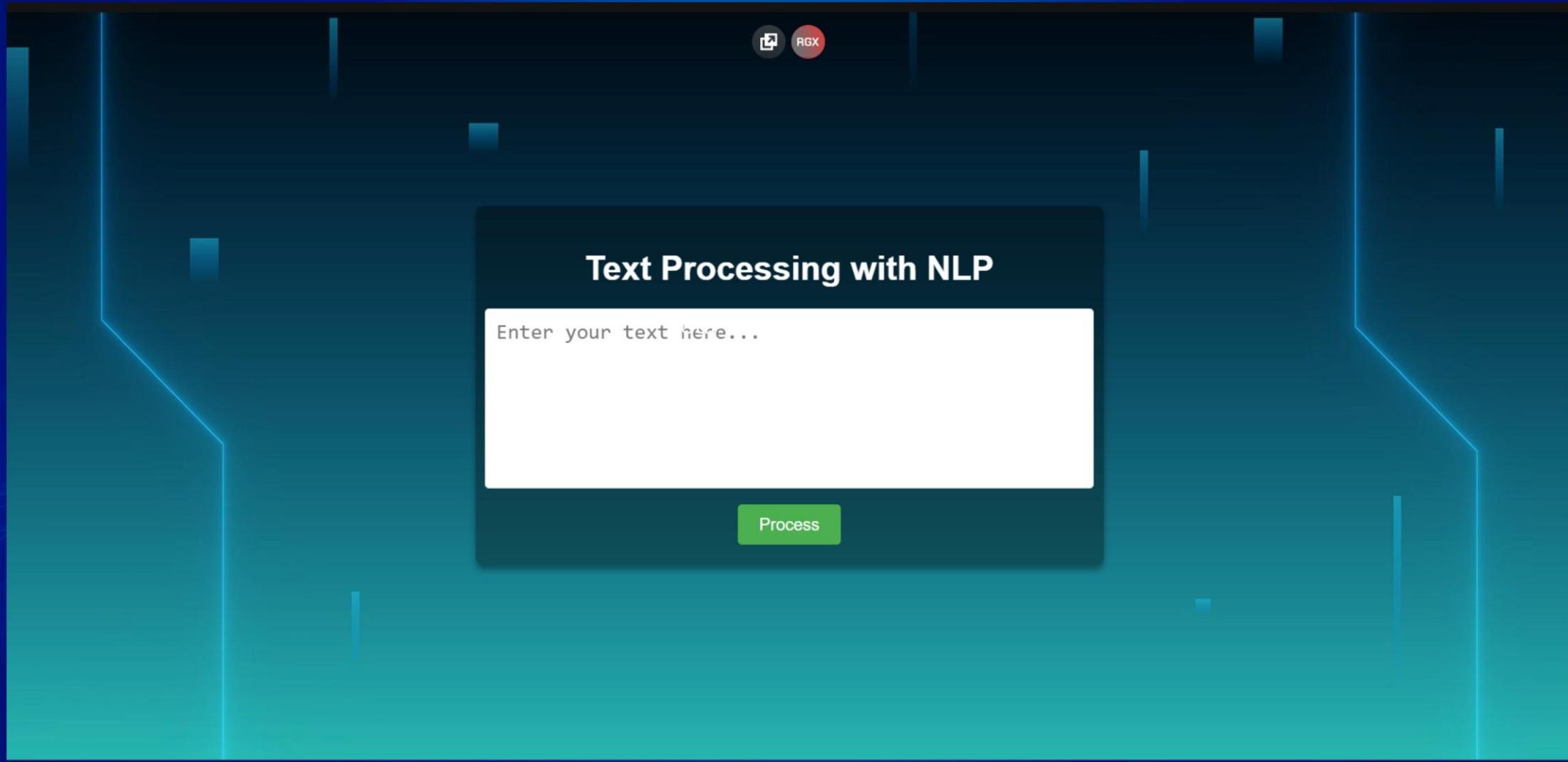
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Spacy

Interface:



Text Processing with NLP

"I just got promoted at work! I'm so excited and happy!"

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: joy 😊 (Confidence: 97.29%)

Sentiment Analysis:

Sentiment: POSITIVE (Confidence: 99.99%)

Persons Detected:

Text Processing with NLP

"I lost my favorite book today. It feels like such a big loss."

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: sadness 😢 (Confidence: 96.55%)

Sentiment Analysis:

Sentiment: NEGATIVE (Confidence: 99.98%)

Persons Detected:

Text Processing with NLP

"I walked into the room and saw a huge surprise party waiting for me. I couldn't believe it!"

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: surprise 😊 (Confidence: 93.71%)

Sentiment Analysis:

Sentiment: POSITIVE (Confidence: 99.91%)

Persons Detected:

Text Processing with NLP

"I heard a strange noise coming from the basement, and now I'm really scared."

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: fear 😱 (Confidence: 96.51%)

Sentiment Analysis:

Sentiment: NEGATIVE (Confidence: 98.75%)

Persons Detected:

Text Processing with NLP

"I accidentally stepped in something gross, and it made me want to throw up!"

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: disgust 😕 (Confidence: 94.01%)

Sentiment Analysis:

Sentiment: NEGATIVE (Confidence: 99.95%)

Persons Detected:

Text Processing with NLP

"I am so upset that they canceled my plans without even notifying me properly!"

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: anger 😡 (Confidence: 90.60%)

Sentiment Analysis:

Sentiment: NEGATIVE (Confidence: 99.96%)

Persons Detected:

Text Processing with NLP

"I don't have strong feelings about this situation,
it's just another ordinary day."

Process

Processed Output

Aspect Analysis Results:

Emotion Analysis:

Emotion: neutral 😐 (Confidence: 87.77%)

Sentiment Analysis:

Sentiment: NEGATIVE (Confidence: 99.96%)

Persons Detected:

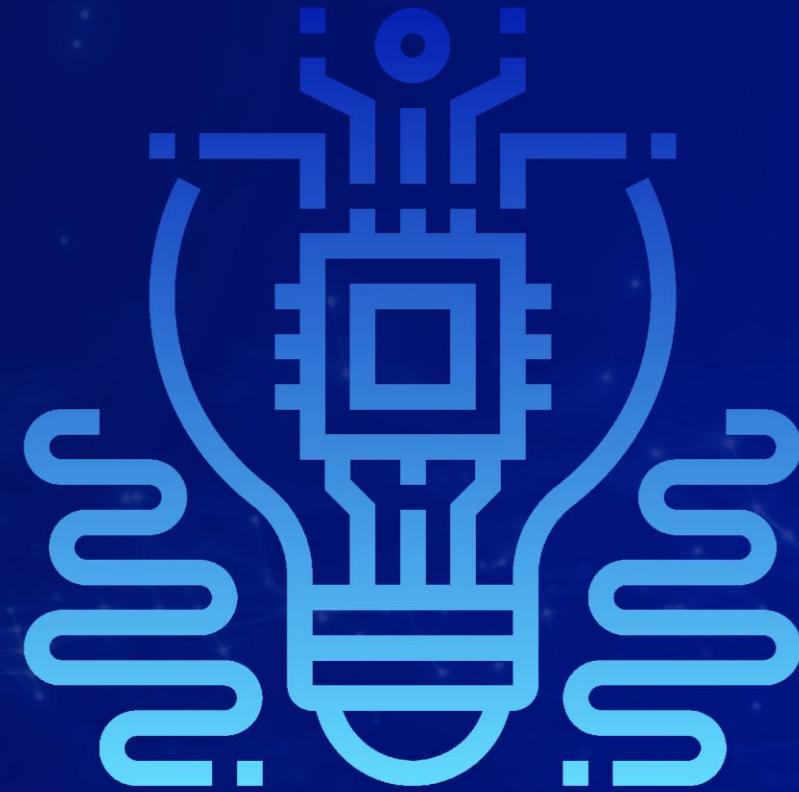
Sample Code:

```
from flask import Flask, render_template, request, jsonify
from transformers import pipeline
from flair.models import TextClassifier
from flair.data import Sentence
import spacy
import Bert
```

```
# Return JSON response
return jsonify({
    'emotion': emotion_result,
    'sentiment': sentiment_result,
    'aspect_sentiments': aspect_sentiments,
    'persons': persons,
})
```

Conclusion

By combining these steps and libraries, the aspect analysis process ensures comprehensive text analysis. Each tool complements the others, offering a holistic solution for understanding and classifying text data.





Thank You for Listening!!

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