Sentiment Analysis Web Application using Transformers and Gradio

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1. Objective

To build a simple web-based sentiment analysis application using a pre-trained Transformer model and deploy it using Gradio.

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2. Technologies Used

- Python
- Hugging Face Transformers
- Gradio
- Pre-trained NLP Models

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3. Theory

Sentiment analysis is an NLP task that identifies the emotional tone of text, typically classifying it as positive or negative. Transformer-based models use self-attention mechanisms to understand contextual meaning, enabling high accuracy in sentiment classification.

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4. Types of Sentiment Analysis

- Binary sentiment analysis (positive/negative)
- Multi-class sentiment analysis
- Emotion-based sentiment analysis
- Aspect-based sentiment analysis

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5. Algorithm / Workflow

1. Install required libraries
2. Load a pre-trained sentiment analysis model
3. Accept user input text
4. Analyze sentiment using the Transformer model
5. Display sentiment label and confidence score
6. Deploy the application using Gradio

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6. Implementation (Code)

```
!pip install -q transformers gradio

from transformers import pipeline

import gradio as gr


classifier = pipeline("sentiment-analysis")


def analyze_text(text):

    result = classifier(text)[0]

    return f"Label: {result['label']}, Score: {round(result['score'],
4)}"


demo = gr.Interface(
```

```
    fn=analyze_text,
    inputs="text",
    outputs="text",
    title="My First AI Sentiment App",
    description="Type a sentence below to see if it's Positive or
Negative!"
)
demo.launch(share=True)
```

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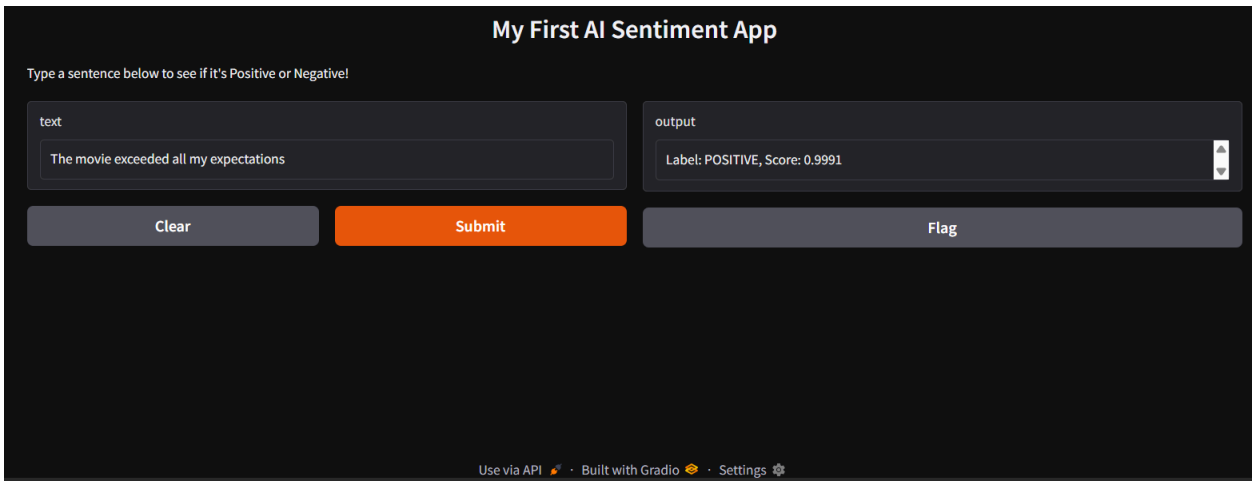
7. Output

- A web-based user interface
- Sentiment label (Positive/Negative)
- Confidence score for the prediction



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8. Result

The application successfully analyzes user input text and correctly classifies sentiment using a pre-trained Transformer model with high confidence.

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9. Conclusion

Transformer-based sentiment analysis provides accurate results without manual feature engineering. Gradio enables quick and easy deployment of interactive AI applications.

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10. Applications

- Social media monitoring
- Product review analysis
- Customer feedback systems
- Opinion mining
- Chatbot response evaluation

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11. Future Scope

- Support for multi-language sentiment analysis
- Emotion and aspect-based analysis
- Integration with databases or APIs
- Deployment on cloud platforms

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12. References

- Hugging Face Transformers Documentation
- Gradio Documentation
- Vaswani et al., *Attention Is All You Need*