Multi-modal Sentiment Analysis Mini-Project

Project Summary

This project demonstrates a proof-of-concept for a **multimodal sentiment analysis** system. The core idea is to determine the overall sentiment of a piece of content by analyzing both its **textual** and **visual** components. By combining these two sources of information, the system aims to provide a more accurate and nuanced sentiment score than either modality could provide on its own.

Methodology

The system is built using popular Python libraries for data science, **Natural Language Processing (NLP)**, and **Computer Vision (CV)**.

- **Text Analysis:** Sentiment is extracted from the text using the **VADER (Valence Aware Dictionary and sEntiment Reasoner)** library, which is a rule-based sentiment analysis tool specifically attuned to social media text.
- **Image Analysis:** The project processes images to determine their visual sentiment. This is achieved by analyzing image features such as average color and brightness. The system assigns a sentiment score based on these visual characteristics; for instance, darker images might be associated with a more negative or neutral sentiment, while brighter images with a more positive one.

Functionality & Output Analysis

The system combines the sentiment scores from both the text and image inputs. This is showcased in the provided output, which includes test cases with different combinations of text and image sentiments.

The Combined Sentiment is calculated as a weighted average of the individual text and image sentiments. The Combined Confidence reflects the overall certainty of the sentiment classification. The output successfully demonstrates the project's ability to process and combine these distinct inputs to produce a single, unified sentiment score, even in cases of conflicting sentiment between the text and image.

Conclusion

This mini-project effectively showcases the fundamental principles of multimodal sentiment analysis. It successfully integrates NLP and CV techniques to create a more robust sentiment prediction model. The tests demonstrate the system's ability to handle various input combinations and provide a combined, weighted sentiment score.