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| **Title** | **:** | Song Recommendation System Based on Caption |
| **Author** | **:** | Lee Hui Xing |

**Abstract**

Social media platforms have become an integral part of daily communication, often serving as a place for users to express their emotions through captions. However, despite advancements in personalization technology, there is still a gap in systems that recommend songs to match the sentiment and context of user-generated captions. This project addresses this gap by designing a recommendation system that aligns social media captions with songs, thereby enhancing user engagement and emotional resonance.

This project integrates techniques from natural language processing (NLP) and information retrieval to achieve its objectives. It incorporates sentiment analysis using VADER to classify the emotional tone of captions and contextual analysis leveraging topic modeling techniques like Latent Dirichlet Allocation (LDA) to extract relevant themes and keywords. The Spotify API is used to retrieve song metadata, such as genre, energy, and acousticness, which serve as input features for the recommendation engine. Integration of TF-IDF is utilized to measure the semantic alignment between captions and song features.

The system is modular, comprising components for data collection, preprocessing, sentiment analysis, contextual analysis, and song recommendation generation. Sample datasets are thoroughly tested, including captions and song data from public platforms such as Kaggle. The testing evaluates the system’s ability to recommend related song genres and songs that effectively capture the sentiment and context of captions.

The results indicate the system's effectiveness in creating relevant genre recommendations, although it has difficulties when dealing with complicated sarcasm or extremely nuanced language. This project demonstrates how integrating NLP techniques with music metadata analysis can bridge the gap between text-based and audio-based personalization, providing an innovative solution to improve user experiences on social media platforms. Future work aims to refine contextual knowledge and expand the recommendation scope across multiple platforms.