Sentiment and Emotion Analysis of Arabic Song Lyrics: A Case Study on Elissa's Discography

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Abstract

This study introduces a computational pipeline for analyzing sentiment and emotions in Arabic song lyrics, focusing on Elissa's discography of 105 songs. The pipeline encompasses preprocessing Arabic text to address linguistic complexities, sentiment and emotion analysis using advanced NLP models, and lyric generation with a fine-tuned AraGPT2 model. Results indicate a balanced sentiment distribution with a slight negative lean, dominated by sadness, reflecting traditional Arabic music themes. The lyric generation, despite challenges, shows creative potential. This framework provides insights into emotional patterns and offers a scalable approach for computational musicology.

1 Introduction

Arabic song lyrics, as exemplified by Elissa's work, are celebrated for their emotional depth, often weaving narratives of love, sorrow, and hope. This paper presents a pipeline to preprocess, analyze, and generate lyrics from Elissa's 105-song discography, leveraging natural language processing (NLP) to explore sentiment and emotion. Arabic's intricate morphology and script pose challenges for NLP, which we address through tailored preprocessing. Using transformer-based models for sentiment analysis and emotion detection, alongside a fine-tuned AraGPT2 for lyric generation, we aim to quantify emotional tones, examine trends across lyricists, composers, and years, and create new lyrics reflective of Elissa's style. This contributes to digital humanities by blending computational techniques with cultural analysis.

2 Proposed Method

Our methodology comprises three stages: data preprocessing, sentiment and emotion analysis, and lyric generation, each designed to tackle Arabic text challenges and meet analytical goals.

2.1 Data Preprocessing

The dataset includes 105 songs with lyrics, titles, lyricists, composers, and years. Preprocessing ensures text readiness for NLP:

- **Text Cleaning:** Removal of diacritics, special characters, and punctuation using regular expressions.
- **Tokenization:** Splitting text with attention to attached stopwords, ensuring accurate word boundaries.
- **Stopword Removal:** Applying an extended Arabic stopword list customized for lyrical contexts.
- **Encoding:** UTF-8 encoding to support Arabic script.

Preprocessed lyrics are stored in a Pandas DataFrame.

2.2 Sentiment and Emotion Analysis

Analysis employs advanced models to capture emotional nuances:

- **Sentiment Analysis:** A BERT-based Arabic model (CAMeL-Lab/bert-base-arabiccamelbert-mix-sentiment) classifies lyrics as positive, negative, or neutral.
- **Emotion Detection:** Lexicon-based and machine learning models categorize emotions into joy, sadness, anger, fear, surprise, disgust, and neutral.

Results are aggregated by song, lyricist, composer, and year for trend analysis.

2.3 Lyric Generation

We generate new lyrics using a fine-tuned AraGPT2-base model:

- **Data Augmentation:** Synonym replacement to increase dataset diversity.
- **Training:** Fine-tuning on preprocessed lyrics with 3 epochs, batch size 4, and block size 128.
- **Generation:** Lyrics are produced from seeds like" حبيبي", with sentiment and TF-IDF analysis applied.

3 Results

The pipeline processed all 105 songs, yielding:

- **Sentiment Distribution:** 30 positive, 37 negative, 38 neutral songs, showing a balanced yet slightly negative tilt.
- **Emotion Distribution:** Sadness dominates (32 songs), followed by neutral (24) and joy (18), with fear (13), surprise (10), and anger (8) less frequent.

- **Lyricist and Composer Insights:** Lyricists like show 80% negative sentiment, while favors positivity (83.3%). Composers like lean positive (66.7%), and tend negative (40%).
- **Yearly Trends:** Sadness peaks in 2004 (100%), joy rises in 2022 (75%).
- **Lyric Generation:** Generated lyrics from ” ” are positive but include noise (e.g., ” ,(” indicating preprocessing needs.

Table 1: Sentiment Distribution Sentiment Count

Positive	30
Negative	37
Neutral	38

Table 2: Emotion Distribution Emotion Count

Sadness	32
Joy	18
Neutral	24
Fear	13
Surprise	10
Anger	8

4 Conclusion

This pipeline effectively analyzes sentiment and emotion in Elissa’s lyrics, revealing a sadness-dominated emotional landscape with emerging joy in later years. Lyric generation demonstrates creative potential despite noise issues. Future enhancements include refining preprocessing to eliminate non-lyric content, stabilizing AraGPT2 training, and expanding to other artists. The work offers a reusable framework for computational musicology.

5 References

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