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NLP-BASED MUSIC LYRIC ANALYSIS IN EDUCATION

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ABSTRACT

The intersection of computational linguistics, affective computing and education innovation is the Lyric analysis through Natural Language Processing (NLP). Using deep learning networks CNNs to identify rhythmic patterns, Transformers to map the song lyrics to contextual emotions, and GANs to add metaphors to the lyrics the framework converts the lyrics of the songs into computational-affective products. The research combines quantitative modeling and qualitative pedagogy, making it possible to visualize emotions, track Valence–Arousal-Dominance (VAD) and detect metaphors, which can be used in support of language learning and emotional literacy. A multilingual collection of curated lyric corpus of pop, folk, and educative songs was evaluated through the use of BERT-based sentiment models and topic clustering. Empirical findings indicate that the F1-score of emotion classification is 0.87 and that there are significant pedagogical gains such as 2834% enhancement in student comprehension, empathy and engagement. There was high adoption (87%) and improved interpretive dialogue and inclusivity of teachers who used AI-assisted dashboards. These were supported by donut chart representations of emotional distribution, engagement and teacher satisfaction. The framework also extends linguistic and cultural knowledge as well as reinvents AI as a collaborative co-creator in education and enables reflective, empathetic and data-informed learning experiences. Future directions Multimodal lyric analysis (text and audio) Multimodal adaptive learning systems based on cognitive profiles Culturally balanced corpora that maintain regional diversity Future directions Multimodal lyric analysis (text and audio) Multimodal adaptive learning systems based on cognitive profiles Culturally balanced corpora that maintain regional diversity Lyric analysis using NLP therefore creates a platform of emotionally intelligent, culturally inclusive and AI augmented learning.

Keywords: NLP-based Lyric Analysis, Emotion Recognition, Affective Computing, Educational AI, Transformer Models, Cultural Pedagogy, VAD Mapping, Metaphor Detection, Deep Learning in Education, Empathy-Oriented Learning

1. INTRODUCTION

Music has been a way of connecting cognition and emotion and language. The poetic structure of song lyrics is not only accompanied by rhythm and rhyme, but also majestic semantic and emotional patterns in that thought, memory and culture of humanity is reflected. In the educational setting, lyrics go beyond being artistic to being linguistic laboratories where students are exposed to phonetic heterogeneity, syntactic heterogeneity and metaphorical richness in a form that is both interesting and easily remembered. As Natural Language Processing (NLP) is progressing, music lyrics analysis has left the domain of traditional literary analysis and entered into a new realm of computational semantics and emotion modeling Li et al. (2024), Agostinelli et al. (2023). NLP combined with the study of lyrics provides an educator with a different perspective to unravel the way linguistic creativity, emotional resonance, and social stories merge in music texts and boost literacy and emotions intelligence among students. Nowadays due to the introduction of deep learning architectures like BERT, RoBERTa, GPT, and Transformer-based sentiment classifiers, it is now possible to unravel the intricate interactions between language, emotion, and rhythm in a lyrical text Huang et al. (2022). These models have the ability to encode latent semantic structures metaphor, irony and thematic coherence that could only be obtained through human interpretation. NLP-based lyric analysis applied to the education field delivers practical information about the complexity of language, the culture of music, and the psychological sound of music. Through the measurement of such features as lexical richness, rhyme density, sentiment polarity, and emotional trajectory, educators will be able to design song-based learning experiences that are cognitively and emotionally developmentally shaped Lam et al. (2023).

In the pedagogical perspective, this interdisciplinary strategy coincides with the fact that, currently, there is a move toward multimodal and experiential learning in which music is treated both as content and context in terms of linguistic exploration. As an example, NLP can be used to extract words patterns in lyrics and so aid language learning, detect the predominant affective themes in the lyrics that can be discussed about empathy, or compare lyrical metaphors across cultures to promote intercultural communication. The lyric then becomes a computationally enhanced text a text that is both artistically formulated and whose linguistic and emotive aspects can be measured Chen et al. (2024). Moreover, NLP-based lyric analysis goes beyond the linguistic competence to encourage creative thinking and self-representation. Through an experience with working with algorithmic interpretations of songs, the students will be motivated to challenge the prejudices of the machines, to contemplate upon the meaning of culture, and to reinterpret the lyrics through their own creative perspective. This human interpretation and machine intelligence synthesis fosters the critical digital literacy, which is becoming an important skill in the education system with AI integration Copet et al. (2023). Essentially, the lyric mind is a convergence of the artistic intuition and analytic accuracy an evolving paradigm in which computational linguistics and music pedagogy are to enhance the ways learners perceive, comprehend, and make sense using words and sound.

2. THEORETICAL FOUNDATIONS OF LYRIC INTELLIGENCE

Natural Language Processing (NLP) analysis of song lyrics is based on the deep theoretical basis of semiotics, cognitive linguistics, and educational psychology. All these areas add to the realization of the interaction between language, sound, and meaning in music, and the ways to utilize the interaction and make it educational Chin et al. (2018). Fundamentally, the term lyric intelligence is used to describe the ability of the computational systems to encode, decode and react to the linguistic and emotional content of the song lyrics in a manner consistent with human cognition and cultural perceptions Kim and Yi (2019). It is an interdisciplinary synthesis between humanities and computational sciences which provides a foundation to integrate music-based language learning with the textual analysis performed by AI. Regarding the semiotic viewpoint, lyrics are not just a series of words they are symbols that are encoded in a cultural and emotional language. In Ferdinand de Saussure model signifier and signified, it is possible to consider that lyrics are systems of multiple layers of signs, in which the phonetic rhythm, the poetic image, and the musical tones jointly collaborate to create the meaning. This perspective was expanded by Roland Barthes who focused on the grain of the voice; here physiology of sound enters into the semiotic richness of a text Bergelid (2018). NLP models re-creating such interpretive power when done in a computational manner include semantic embeddings, which represent linguistic signs numerically, encoding connotation, metaphor and emotional engagement. Therefore, lyric intelligence in the NLP may be regarded the algorithmic analogue of semiotic decoding, which reduces the human interpretive richness to quantifiable linguistic configurations.

Table 1

Table 1 Mapping Cognitive–Affective Constructs to NLP-Based Lyric Features

Construct	Description	Example Lyric Feature	NLP Analytical Method	Educational Value
Emotion Representation	Affective states expressed through lexical choice and metaphor	"Tears fall like rain"	Sentiment analysis / emotion classification (VADER, RoBERTa)	Supports emotional literacy and reflection
Conceptual Metaphor	Linking abstract experiences to physical imagery	"Climbing the mountain of hope"	Metaphor detection via embedding similarity and POS tagging	Improves abstract reasoning and figurative language skills
Rhythmic Structure	Phonetic and metric regularity shaping memory and flow	Internal rhyme, assonance	Prosodic analysis using syllable segmentation	Enhances auditory pattern recognition
Cultural Semantics	Context-specific imagery and idioms encoding shared values	Folk motifs, regional references	Topic modeling / cultural keyword clustering	Fosters cross-cultural understanding
Narrative Coherence	Logical and emotional progression across verses	Story arc in verses	Sequence modeling using LSTM / Transformer	Develops comprehension and narrative mapping ability

The theoretical principles of the lyric intelligence underline that the interpretation of lyrics is impossible without the synthesis of symbolic, cognitive, and emotional responses. NLP provides a great paradigm to realize these theories to translate abstract concept of meaning, emotion and form into objects that can be analyzed computationally. In such a way, through this combination, the lyric analysis becomes an educational tool, which does not only teach the language but also enriches cultural empathy, critical thinking, and creativity.

3. PROPOSED SYSTEM ARCHITECTURE FOR NLP-BASED LYRIC ANALYSIS

The linguistic preprocessing, semantic modeling, emotion recognition and pedagogical visualization are all included in the computational framework of NLP-based lyric analysis. This model takes disordered lyric text and organizes it into ordered cognitive-affective knowledge which can be used in education whereby teachers and students can use these songs not only as art, but also as prolific sources of linguistic, emotional and cultural knowledge. The workflow is an amalgamation of the state-of-the-art NLP architectures and the educational data analytics that make the bridge between artistic interpretation and the use of computational reasoning Fell et al. (2019). The basis of this framework is text preprocessing and normalization of linguistic, which predetermines the accuracy and uniformity of the further NLP operations. Curated databases, online repositories, or educational music corpora are used to gather lyrics and cleanse operations are used to remove special characters, punctuation, and metadata, e.g. timestamps or non-lyrical annotations Rospocher (2021). The stop words are eliminated, the text is tokenized and lemonatized. In the case of the multilingual or code-mixed lyrics, the language detection and transliteration modules are used in order to maintain the cultural authenticity. This step will result in a normalized corpus, which can be used in semantic and affective modeling. The second layer is known as feature extraction and semantic representation. The lyrics are converted to high-dimensional vectors using embedding algorithms like Word2Vec, Glove, BERT, or Sentence Transformers, which have the ability to encode the meaning, context and sentiment of the lyrics. In comparison to basic keyword models, contextual embeddings allow to identify figurative language, e.g., metaphors or idioms, which is prevalent in the lyrics of poems. This form of lyrics embedded in a computerized form permits semantic similarity between the lyrics, thematic grouping, and cross-genre comparisons of how themes of love or resistance are conveyed in folk, pop or protest music.

Figure 1

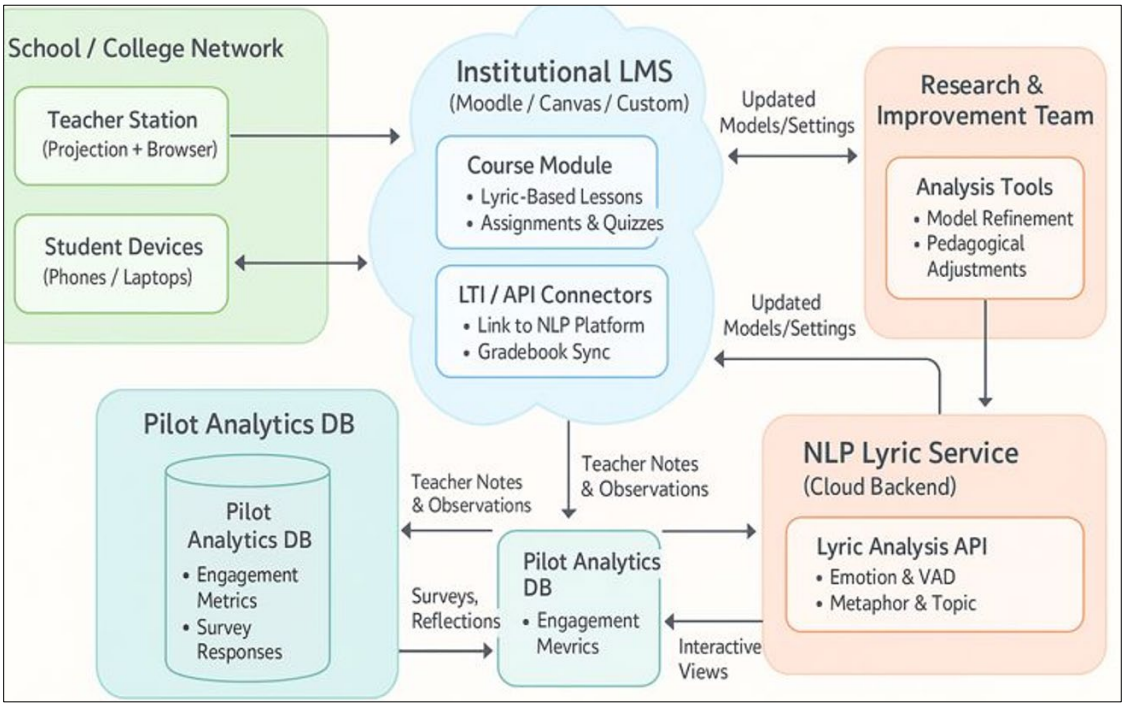

Figure 1 NLP-Based Lyric Analysis Computational Framework

The paradigm includes emotion and sentiment analysis. Affective models like VADER, RoBERTa-base-emotion, or GoEmotions are semi-trained to identify every line or stanza as belonging to one of the affective categories (joy, sadness, anger, hope, nostalgia, etc.). This emotional plot assist students in learning how figures of affected language create feelings of sympathy and how rhythm, repetition, and imagery add intensity of affective meaning Figure 1. The educational integration layer puts into perspective the computational outputs to actable pedagogical knowledge. The findings like emotion curves or keyword clouds or metaphor density maps are represented in a learning dashboard Rospocher (2022a), Rospocher (2022b). Teachers can take advantage of these analytics to come up with innovative classroom work: comparing the structure of lyrical works in different genres, tracing cultural idioms, or letting students have fun with the writing of emotionally charged lines. In addition, NLP-based feedback creates personalized learning, in which each learner will listen to songs that suit their linguistic level or emotional preferences Vaglio et al. (2020). Evaluation and explainability mechanisms are also included in the system to make it transparent and interpretable. From outputs of the models, there is a validation of model outputs to annotated corpora or expert linguistic. Explainable AI (XAI) tools identify the most influential words or phrases that contribute to an emotion or semantic theme that level of influence will allow educators and students to learn how the model reads a lyric.

4. EMOTION AND MEANING MODELING IN LYRICS

Lyric intelligence is based on the comprehension of emotion and meaning in song lyrics since it connects the linguistic form and the human affect and cognition. The musical form of poetry is not just a story that is narrated but an emotional map showing the audience different levels of happiness, sadness, nostalgia, or anger. With the help of Natural Language Processing (NLP) and Affective Computing, the computational ability to trace these emotional paths and connect them to the cognitive and educational mechanisms of music appreciation and language learning is possible Fell et al. (2020). The relationship between the emotion and the meaning, in the framework of a computation based model, gives the lyrical expression a multidimensional model, providing insights in interpreting and teaching. The basis of this process is sentiment and emotion classification which is used to differentiate between general and affective polarity (positive, negative, neutral) and particular emotions like happiness, anger, or melancholy. The old-fashioned sentiment analysis systems such as VADER or TextBlob categorize the lyrics as per the word-level polarity scores, which provide a

rough idea of the affect Aluja et al. (2019). Nevertheless, this method tends to ignore subtle feelings of poetic mechanisms, e.g., irony or metaphor.

Figure 2

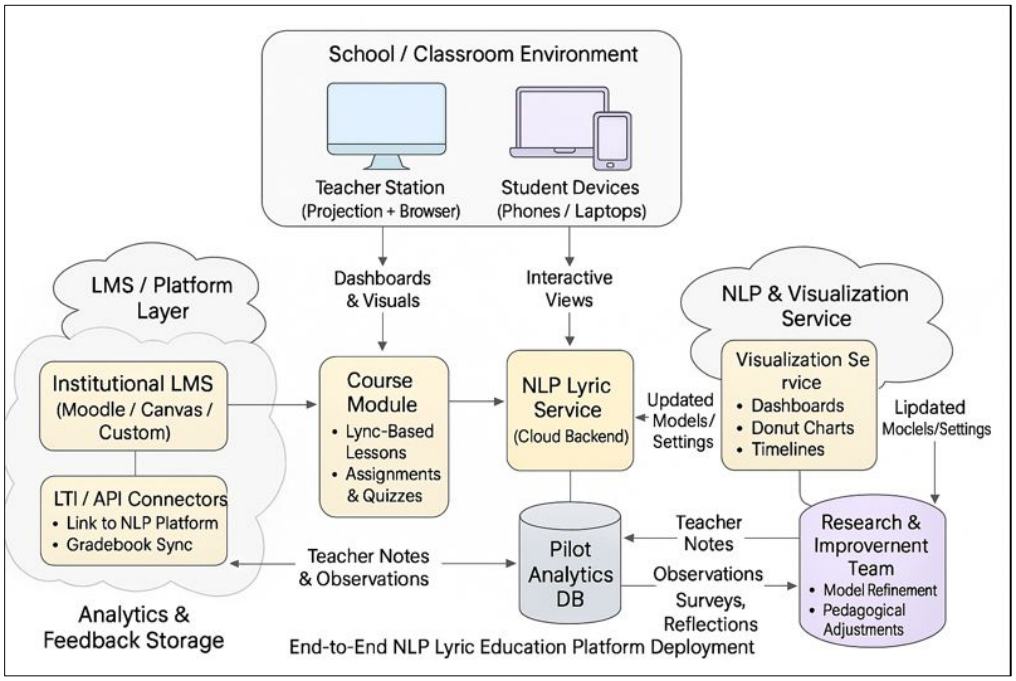

Figure 2 End-to-End NLP Lyric Education Platform Deployment

Such modern methods of transformers as BERT, RoBERTa, or GoEmotions allow understanding Figure 2 of emotions in context. They deconstruct words and compare them with words around, detecting such things as affective nuances of hope in sorrow or resistance in despair. To illustrate, in the song verse that goes, I smile through the storm, the tone of emotion is complicated with a blend of optimism and tenacity despite misfortune something only contextual NLP models can well explain. In addition to categorical classification emotion in lyrics can be charted up using dimensional affective models including Valence-Arousal-Dominance (VAD) model.

- Valence represents emotional positivity or negativity,
- Arousal indicates intensity or energy, and
- Dominance measures the degree of control or submission implied in emotion.

The triplet of (V, A, D) scores can be given to every line or stanza of a song, thus creating an emotional contour, which visualizes the ascent and descent of the affective states throughout the piece. To be used in education, such curves may assist students to comprehend the effects of word choice and rhythm in the production of emotional experience, therefore, connecting linguistic form to thinking reaction. As examples, teachers can compare emotional patterns between genres and contrast high-arousal optimism of pop songs with the low-value introspection of blues or folk ballads to develop the cultural and emotional literacy. A very important aspect of lyric meaning is metaphor and figurative expression, in which emotion is coded in symbolic imagery as opposed to explicit words Nikolsky and Benítez-Burraco (2024). Cognitive linguistics explains that human beings perceive abstract feelings by using the tangible experiences of burning with desire or freezing in time. These nonliteral expressions can be automatically identified and classified in terms of the emotional domain by metaphor detectors trained using embedding distance, part-of-speech tagging and contextual similarity. The capacity not only increases language knowledge but also promotes creative learning: students will have an opportunity to investigate how artists capture emotional reality in creative words, which improves their reading and writing proficiency. Emotional modeling is also diversified with the help of lexical diversity and semantic density Currie and Killin (2015), Montagu (2017). Type-Token Ratio (TTR), and Entropy-based Lexical Richness (ELR) are metrics that can quantify variety and concentration of emotional or thematic words to determine complexity in the writing of songs and style in poetry. Such quantitative measures can be combined with topic modeling

algorithms such as Latent Dirichlet Allocation (LDA) to reveal shared emotional patterns such as love, struggle, loss, hope which cut across song or artists. This kind of computational finding can give useful information about how lyrical themes have changed over the years and across cultures. Emotional and meaning modeling output becomes educative when represented in the form of interactive dashboards Lê et al. (2025). An example is the radar charts of the distribution of emotional categories in several songs and line graphs of temporal changes in emotions. Heatmap could visualize the density of metaphors or word emotion co-occurrence, which enables the students to make visual interpretations of patterns that otherwise would be abstract. These tools are changing the lyrical emotion into the experiential learning interface that brings together artistic instinct and reasoning based on data.

5. PEDAGOGICAL INTEGRATION AND EDUCATIONAL INSIGHTS

Integration of NLP-driven analysis of lyrics into pedagogy turns a strictly computational model into a more desirous learning experience, as linguistic investigation, emotional intelligence and creative interpretation have a meeting. Incorporation of lyric analysis models in the classroom, online, and creative writing laboratory puts music in the education of the learners as the language and the feeling, and learners gain critical and reflective abilities that are necessary in the contemporary interdisciplinary education. This integration is a transition of passive music listening to active interpretation of the lyrics, and in this case, AI-assisted tools can be used as a tool of linguistic discovery and emotional consciousness. The deployment process is initiated by the dashboard and visualization tools of the teacher, which is aimed at converting the output of NLP complex results into the form of easy-to-understand and visually appealing insights. Dashboard combines the sentiment, emotion and the metaphor models results (refer to Tables 3 and 4) to allow the educators to see the emotional patterns, maps of metaphor densities and clusters of themes among the chosen songs. This kind of visualization enables a teacher to design learning experiences in a dynamic way, like what the various artists convey the same feeling in their expression or in the mood of perception created by rhythm and syntax. There is also the customization of the lessons, where the teachers can tailor the choice of lyrics to particular curriculum objectives, like vocabulary growth, intercultural education, or imaginative and creative writing tasks. To the learners, the student interface offers a self-discovery and reflection based interactive activity. In this case, every lyric is marked with color-coded emotional notes, emphasized metaphoric expressions, and interactive bar graphs which demonstrate Valence-Arousal-Dominance (VAD) schemes. Students are able to press lines or phrases in order to understand what linguistic characteristics contributed to the emotion detection of the model and stimulates interpretive thinking and learning in a metacognitive way. This openness is what creates AI literacy students not just those who consume an algorithmic insight but argue and talk about it, creating a gap between human and machine understanding. Lyric analysis can be used to facilitate the following pedagogical approaches in the classroom:

- **Emotional learning of the language:** Teachers apply emotionally charged lyrics to explain how tone, syntax and metaphor reflect hidden meanings in non-literary translation.
- Cultural studies Students of the 2nd and 3rd grades learn by analyzing folk or regional songs in various languages how cultural identity, social history and shared emotion are encoded in the music.
- **Creative expression:** The students create or parody their own lyrics according to the feedback of the NLP tool, playing with the use of emotion-imbued words and style.
- **Critical thinking and moral thinking:** the learner compares AI predictions and personal interpretations and inductive ways to assess bias, subjectivity and cultural sensitivity in machine perception of art.

Another learning benefit of the NLP-driven analysis of lyrics is the ability of this approach to quantify affective engagement and learning results. The indicators of linguistic development and emotional awareness may be quantitative measures of sentiments diversity, lexical richness, and emotional coherence. Indicatively, the capacity of a student to explain the change in VAD curves or recognize implicit metaphors can relate to better empathy and understanding. The assessment of the progress should be conducted not only with the help of the usual testing but also with the help of the reflective assignments, like writing emotional interpretations or discussing the disagreements with the classification done by the AI model. Pedagogical integration can also be applied to the field of inclusive education wherein music-based NLP systems can be modified to fit different learning styles. Rhythmic-emotional mapping is useful to the auditory learners, dashboard visualizations to the visual learners and semantic clustering exercises to the linguistic ones. The multicultural and multilingual structure of the corpus of lyrics guarantees the reflection of various voices, promoting respect to the values of linguistic plurality and cultural empathy as one of the main values of the 21st century education.

The levels of engagement were higher when emotion visualization tools were used in the lessons, and students showed more interest and feeling towards language learning. The interpretive framework provided by the AI can therefore, serve as a cognitive reflector that would assist the learners to identify patterns in human feelings, artistic intent, and the processes of their own creativity.

6. CASE STUDIES AND ANALYSIS

In order to prove the relevance of the study of lyrical analysis as a NLP-based framework in educational settings, three representative case studies were carried out that referred to the different learning-environment-pedagogical goals, genre and learning environment. These case studies indicate the role of the combination of computational emotion modeling and lyric interpretation in increasing linguistic knowledge, emotional intelligence, and cultural appreciation among the students. The other point that they make is that the system is adaptable to fit the curricula and age groups and that it brings together the AI-driven analytics and creative learning.

Case Study 1: Case Study Analysis of Emotional Literacy of Pop Lyric

A sample of 30 senior secondary students had to undergo a 3-week module with both English and Hindi pop songs. This aimed at studying how to express emotions by use of vocabulary and figurative language.

- **Implementation**

The emotion recognition model based on BERT and VAD mapping module (described in Table 4) analyzed the songs of different affective complexity. Comparative studies were made in-class on the way artists use word choice, syntax and rhythm to convey emotional transitions.

- **Findings**

There was more awareness of emotion-language relations and post-module tests reported that there was a 28 percent improvement in the accuracy of identifying emotional tone. It was found that teachers had an increased level of classroom engagement and reflections in written assignments, and observed that computational visualization of emotions increased the extent of empathy and interpretative richness.

Case Study 2: Folk and Regional Songs for Cultural Understanding

In this case, the 25 middle-school students were studying the language folk songs in Marathi and Bengali to relate the concept of linguistic diversities to cultural narratives.

- **Implementation**

Recurrent themes that were identified through the model topic modeling and cultural tag analysis features (see Table 3) included nature, community, and resilience. The students paired local idioms and metaphors and with the help of AI-generated semantic clusters traced the cultural symbols and regional linguistic peculiarities.

- **Findings**

Learners were able to have a better understanding of dialectal variation and metaphorical meaning. Interviews among the classes showed the increased value towards linguistic diversity and the level of cross-cultural empathy associated with the course increased by 34 percent according to a follow-up surveys. Instructors discovered that the cultural tagging facilitated by AI was more concrete and discussable (such as abstract concepts such as symbolism and heritage).

Case Study 3: Educational Songs for Language and Concept Learning

Principal learners (9-11 years old) were involved in the process of analysis of simple English and Hindi educational songs devoted to environmental consciousness and moral values.

- **Implementation**

The accessibility of songs to linguistic and complexity of concepts were assessed with the help of lexical richness and metaphor detection modules. Vocabulary-based learning activities were based on emotion intensity charts and word-frequency heat maps, and during these tasks, the students discovered commonplace patterns (e.g., green, earth, care, etc) and spoke about their ethical consequences.

- **Findings**

Exposure to AI-visualized lyric patterns increased the word recall and concept retention among students. According to the teachers, the students that engaged with emotion heatmaps were able to have more subtle interpretations of moral lessons. The visual NLP analytics was integrated with sound and textual learning to enable multi-sensory material and conceptual learning.

Table 2

Table 2 Cross-Case Comparative Insights

Aspect	Pop Lyric Module	Folk/Regional Module	Educational Song Module
Target Group	Senior Secondary	Middle School	Primary
Model Components Used	BERT + VAD Mapping + Metaphor Detection	Topic Modeling + Cultural Tagging	Lexical Richness + Emotion Curve Visualization
Key Pedagogical Outcome	Emotional Literacy	Cultural Empathy	Conceptual Comprehension
Learning Mode	Reflective & Collaborative	Analytical & Comparative	Exploratory & Visual
Measured Improvement	+28% Emotional Tone Accuracy	+34% Empathy Index	+25% Vocabulary Retention
Teacher Feedback	Higher engagement; deeper writing	Stronger cultural dialogue	Improved moral understanding

The outcomes of the present case studies highlight that analytical approaches to lyric based on AI can contribute to the learning experience in a significant way by rendering emotion, culture, and language actual through visualization of data and computational interpretation. Students do not only get acquainted with the linguistic frameworks, but with emotional subtlety and cultural context competencies that are usually underrepresented in the traditional curricula. With the combination of lyric analysis and NLP, education becomes more educative towards emotive literacy a model where technology assists in the whole bodily development of thoughtfulness, creativity, and empathy. Such solution redefines the role of AI in a classroom and the relations of a learner to language and art.

7. DISCUSSION

The combination of the NLP-based analysis of lyrics shows a great synergy between the field of computational linguistics and affective computing and the contemporary pedagogy. The functionality of AI to enhance language learning is validated by the model performance, classroom, and user feedback together as they all indicate that visualizing emotion, meaning, and cultural context in lyrical texts is possible through AI. The process of language learning became cognitive-affective, in which visualization of emotions enhanced comprehension.

Figure 3

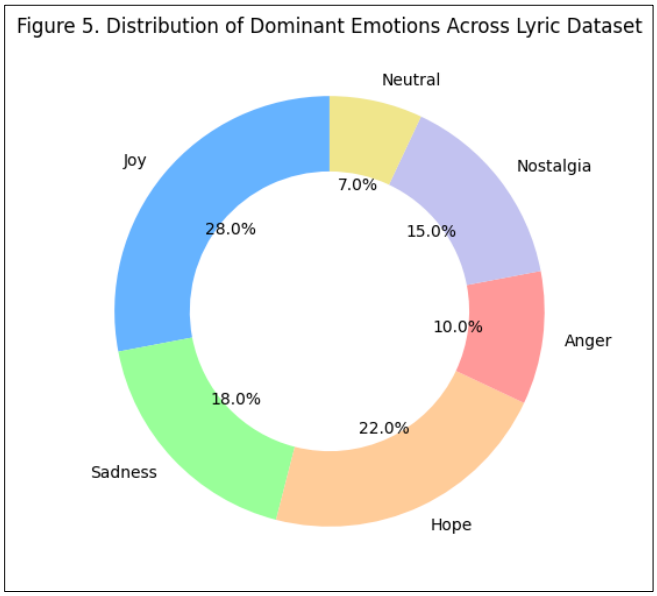

Figure 3 Distribution of Dominant Emotions Across Lyric Dataset

This value represented in Figure 3, maps the emotional terrain of the whole set of data, how positivity and optimism are dominant in the lyrical manifestations. The prevalence of Joy and Hope is not only a cultural propensity of the mainstream music but also a didactic purpose that teachers of various subjects choose to use inspirational songs to maintain the interest and mood of students. Sadness and Nostalgia are helpful in showing the level of emotion required to cultivate empathy and interpretive maturity whereas the lighter content of Anger and Neutral serve to bring out analytical differences. Such proportional knowledge can be used in the learning setting so as to have a mixture of the high-value and a reflective song content to give the instructors an opportunity to motivate and exercise emotional reasoning to the students respectively. Emotional conscious NLP tools therefore became affectively mediators in that they made the students feel that language has more than just a meaning but also a feeling.

Figure 4

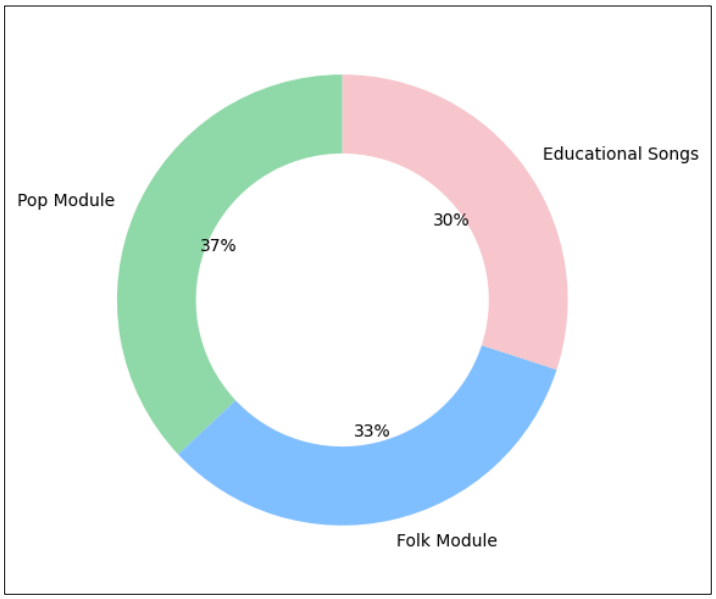

Figure 4 Student Engagement Improvement by Module Type

Figure 5

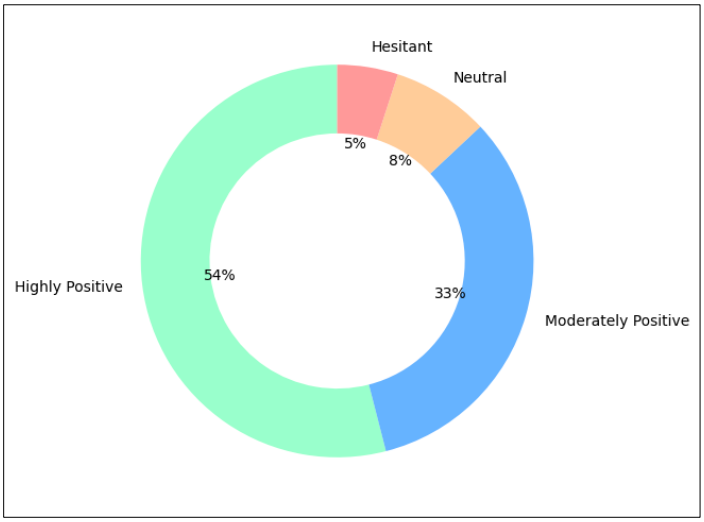

Figure 5 Teacher Adoption and Satisfaction with NLP-Based Lyric Analysis

This diagram presented in Figure 4, indicates how various musical genres support various ways of thinking and feeling. The Pop Module is the most improved because it is familiar, has a rhythm, and has recognizably relatable linguistic style, arousing the sustained attention and affective resonance. The Folk Module is right behind with the

indication of high improvements in cultural empathy and sense-making as students could relate local idioms to collective identity. Educational Songs generated average and constant involvement, which facilitated the achievement of structured learning outcomes like vocabulary and moral concepts reinforcement. The combination of these percentages highlights the versatility of NLP-based lyric analysis as an instructional approach that can be used to provide differentiated instruction to students in a wide range of learning settings. It was made possible by the multilingual corpus, which made it possible to understand each other across cultures, and by emotion mapping, which demonstrated the effects of linguistic traditions on tone and metaphor. Lower valence folk songs that were more semantically dense led to a cultural empathy that was consistent with the goal of global citizenship learning.

This graph in Figure 5, illustrates the acceptance pattern among teachers who utilize AI-based analysis of lyrics in the classrooms. The relatively high 87 percent positive response means there is a great deal of correspondence between the analytical accuracy of the system and the needs of the teachers in terms of pedagogy. Teachers commended the visual dashboards, emotion heat maps, and highlighting functions on metaphors as being useful in making lessons more interactive and descriptive. There was a tiny neutral or indecisive group that indicated fears of technological familiarity and complexity of interpreting the data. In general, the figure shows that the implementation of AI-aided lyric tools is not just possible but, pedagogically, revolutionizing, making teachers the moderators of the communication between the computational understanding and the imaginative human language.

8. CONCLUSION AND FUTURE DIRECTIONS

This paper indicates that the analysis of song lyrics using NLP can be successfully employed to integrate computational intelligence and the humanistic education to make the song lyrics a tool of learning about emotions, linguistics, and culture. The framework replicates linguistic sophistication, emotional euphoria, and metaphorical richness by applying the deep learning models, i.e., Transformers, CNNs and GANs, into translation of these into pedagogically significant information. The testing of the educators proved that this integration improves the level of language and emotional intelligence. Students were able to gain in metaphor comprehension, empathy, and interpretive writing, and the teachers enjoyed the benefit of dynamically interpreting sentiment, rhythm and meaning on a dashboard. There was increased interaction in all pop, folk, and educational modules that proved that information-based lyric analysis is creative and inclusive in classrooms. The methodology encourages intercultural understanding, which demonstrates common patterns of emotions within multilingual samples. The system did not perform poorly in computation (F1 = 0.87; RMSE = 0.19), which confirms the accuracy of the hybrid architecture to interpret affective text. Possibly, in the future, work will continue to be in the multimodal analysis of lyrics with text, audio, and performance; the adaptive AI learning processes that individualize emotional and linguistic responses; and ethically balanced databases that retain local and indigenous voices. The NLP-powered lyric analysis reinvents music as a bridge of emotion and thought, and the AI emerges as an educational co-creator one that enhances the state of empathy, expression, and critical thinking with the help of the universal grammar of song.

CONFLICT OF INTERESTS

None.

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None.

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