Text-to-Music Generation with Emotional Nuance: Multi-dimensional Emotion Space Modeling

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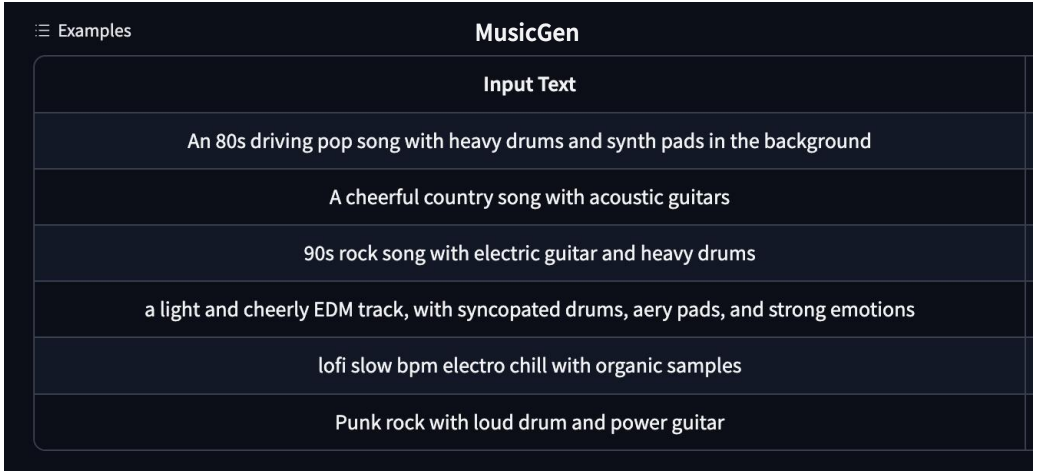
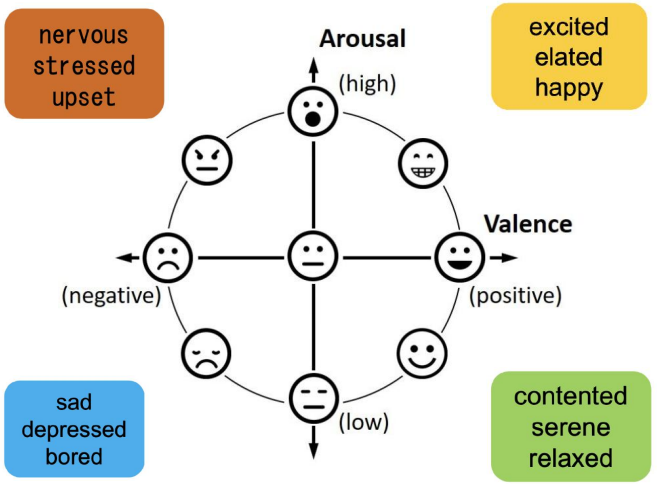
Background & Research Hypothesis

Problem: "sad but hopeful" versus "purely tragic" ?

Hypothesize: VA-based emotion conditioning will enable music generation models to generate musically distinct, nuanced emotional outputs.



Russell's Circumplex Model of Affect (VA model)



Mahmood, Mahmood A., et al. "Segmentation-enhanced approach for emotion detection from EEG signals using the fuzzy C-mean and SVM." Scientific Reports 15.1 (2025): 31956.

Methodology & Tools

Step 1:Data Collection	Step 2:Emotion Conditioning	Step 3:Model Fine-tuning	Step 4: Evaluation	Step 5:Optimization
• Compile a standardized VA dataset	• Emotion Encoder • Modified Cross-Attention	• Leveraging Low-Rank Decomposition (LoRA) method	• Interactive Demo • Human-in-the-Loop Evaluation: A/B Testing & VA-Value Rating	• Refine the model based on the feedback gathered from the evaluations

PyTorch

Hugging Face

gradio

Pre trained model: MusicGen

microsoft/LoRA

Code for loralib, an implementation of "LoRA: Low-Rank Adaptation of Large Language Models"

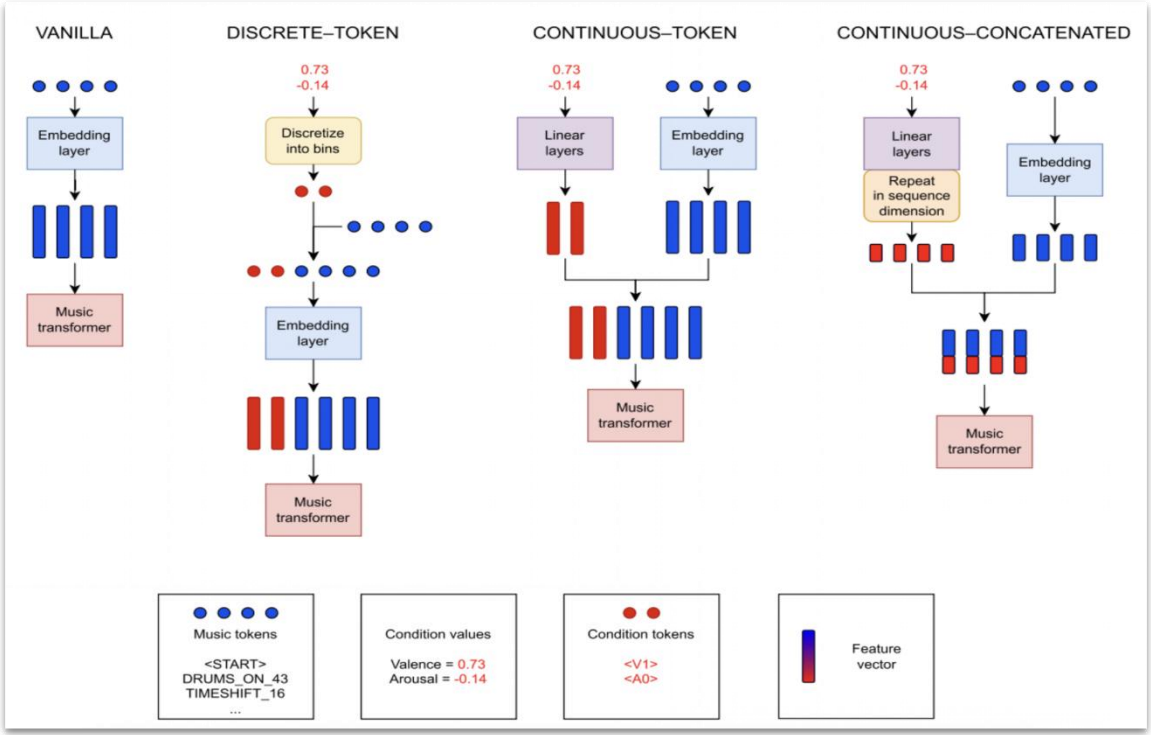
6 Contributors 81 Used by 1k Stars 85 Forks

kaggle

colab

Preliminary Results

Four Architectures for Emotion Conditioning in Music Transformers

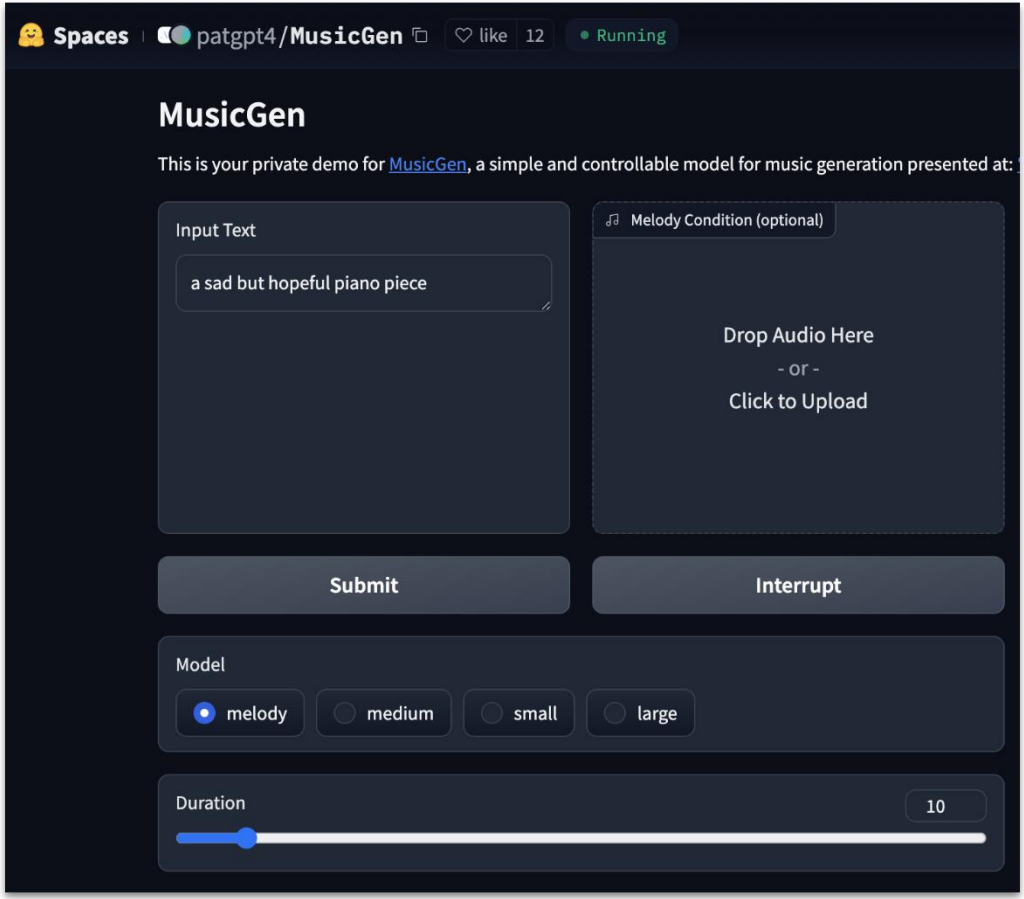


Model performance comparison

Model	NLL	Top-1	Top-5
vanilla	0.7445	0.7784	0.9513
discrete-token	0.7375	0.7885	0.9536
continuous-token	0.7122	0.7895	0.9545
continuous-concatenated	**0.7075**	**0.7913**	**0.9548**

- **NLL** (Negative Log-Likelihood): Error metric **lower value** means better.
- **Top-1 and Top-5 Accuracy**: Accuracy **metrics higher** value means better.

S. Sulun et al. Symbolic music generation conditioned on continuous-valued emotions. IEEE Access, 10:44617–44626, 2022.



Potential Impact & Outcomes

Goals: Introduces fine-grained, psychologically grounded emotion modeling into music generation.

Contributions: A VA-conditioned text-to-music framework enabling finer emotional control.

Deliverables: Micropublication, open-source code, interactive demo.

Impact: Advances emotion-aware AI music generation for potential applications of personalized media, therapy, and creative tools.

Work Plan & Timeline

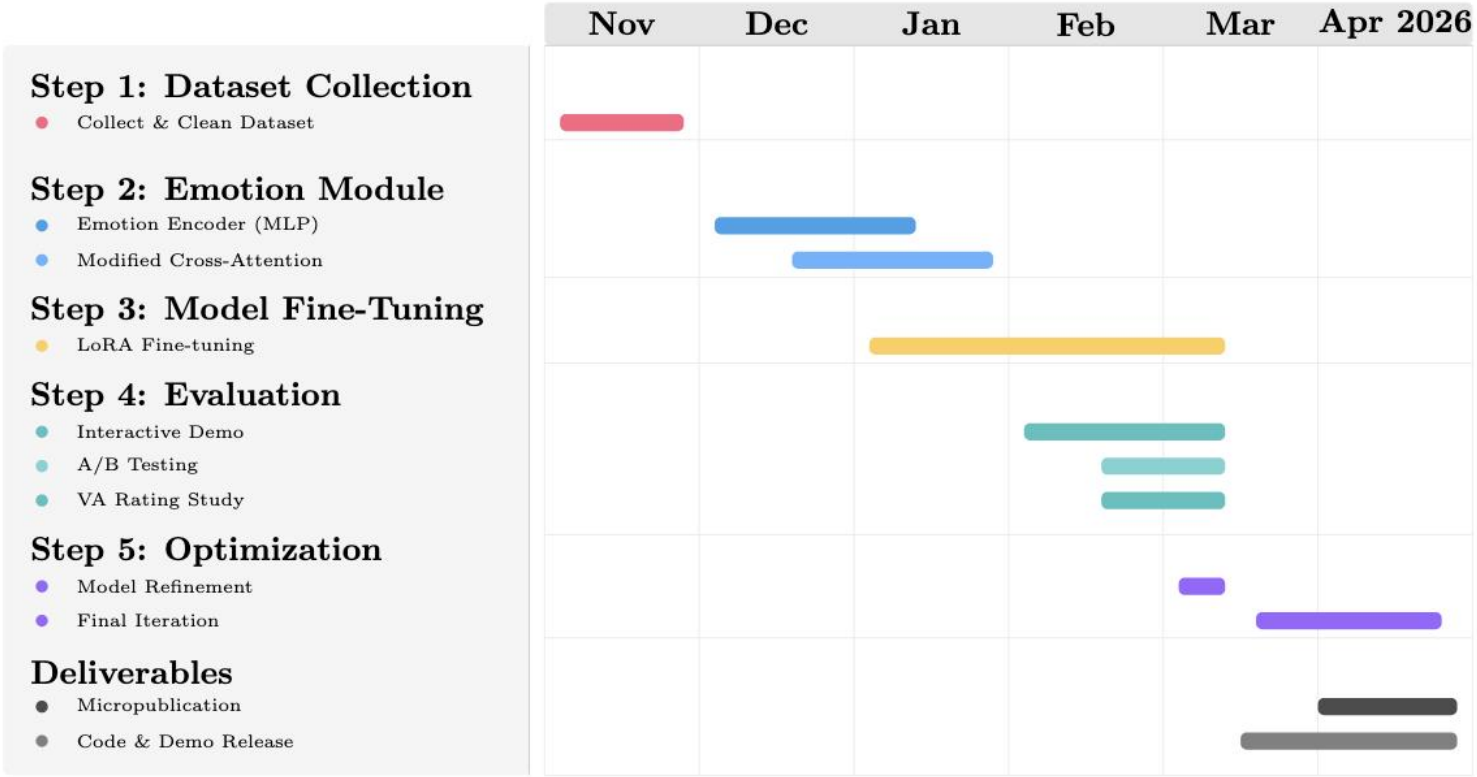


Figure 1: Project Gantt Chart: Nov 2025 - Apr 2026 Implementation Timeline