

# Fine-tuning emotion into sound

A fine-tuned LLM pipeline translating natural-language emotions into mood-based music recommendations

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# What we built



## Problem

Music recommendation systems lack emotional context



## Solution

A fine-tuned LLM that interprets natural language mood descriptions and suggests corresponding music

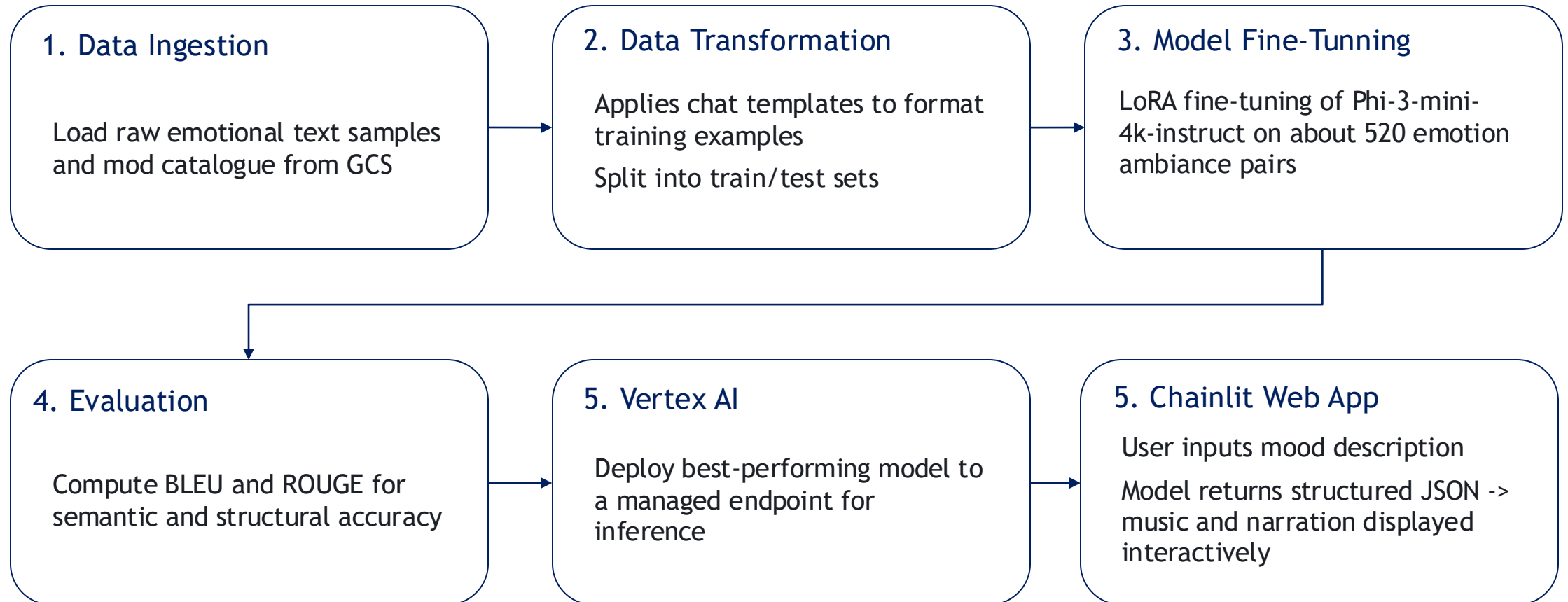


## Impact

Bridges emotion and sound to create personalised, mood-based music experiences

# System Architecture

End-to-end workflow connecting data processing, model training, and user interaction



# Data

We adapted a general-purpose language model to interpret emotional language contextually and generate structured, mood-based outputs for personalized music recommendations

## Mood samples dataset:

- Custom dataset of ~520 samples
- List of sentences linked to an emotion

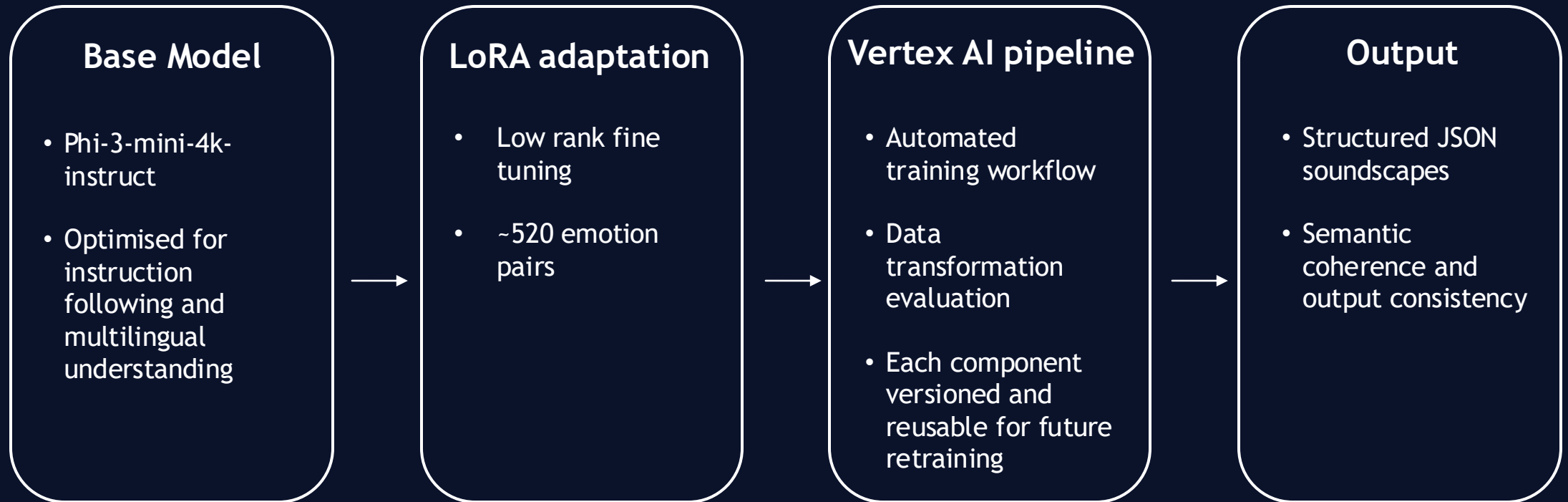
Field	Description
user_text	Natural language description of the user's mood or emotional state
mood_id	Target emotion label corresponding to one of the 12 moods

## Mood catalogue dataset:

- 12 core emotional states defining the target mood taxonomy
- Each mood linked to curated audio references

Field	Description
mood_id	Unique mood identifier
file_uri	Path to the curated audio file in the Google Cloud Storage bucket

# Model Adaptation





# Evaluation and Results

We evaluated the fine-tuned model’s ability to generate structured and emotionally coherent outputs

## Quantitative Metrics

Metric	Description	Result
BLEU	Measures precision how many predicted words match the reference	0.258
ROUGE	Measures recall how much of the reference content is captured	0.520

## Outcomes

- The model captures the correct emotional meaning even when using different wording.
- Balanced BLEU and ROUGE scores show good emotional alignment with natural variation.
- Indicates the model is not memorizing – it’s generalizing emotional patterns correctly.

# Demo

# Next Steps



## Expand and diversify the dataset

- Add more nuanced emotional expressions and mixed moods
- Collect multilingual examples to improve robustness



## Enhance model capabilities

- Test larger base models for richer emotional mapping
- Improve fine-tuning quality through parameter optimisation



## Application Development

- Implement real-time lighting synchronization, colour changes appear dynamically after each prompt
- Improve Chainlit interface design and responsiveness



## Evaluation Improvements

- Introduce human evaluation for emotional alignment
- Develop a custom emotion consistency metric