Human-Centered AI for Music

Hao-Wen (Herman) Dong

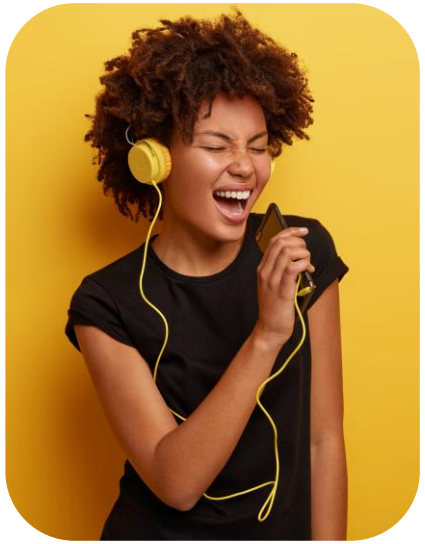
Department of Performing Arts Technology
School of Music, Theatre & Dance
University of Michigan
hermandong.com

October 28, 2026

How can AI Support Novice A Cappella Singers?



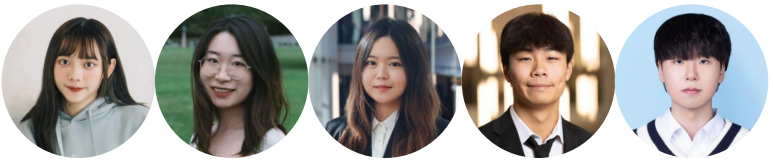
Annapella
(A cappella group at U-M, since 2016)



How can we best support a novice a cappella singer in practicing their singing skills?

U-M has the largest collegiate a cappella community in the US, with more than 15 groups!

Formative Study



- Interviewed **12 a cappella singers** (including beginners & professionals)

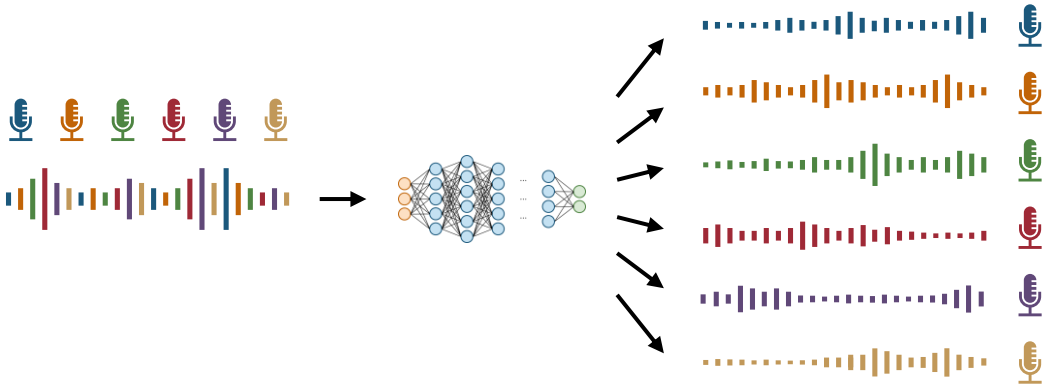
- **Four design goals** identified
  - **Simulating an authentic group singing context** during individual practice
  - **Offering intuitive, context-aware feedback** on the users' recordings
  - **Assisting a sensemaking of the "big picture"** (patterns & links between parts)
  - **Placing human creativity at the center** as an assistive tool

Goals



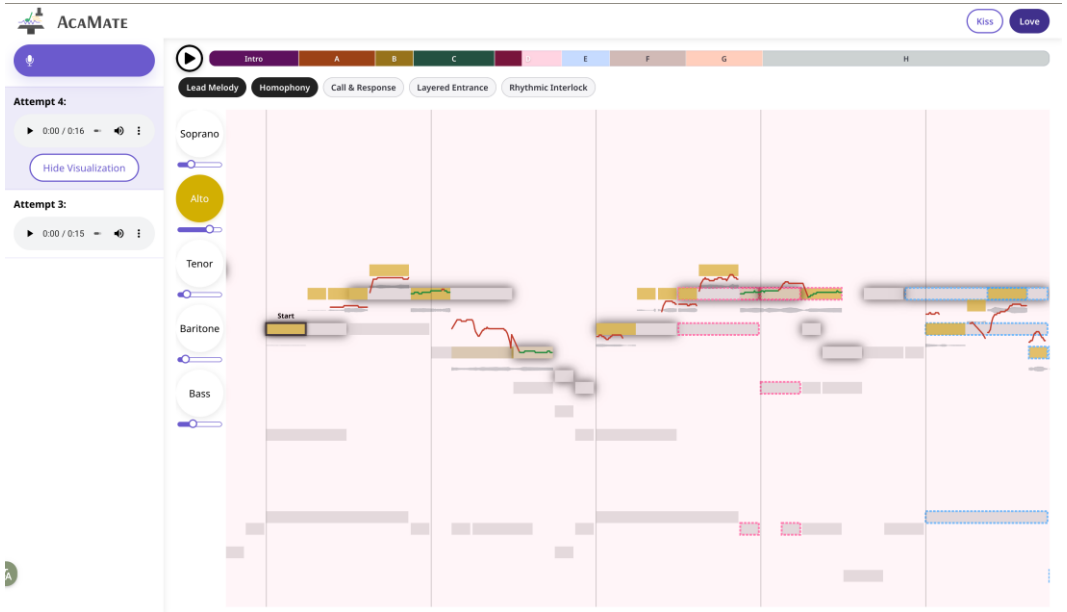
AcaSep

Source separation for a cappella music



AcaMate

AI-powered a cappella practice interface

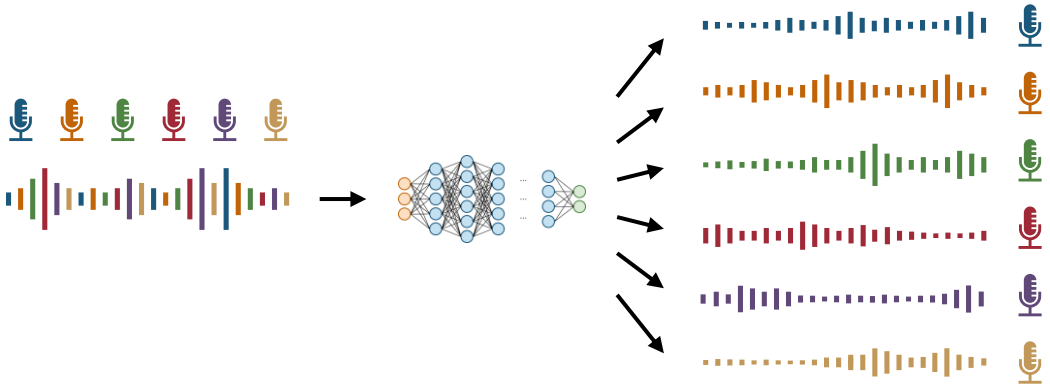


Goals



AcaSep

Source separation for a cappella music

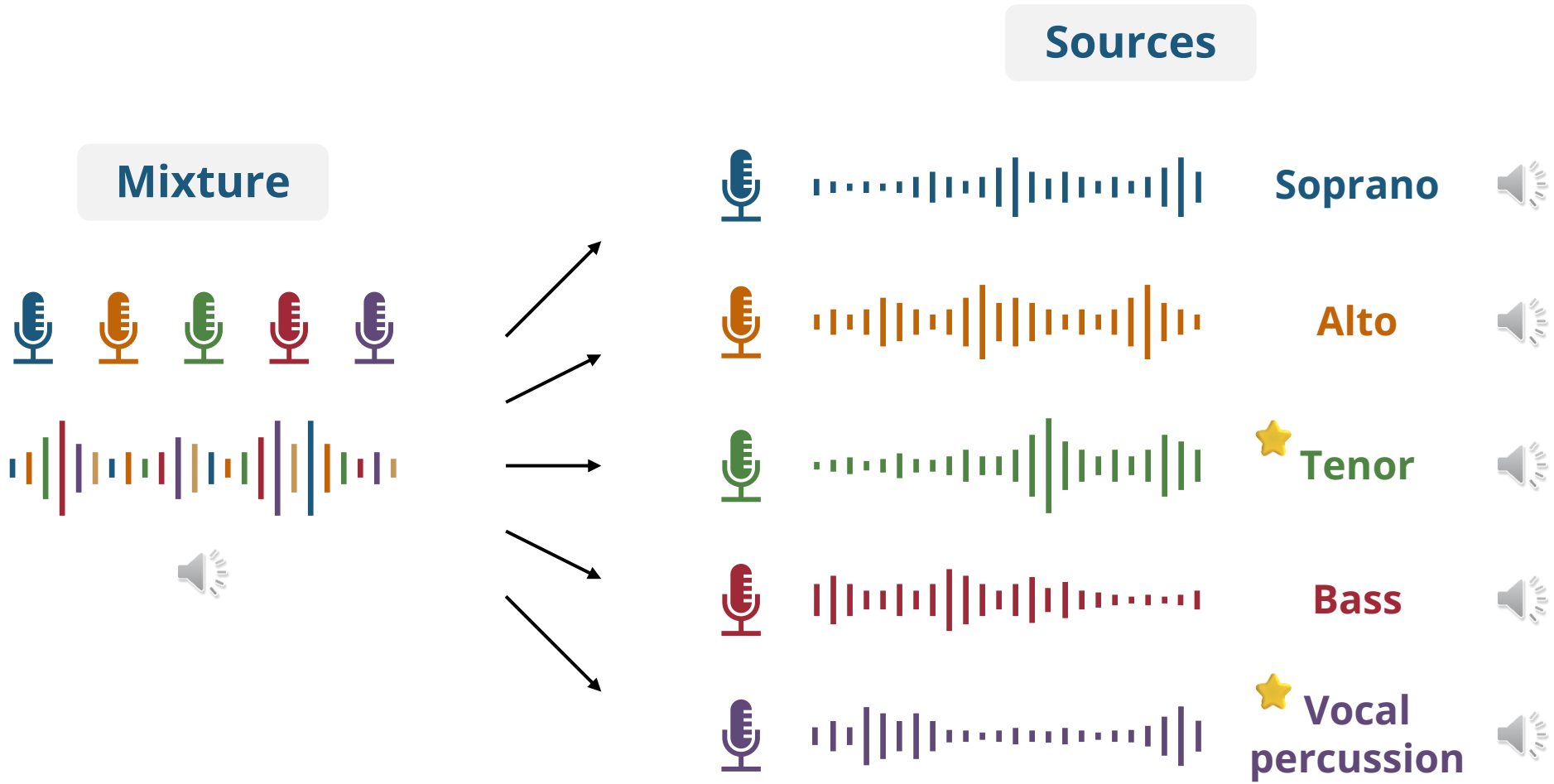


AcaMate

AI-powered a cappella practice interface

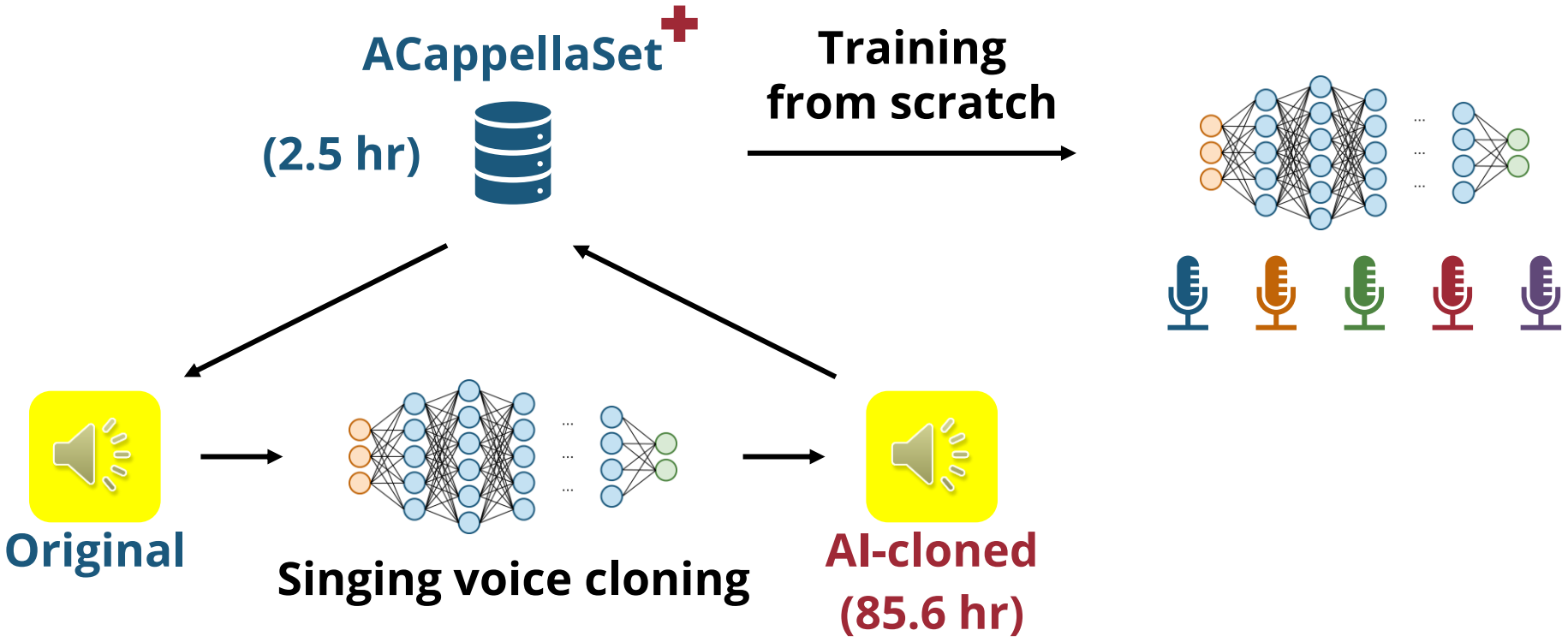
AcaSep: Source Separation





Generative AI-based Data Augmentation





Generative AI-powered data augmentation improves the source separation model's generalizability

Goals

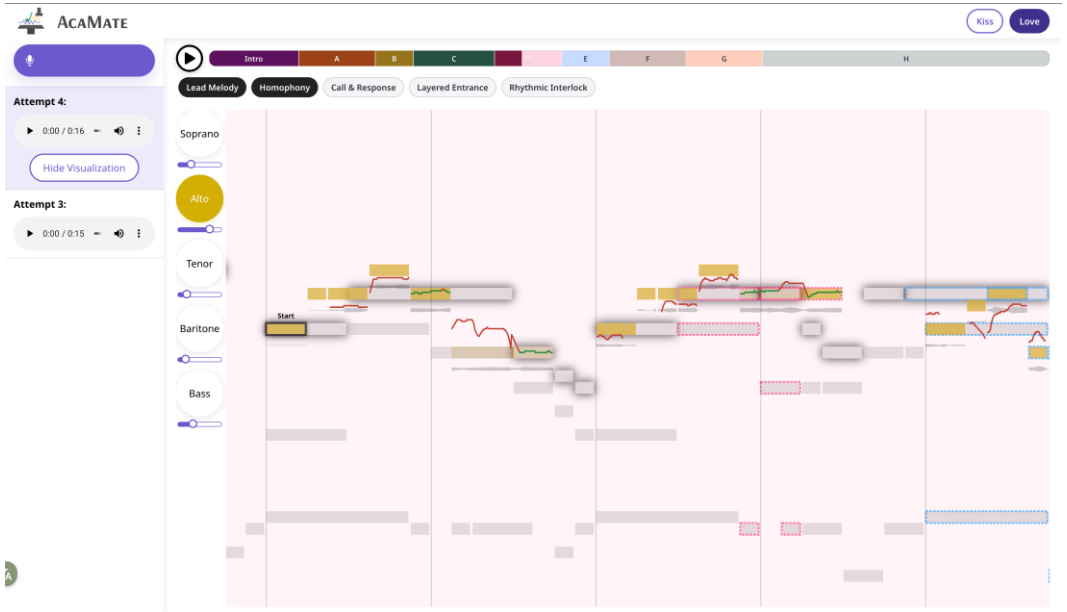


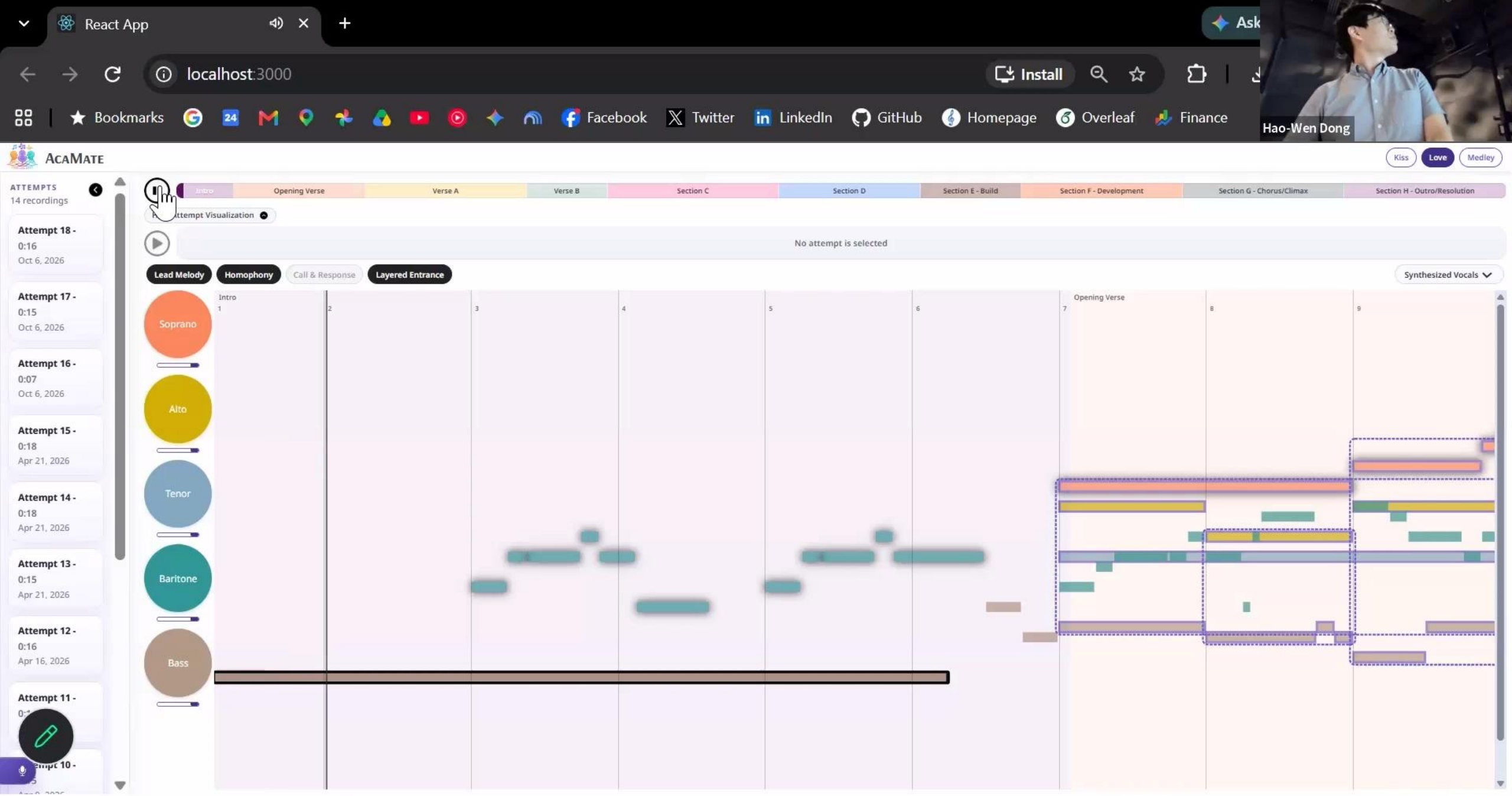
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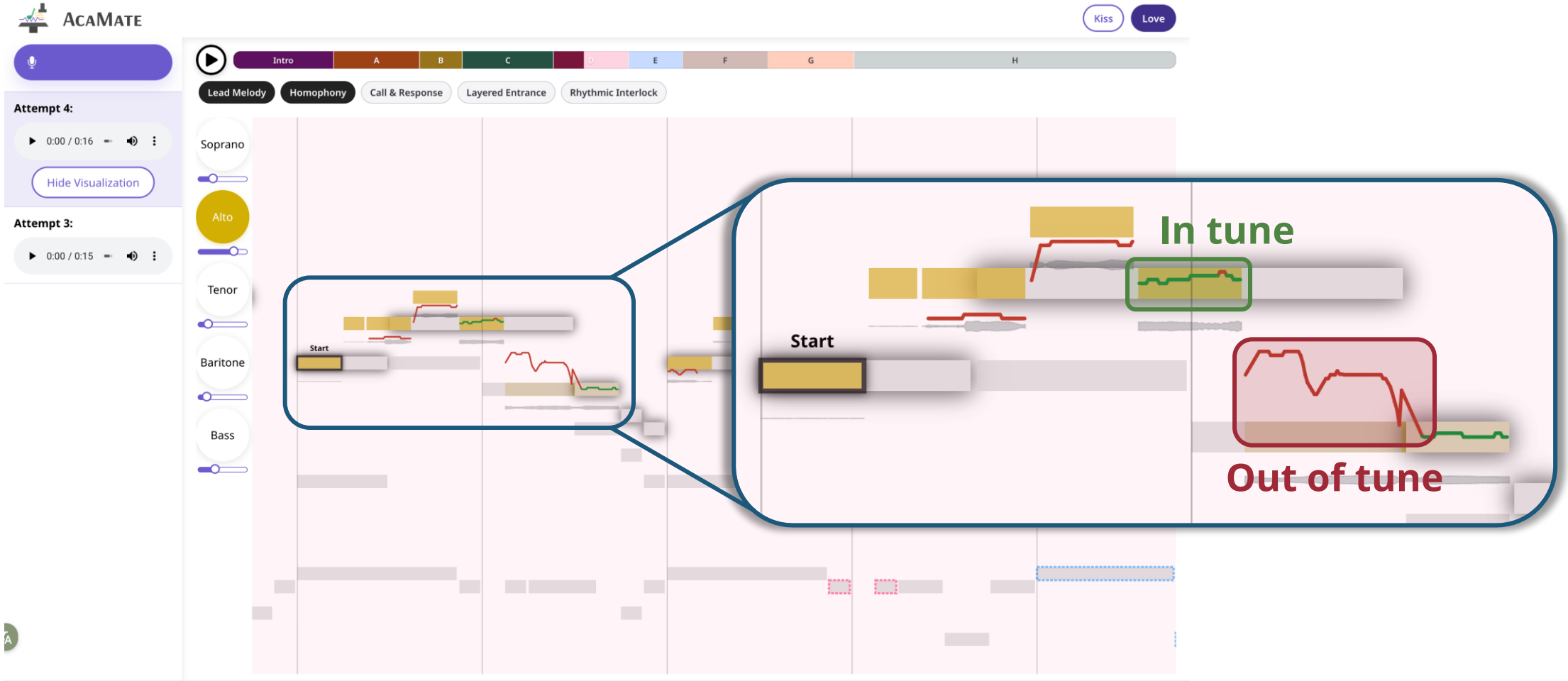
AI-powered a cappella practice interface



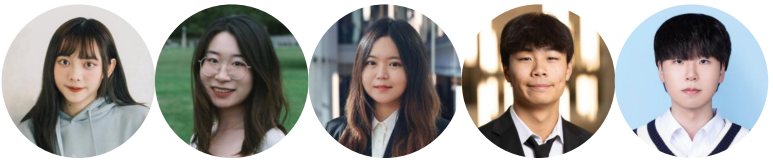

React App
localhost:3000
Install
Bookmarks
Facebook
Twitter
LinkedIn
GitHub
Homepage
Overleaf
Finance
Hao-Wen Dong
AcaMate
Kiss
Love
Medley
ATTEMPTS
14 recordings
Attempt 18 - 0:16 Oct 6, 2026
Attempt 17 - 0:15 Oct 6, 2026
Attempt 16 - 0:07 Oct 6, 2026
Attempt 15 - 0:18 Apr 21, 2026
Attempt 14 - 0:18 Apr 21, 2026
Attempt 13 - 0:15 Apr 21, 2026
Attempt 12 - 0:16 Apr 16, 2026
Attempt 11 -
Intro
Opening Verse
Verse A
Verse B
Section C
Section D
Section E - Build
Section F - Development
Section G - Chorus/Climax
Section H - Outro/Resolution
Attempt Visualization
No attempt is selected
Lead Melody
Homophony
Call & Response
Layered Entrance
Synthesized Vocals
Soprano
Alto
Tenor
Baritone
Bass
Intro
Opening Verse
1
2
3
4
5
6
7
8
9

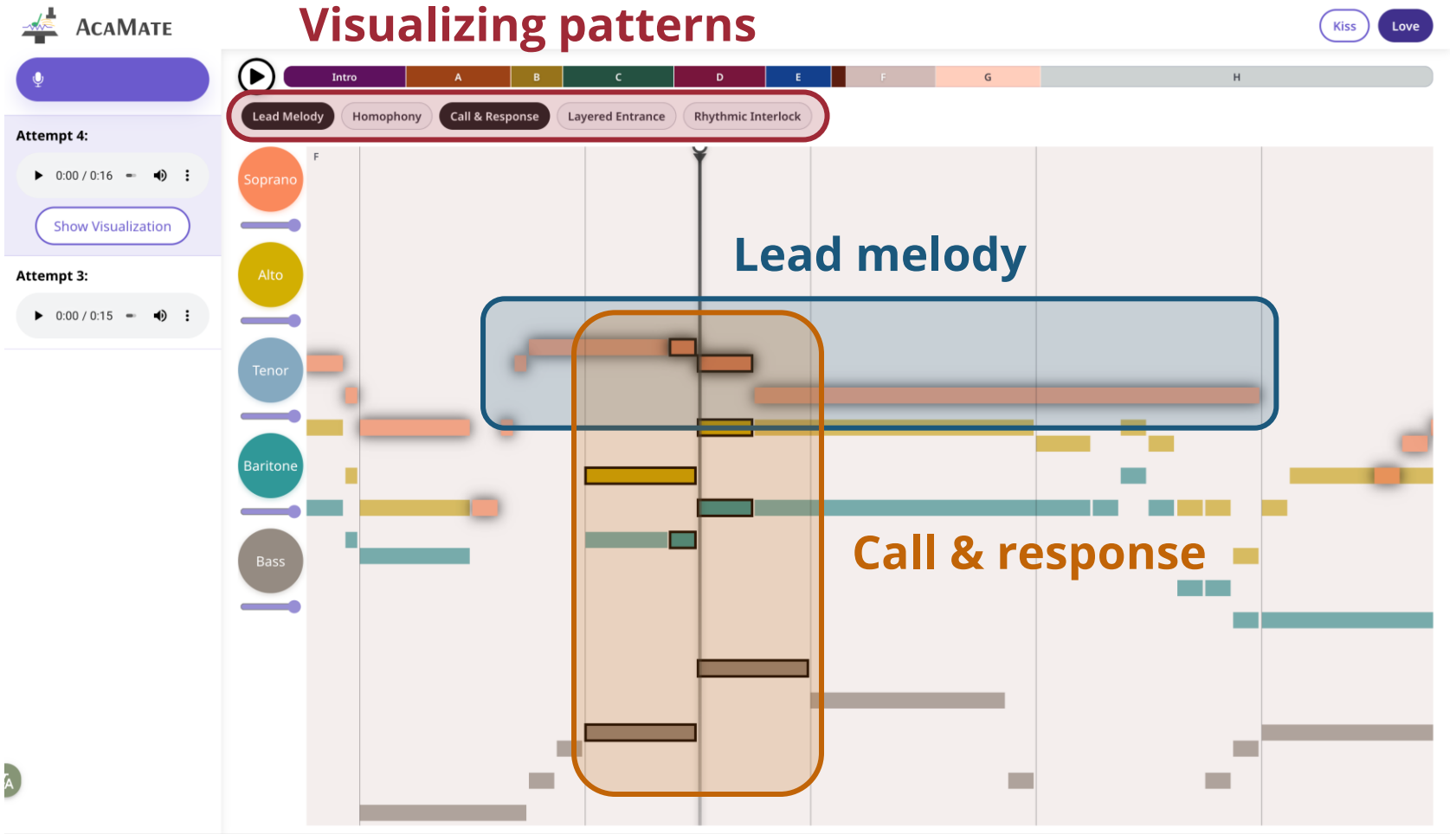
AcaMate: Pitch Estimation





AcaMate: Pattern Visualization

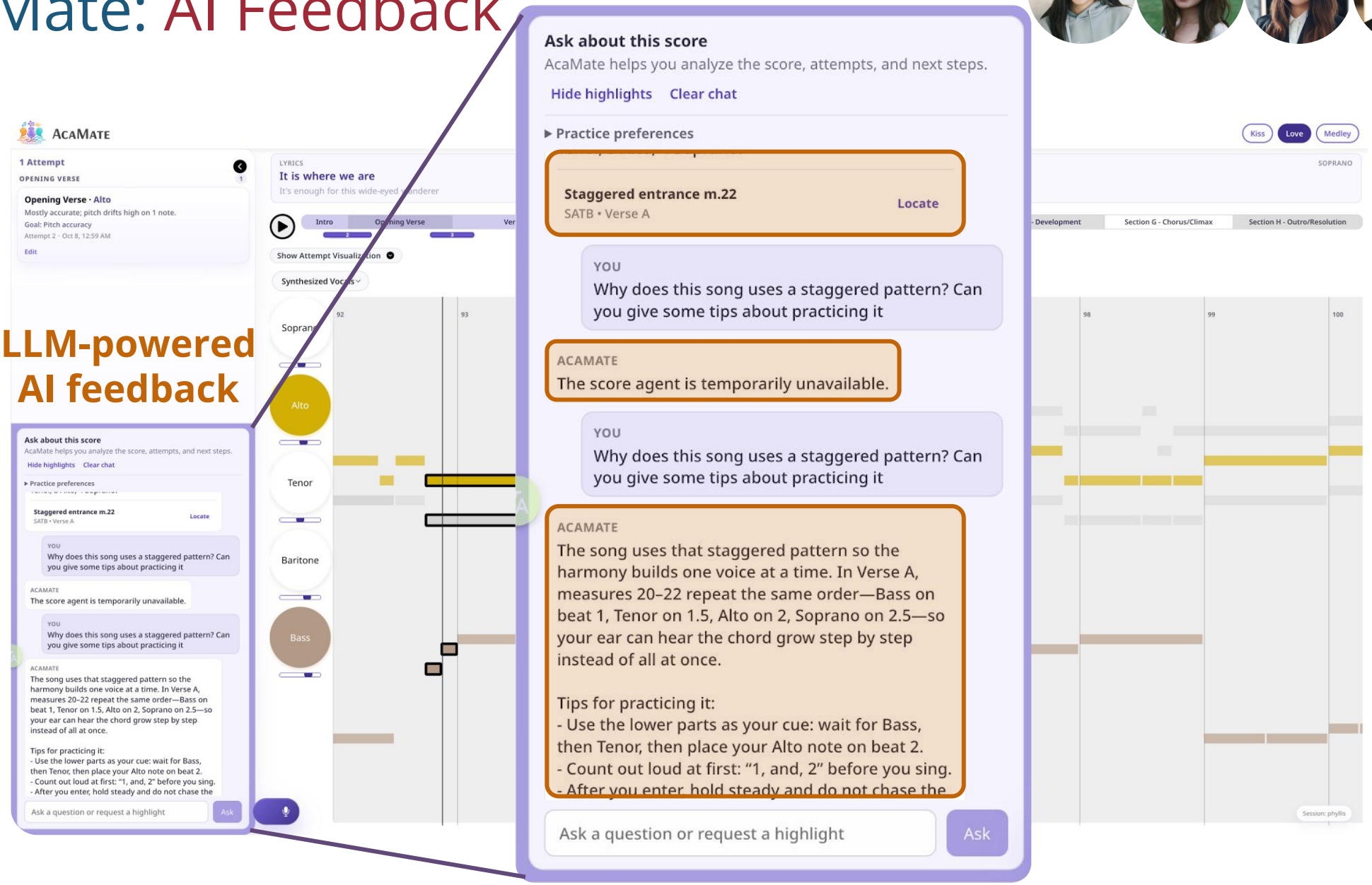




AcaMate: AI Feedback



LLM-powered AI feedback

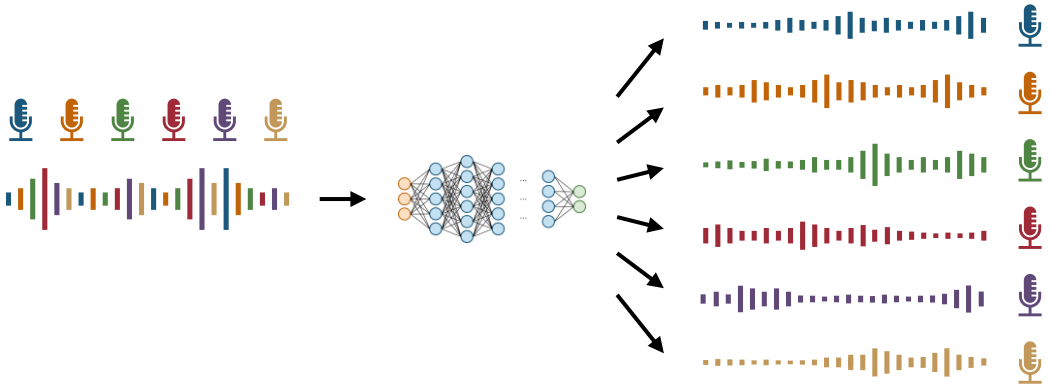


Goals



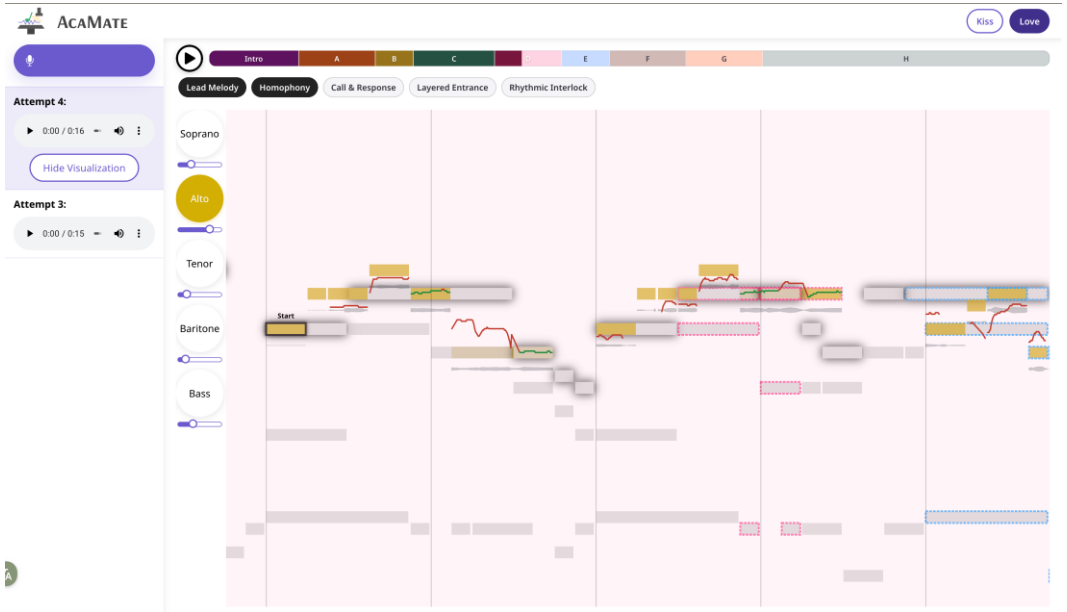
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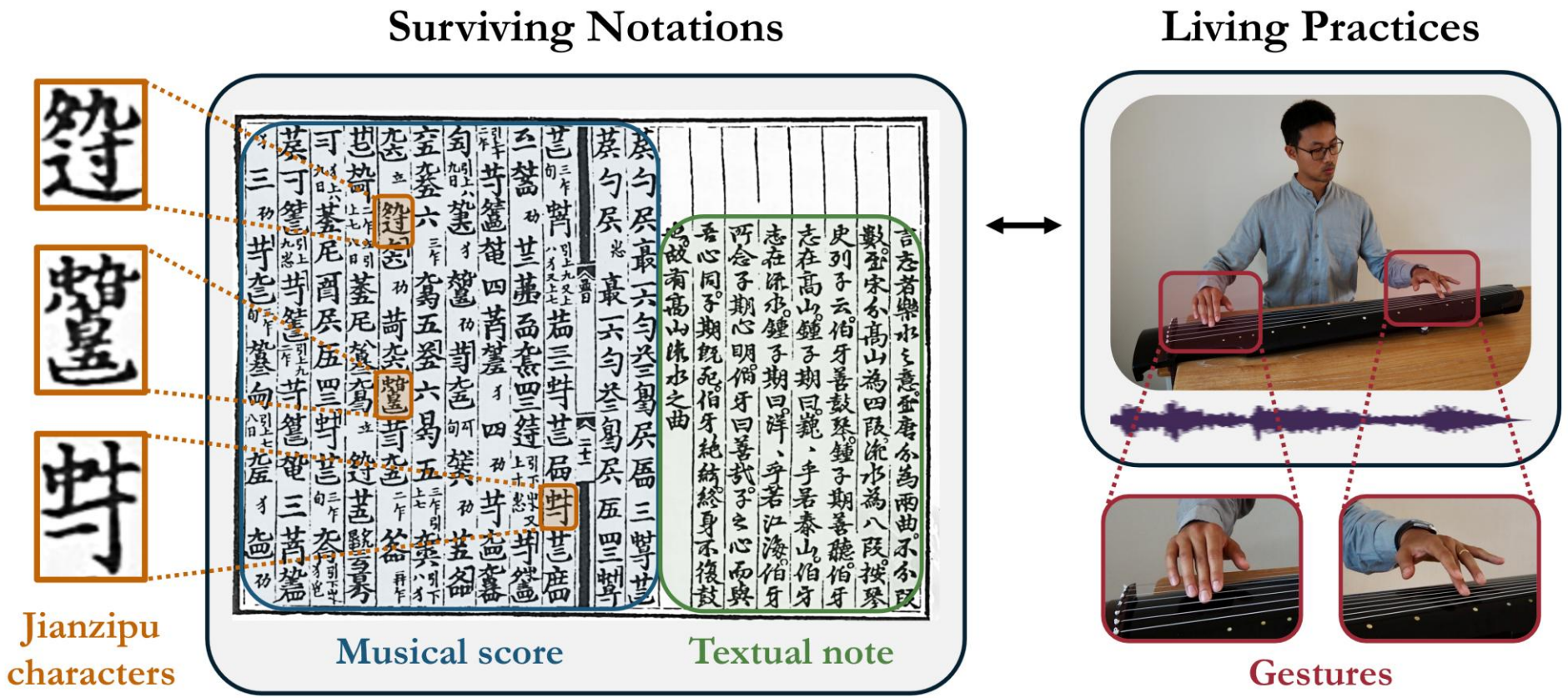
AcaMate

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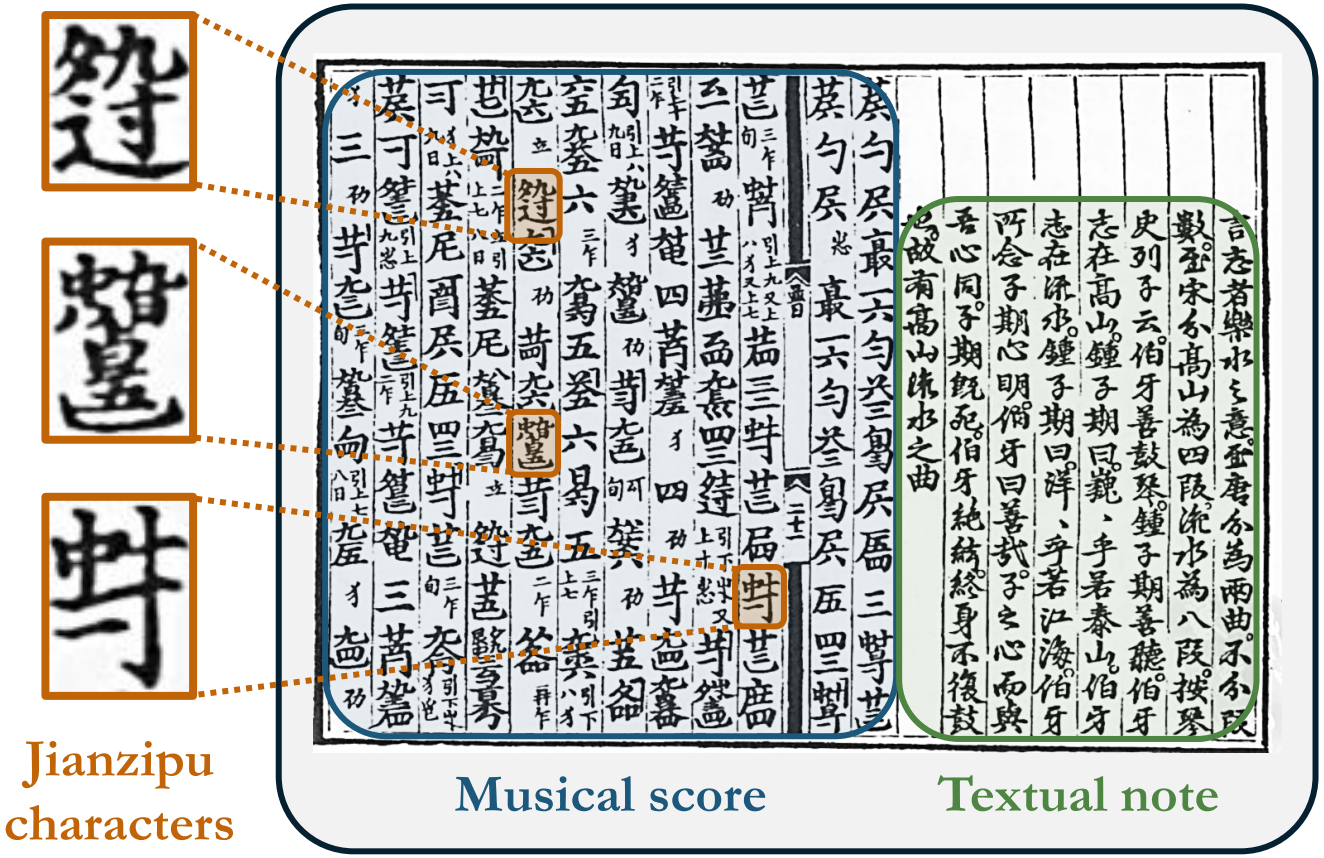
Strokes of Sonic Tradition

Retracing Surviving Guqin Notations and Practices

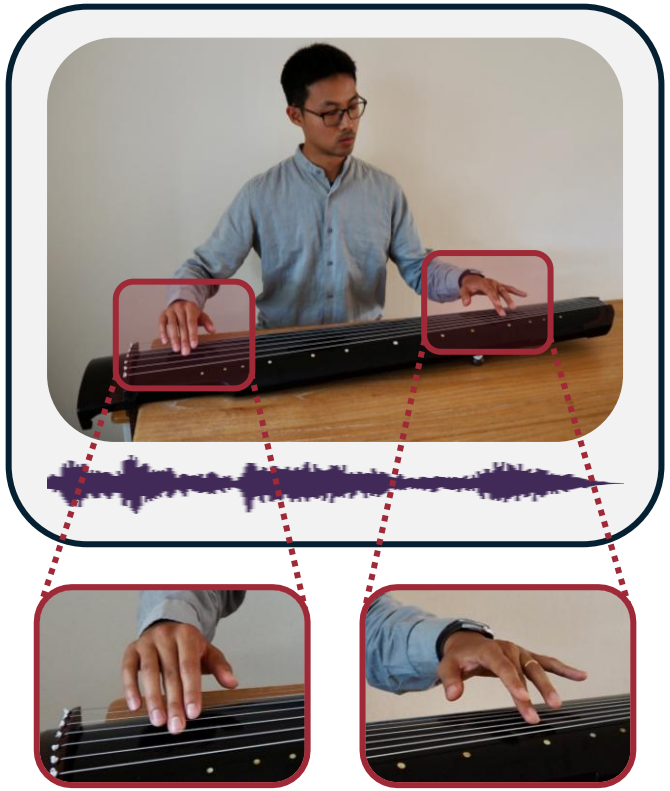


Surviving Corpus & Living Practices

Surviving Notations



Living Practices

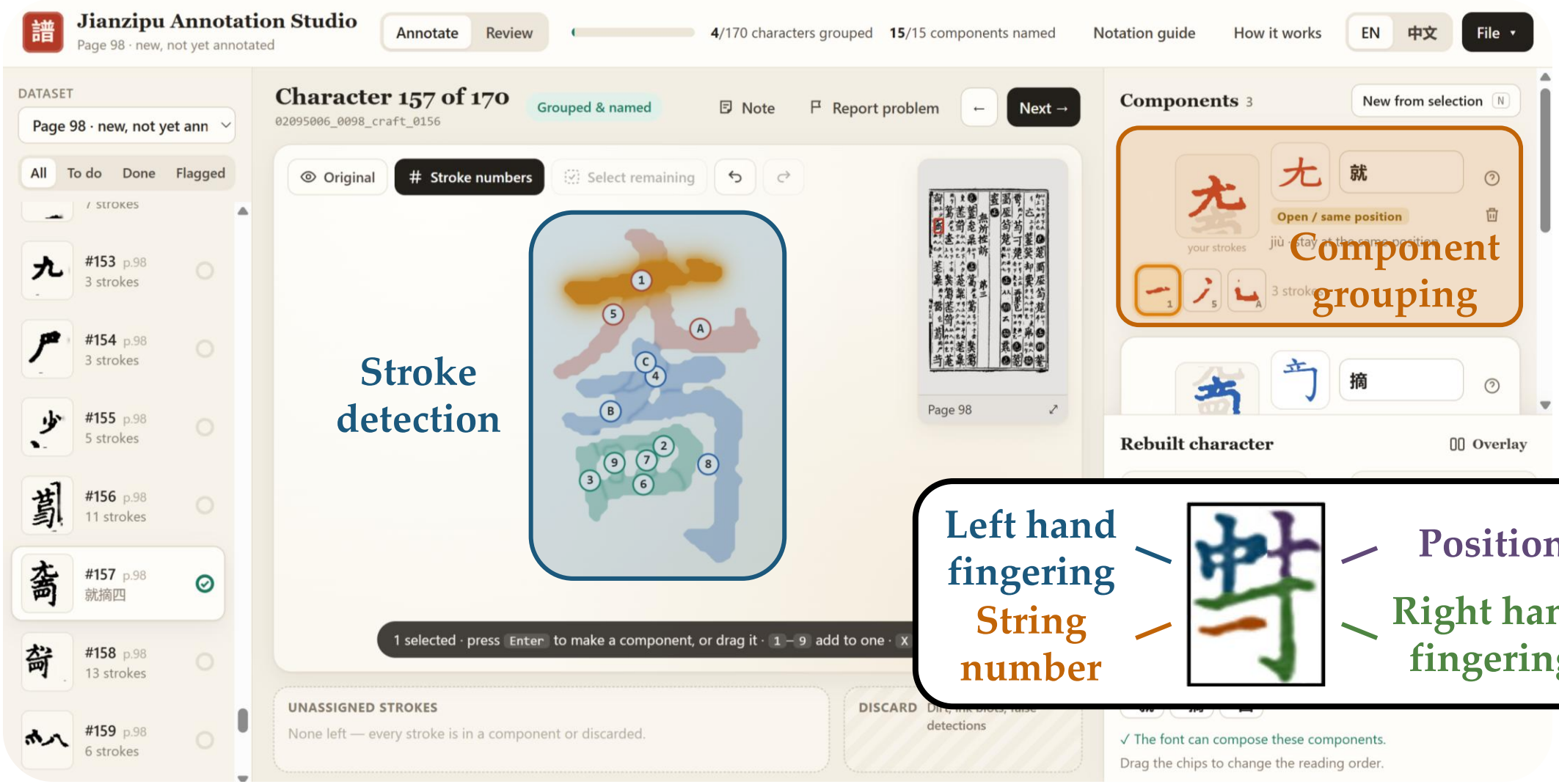


3,000-10,000 titles, 15,000+ pages

Pictured playing the guqin is Ming Wilson, PhD student in music theory at the University of Michigan and member of the project team.

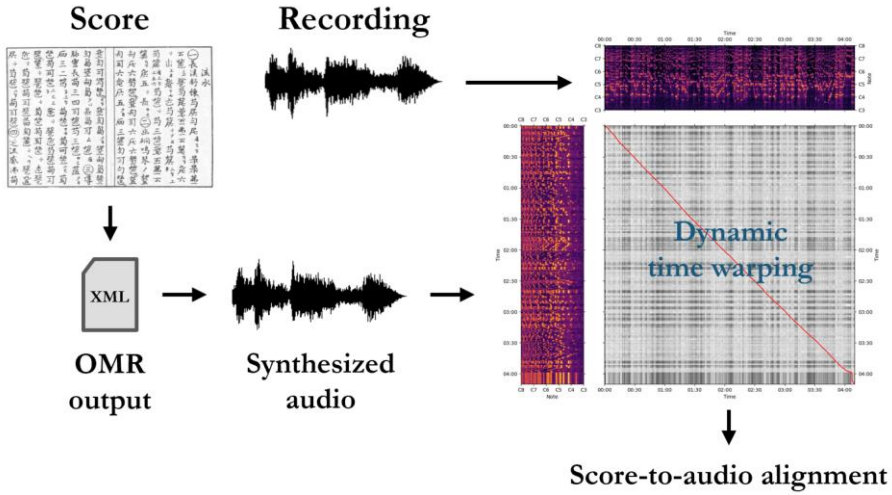
AI-assisted Jianzipu Annotation Tool

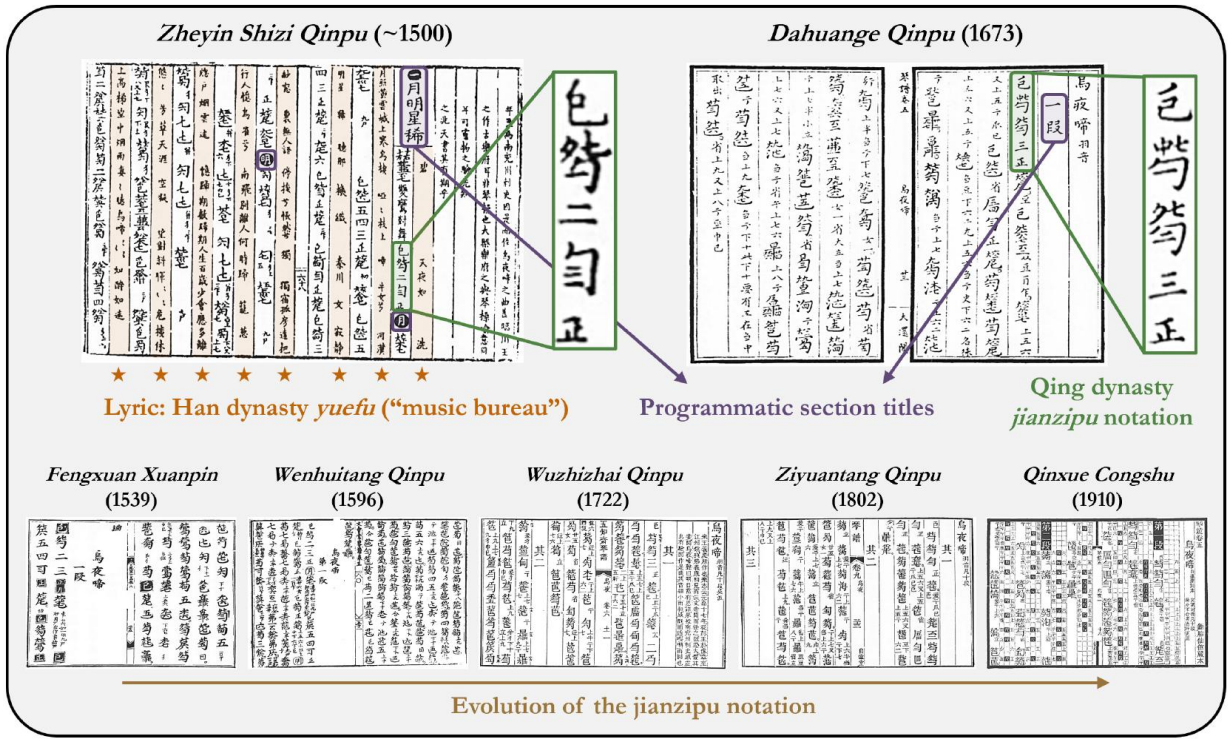


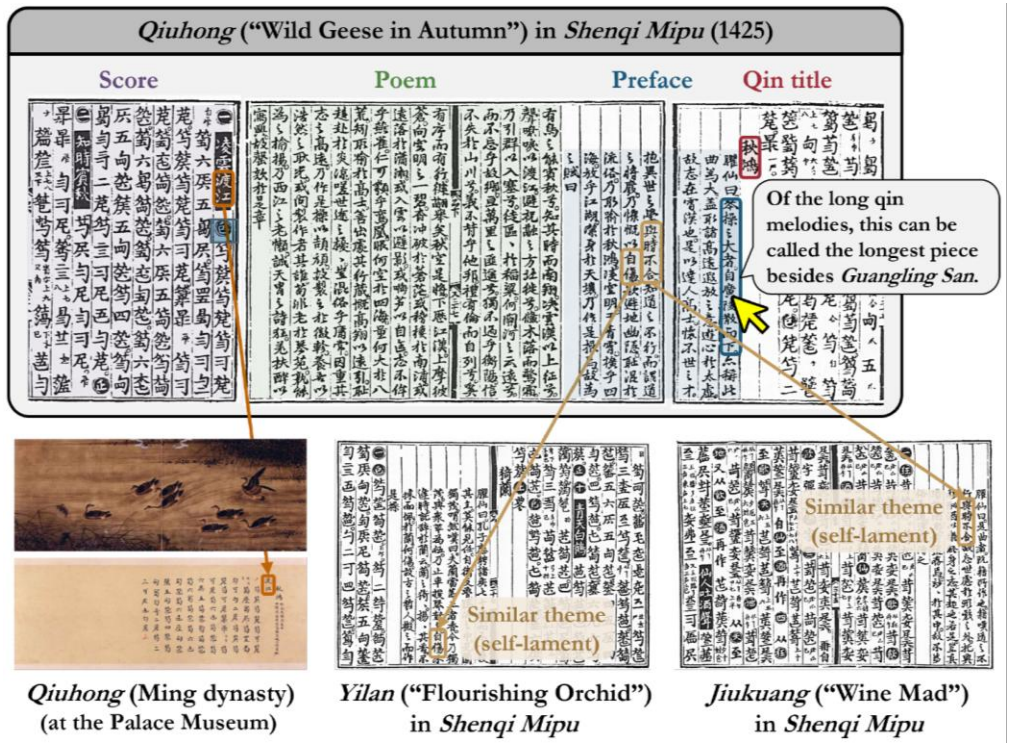


Strokes of Sonic Tradition









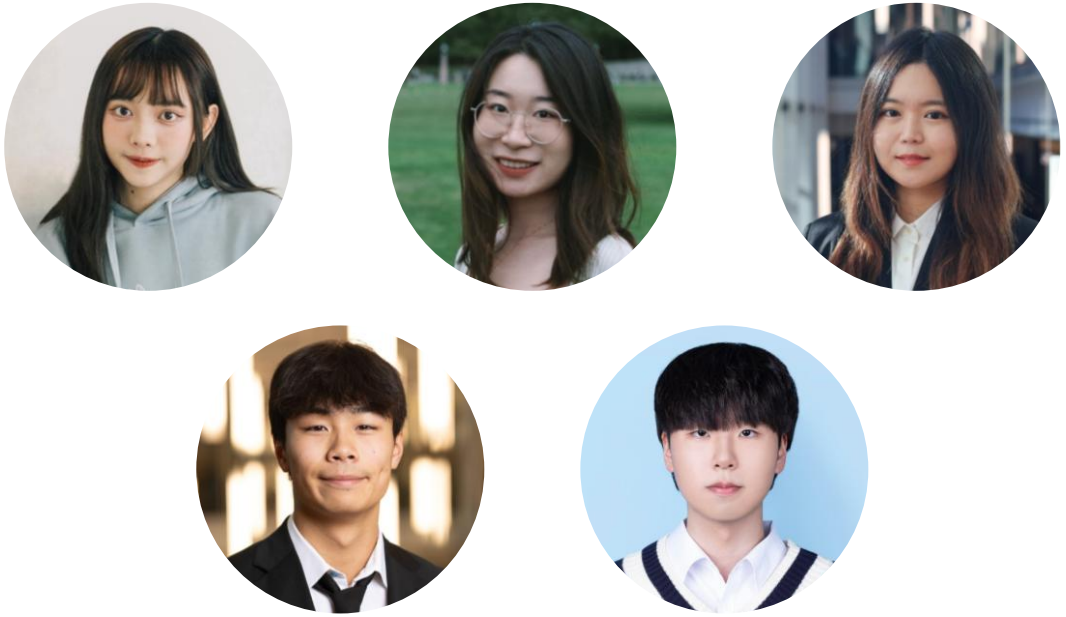
Acknowledgment

- The “Strokes of Sonic Tradition” project has been supported by a **Humanities and AI Virtual Institute (HAVI)** grant from **Schmidt Sciences**.

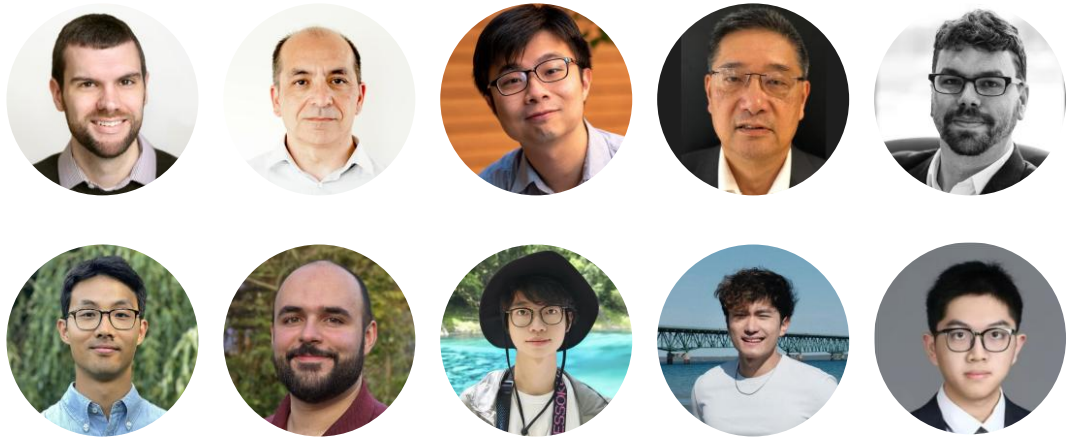


Human-Centered AI for Music

AcaMate Team



Strokes of Sonic Tradition Team



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