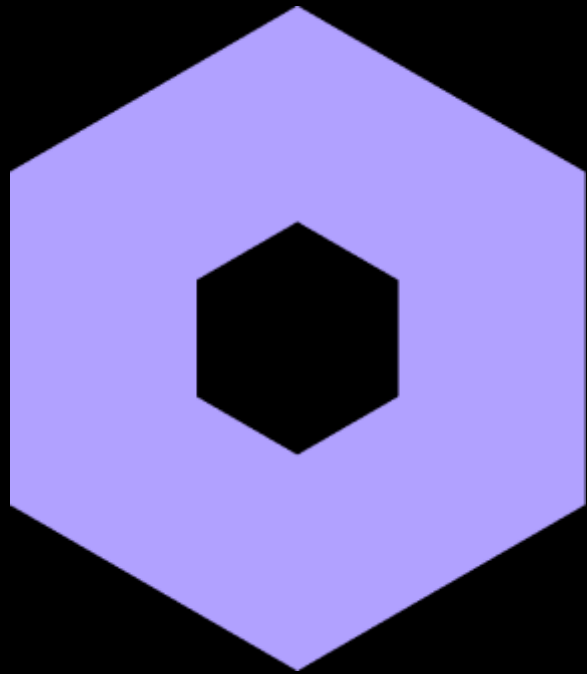


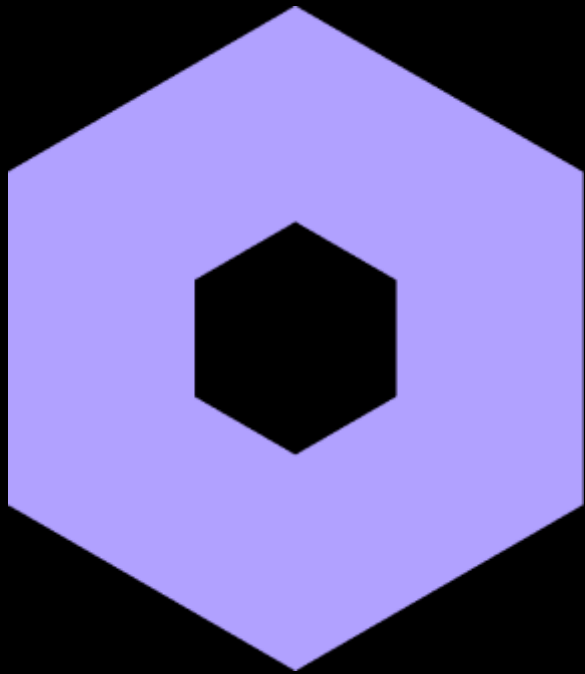
AMIS 2025



Rethinking Musical Instrument Classification: Accounting for AI Semantic Interfaces

Zhiyu (Alex) Zhang

Incoming PhD student in Information Science at the
University of Washington



*What counts as an
instrument today?*



Historical Perspectives on Musical Instrument Classification



Ancient China

Eight notes (ba yin/八音): stone, earth (pottery), bamboo, metal, skin, silk, wood, and gourd.





Ancient India

Natya Shastra by Bharat Muni: Avanaddha Vadya (percussion instruments), Ghan Vadya (solid instruments), Sushir Vadya (wind instruments), and Tat Vadya (stringed instruments).





Hornbostel–Sachs System

1. Victor–Charles Mahillon first proposed four classes of musical instruments based on material cause of sound
2. Hornbostel and Sachs (H–S) later expanded on Mahillon's ideas
3. The H–S system became the most universally taught taxonomy

TIME (not to scale)

Traditional 3-
category system*

Strings

Wind

Percussion

Mahillon
(1880)

Instruments
autophones

Instruments à
membranes

Instruments
à vent

Instruments à
cordes

Hornbostel-
Sachs (1914)

Idiophone

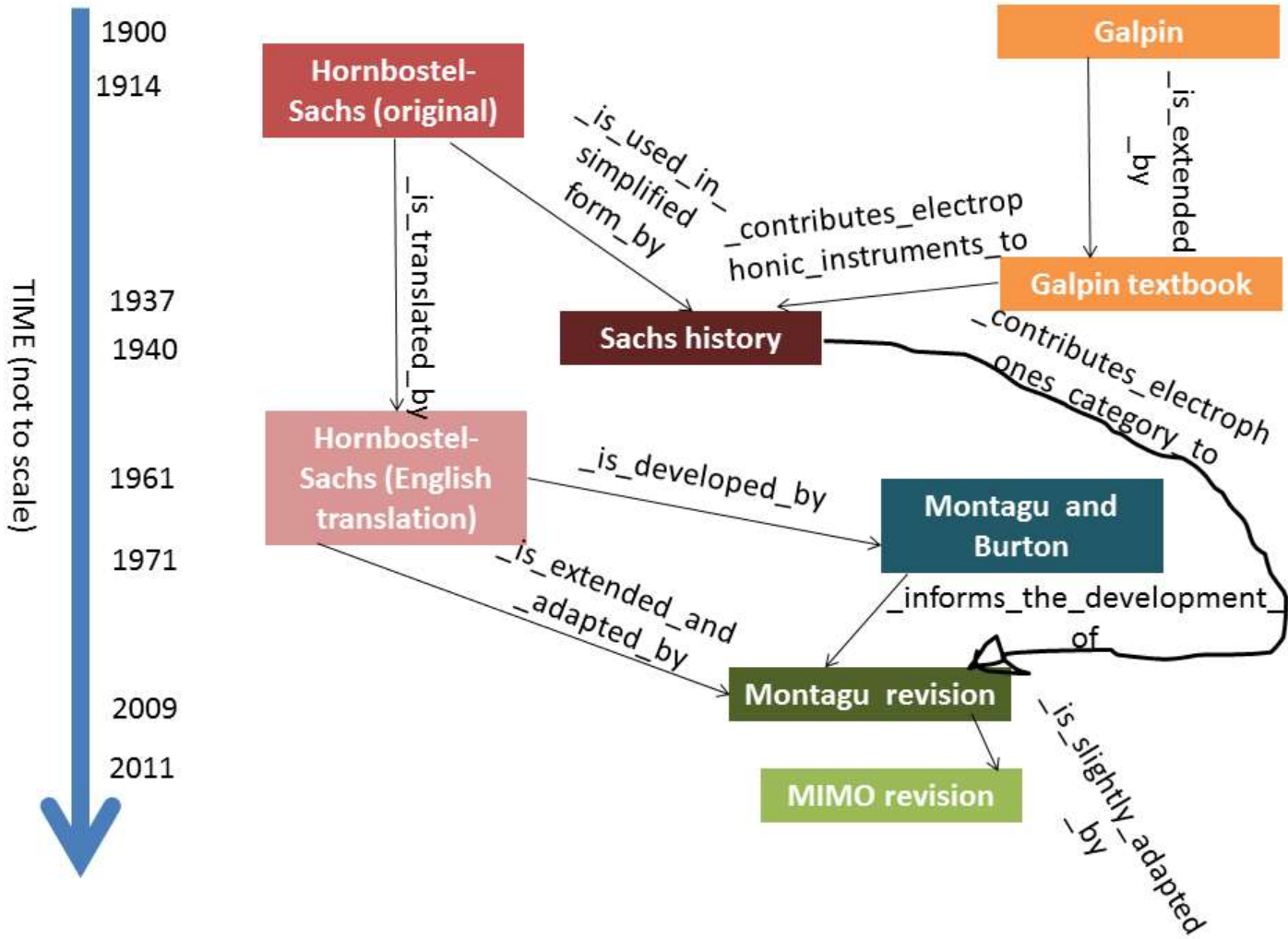
Membranophone

Chordophone

Aerophone

*Strings and wind could be in either order, but percussion is likely to be the last category – see Lee (2017b)







Hornbostel–Sachs System, Continued

1. Organological taxonomy has never been completely static.
2. Interfaces significantly influence how instruments are perceived and classified.



The Rise of AI (Semantic) Musical Instruments



Digital Musical Instruments (DMIs)

The decoupling of the control interface from the sound generator!



Digital Musical Instruments (DMIs)

The decoupling of the control interface from the sound generator!



New Interfaces for Musical Expression (NIME)



Traditional taxonomy struggled to capture these new realities, prompting multidimensional approaches like those explored by NIME researchers...

Jukebox

We're introducing Jukebox, a neural net that generates music, including rudimentary singing, as raw audio in a variety of genres and artist styles. We're releasing the model weights and code, along with a tool to explore the generated samples.

[📄 READ PAPER](#)[🔗 VIEW CODE](#)

April 30, 2020
12 minute read, 10 day listen





SUNO

Custom

Upload Audio

v3.5

Song description ⓘ

Instrumental

a romantic funk song about dancing with you for the last time

0 / 200

Create

Need ideas?

2024 Olympics

Make a song to cheer your country on at the 2024 Summer Olympics.

Rain Day v3.5

melodic pop acoustic

Extend Public

Rain Day v3.5

melodic pop acoustic

Extend Public

Sail Away v3.5

acoustic soothing soft rock

Extend Public

Sail Away v3.5

acoustic soothing soft rock

Extend Public

Love on the Rocks v3.5

electric rock

Extend Public

Love on the Rocks v3.5

electric rock

Extend Public

Laugh Out Loud v3.5

pop comedy

Extend Public

Rain Day

BaffledCrustpunk456

00:03 / 02:08

👍 🗣️ 🔄 ⋮ 🔊

Rain Day

melodic pop acoustic

BaffledCrustpunk456

2 August 2024 at 5:55

👍 🗣️ 🔄 ⋮

[Verse]
Rain drops on my face
Gray clouds in the sky
No sun to light my way
Just you and I

[Verse 2]
Cold breeze in my hair
Puddles on the ground

16



Demo

“A smooth, elegant jazz–bossa nova theme celebrating AMIS 2025: warm nylon guitar, soft brushed drums, and laid–back piano… Evokes curiosity, craftsmanship, and the timeless charm of musical instruments across cultures.”



Human – AI Collaboration: AI as Epistemic Tools



Human role: **Performer** → **Curator**

Direct execution → Iterative aesthetic steering

Tool → Partner

Humans handle everything → AI handles micro;

Humans handle macro



Towards a New Taxonomy



Attempt 1: Hornbostel–Sachs System

In the H–S system, AI musical instruments would fall into:

53 (electrophones) = instruments in which make sound primarily by way of electrically driven oscillators

Instrument	Sound Production	Control Interface	Classification (H-S)
Theremin	Electronic oscillator	Hand gestures	Electrophone
MusicLM	AI-generated audio	Natural language prompt	Electrophone (flawed)



Algophone?
Informophone?



Attempt 2: Magnusson's Multidimensional Framework

Instruments exist along several dimensions:

1. Sound production: acoustic / electric / algorithmic
2. Interface: physical / gestural / semantic
3. Autonomy: passive / responsive / generative
4. Material: object-based / software-based / hybrid

Instrument	Interface	Sound Source	Autonomy
Violin	Manual	Acoustic strings	None
Synthesizer	Tactile/MIDI	Oscillator	Low
MusicLM	Semantic	Neural network audio	High



What I AM NOT Proposing...

- Completely discarding Hornbostel–Sachs or traditional classifications
- Suggesting that all instruments require AI or semantic interfaces
- Overcomplicating classification beyond practical use



What I AM Proposing...

Is to account for AI semantic interfaces.



Thank You!