



cadenza

# Future challenges CAD2 2024

<https://tinyurl.com/CadenzaChallenge>



Engineering and  
Physical Sciences  
Research Council



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Nottingham



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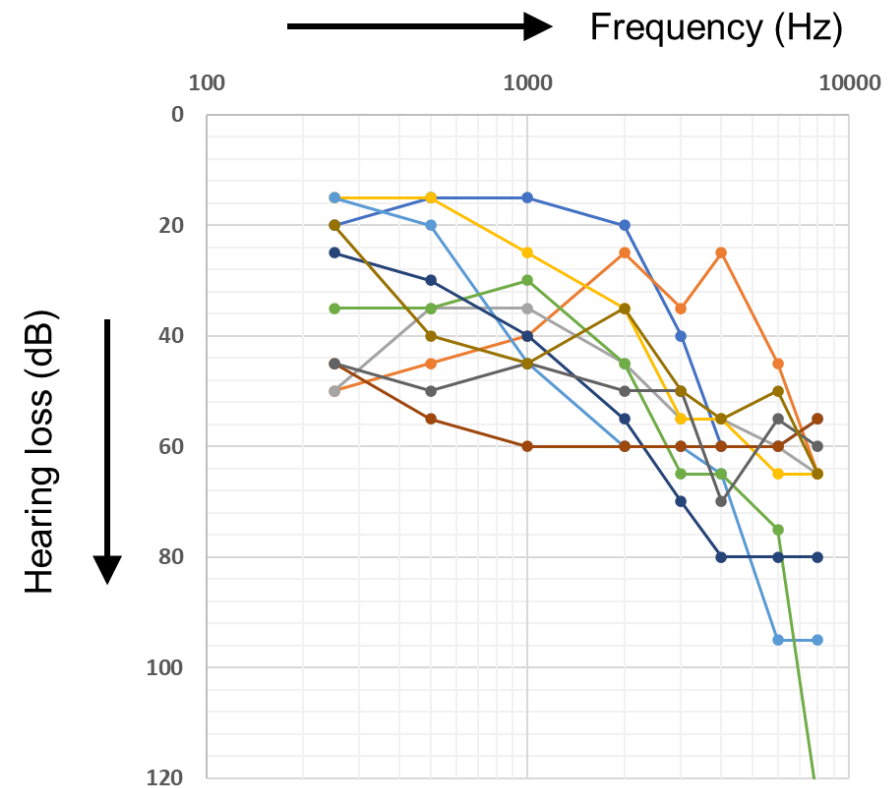
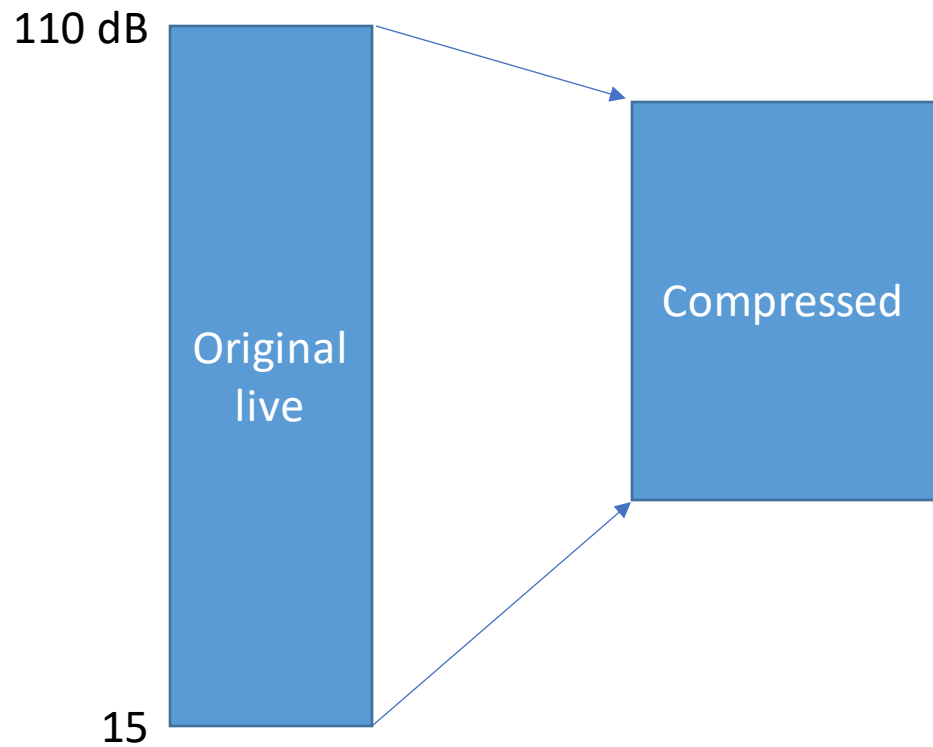
# Possible CAD2 tracks



1. Demixing/remixing. Continuity track from CAD1 and ICASSP 2024
  - Causal, low-latency to work on hearing aids.
  - Waiting to see results from ICASSP 2024.
2. Loudness/dynamic range
3. Lyric intelligibility

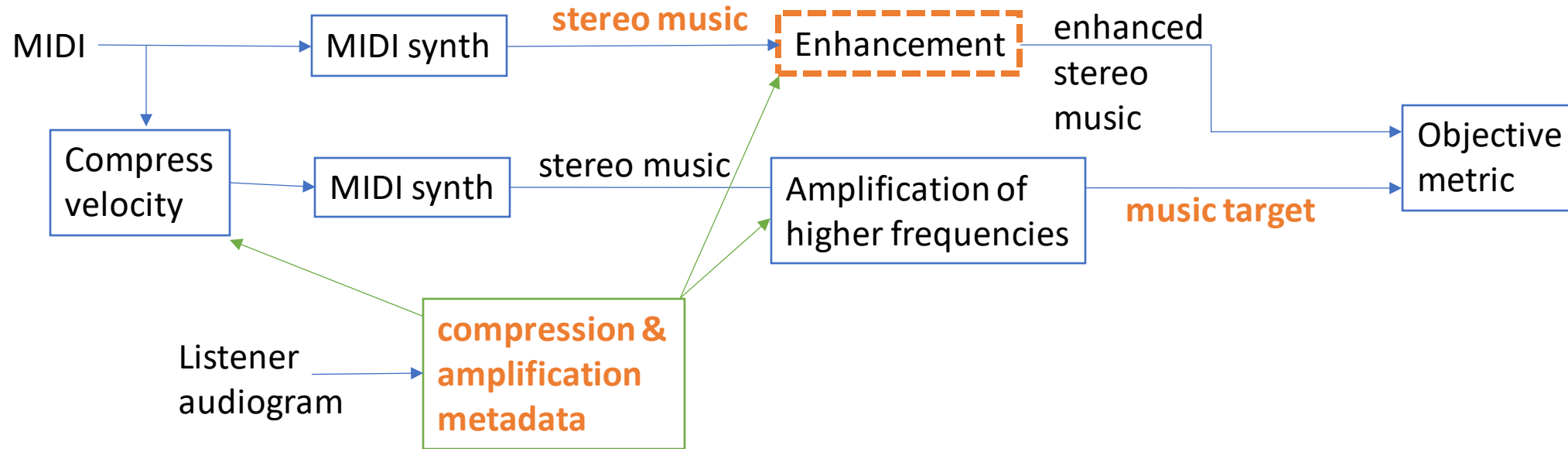
# Loudness/dynamic range

- How do we solve the problem of hearing aids creating music that is sometimes too loud and sometimes too quiet?
- Live classical music for performers and listeners with hearing loss is arguably the most challenging.



# Loudness/dynamic range

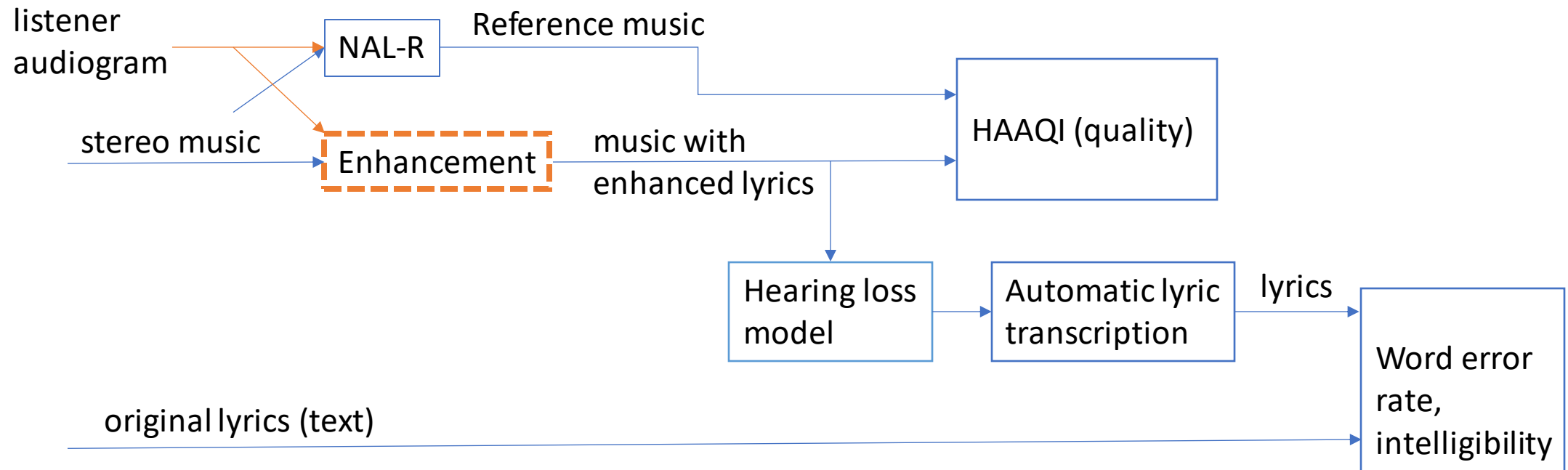
- Using MIDI to create a *potentially* ideal music target without artefacts due to dynamic range compression
- Suggested training baseline shown in diagram



- In evaluation we will test:
  - MIDI generated music and stereo recordings
  - Objective measures and listening panel

# Lyric intelligibility

- How can we improve the clarity of lyrics for people with hearing loss?
- One possible approach below



# Some Qs on lyric intelligibility

- Intelligibility calculation:
  - Take enhanced audio, pass through hearing loss model, then automatic lyric transcription (ALT) to get text.
  - What is the intelligibility reference that the above text is compared to?
    - The written text lyrics.
    - The text transcribed off the clean vocal tract using ALT.
    - The text transcribed from the unprocessed original mix using ALT.
- Hearing loss modelling
  - What hearing loss model do we use?
  - Will ALT work after hearing loss model processing?
  - And how ALT output map to human performance?
- Design of lyric intelligibility listening tests:
  - Are listeners transcribing and we check word error rate?
  - Are they scoring perceived intelligibility e.g. on a scale from very poor to very good?
- What is desirable intelligibility?
  - How do we deal with heterogeneity between subjects, music, etc.