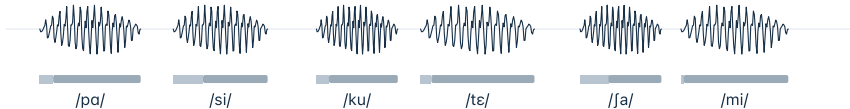


From waveform to qualified contrasts

MI ENGINE / FEATURE-RESOLVED MEASUREMENT AND STIMULUS ACCEPTANCE

● a One signal, a traceable measurement record



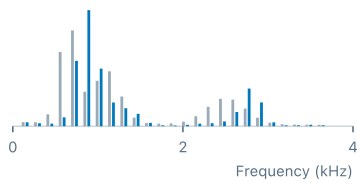
Matched sentence · references A / B

Audio hash + voice / generator version

Fixed extraction settings + alignment

● b R^3 · spectral components

Harmonics (a.u.)



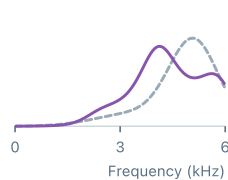
— Reference — Changed spectrum

F0 = 145 Hz; amplitudes redistribute.

MFCC [63–75] · contrast [76–82] · flatness [23]

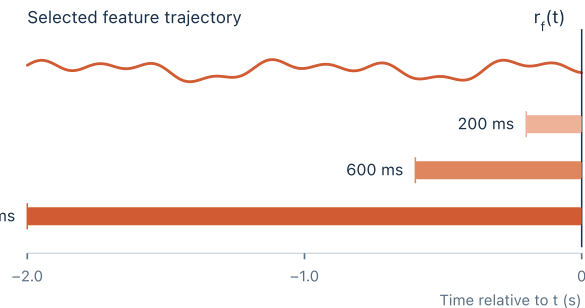
Flux [21] · onset [11] · modulation [83–88]

Aperiodic (a.u.)



● c T^3 · temporal organization

Selected feature trajectory



Mean · variability · change; L0 = past-directed.

d Speech-specific integration

PROPOSED ADAPTER

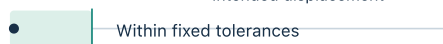
Checked phoneme timing · F0 · F1–F3 · harmonic / aperiodic measures · calibrated level

● e Qualify the contrast

Target terms



Other terms



S comparison: bound timing. T comparison: bound spectrum.

Both: F0, level, pronunciation, naturalness and covariance.

● f Require all four cells

SA TA



SB TA



SA TB



SB TB



FAIL → regenerate / resynthesize → re-measure

PASS → full vectors for analysis; X/Y for display

Procedural illustrations; no measured spectra, accepted research cells or participant results.