Music Structure Segmentation Using Shift-Invariant Probabilistic Latent Component Analysis (MIREX 2010)

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1. Summary

- Analyze beat-synchronous chromagram using shift-invariant PLCA
- Identifies repeated harmonic motifs in a song
- Derive segmentation assuming each motif corresponds to unique segment
- Sparse prior to learn number of motifs

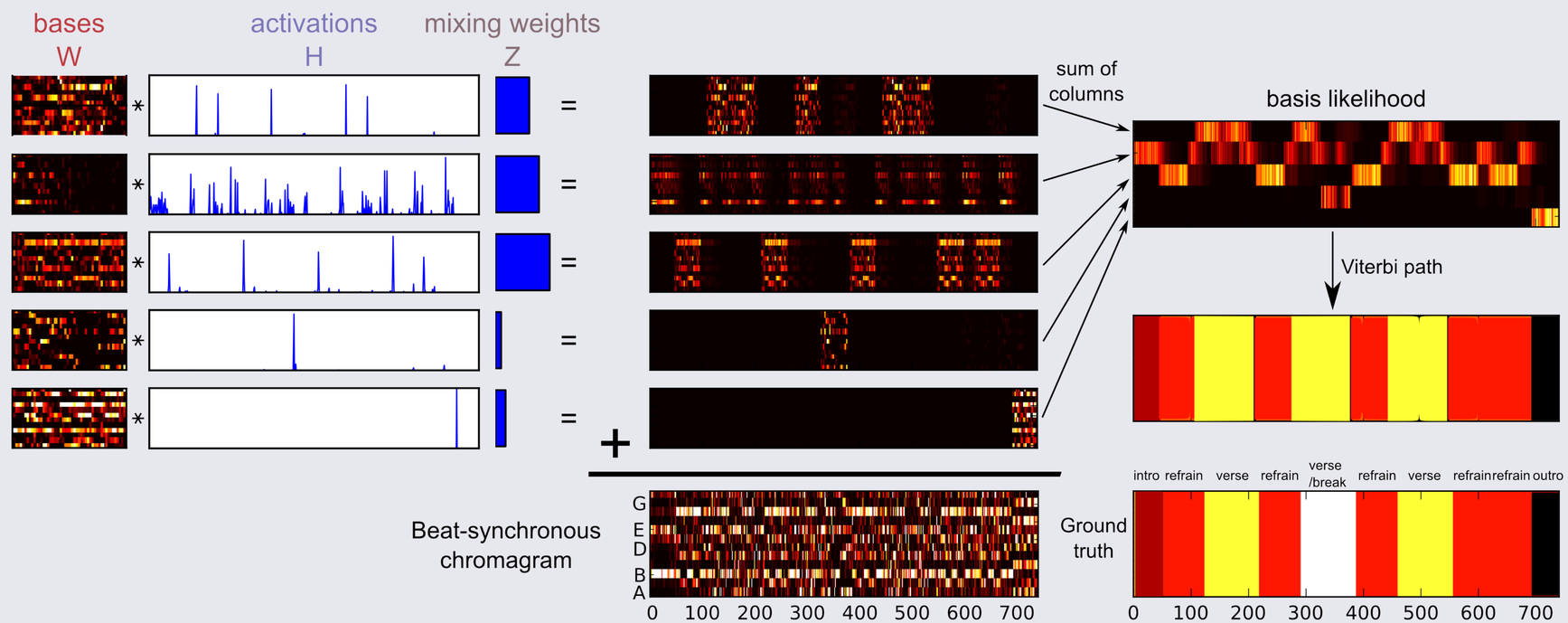
3. MIREX Results

Alg	frame f-meas	boundary (0.5) f-meas	boundary (3) f-meas
WB1	0.54	0.20	0.48
MND1	0.61	0.32	0.61
MHRAF2	0.55	0.19	0.51
GP7	0.54	0.18	0.50
BV2	0.49	0.22	0.56
BV1	0.50	0.22	0.57

- Our system (WB1) suffers due to over-segmentation and poor boundary detection
  - segments often broken into multiple motifs
- Future work
  - downbeat detection to align motifs to underlying bar structure
  - adaptive model of motif length

2. SI-PLCA structure segmentation

- Decompose chromagram into convolution of bases W with activations H (multiplied by mixing weights Z)
- Compute likelihoods of bases being active during each beat
- Use the Viterbi algorithm to determine most likely basis at each beat



Open source implementation available: `http://ronw.github.com/siplca-segmentation`

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