

A Score-Informed Computational Description of Svaras Using a Statistical Model

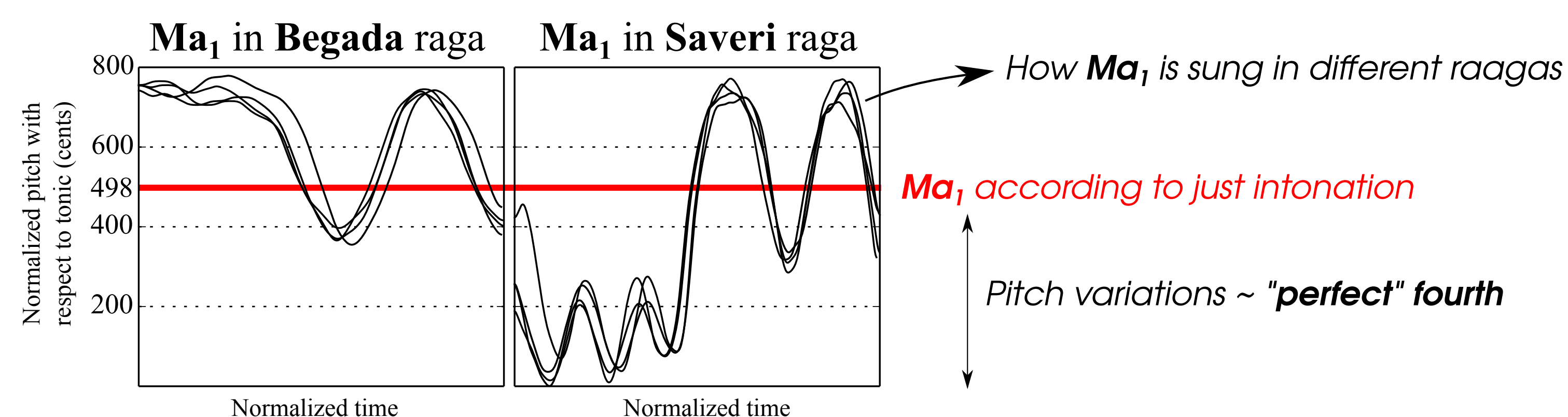
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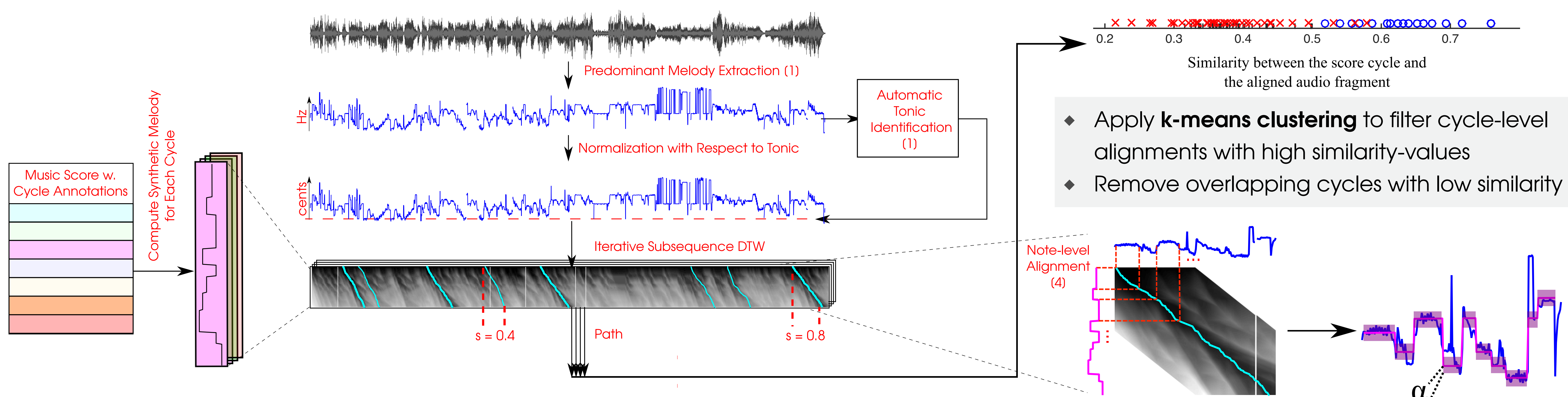
Motivation



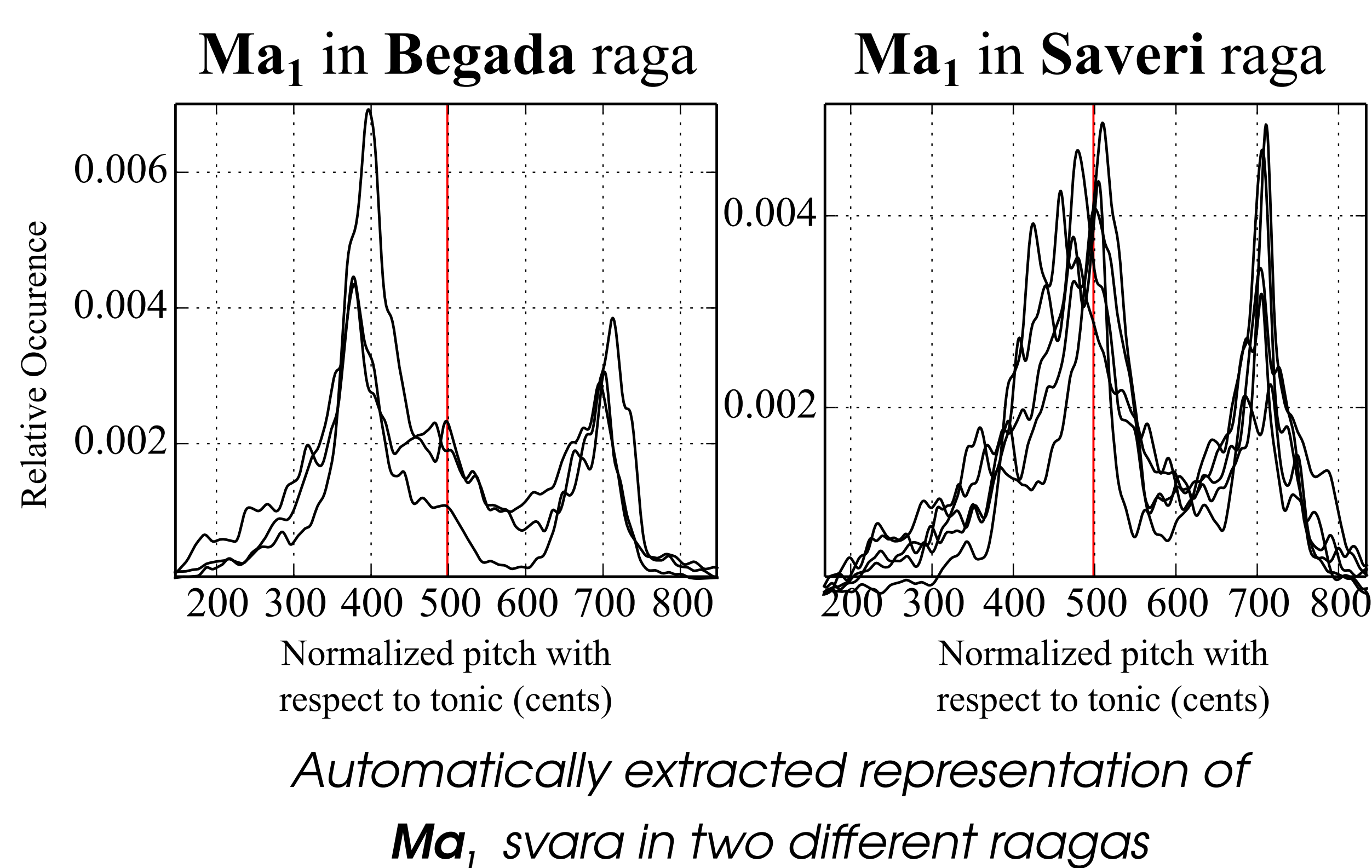
Data

- ◆ CompMusic Carnatic Varnam dataset (2)
 - 7 ragas, 27 audio recordings with 1155 annotated tala (cycle-level) boundaries
- ◆ CompMusic Carnatic Kriti dataset
 - 40 audio recordings of 30 compositions
 - Performances structurally more flexible (e.g. improvisations)

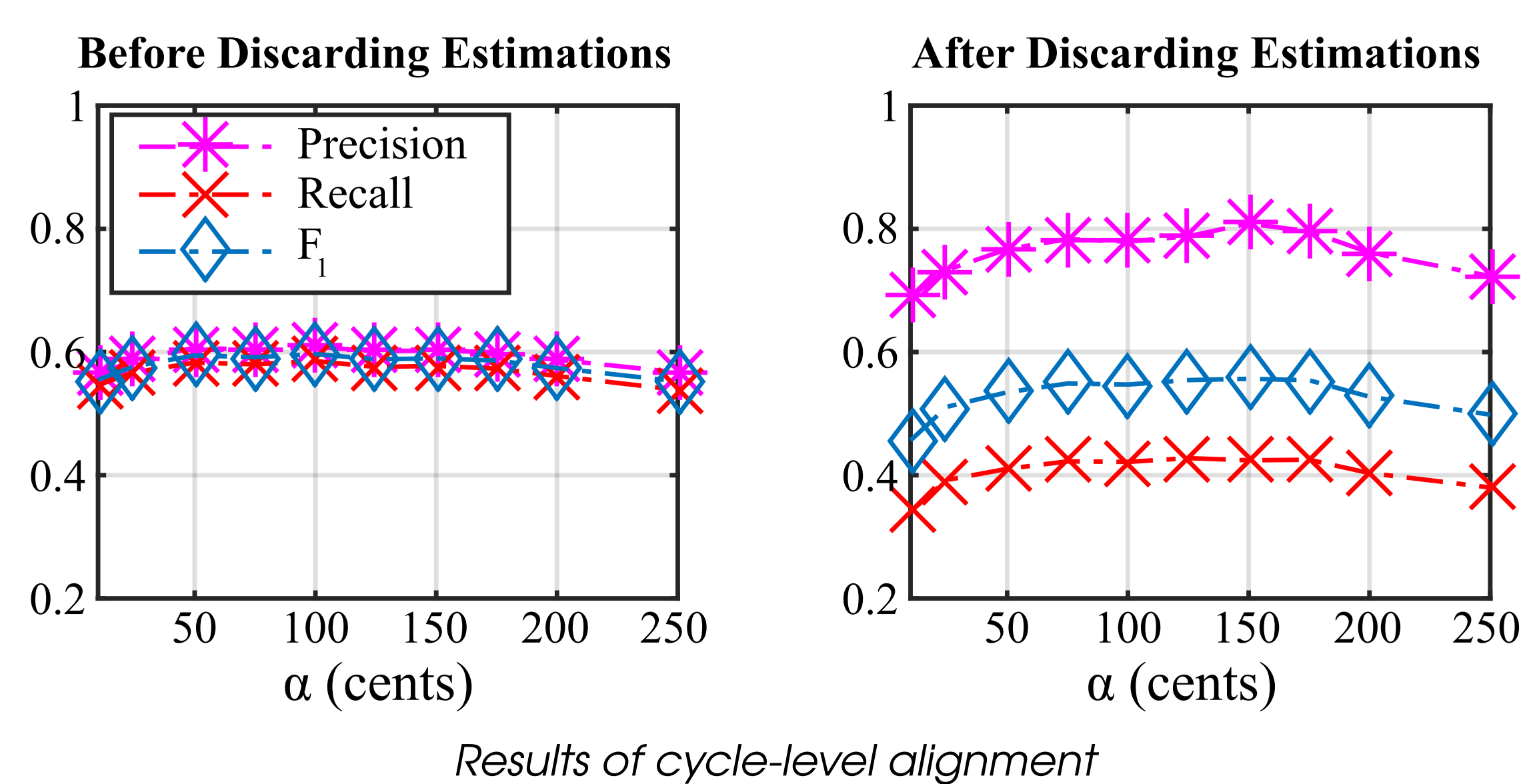
Audio Score Alignment (3, 4)



Svara Representations



Results



Method	Carnatic Varnam dataset	Carnatic Kriti Dataset
Context-based svara distributions [2]	0.62	0.64
Our approach	0.95 to 1	0.88
Using the groundtruth annotations	0.95	N/A

Results of raaga classification task

Experiments

- ◆ **Cycle-level alignment:** evaluated intrinsically using the ground truth annotations in the Varnam dataset.
 - Effect of the similarity threshold, α
- ◆ **The svara-level alignment and the computed representations,** evaluated extrinsically using a raaga classification task on both the datasets
 - Compared with the method proposed in (2)

Summary

- ◆ Cycle-level alignment is robust to α values **between 50 and 200 cents**. Optimal is **150 cents** with **0.42 recall**, **0.81 precision** and **0.51 F1 - score**
- ◆ **~1500 cycles** and **75000 svaras** aligned in total
- ◆ Svara representations extracted using our method is **superior to (2)** and **as good as the ground truth annotations** themselves!
- ◆ The dataset and the results are publicly available via:
<http://compmusic.upf.edu/node/314>



[1] S. Gulati, "A tonic identification approach for Indian art music," Masters Thesis, Universitat Pompeu Fabra, 2012.
[2] G. K. Koduri, V. Ishwar, J. Serrà, and X. Serra, "Intonation analysis of rāgas in Carnatic music," Journal of New Music Research, vol. 43, no. 01, pp. 72–93, Jan. 2014.
[3] S. Şentürk, A. Holzapfel, and X. Serra, "Linking scores and audio recordings in makam music of Turkey," Journal of New Music Research, vol. 43, no. 1, pp. 34–52, 3 2014.
[4] S. Şentürk, S. Gulati, and X. Serra, "Towards alignment of score and audio recordings of Ottoman-Turkish makam music," in IProceedings of FMA. Istanbul, Turkey, 2014, pp. 57–60.