Violin Etudes

27.8 Hours of Real Data with f0 Labels

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Violin Etudes: A Comprehensive Dataset for f0 Estimation and Performance Analysis

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Musical etudes as a solution to two major problems in MIR datasets

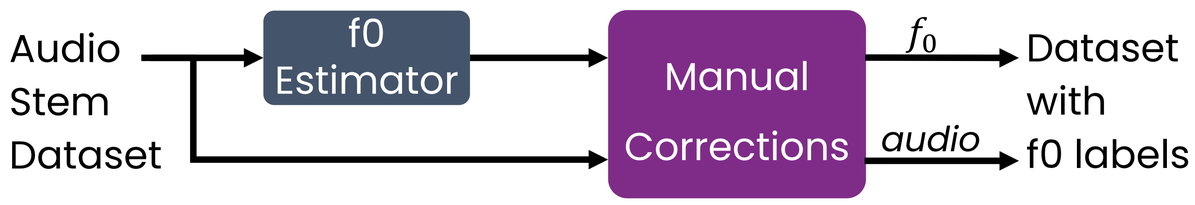
Current datasets are not suitable for music performance analysis.

- Etudes are fundamental in mastering music performance.
- Violin Etudes dataset is a graded violin repertoire played by 21 different violin content creators from YouTube:

Violin Etudes statistics

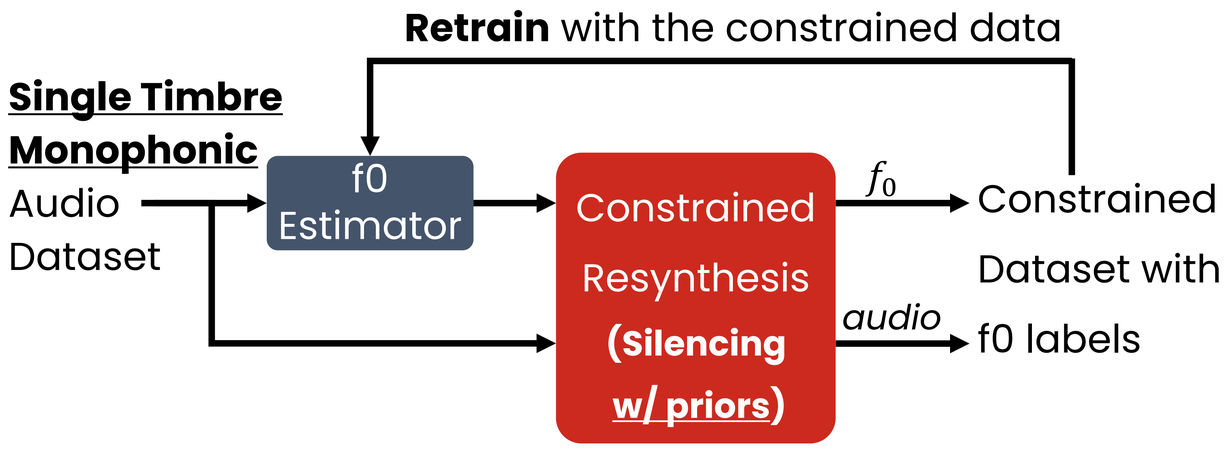
Method	Etudes	Players	Performances	Duration (min)
Suzuki, Vol. 1-5	40	4	158	248.8
Dancla, Op. 84	27	2	59	131.9
Wohlfahrt, Op. 45	41	6	357	458.1
Sitt, Op. 32 Vol. 1-3	34	2	60	140.1
Kayser, Op. 20	5	8	40	81.9
Mazas, Op.36	12	4	35	100.7
Dont, Op. 37	10	3	30	68.1
Kreutzer, Études	24	4	95	229.8
Fiorillo, Op. 3	13	3	34	72.1
Rode, Op.22	7	5	35	82.5
Dont, Op. 35	7	2	14	31.7
Gavinies, Matinées	6	2	8	24.6
Total	**226**	**21**	**925**	**1670.2**

f0-labeling of datasets is costly.

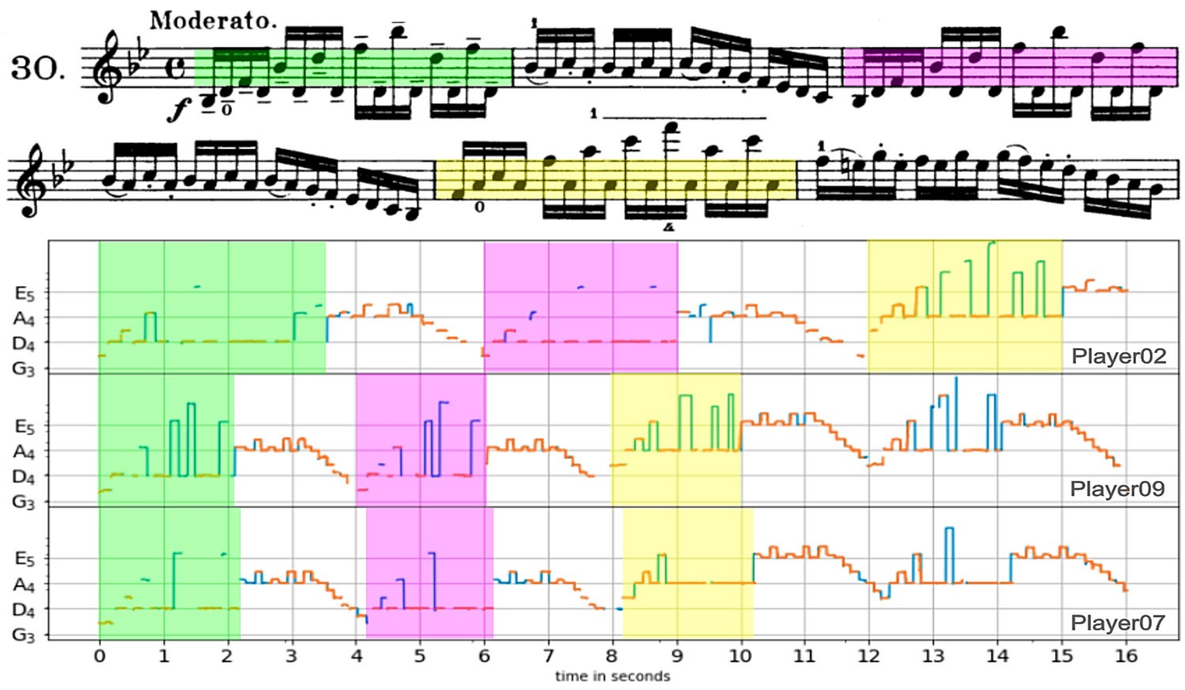


Constrained Harmonic Resynthesis

Violin Etudes are single-timbre and monophonic. Labeling is guided by these priors. No manual correction is needed.



A new paradigm for joint f0-labeling and f0 estimator training



Ex. 1: Iterative labeling exemplified in Kreutzer Etude No. 30.

- The iterative f0-labeling procedure of the Violin Etudes:
  1. Automatic f0 estimates are obtained with, e.g., CREPE [1]
  2. Constrained Harmonic Resynthesis (CHR) silences anomalous estimates (Ex.1, see gaps in orange track),
  3. Constrained labels are used for finetuning,
  4. Finetuned model creates better estimates,
  5. CHR accepts more estimates as label (Ex.1, blue track)
  6. The procedure continues in a loop.

- Tested on disjoint datasets, CREPE [1] architecture trained with these labels outperforms the pretrained CREPE which was trained on multiple manually-labeled datasets:

	URMP Dataset (unseen to all)				Bach10-mf0-synth (used in the pretrained CREPE)			
	Violin		Other Instruments		Violin		Other Instruments	
	RPA50	RPA5	RPA50	RPA5	RPA50	RPA5	RPA50	RPA5
Pretrained CREPE [1]	96.4	68.3	**96.2**	68.1	98.9	89.5	99.1	**87.4**
CREPE trained only on Violin Etudes	96.7	**84.2**	94.8	75.7	99.1	95.1	98.3	77.6
CREPE finetuned on Violin Etudes	**97.0**	83.0	96.0	**77.3**	**99.2**	**95.7**	**99.2**	84.7

[1] J. W. Kim, J. Salamon, P. Li and J. P. Bello, "Crepe: A Convolutional Representation for Pitch Estimation," in *Proc. ICASSP* 2018, pp. 161-165.

Violin Etudes

Constrained Harmonic Resynthesis

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