ENSEMBLESET: A NEW HIGH-QUALITY SYNTHESISED DATASET FOR CHAMBER ENSEMBLE SEPARATION

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AI + MUSIC

Highlights

- We introduce a novel multitrack dataset called "EnsembleSet" generated using the Spitfire BBC Symphony Orchestra library with ensemble scores from RWC[1] and Mutopia[2].
- Our data generation method introduces automated articulation mapping for up to 16 different playing styles based on the input MIDI/MusicXML data.
- 80 tracks (6+ hours) of string, wind and brass ensembles. 20 unique microphone and mix configurations for each track.
- We achieve **+11.37dB SDR** using EnsembleSet to train a DPTNet[3] based model to separate 2 source chamber ensemble mixtures and evaluating on real examples from URMP[4].

Dataset

Fig. 1: Instrument-wise activity distribution in EnsembleSet.

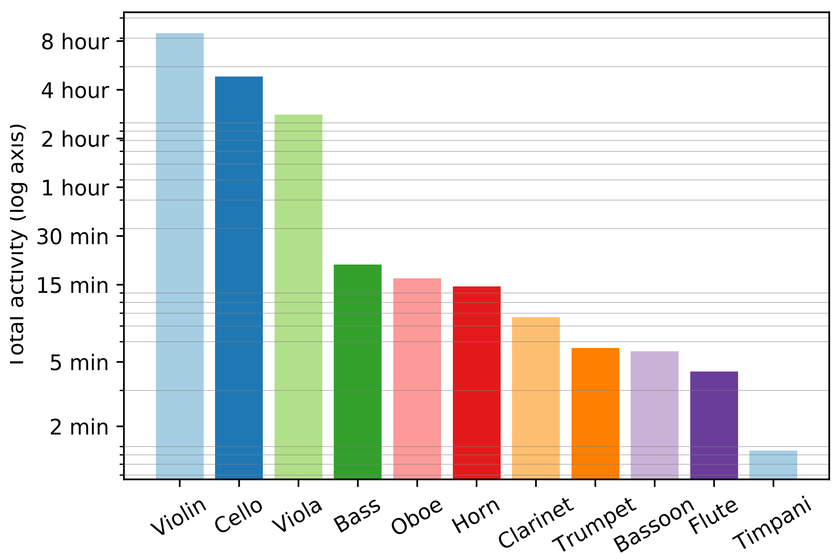
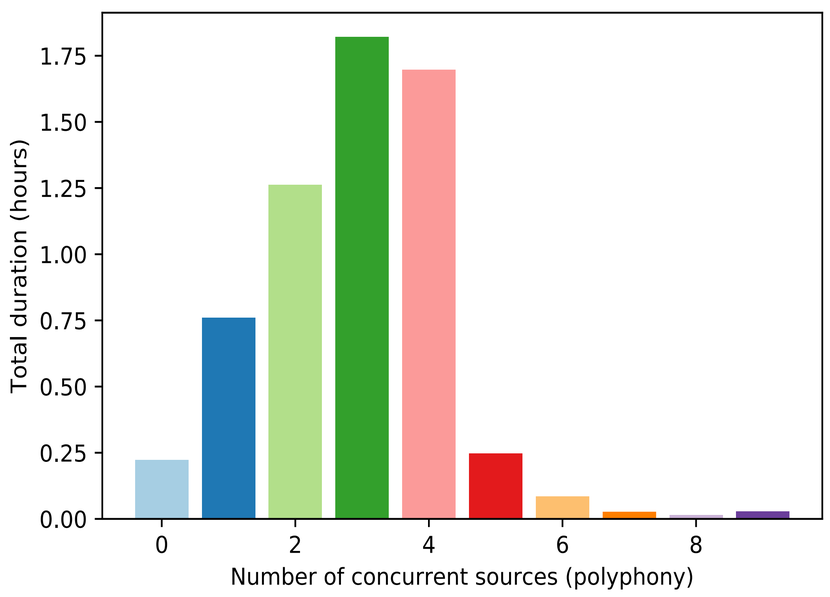


Fig. 2: Polyphony distribution across instruments in EnsembleSet

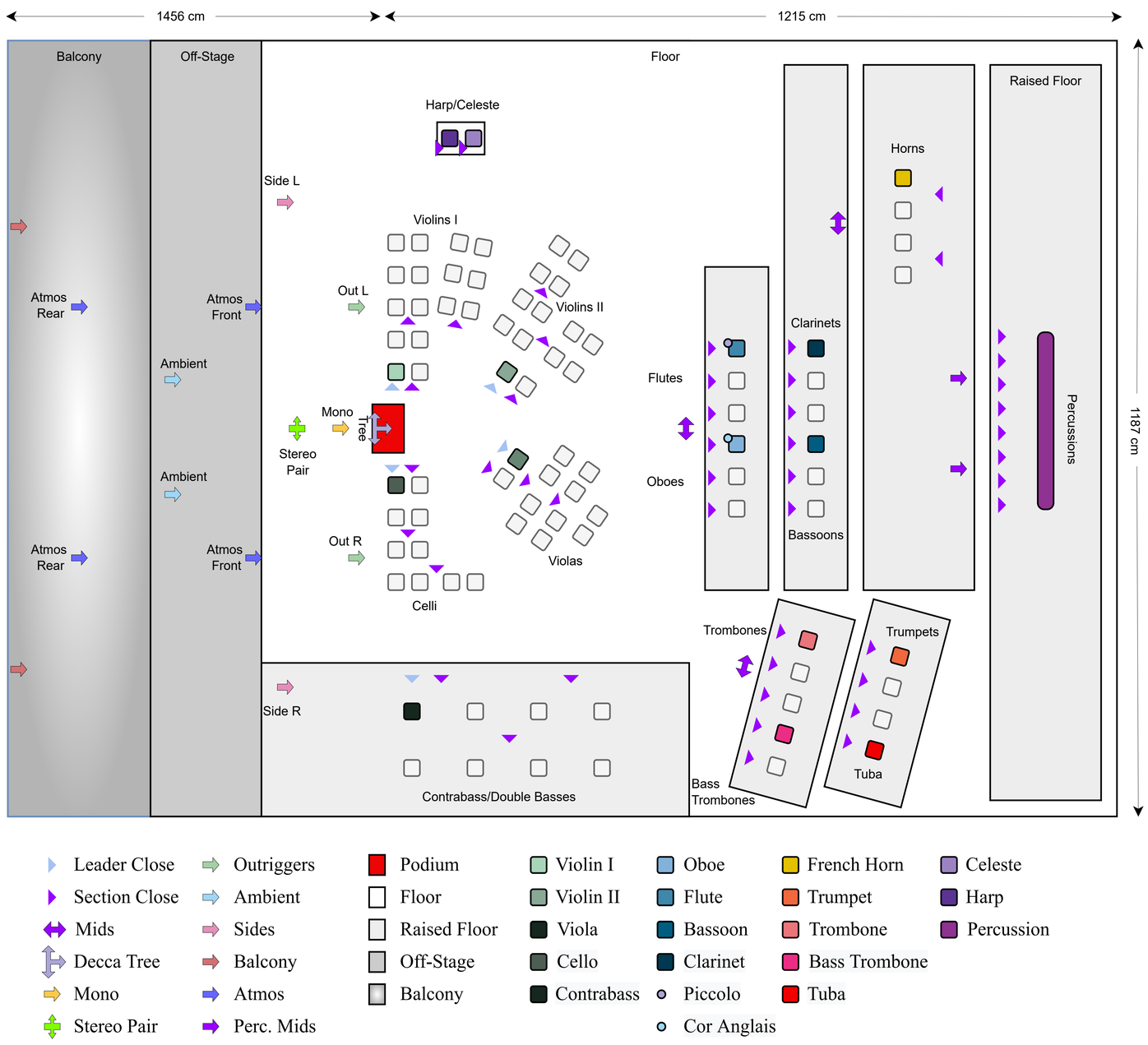


Potential Applications

The presented dataset not only contains high-quality multi-microphone renders of various instruments, but is also accompanied by the MIDI files used for generating this dataset. This paired data can be utilised for various tasks including **multi-instrument transcription**, **instrument recognition, score-informed source separation, microphone simulation and automatic mixing.**

Microphone Configurations

Fig. 3: Recording configuration for the Spitfire Audio BBC Symphony Orchestra sample library depicting the placement of individual performers and respective microphones.



Source Separation

We present our baseline results for separating 2 source mixtures trained on EnsembleSet and compare it with prior work on the same task trained with limited datasets.

Model	Training Set	Eval Set	SDR	SI-SDR
MSI[5] (Lin. et. al.)	URMP	URMP	+6.33 dB	-
DPTNet	URMP	EnsembleSet	+6.29 dB	+4.37 dB
DPTNet	EnsembleSet	URMP	+11.37 dB	+9.06 dB
DPTNet	EnsembleSet	EnsembleSet	+14.17 dB	+12.87 dB

Zenodo download link:

References:
[1] M. Goto, H. Hashiguchi, T. Nishimura, and R. Oka, "RWC music database: Popular, classical and jazz music databases." in Proceedings of the 2nd International Society for Music Information Retrieval Conference (ISMIR), vol. 2, 2002, pp. 287–288.
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[3] J. Chen, Q. Mao, and D. Liu, "Dual-path transformer network: Direct context-aware modeling for end-to-end monaural speech separation," arXiv preprint arXiv:2007.13975, 2020.
[4] B. Li, X. Liu, K. Dinesh, Z. Duan, and G. Sharma, "Creating a multitrack classical music performance dataset for multimodal music analysis: Challenges, insights, and applications," IEEE Transactions on Multimedia, vol. 21, no. 2, pp. 522–535, 2018.
[5] L. Lin, Q. Kong, J. Jiang, and G. Xia, "A unified model for zero-shot music source separation, transcription and synthesis," in Proceedings of 21st International Conference on Music Information Retrieval, ISMIR, 2021.

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