Pypianoroll: Open Source Python Package for Handling Multitrack Pianoroll

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[Documentation] `https://salu133445.github.io/pypianoroll/`

>> Core Classes

♯ use ***symbolic timing***

→ each beat has the same length (`beat_resolution`)

→ note length can represent a *musically-meaningful* amount of time (such as a 4th or 8th note)

♯ save tempo information in the `tempo` array

Attributes of a `Multitrack` object

Attribute	Description
tracks	List of `Track` objects
beat_resolution	Resolution of a beat (in time step)
tempo	Array that records the tempo value (in bpm) at each time step
downbeat	Array that indicates the locations of downbeats (the first beat of a bar)
name	Name of the multitrack

Attributes of a `Track` object

Attribute	Description
pianoroll	Pianoroll matrix
program	Program number according to General MIDI Level 1 specification
is_drum	Whether it is a percussion track
name	Name of the track

>> Manipulation Utilities

track level	pianoroll level
♯ `append_track`	♯ `clip`
♯ `merge_tracks`	♯ `binarize`
♯ `remove_tracks`	♯ `transpose`
♯ `remove_empty_tracks`	♯ `pad_to_multiple`
♯ `get_merged_pianoroll`	♯ `assign_constant`
♯ `get_stacked_pianoroll`	♯ `trim_trailing_silence`

>> Evaluation Metrics

♯ `empty_bar_rate`

♯ `qualified_note_rate`

♯ `drum_in_pattern_rate`

♯ `polyphonic_rate`

♯ `n_pitches_used`

♯ `n_pitch_classes_used`

♯ `in_scale_rate`

♯ `tonal_distance` [2]

*(designed for evaluating **generative system** [1])*

>> Content Analysis Utilities

♯ key detection

♯ melody recognition

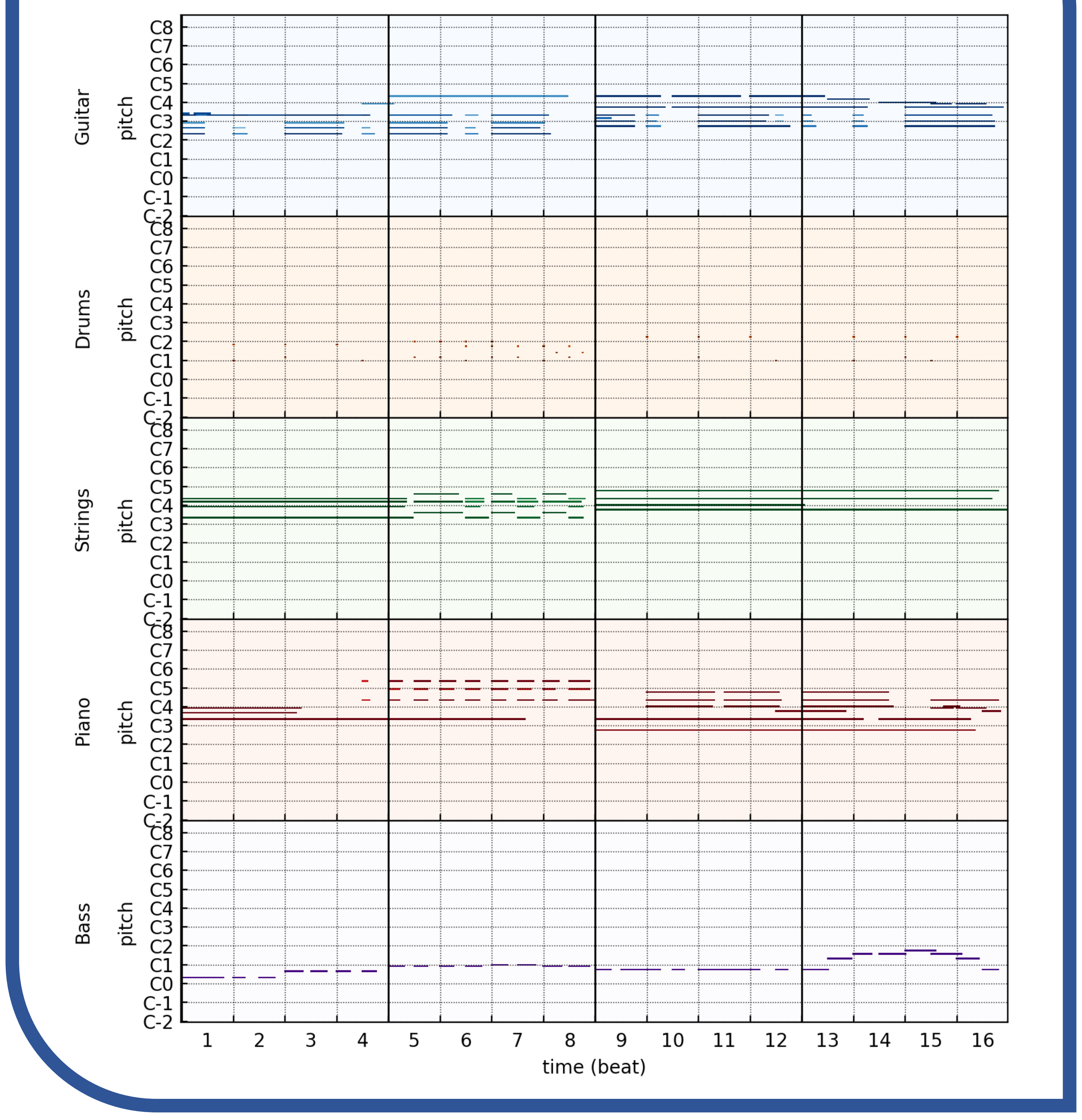
♯ chord recognition

♯ chord-related feature extraction

(future plan)

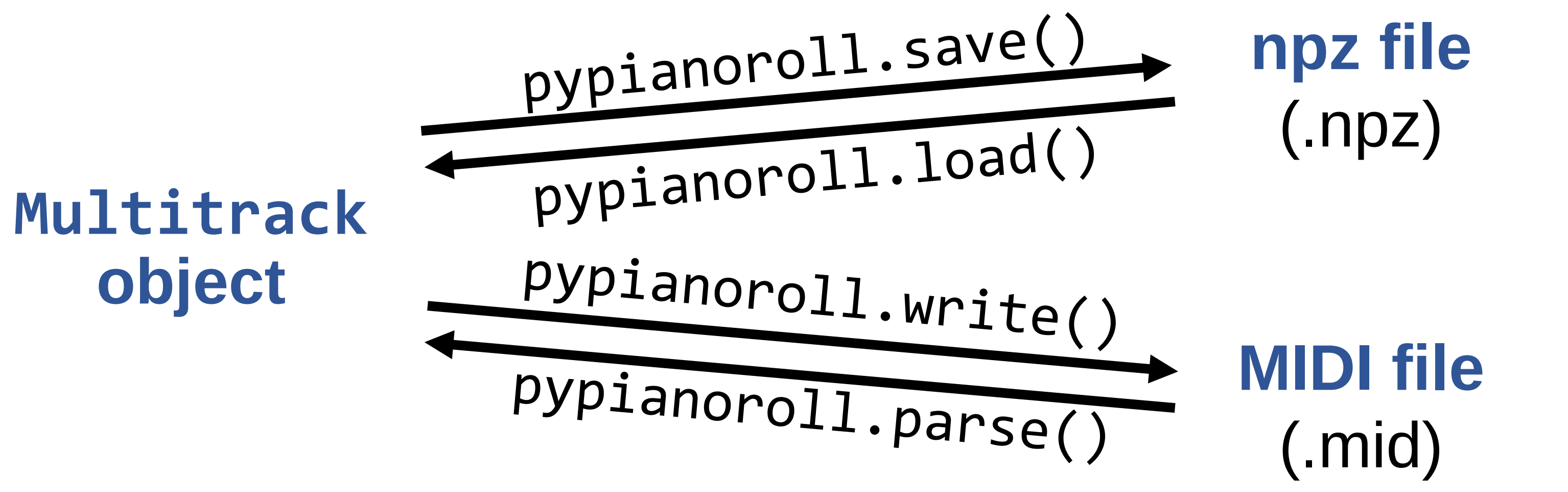
(may contribute to applications like lead sheet arrangement [3])

>> Visualization



>> Data I/O

(use compressed column storage to save space)



(use `pretty_midi` [4] for MIDI I/O)

(plan to support MusicXML format in the future)

>>References

[1] H.-W. Dong, W.-Y. Hsiao, L.-C. Yang, and Y.-H. Yang. MuseGAN: Symbolic-domain music generation and accompaniment with multi-track sequential generative adversarial networks. In *Proc. AAAI*, 2018.

[2] C. Harte, M. Sandler, and M. Gasser. Detecting harmonic change in musical audio. In *Proc. ACM Workshop on Audio and Music Computing Multimedia*, 2006.

[3] H.-M. Liu and Y.-H. Yang. Lead sheet generation and arrangement by conditional generative adversarial network. In *Proc. ICMLA*, 2018.

[4] C. Raffel and D. P. W. Ellis. Intuitive analysis, creation and manipulation of MIDI data with pretty_midi. In *ISMIR Late Breaking and Demo Papers*, 2014.