JAMS: A JSON Annotated Music Specification for Reproducible MIR Research

Eric J. Humphrey1, Justin Salamon1,2, Oriol Nieto1, Jon Forsyth1, Rachel M. Bittner1 and Juan Pablo Bello1
1Music and Audio Research Laboratory, New York University
2Center for Urban Science and Progress, New York University

Context
Music annotations are a critical component in a variety of active research areas in MIR.
- Used for both development and evaluation
- Time scales at the level of a recording, e.g., beats, chords, tags
- Typically, “lab” files or other custom plain-text conventions are used to serialize this data

Introducing JAMS
A JAMS Object contains:
- arrays of Annotations for different tasks, e.g., beat or chord estimation
- a file metadata object
- a global sandbox

An Annotation contains:
- a data array corresponding to the task, e.g., beat times or chord intervals
- an annotation metadata object, specific to this particular annotation
- an annotation sandbox

Data arrays contain a collection of similar types:
- Observations are global descriptors, e.g., tags or genre
- Events are instantaneous occurrences, e.g., beats or onsets
- Ranges describe intervals in time, e.g., chords or segments
- TimeSeries represent dense data, e.g., melody

Practical Considerations
Software APIs
- Python and Matlab
- Baseline parsers to convert data

Pre-converted Datasets
- Isophonics (beat, chord, key, segment)
- Billboard, tmc32 (chord)
- SALAMI (two-layer segments)
- RockCorpus (chord, key, measures, melody)
- Cal500 / 10k (tag)
- ADC04, MIREX05 (melody)
- MedleyDB (melody, pitch, source)

Next Steps
Calling all users, contributors and collaborators!
- Make this a community endeavor
- Actively seek out and incorporate feedback

Limitations and Near-field Challenges
- Refine datatypes
- Tighter JSON support in Matlab
- Scalability and streaming JSON

“Ground Truth” is tenuous in MIR
- Embrace multiple reference annotations
- Subjectivity is variable; all perspectives are valid

Future goals
- Integration with other tools, e.g., Sonic Visualizer, librosa, mir_eval, and MIREX
- Better annotation coverage for existing datasets
- Establish a freebase-style archive of annotations

JAMS on Github:
http://github.com/jams

Key Design Criteria
Simplicity
- Easy to use, easy to understand

Structure
- Mixed data types, e.g., scalars, strings, arrays of different shapes

Sustainability
- Methodology and metadata should be embedded in the annotation itself
- Leverage standardized tools and technologies developed by larger communities