# mir_eval

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Lab ROSA

MARL
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Research Laboratory

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Our solution: `mir_eval`

# `mir_eval`'s Goals

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# mir_eval's Goals

- **Standardized** - mir_eval should implement evaluation metrics as agreed upon by the community, rather than a single researcher.
- **Transparent** - The implementations in mir_eval should make it very clear why the metrics were implemented the way they were. Code should be readable and well-documented.
- **Easy-to-use** - Using mir_eval should be easy whether you're familiar with Python or not, and should have minimal "start-up cost".

# Why Standardization Matters

Compared to NEMA/MIREX:

| Beat Detection | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| F-measure | Cemgil | Goto | P-score | CMLc | CMLt | AMLc | AMLt | In. Gain |
| 0.703% | 0.035% | 0.054% | 0.877% | 0.161% | 0.143% | 0.137% | 0.139% | 9.174% |

| Structural Segmentation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NCE-Over | NCE-under | Pairwise F | Pairwise P | Pairwise R | Rand | F@.5 | P@.5 | R@.5 |
| 3.182% | 11.082% | 0.937% | 0.942% | 0.785% | 0.291% | 0.429% | 0.088% | 1.021% |

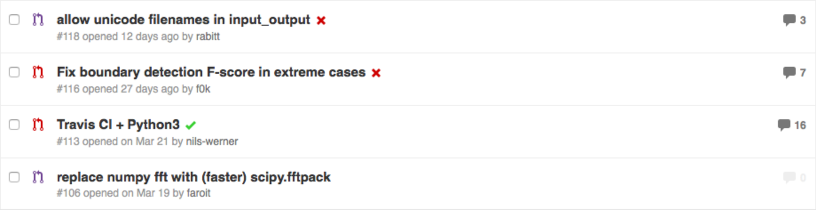
| Structural Segmentation (continued) | | | | | Onset Detection | | |
|---|---|---|---|---|---|---|---|
| F@3 | P@3 | R@3 | Ref-est dev. | Est-ref dev. | F-measure | Precision | Recall |
| 0.393% | 0.094% | 0.954% | 0.935% | 0.000% | 0.165% | 0.165% | 0.165% |

| Chord Estimation | | | | | Melody Extraction | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Root | Maj/min | Maj/min + Inv | 7ths | 7ths + Inv | Overall | Raw pitch | Chroma | Voicing R | Voicing FA |
| 0.007% | 0.163% | 1.005% | 0.483% | 0.899% | 0.070% | 0.087% | 0.114% | 0.000% | 10.095% |

Differences explained in ISMIR 2014 paper, “`mir_eval`: A Transparent Implementation of Common MIR Metrics”

# Community Development

Community involvement through issue tracking and pull requests:



□ allow unicode filenames in input_output ✗ 3
#118 opened 12 days ago by rabitt

□ Fix boundary detection F-score in extreme cases ✗ 7
#116 opened 27 days ago by f0k

□ Travis CI + Python3 ✓ 16
#113 opened on Mar 21 by nils-werner

□ replace numpy fft with (faster) scipy.fftpack 0
#106 opened on Mar 19 by faroit

`http://github.com/craffel/mir_eval`

# Using mir_eval

In Python:

```python
import mir_eval
# Load in beat annotations
reference_beats = mir_eval.io.load_events('ref_beats.txt')
estimated_beats = mir_eval.io.load_events('est_beats.txt')
# scores will be a dictionary where the key is the metric name
# and the value is the score achieved
scores = mir_eval.beat.evaluate(reference_beats, estimated_beats)
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Using the evaluator scripts:

```
> ./beat_eval.py ref_beats.txt est_beats.txt -o scores.json
> cat scores.json
  {"F-measure": 0.6216216216216,
   "Cemgil": 0.36267669947376,
   "Cemgil Best Metric Level": ...
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Using our web API:

http://labrosa.ee.columbia.edu/mir_eval

# Where to find us

Code:

`http://github.com/craffel/mir_eval`

Documentation:

`http://craffel.github.io/mir_eval`

Web API:

`http://labrosa.ee.columbia.edu/mir_eval`

Paper:

C. Raffel, B. McFee, E. J. Humphrey, J. Salamon, O. Nieto, D. Liang, and D. P. W. Ellis, "`mir_eval`: A Transparent Implementation of Common MIR Metrics", *Proceedings of the 15th International Conference on Music Information Retrieval*, 2014.