ROBOD: a Real-time Online Beat and Offbeat Drummer

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Beat tracking
Beat tracking: online problem

- Limited information: only previous data is available
- Cannot fix errors afterwards
Beat tracking

ROBOD

Pattern tracking

Conclusion

ROBOD

interaction

Created by Jairz Tiana
from Neos Project

Created by Dan Xenon Lay
from Neos Project
ROBOD

Beat tracking

Pattern tracking

Conclusion

interaction
Beat tracking

ROBOD

Beat tracking

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Conclusion

ROBOD

interaction

Rhythmic companion

beats

downbeats

rhythmic patterns
ROBOD: Global description

Audio

100fps

Signal pre-processing

STFT → Semitone filterbank → Positive differences → RNN → DBN

Beat tracking

Beat / Features synchronisation

GMMs → DBN → ROBOD

Downbeat & pattern tracking

Pattern

Beats

Position inside bar

every beat
Beat tracking: RNN

Input layer

Hidden layer 1

Hidden layer 2

Hidden layer 3

Output layer
Beat tracking: DBN

Before beat
State density, frame = 505

Activation and beats reported
Beat tracking : DBN

On beat
State density, frame = 510

Activation and beats repoted
ROBOD: Global description

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100fps

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Pattern

Position inside bar

ROBOD

Beats

every beat
Pattern tracking
ROBOD is more than just a beat tracker

The online beat tracking algorithm is open source and available at:
https://github.com/CPJKU/madmom or
pip install madmom

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Questions ?