

Hierarchical Organization and Visualization of Drum Sample Libraries

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Outline

- Context & Related Work
- Method
 - Similarity Measure
 - Hierarchical Organization (Text/Graphic)
- Demonstration
- First User Feedback
- Conclusions & Future Work

Context

- Who & What
 - Musicians / Producers
 - Drum Loops
 - Very Large Drum Sample Collections

- Current Situation
 - Industry
 - Sample CDs & Virtual Instruments
 - Organizations of Sample Libraries
 - Manual (rough, inconsistent, cumbersome)

Related Work

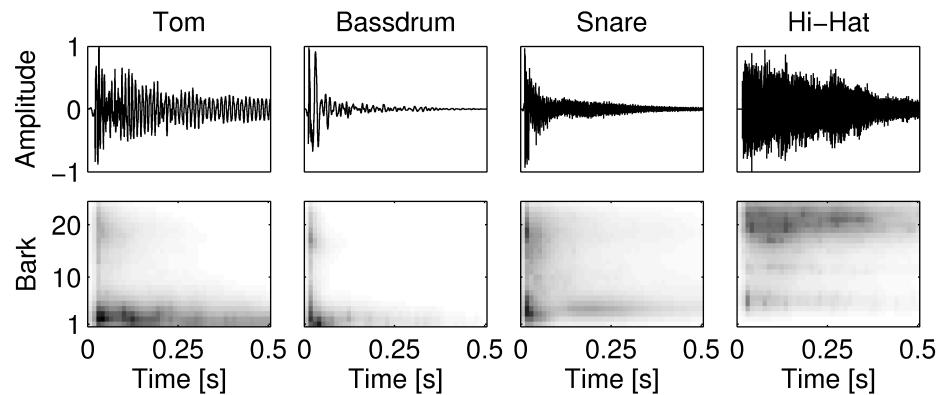
Automatic Organization of Sound Collections

- Feiten et al. 1991
- Feiten & Günzel 1994
- Cosi et al. 1994

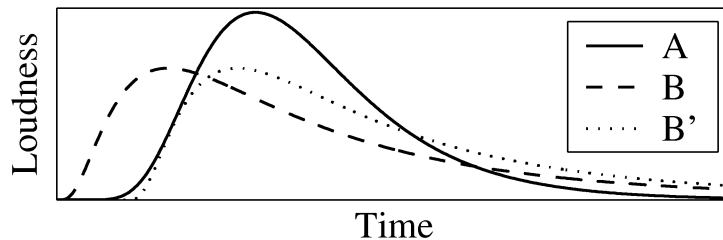
Sound Similarity, Timbre Spaces,
Instrument Classification, ...

Similarity between Samples

1. Compute Sonogram for each sample



2. Alignment



3. Euclidean Distance

Hierarchical Interface

- Hierarchical Partitioning of Data Space
 - 1-dim. Self-Organizing Map (SOM) clustering into 9 partitions
 - recursively cluster each partition into 9 partitions until only few samples remaining in partition
- Overlap
 - each partition is enlarged by 50%, adding samples from similar partitions
- Text-based interface
 - display most typical sample of each partition
- Graphical interface
 - Large SOM trained on all samples
 - partitions visualized with Smoothed Data Histograms (SDH)

Demonstration

Data

- 2 sample CDs
- 817 distinct samples
- dry drums sounds
(bass drum, snare, toms, hi-hats, cymbals, ...)

Drum Sample Explorer - Microsoft Internet Explorer

<ol style="list-style-type: none">1. Toms PS toms 16" tom, dry mp (130)2. thintom8A2mf4 (141)3. SN PS 5" maple SN II +amb. & E-ring rimshot pp (126)4. mapsnronA3CZrgpp3 (128)5. Toms 12" N&C tom dry ff (79)6. SN DBW hedge SN III +refR rimshot ff (64)7. SN PS 5" maple SN II +amb. accent (49)8. HH 14" PL 2002 sound edge dry open (54)9. Cymbals Ride 2 flat (26) <p>[MAP]</p>	<ol style="list-style-type: none">1. SlingKickA2mp1 (17)2. YankidUA2SEQ2ff2 (21)3. BDs 20" N&C Horizon BD +refR mp (22)4. BDs 22" N&C Horizon BD II +refR ff (21)5. thintom13A2mf2 (32)6. blkto8A3NSMOmf2 (21)7. Toms PS toms 12" tom, ambience mp (21)8. Toms N&C toms 14" tom, dry mf (31)9. Toms PS toms 12" tom, dry mp (29) <p>[MAP]</p>	<ol style="list-style-type: none">1. blkto8A3NSMOmp9 (3)2. SN 6" JM maple SN dry, - SNx mf (5)3. thintom12A2NSmf2 (7)4. BDs 20" N&C Horizon BD II +refR mf (4)5. thintom13A2ff2 (6)6. Toms PS toms II 16" tom, ambience pp (9)7. Toms 14" Snare tom dry ff (5)8. Toms 16" Snare tom ambient mp (6)9. Toms N&C toms II 14" tom, ambience mp (8) <p>[MAP]</p>	<ol style="list-style-type: none">1. thintom13A2ff5 (1)2. thintom13A2NSff2 (1)3. BDs 20" N&C Horizon BD II +amb. ff (1)4. thintom13A2ff2 (1)5. SN 6" JM maple SN dry, - SNx mp (1)6. BDs 20" N&C Horizon BD +amb. ff (1) <p>[MAP]</p>
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First User Feedback & Discussion

Asked 5 Prospective Users

- Overall very positive
- Graphics preferred to text
- Requests
 - instrument filters
 - better integration of metadata (labels)
 - fewer hierarchical levels (3 instead of 4)
 - zoom function

Conclusions & Future Work

- Approach seems to work
- Improve similarity measure (listening tests)
- Extend to
 - wet-sounds (ambience, effects)
 - other instruments
- VST plugin for Cubase