An Intelligent Musical Rhythm Variation Interface

Richard Vogl (richard.vogl@jku.at)
Peter Knees (peter.knees@jku.at)

1. introduction
   - drum tracks in electronic dance music (EDM) arrangements are usually built from drum patterns from a drum pattern library or manually composed patterns
   - manual composition and creating variations is usually a cumbersome task
   - in this work an intelligent agent to improve the workflow for this task is introduced

2. prototype
   - step sequencer like interface to enter seed patterns and visualize pattern variations
   - controls for playback, pattern variation, as well as tempo and swing
   - MIDI input and output for easy integration

3. variation algorithm
   - as variation method a restricted Boltzmann machine (RBM) is used
   - the RBM is trained on a data set of ~16,000 EDM rhythm patterns
   - to create variations the seed pattern is entered in the visible layer of the RBM and varilated using Gibbs sampling

4. evaluation
   - qualitative interviews with ten experts
   - five aspects were evaluated (see evaluation results)
   - participants were exploring the prototype in combination with a hardware controller

5. conclusion
   - interaction with implemented prototype was well received
   - produced patterns are musically meaningful
   - seed patterns untypical for EDM yield unexpected variations
   - participants liked the idea of using the prototype in the studio but demanded additional features for the context of live environments

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evaluation results

<table>
<thead>
<tr>
<th>aspect</th>
<th>positive comments</th>
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<tbody>
<tr>
<td>seed rhythm is preserved</td>
<td>7</td>
</tr>
<tr>
<td>patterns are meaningful</td>
<td>9</td>
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<tr>
<td>prototype interaction</td>
<td>8</td>
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<tr>
<td>would use live</td>
<td>6</td>
</tr>
<tr>
<td>would use in studio</td>
<td>9</td>
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