AUDITORY SCENE ANALYSIS

Fundamental Question: What is out there, and where is it?

1. Auditory Scene Analysis
   a) Auditory system used to analyze, or parse the scene, or world around us

2. Auditory Scene
   a) Sum of all auditory events, all sound sources (note, focus is on the sound-producing events, not the sounds)

3. Auditory Streams
   a) The sounds that denote a single, continuous sound-producing event

4. Stream Segregation
   a) Top-down
      i. Automatic schema activation
      ii. Voluntary schema activation
b) Bottom-up: primitive auditory scene analysis

i. Use acoustic regularities to “calculate” likely stream segregations

ii. GESTALT principles describe some segregation processes (strategies??)

iii. Unrelated sounds seldom start/stop at the same time
   1. Common fate
   2. Good continuation
      - “Old plus new”
      - “Tone through noise”

iv. Gradualness of change
   1. Single sounds change slowly and smoothly
   2. Sequences of sounds from the same source change slowly
   3. Note: Takes some time (~4 sec) to build up evidence for a stream

v. Harmonic relatedness
vi. Holistic effects

1. Co-modulation masking release (CMR)

5. Streaming and Gestalt Principles (Summary)

<table>
<thead>
<tr>
<th>GESTALT Principle</th>
<th>Stream Effect or Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity (Nearness)</td>
<td>Frequency, time or space proximity</td>
</tr>
<tr>
<td>Similarity</td>
<td>Harmonic relatedness</td>
</tr>
<tr>
<td>Connectedness</td>
<td>Pitch glides pass through noise</td>
</tr>
<tr>
<td>Good continuation</td>
<td>Gradual increase in loudness of approaching train</td>
</tr>
<tr>
<td>Common fate</td>
<td>Musical counterpoint</td>
</tr>
<tr>
<td>Symmetry</td>
<td>Rising pitches tend to fall again</td>
</tr>
<tr>
<td>Closure</td>
<td>Masking, CMR</td>
</tr>
</tbody>
</table>