Generative Grammars for Real-Time Composition

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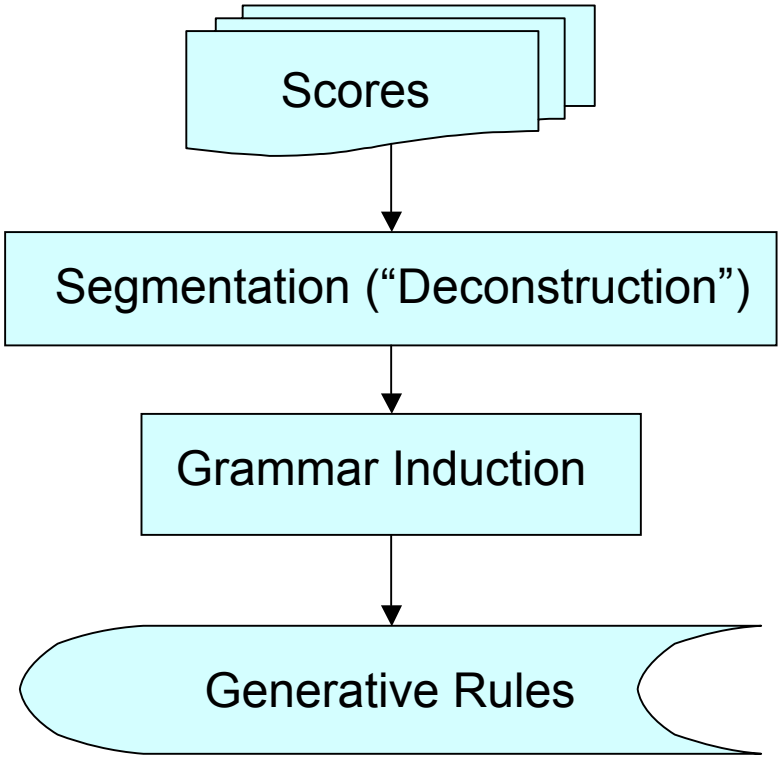
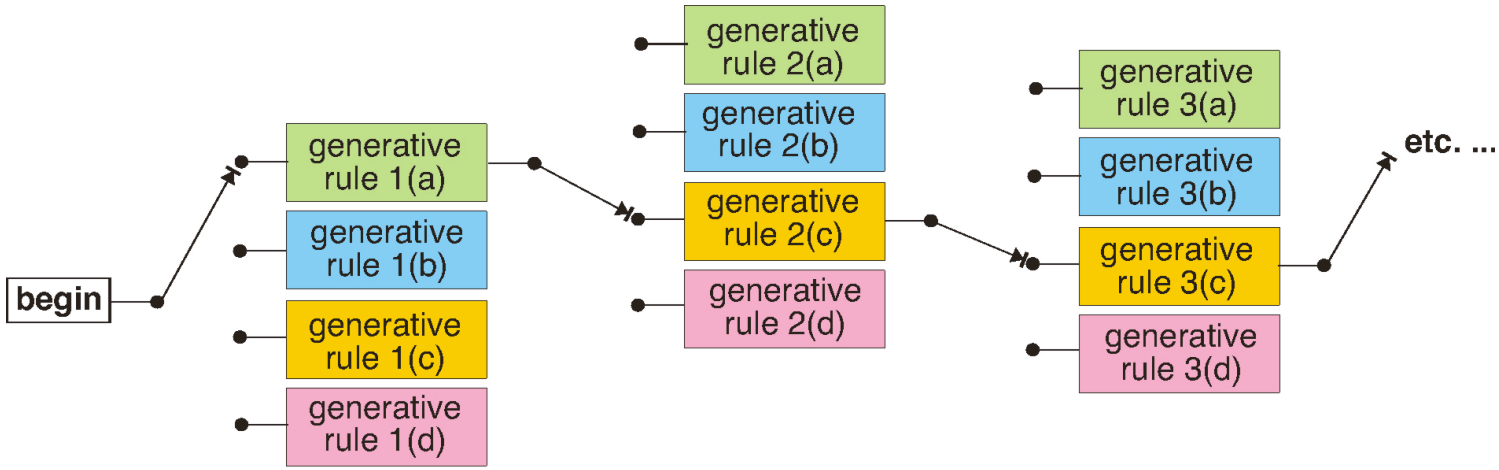
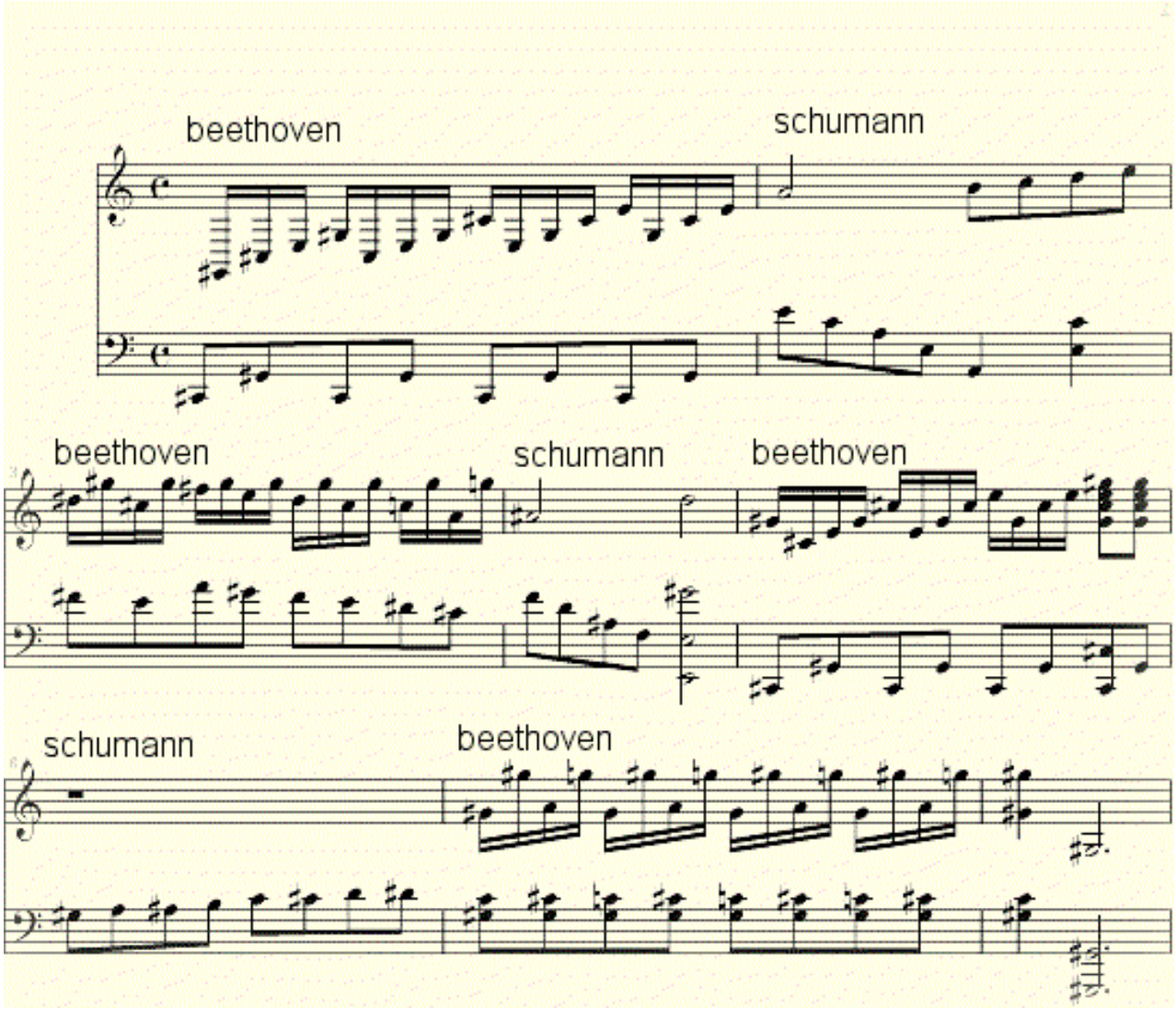

Scores
Segmentation (“Deconstruction”)
Grammar Induction
Generative Rules



The generative system composes sequences of short sections of music using the grammars. Each section is generated by a rule selected from *n* sets of grammatical rules, each corresponding to a different musical style.


beethoven
schumann
beethoven
schumann
beethoven
schumann
beethoven

Synthesis: (re)combinatorial composition

Style-replication based on David Cope:

The genius of great composers, I believe, lies not in inventing previously unimagined music but in their ability to effectively reorder and refine what already exists.

On this assumption, that composing or improvising is just a re-ordering of existing material, we develop a simple improviser that transfers a part of the musical task to the computer.

Combinatorial composition

- Can work on notes, chords, bars.
- Find an acceptable continuation of music.
- Uses harmony, melody, phrase structure.
- Possibly spectral information. (to be developed)

(see web page)

Style blending

- Mixing slices: 'the patchwork opus'?
- Projection vs. simple mixing?

Phrase structure + transitions

```
S   => incip bar bar bar bar bar cadence2bar
incip       => '((equal-slot 'composer eeg-composer)
           (equal-slot 'bartype 'incip))
bar=> '((equal-slot 'composer eeg-composer)
           (equal-slot 'pitchclass prev-pitchclass)
           (equal-slot 'type 'bar)
           (close-slot 'pitchleading prevpitchleading))
```

Similarities & copies

Similaries: SS -> S S'

S' -> '(generate-pitch-class-abstract generated-S)

result:

S == '((incip (close-slot 'pitchclass '(0 5 8)))
    (bar (close-slot 'pitchclass '(...)))
    etc...)

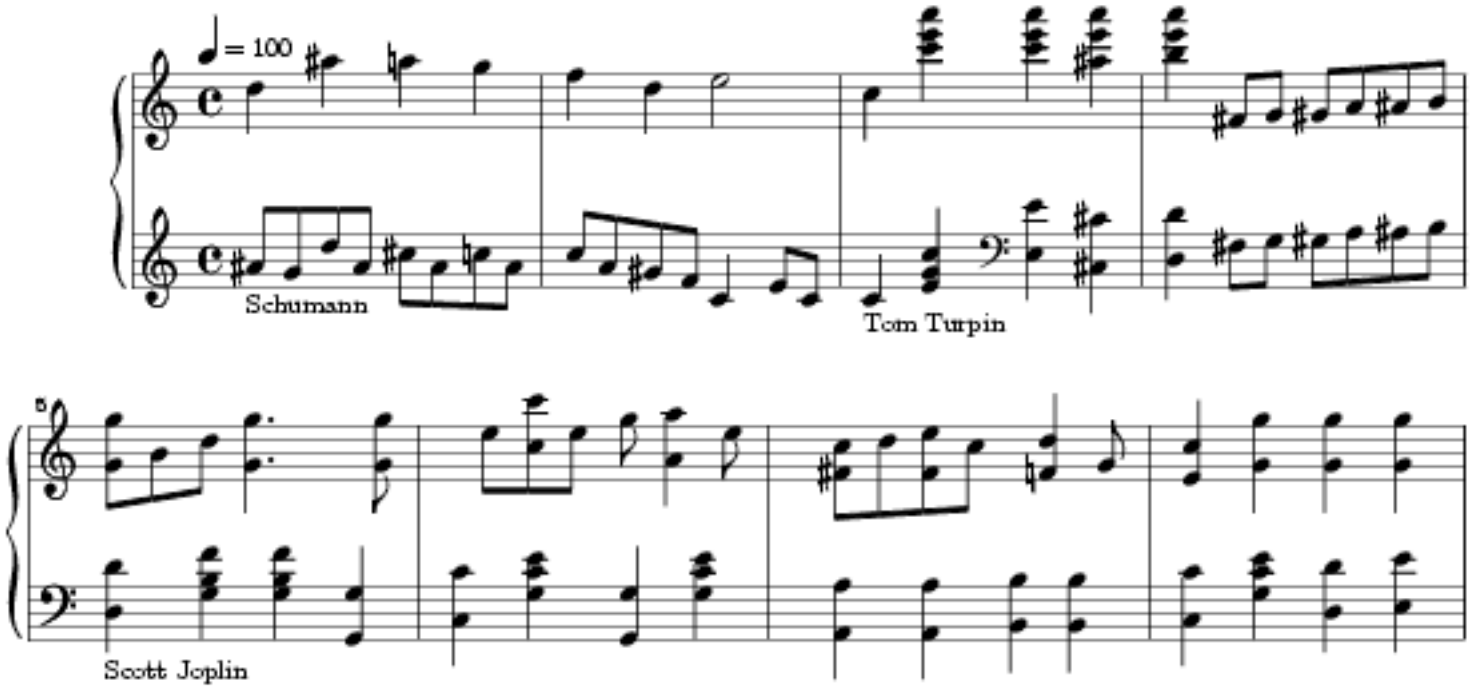
Copies: SS -> Shc Sfc

Shc -> '(incip bar bar bar bar bar halfcad)

Sfc -> '(copy-generated)

S is now '((bar (equal-slot 'id 102)) (bar ....) [...] (full-cadence))

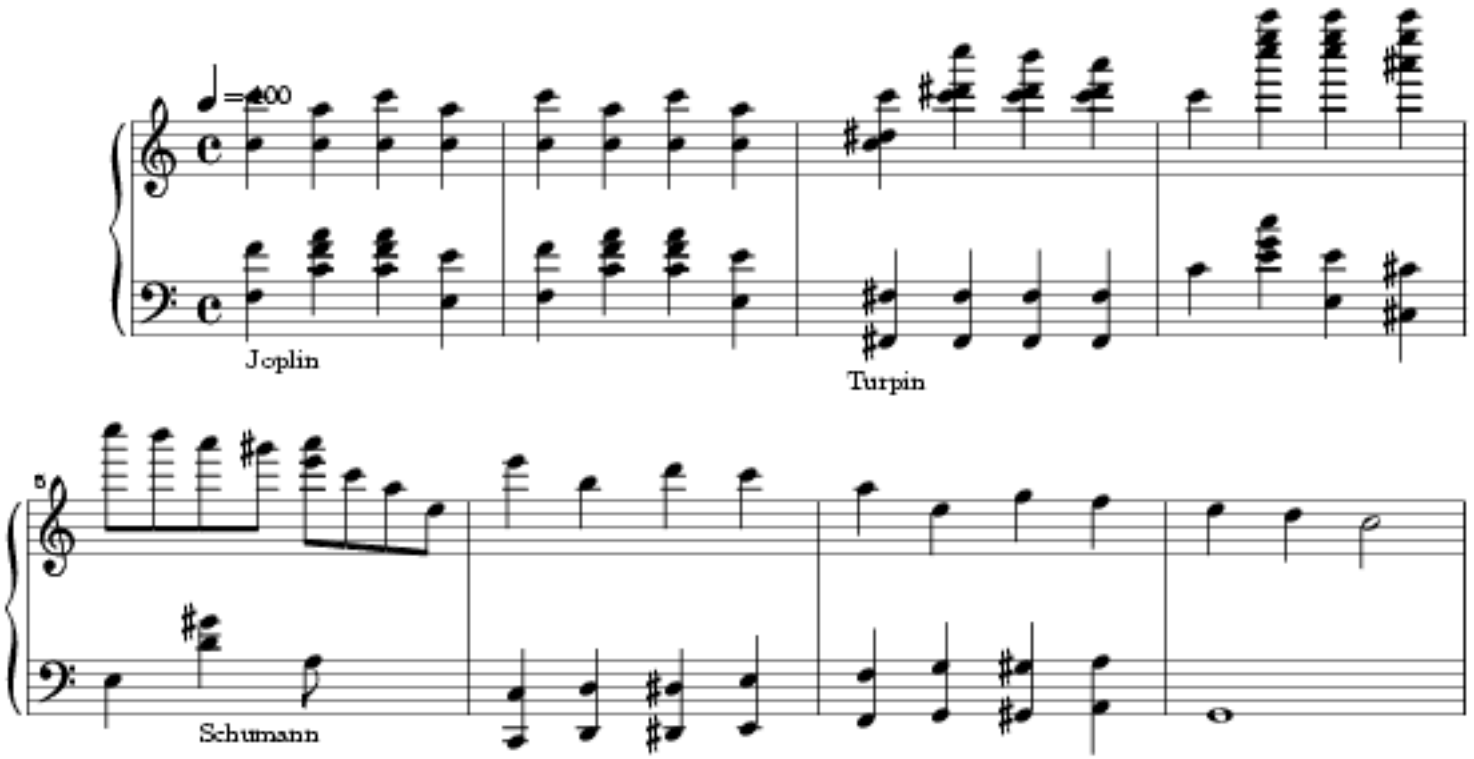
One-dimensional control



Multi-dimensional control

System always orders possibilities to harmonic, melodic and rhythmic distance.

This ordering calculates euclidean distance from different axis; those axis can be weighted by input controls.

$$R = \sqrt{\left\{ w1 * h \right\}^2 \quad \left\{ w2 * m^2 + \left\{ w3 * r \right\}^2 \right.}$$

Multi-dimensional control