My computer writes music on its own … does yours?

An investigation on the automatic generation of music and its application into video games

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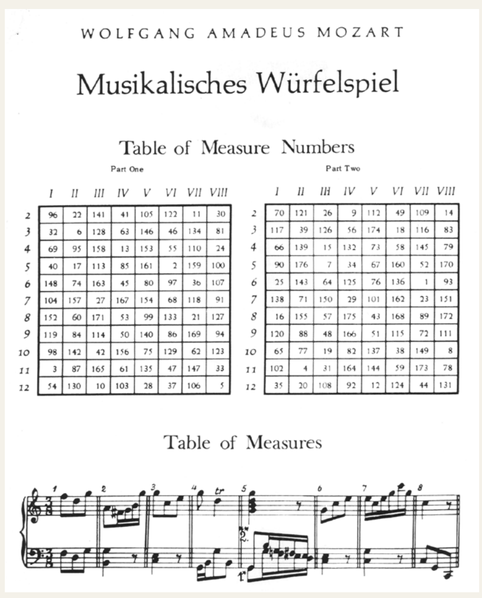
Introduction

What is Algorithmic Composition?

- ✓ computational process [1]
- ✓ music generation
- ✓ following a set of instructions [2]



Why Compose Algorithmically?

- ✓ source of original material [3]
- ✓ inspiration [4]
- ✓ reduction of efforts and costs [5]

Where is Algorithmic Composition used?

- ✓ academia
- ✓ films and video games [6]

Which is the next step within Algorithmic Composition?

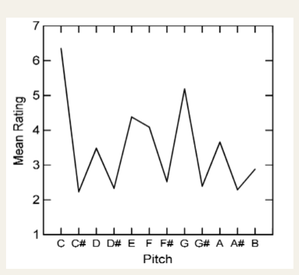
- ✓ refer to a specific feature

e.g. musical tension [7]

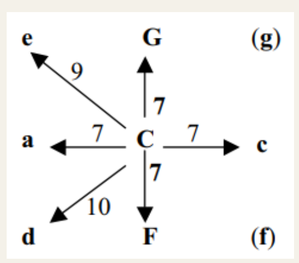
Theoretical Background

What is Tension in Music?

- ✓ notes and chords are organized in hierarchies
- ✓ the *more important* a note or chord, the more it is expected to be played

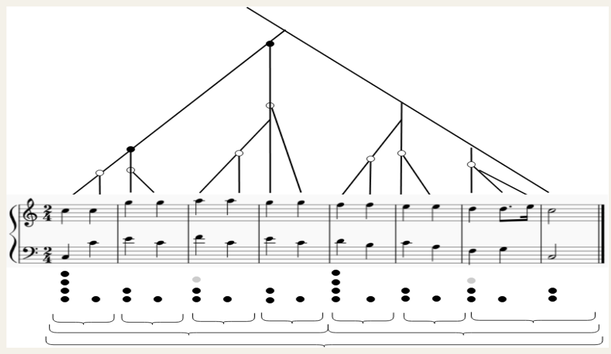


- ✓ tension relates to expectation [8]



Related Work

How to model Tension in Music?



- ✓ Harmonically

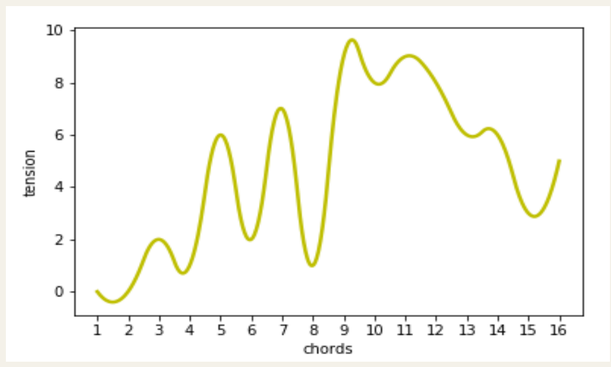
distance between chords [9]

- ✓ Melodically

distance between melodic notes, their direction and role in the hierarchy [10]

- ✓ Rhythmically

duration of chords and speed of change when going from one chord to the next [11]



Methodology

What is the Music Generator?

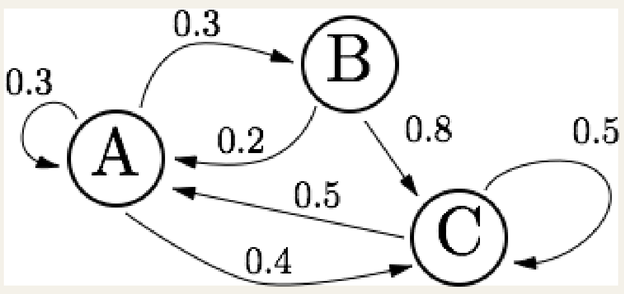
- ✓ computational interface
- ✓ real-time music generation
- ✓ matching a given tension level

How does the Music Generator work?

- ✓ quantitative tension values can be calculated for any possible sequence of notes or chords [9-13]
- ✓ tension values are transformed into probabilities according to how close they are to the input tension level.

e.g. the more important a chord, the more likely it is to be generated

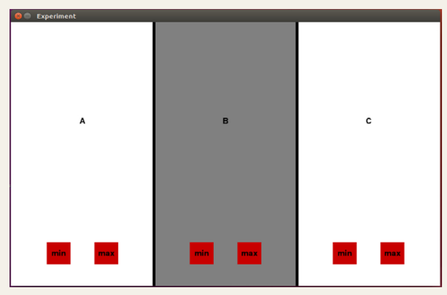
- ✓ stochastic selection of chords and notes



Empirical Study

Does the Music Generator match people's perceptions?

- ✓ ten musicians and ten non-musicians
- ✓ three pieces were presented at a time



- ✓ participants selected which piece they perceived as being the most and the least tense
- ✓ the agreement between a participant's and the system's labelling was defined as equal to *one* if the system's tension label was the same as the participant's, *zero* otherwise.

	Min M	Med M	Max M	Average M	Min NM	Med NM	Max NM	Average NM
HARMONY	84 %	70 %	92 %	82 %	52 %	40 %	54 %	49 %
MELODY	42 %	40 %	92 %	58 %	46 %	50 %	76 %	57 %
BOTH	68 %	64 %	94 %	75 %	60 %	58 %	78 %	65 %
AVERAGE	65 %	68 %	93 %		53 %	49 %	69 %	

Conclusion

- ✓ agreement (%) high correlation
- ✓ melodic and rhythmic mislabellings
- ✓ physiological data
- ✓ real-time generation

e.g. dynamic narratives

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