



WHAT MAKES BACH BACH?

Understanding Music as a Complex System

CSSS 18

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QUESTION

- What makes music different between different eras, composers and genres?
- Can we use machine to understand how music is composed and structured?

METHOD

- Represent music as a higher order network

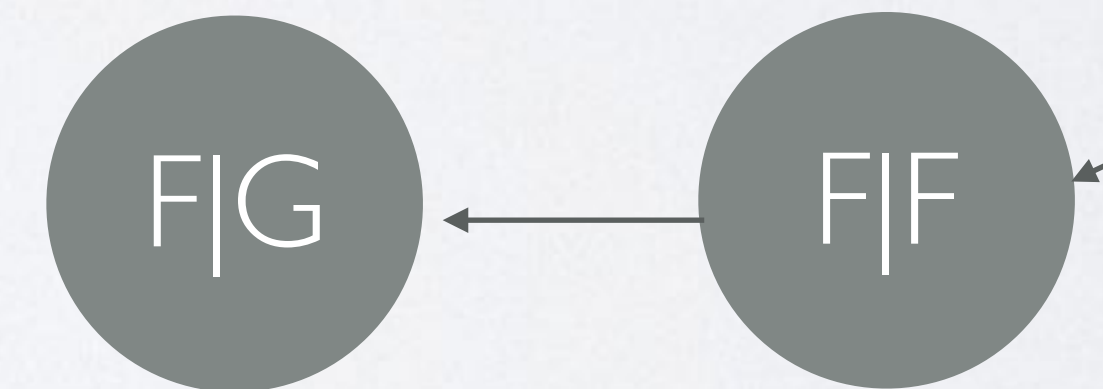
HIGHER ORDER NETWORK (HON)



Snippets of Twinkle, Twinkle Little Star

In Xu et al.'s algorithm, the order is not fixed. The algorithm will automatically generate rules with different orders.

Simple Network



Two-order Network

EIGENVALUES OF HON

FEATURES FROM HON

- Abruptness: high betweenness, but low transition probabilities
- Repeatedness: longest path
- Branching: how complex the graph is
- Pitch Range: pitch within/between rules, whole piece
- Melodic: length of rules

CASE STUDIES

FUTURE PLAN

- Code the sequence better (difference in pitches, chord, etc.)
- Multilayer network to incorporate different instruments
- Add temporal information to capture rhythm

Questions?

