

WORD EMBEDDING MODELS APPLIED TO CLASSICAL MUSIC RECOVER THE CIRCLE OF FIFTHS IN EMBEDDING SPACE

First Author

Affiliation1

author1@ismir.edu

Second Author

Retain these fake authors in

submission to preserve the formatting

Third Author

Affiliation3

author3@ismir.edu

ABSTRACT

We apply a word embedding model to a large symbolic corpus of classical music to learn an embedding space where chords are represented by real-valued vectors. In early classical music, the first two principal components of the embeddings of major triads form a circle. In music from later composers, this circular topology is less evident. Remarkably, the order in which major triads are arranged on this structure corresponds to their order in the circle of fifths. The emergence of this structure is justified by reasoning about the probabilistic embedding model and the composition of classical music. Deviation from the circle of fifths in the embedding space of music from later composers corresponds to intuitions from music theory about the decline in use of functional harmony. We situate our results in the context of current statistical research into functional harmony in common practice music. We make a connection with the problem of polysemy in natural language processing by pointing out that major chords in classical music can be viewed as having multiple meanings, which are context-dependent. This motivates a similar topological analysis of learned embedding spaces of both music and natural language in service of disambiguating tokens with multiple meanings. We show how this technique is useful for large-scale, quantitative stylistic analysis of music.



© First Author, Second Author, Third Author. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). **Attribution:** First Author, Second Author, Third Author. “Word embedding models applied to classical music recover the circle of fifths in embedding space”, 17th International Society for Music Information Retrieval Conference, 2016.