Non-chord Tone Identification

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Non-chord tones are:

- Elaborative notes, usually marked by particular step-wise melodic contours, which don’t belong to the local structural harmony.

Non-chord tone identification can be used in:

- Melodic analysis (Illescas et al. 2011)
- Polyphonic music retrieval (Pickens et al. 2004)
- Harmonization (Chuan and Chew 2011)
- **Harmonic analysis** (Pardo and Birmingham 2002; Sapp 2007; Mearns 2013; Willingham 2013)
1 Introduction

Harmonic analysis:

- Identifying local harmony in complex music textures
- Can be greatly simplified by identifying and eliminating all non-chord tones before determining a chord label

Few scholars have proposed complete, dedicated non-chord tone identification models
1 Introduction

Original score

Identifying and eliminating non-chord tones

Determining chord labels
We propose a non-chord tone identification model:

- Using machine learning (feedforward neural networks, FFNN), which learns to conduct non-chord tone identification automatically from the provided training examples

- Rameau (Kröger et al. 2008), a dataset consisting of 140 Bach chorales with non-chord tone labels, is used
2. Method

Fig. 1: Illustration of the structure, the input and output of FFNN, which is generated from Bach chorales.
3 Evaluation

10-fold cross validation:

F1-measure: 70.21 ± 7.97%

Shuffled 10-fold cross validation:

F1-measure: 71.55 ± 0.35%  (Averaged performances for 10 shuffles)
3 Results

F1-measure: 71.55%

Fig. 2: Illustration the first 9 measures of BWV 389 “Nun lob, mein Seel, den Herren”. The second line is the non-chord tone ground truth, and the third line is the predicted non-chord tones.
3 Results

F1-measure: 71.55%

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3 Results

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4 Conclusion

• F1-measure: 71.55%

• An innovative and promising approach to tackling the problem of non-chord tone identification, as well as harmonic analysis.

• If more data is available, better performances can be achieved

• Complete the whole Bach chorale dataset, with 371 chorales fully annotated with non-chord tone labels
  ➢ Enables the model to achieve better performances
  ➢ The dataset can be used in other music analytical tasks
Andrew Hughes’ Chants

Andrew Hughes encoded about 6000 medieval chants into a special format, which are converted into music scores with MEI (Music Encoding Initiative) format (rendered by Verovio)
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References


