

Microtiming analysis in traditional Shetland Fiddle music

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Introduction

The Shetland Isles is an archipelago situated 100 miles north of the Scottish mainland. Shetland has a distinct music tradition with a wide range of influences including mainland Scottish, Scandinavian, and North-American.

The fiddle is a vital component of the Shetland music tradition and is played at ceremonies and rituals where dancing plays an important role.

Microtiming



To facilitate dancing, Shetland fiddle music has characteristic rhythmic qualities known as *lilt* [1].

Despite the importance of *lilt* in Shetland fiddle music, the exact qualities of *lilt* are poorly defined.

This work aims to characterize microtiming variations in traditional Shetland fiddle music with the goal of improving our understanding of *lilt*.



Method

The **corpus** comprises 27 audio recordings of solo fiddle from the Tobar and Dualchais platform [2].

Recordings were manually **transcribed**, converted to MIDI, and aligned with the original audio track using the method for **MIDI-to-Audio synchronization** in [3].

We extract **4 eighth note sequences** from each melody (N = 1030). We calculate time intervals between consecutive eighth notes (**inter-onset-interval IOI**). To account for varying tempi, these intervals are **song-wise normalized**.

Fig 1. Example sequence: straight version - equal IOIs, and lilt version - unequal IOIs.

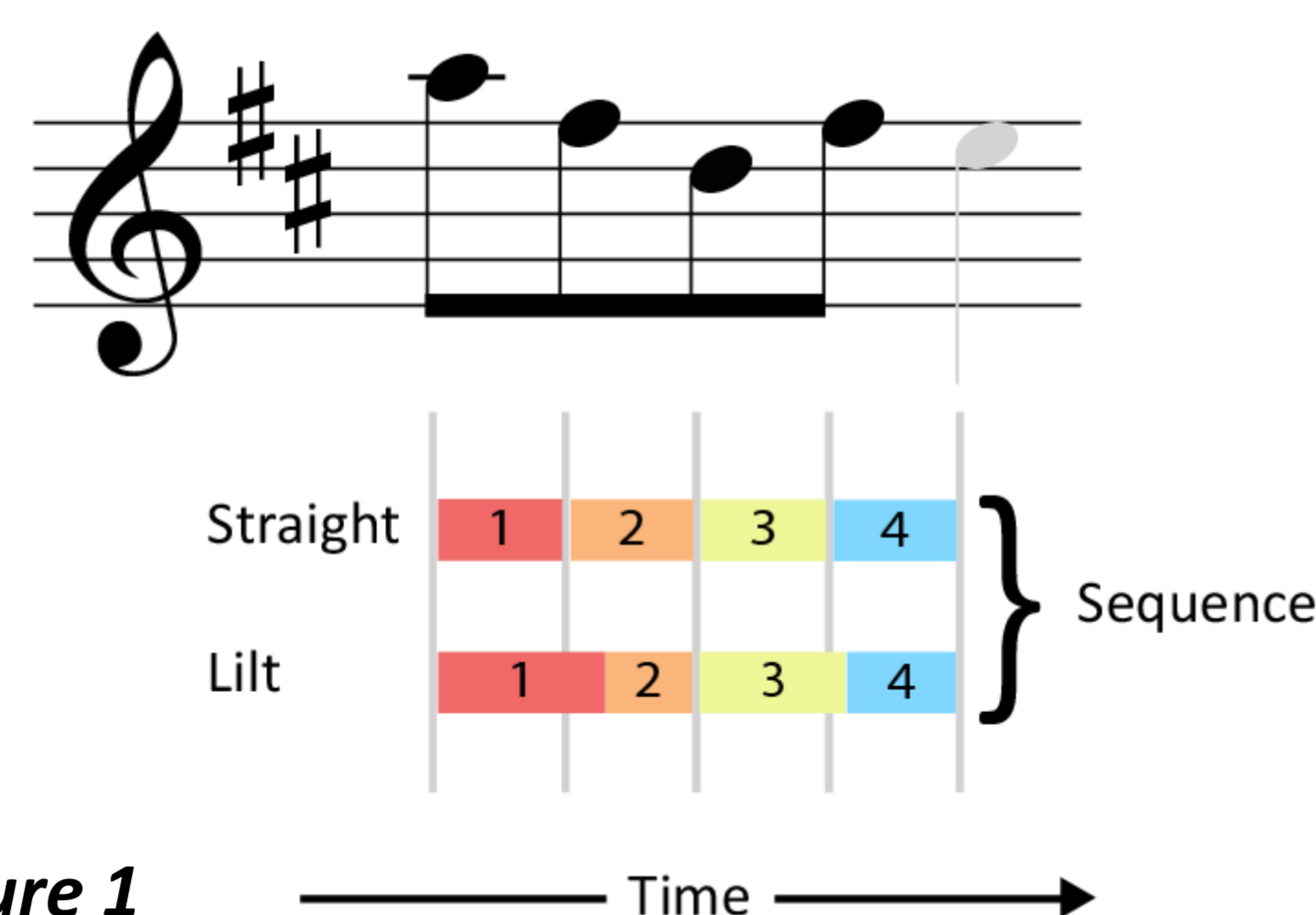


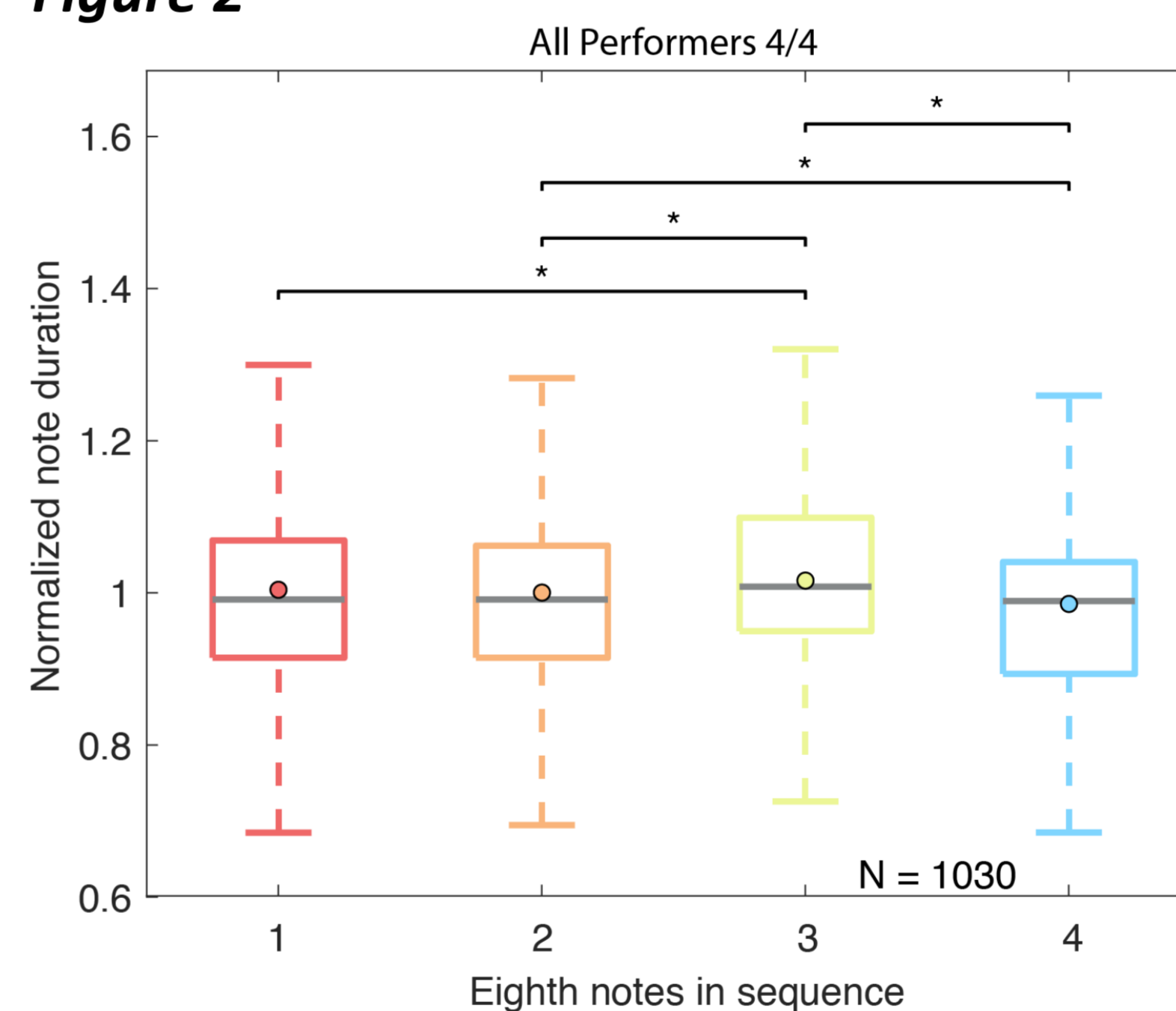
Figure 1

References

- [1] Peter Cooke. *The Fiddle Tradition of the Shetland Isles*. Cambridge University Press, 1986.
- [2] The Shetland Fiddle Corpus. www.github.com/ecanoc/ShetlandFiddles
- [3] Sebastian Ewert, Meinard Müller, and Peter Grosche. High resolution audio synchronization using chroma onset features. In Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), pages 1869–1872, Taipei, Taiwan, 2009

Results

Figure 2



Pairwise differences of the mean IOIs were calculated across the entire corpus using a Wilcoxon signed-rank test at ($p < 0.05$).

- Significant lengthening of the 3rd note compared to all other notes in the sequence.
- Significant difference between the length of eighth note 2 and eighth note 4, with note 4 slightly shorter than note 2.
- No significant difference was found between note 1 and 2 suggesting these are played in a *straight* manner.

See the paper for additional results including:

- Annotation reliability of MIDI-to-audio synchronization
- Inter-Beat-Interval (IBI) analysis showing a tendency to slight shorten beat 3.
- Performer-wise analysis of IOI and IBI.