“Telling a Story.” On the Dramaturgy of Monophonic Jazz Solos

Klaus Frieler, Martin Pfeiderer, Jakob Abeßer, Wolf-Görg Zadlach
University of Music “Franz Liszt” Weimar

Hochschule für Musik
FRANZ LISZT WEIMAR
DFG

Introduction

- The storytelling metaphor is ubiquitous in jazz parlance [2, 3, 4].
- However, storytelling in a non-narratological language such as music is hardly possible in a literal sense.
- Hypothesis: One part of the story-telling metaphor might refer to musical analogies, i.e., intensity and tension changing in time.

Aims: Exploring the time courses of selected features (“dramaturgy”) of monophonic jazz solos to reveal possible foundations for the story-telling metaphor.

We conducted three studies:
1. Investigation of global trends of pitch and intensity, note-based.
2. Investigation of global trends of selected features related to tension, variability and intensity based on phrases.
3. Investigation of distribution of ideas with respect to position in a solo.

Out of scope: Player interaction, overall dramaturgy.

Data

- Study 1 & 2: 299 monophonic solos by 70 soloists taken from the Weimar Jazz Database, covering a wide range of stylos and performance.
- Study 3: A subset of 116 solos of the Weimar Jazz Database equipped with melodic annotations.

Intensity and pitch

Method

- For each solo, pitch and intensity values [3] were extracted.
- Onsets were normalized to the interval 0-1.
- Overall trends were extracted by fitting quadratic polynomials.
- Quadratic trends classified in five categories: non-significant, horizontal, ascending, descending, convex, concave.
- Non-significant assigned to solos with non-significant fits (p > .05).
- Horizontal assigned to solos with significant fits, but $R^2 < 1$.

Results

- Most solos are flat (non-significant or horizontal).
- 57.9% of pitch curves and 47.0% of intensity curves showed sig. quadratic fit.
- 18.8% of pitch curves and 10.1% of intensity curves showed non-flat trend.
- Intensity and pitch are correlated ($\rho = -.2, p < .001$), particularly for brass instruments (cf. [4]).
- Convex shapes are the most common sig. trends in both domains.
- Significant difference between performers (Kruskal-Wallis, p = .012), instrument (p = .014), rhythmical feel (p = .002), and tempo class (p = .012) for $R^2$ would be found in the class of significant pitch fits, but not for significant intensity fits.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>abs_int_range</td>
<td>Intensity</td>
<td>Range of absolute intensity values.</td>
</tr>
<tr>
<td>abs_int_contour</td>
<td>Intensity</td>
<td>Contour of absolute intensity.</td>
</tr>
<tr>
<td>abs_int_tension</td>
<td>Intensity</td>
<td>Tension of absolute intensity.</td>
</tr>
<tr>
<td>durclass_abs_entropy</td>
<td>Tension</td>
<td>Entropy of duration classes.</td>
</tr>
<tr>
<td>pitch_int_entropy</td>
<td>Tension</td>
<td>Entropy of intensity.</td>
</tr>
<tr>
<td>pitch_range</td>
<td>Tension</td>
<td>Range of pitch values.</td>
</tr>
<tr>
<td>pitch_entropy</td>
<td>Tension</td>
<td>Entropy of pitch values.</td>
</tr>
<tr>
<td>cpc</td>
<td>Melody</td>
<td>Coefficient of partial correlation.</td>
</tr>
</tbody>
</table>

Table 1: List of selected features.

Discussion

- Fast explorative statistical analysis of macro-level structures of jazz solos.
- Global (quadratic) trends for some solos on some variables could be observed.
- Intensity related measures tend to convex shapes with peaks in the second half of the solos.
- Most solos do not show significant linear or quadratic trends with respect to our measures.
- Trends of higher order are worth further examination in the future.

Acknowledgments

The work was supported by the DFG grant “Melodisch-rhythmische Gestaltung von Jazzimprovisationen. Rechnerbasierte Musikalisierung existenter Jazzmusik” (DFG-PI 659/7-1).

References


FIGURE 1: Polynomial fits (2nd order) to intensity curves for 19 solos. Only curves with $R^2 > .15$ are shown.

FIGURE 2: Significant polynomial fits (2nd order) for Bob Berg solos on "I Didn’t Know What Time It Was" (1979).

FIGURE 3: Distribution of main and subtypes of ideas with respect to relative position (normalized relative number).

Method

- Intensity and pitch analysis is a qualitative method for categorizing ideas in jazz improvisation.
- Solos are annotated manually with non-overlapping, exhaustive sequences of melodic units coming in 9 main types with 18 subtypes.
- Relative starting position in a solo is measured with normalized note numbers.

Results

- Relative positions of main types are significantly different (F(8, 4,463) = 6.21, $p = .000^{*}$).
- Theme (median rel. pos = 22), quote (43) and void (38) occur earlier (related begin).
- The most expressive types expressive (63) and rhythm (62) occur later (late climax).
- Licks and melody show a tendency to bis- or multi-modality.