



Tracing the creative process

A case study of Bob Berg's solo on "Angles"

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Introduction

- In this case study, we try to reconstruct the creative process with means of computational and statistical tools.
- Data from the Weimar Jazz Database (Frieler et al., 2012).
- Analysis done with MeloSpyGUI & R.

General Description

- Bob Berg (1951–2002), was an eminent postbop tenor sax player of Miles Davis fame, from Brooklyn, New York.
- "Angles" is an Bob Berg original from his 1993 record "Enter the Spirit" (Stretch Records STD-1105).
- Personnel: Bob Berg (ts), David Kiskoski (p), James Genus (b), Dennis Chambers (dr).

Tempo	270 bpm
Signature	4/4
Key	Indeterminate, between Ab-maj and C-min.
Form	A(16) A(16) B(16)
Rhythm feel	A: Latin, B: Swing
Lengths	799 tones, 144 bars, 3 choruses, 8 phrases
Duration	127 s
Densities	6.3 tones/sec, 5.6 tones/bar, 21 tones/phrase
Metrical centroid	3+
Start of phrases	42% (beat 3), 13% on 3+, 10% on 1, 10% on 2+
Syncopicity	9.2% (very few)
Ambitus	as-as" (36 semitones / 3 octaves)

Tab. 1: Global statistics of Berg's solo on Angles.

Fig. 1: Transcription of Berg's solo with annotated mid-level units and assorted pitch patterns.

Dramaturgy

- Overall wave-like ascending tension curve (Fig. 2).
- Number of expressive ideas (**oscillations**, **expressive**), loudness, intervals, and contrasts increase over time (Fig. 2 & 4).
- Highest tonal tension at end of choruses on G7#9/D7alt turnaround.

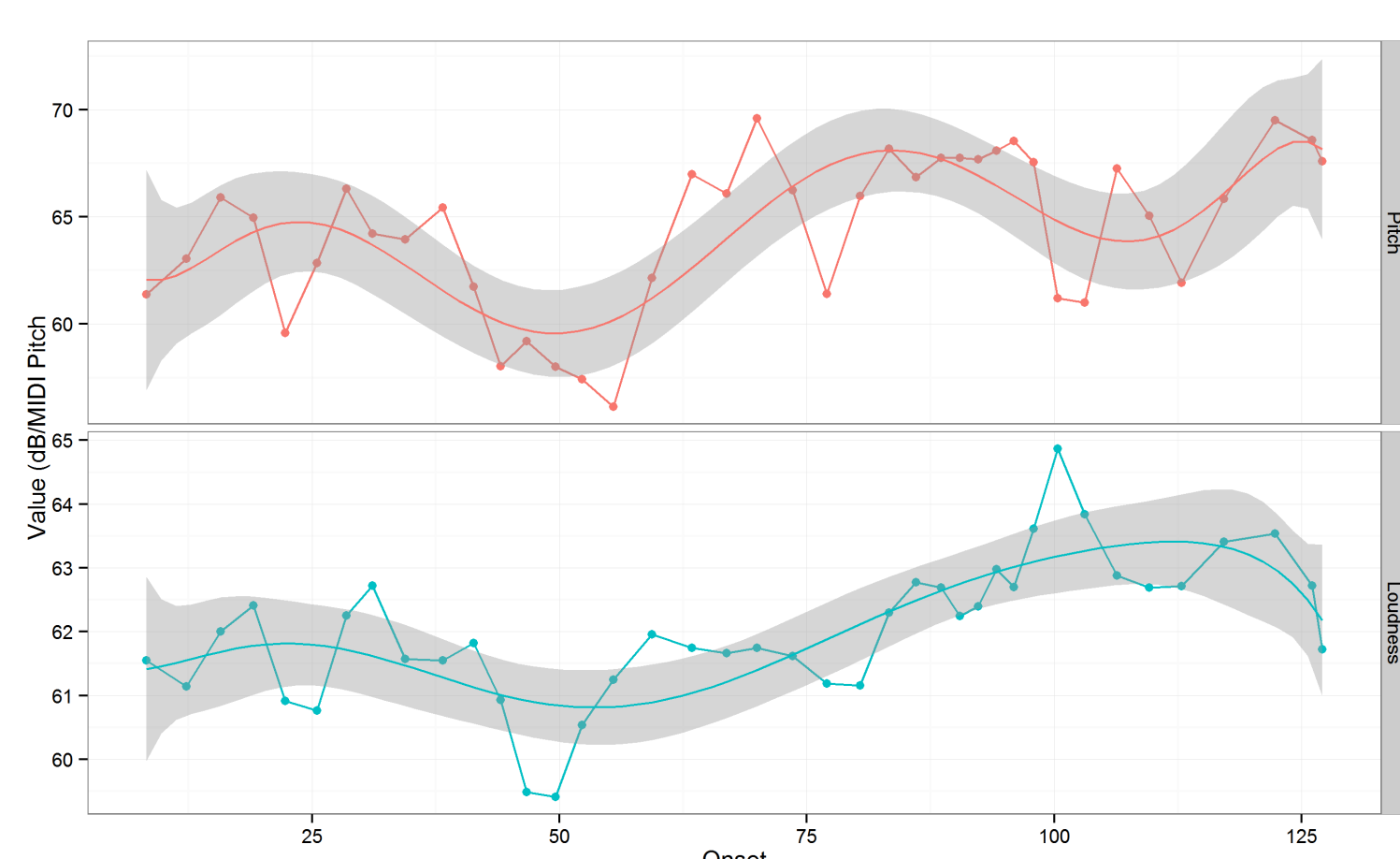


Fig. 2: Pitch and loudness curves, smoothed with N=40 window, polynomial fit of degree=7.

Chorus 1																Chorus 2																Chorus 3															
A1				A2				B1				A1				A2				B1				A1				A2				B1															
Abj7	C-7	Db7	Eb7	Abj7	C-7	Db7	Eb7	F-7	Db7#11	G7#9	D7alt	Abj7	C-7	Db7	Eb7	Abj7	C-7	Db7	Eb7	F-7	Db7#11	G7#9	D7alt	Abj7	C-7	Db7	Eb7	Abj7	C-7	Db7	Eb7	F-7	Db7#11	G7#9	D7alt												
rhym	mel	mel	line	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck	lck												

Fig. 3: Distribution of mid-level units (bottom) over choruses (top, 48 bars each), form parts (upper middle, 16 bars each) and chords (lower middle, 4 bars each). (rhym = rhythm, m/mel = melody, exp = expressive, lck = lick, blank = pauses).

References: Frieler, K., Pfeleiderer, M., Abeßer, J., & Zaddach, W.-G. (2016). "Telling a story". On the dramaturgy of monophonic jazz solos. *Empirical Musicology Review*, 11(1). Frieler, K., Pfeleiderer, M., Abeßer, J., & Zaddach, W.-G. (2016). Midlevel analysis of monophonic jazz solos. A new approach to the study of improvisation. *Musicae Scientiae*, 20(2). 143-162. Frieler, K., Abeßer, J., Zaddach, W.-G., & Pfeleiderer, M. (2013). Introducing the Jazzomat Project and the Melo(S)py Library. In: Kranenburg, P. van, Anagnostopoulou, C., & Volk, A. (Ed.) *Proceedings of the Third International Workshop on Folk Music Analysis*, Meertens Institute and Utrecht University Department of Information and Computing Sciences, pp. 76–78.

Mid-level Analysis

- Qualitative annotation of "playing ideas" (Frieler et al., 2016).
- MLA Stats:
 - 51 units, 15 glued, 13 derived (mostly immediate).
 - Mean duration 2.0 sec/2.75 bars.
 - Mostly **lines**, **rhythm** and **expressive** (Tab. 1).
 - Often across form boundaries (Fig. 2).
 - Lines can be classified roughly into arpeggios (6/21), diatonic (4/21), chromatic (3/21), and mixed (8/21).

	expressive	lick	line	melody	rhythm	Sum
Count	6	11	21	6	7	51
Tones	24	67	485	50	173	799
Duration (s)	12	9	56	10	19	106

Tab. 2: Distribution of mid-level units.

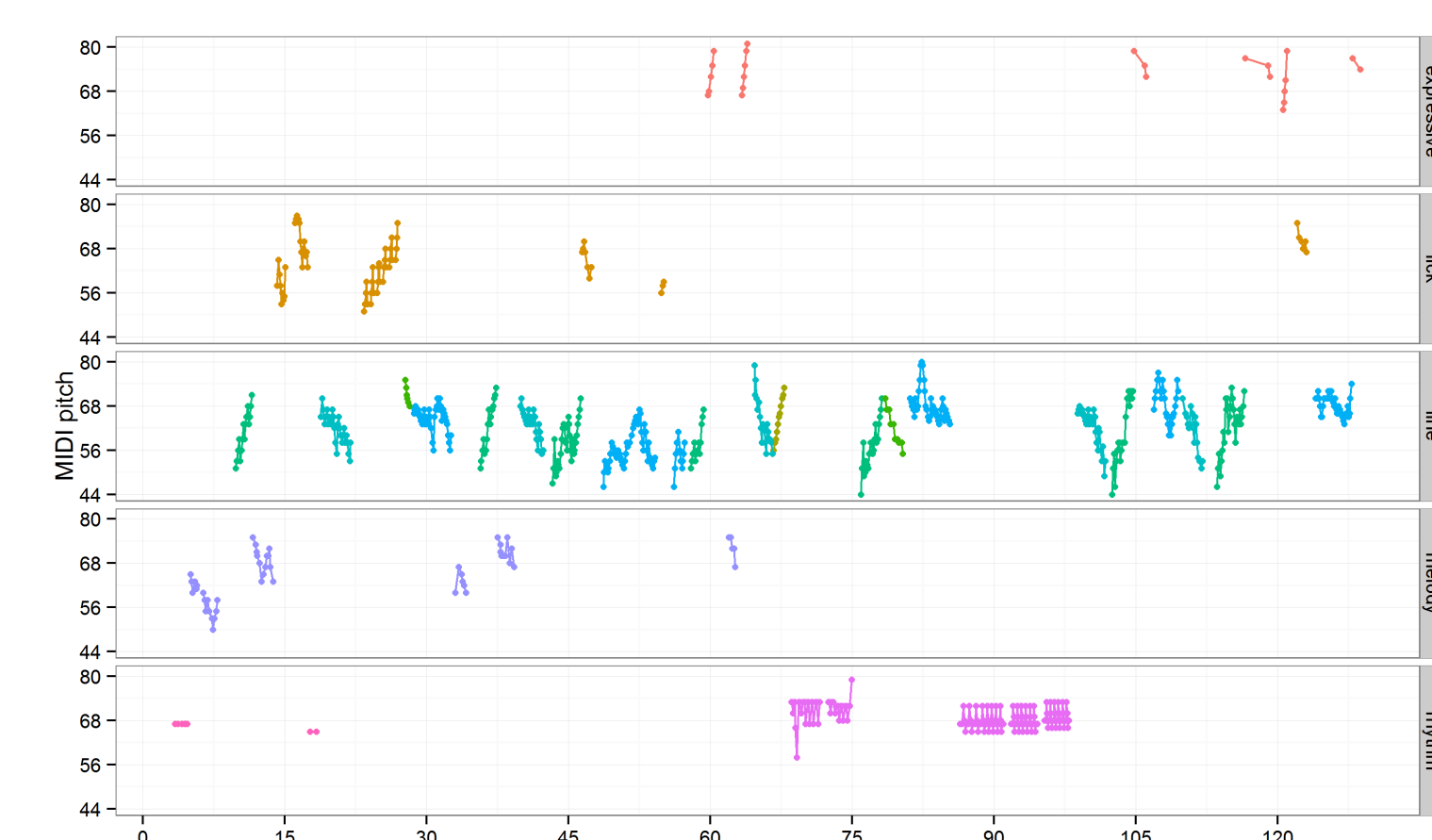


Fig. 4: Time course of solo with respect to main types of annotated mid-level units. Lines are colored according to sub-types.

Tonal material

Preference for upper structures, e.g., C-min/Abj7, G-7/C-7, F-7b5/Db7.

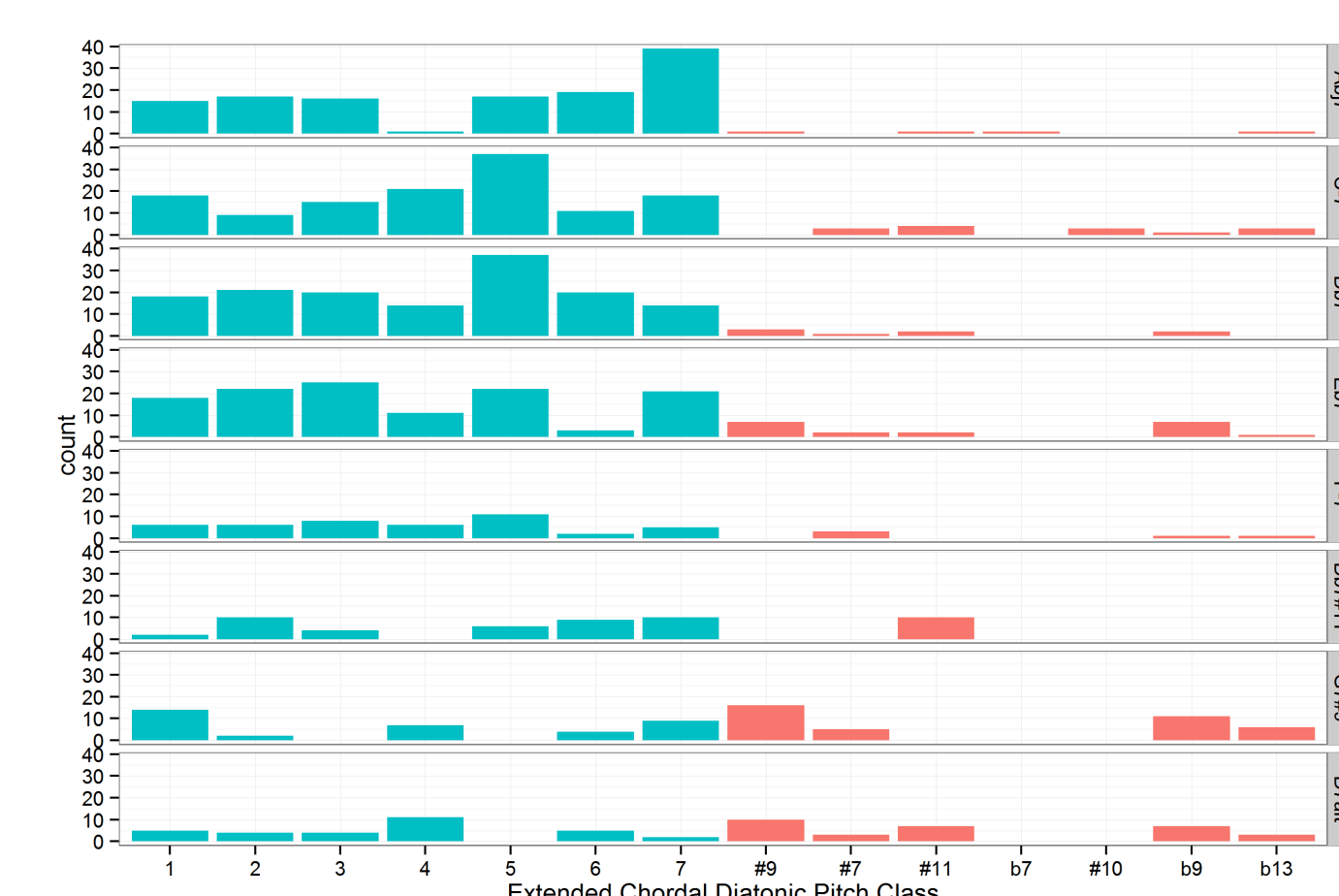


Fig. 5: Distribution of extended chordal pitch classes with respect to chords context.

Patterns

- Mainly lines contain longer pitch pattern, partly overlapping (Fig. 1), built itself from smaller particles.
- The longest 18-tone pattern (m. 31, m. 110) occurs also in „Nature of the Beast“ from the same record.
- Many interval patterns are actually pitch patterns (or octave transposed).
- Numerous tetrachord arpeggios (e.g., on the Db7 in the first chorus) and bebop-style four-tone motives (e.g., m. 20, m. 32, m.111).
- Pattern coverage with at least 4-tone patterns occurring in at least 10 solos of a total of 101 tenor solos: **pitch: 38%**, **cpc: 67%**, **interval: 93%**.

Conclusion & Outlook

- In an explorative pilot study, we tried to re-trace the creative process in a single jazz solo improvisation.
- Many details left out here due to space restrictions. More to come!