

http://phenotypical.com/content/multimedia/flash/John_Coltrane-Giant_Steps.swf

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GATITO: a Gesture Analyser for Trumpet Improvisation Training and Organising

Trumpet players face troubles to browse the pitch space opened by their instrument. Maybe because they have to combine two different browsers, 1° their lips (coupled to the mouthpiece through their whole respiratory system, like singers) and 2° their fingers (three fingers of the right hand, for three different valves). The lips are used to browse the harmonic pitch space (related to the current length of the tube), when the fingers are used to modify the current length of the tube.

The combination of those two browsers for reaching a desired pitch is so difficult to master that beginners usually have no choice but fingering without referring to that double-constrained browsing, like learning an abstract table.

When most melodic instruments provide metaphors to browse the pitch space, or at least allow players to correct quickly their approximations or mistakes (“more on the right” for “higher” on the piano, or “fewer fingers” for “higher” on the saxophone), the trumpet player has not even a raw heuristic to modify a wrong pitch, because the solution is always depending on the local pitch: sometimes, to elevate a pitch (C0) requires to press the three valves, sometimes (C#0) it requires to relax one valve (the central one, keeping the others pressed).

And the effect of using lips to change the current harmonic is also depending on the local situation: if you move from C1 to G1 (a 5th interval), the effect is different from going to G1 to C2 (a 4th interval), because the harmonic space is not “regular”.

Thus no gesture rule, only the abstract truth of the fingering you have to learn by heart.

It is generally admitted that a melody player has to know many different scales to improvise through harmonic environments like jazz music, a single piece requiring typically a dozen of different scales, each one involving a particular (irregular) trumpet fingering.

And as every jazzman well knows, the local harmonic structure of a jazz piece is changing very quickly while playing, so that the trumpet player is often missing the current scale, for being still involved with the past one, or/and maybe afraid of the next one. Not enough cognitive resource to hear the sound, to capture partners' messages, to handle the music: fingering constraints tend to kill melody inspiration and music interaction.

To make a long story short, turning music theory to improvisation practice is a long and fastidious way for trumpet beginners. But why consider that improvisation training has to go from theory to practice?

What if a trumpet player could put forward some proper propositions based on simple gesture inspirations, just to hear how it fits and ask for some appropriate pieces of advice?

We have designed GATITO, a Gesture Analyser system to support Trumpet Improvisation Training. The first version of GATITO does not work in real-time, and only offers two main features:

- Given a simple cyclic gesture, the trumpet player asks the system to shortlist, in “Google™-like” style, the main jazz scales that could be approximated by that gesture, using different assessment parameters;
- Given an interesting jazz scale, the system returns a shortlist of simple cyclic gesture that could be used to approximate that jazz scale.

For the moment, no machine learning takes place, nothing but a simple interface and a person-system interface allowing the user to extract scales or gesture from practical imitation criteria, to listen to the result and to combine partial solutions to elaborate personal ones. And it is already amazing to consider how powerful it is already, and how fascinating it is to put upside down the improvisation question mark!

If *there is no melody, but melodying* [David Sudnow], we can also claim that *there is no improvisation but improvising*. Improvising is like collecting some *melodying* experiments under certain environmental constraints (the theme and the previous chorus as examples to mimic, the harmonic grid of the piece, interaction with the other musicians and the listeners,...).

But collecting is not classifying, as far as classes are not yet available. Piaget put forward the interesting notion of figural collections to express the concurrent process of “disposition” vs “classification” (or even “contiguity” vs “formal similarity”) that supports our collection making actions.

Trumpet playing suffers from a lack of correspondence between pitch contiguity and gesture continuity. Our system aimed at establishing a better compromise by offering gesture facilities to the trumpet player, and corresponding proposals in the melody world.

Notes

[Sudnow]. David Sudnow, *Ways of the Hand: The Organization of Improvised Conduct*, *Ethnomusicology*, doi:10.2307/851348, Vol. 23 n°1, pp. 149-150, January 1979.