

Motivation

- To bring together the knowledge in the fields of Computer Animation production (from UCP Porto) and Automatic Music Performance Software Research (from KTH Stockholm)

Goals

- Create an experimental framework for expressive music generation in the Computer Animation production pipeline

Research Idea

- Design a useful interactive application for Music Design that could take as input a basic music score (MIDI) quantized linearly, and imprint expressiveness and emotion to this music in sync with the expressiveness cues from the timeline exported from the animation project.
- Test and validate the application by an ongoing production, which complies with the industry requirements: "O Trovão" www.abarbosa.org/work.html

Research Process

Step 1 | Get familiarly with the KTH Performance Rules

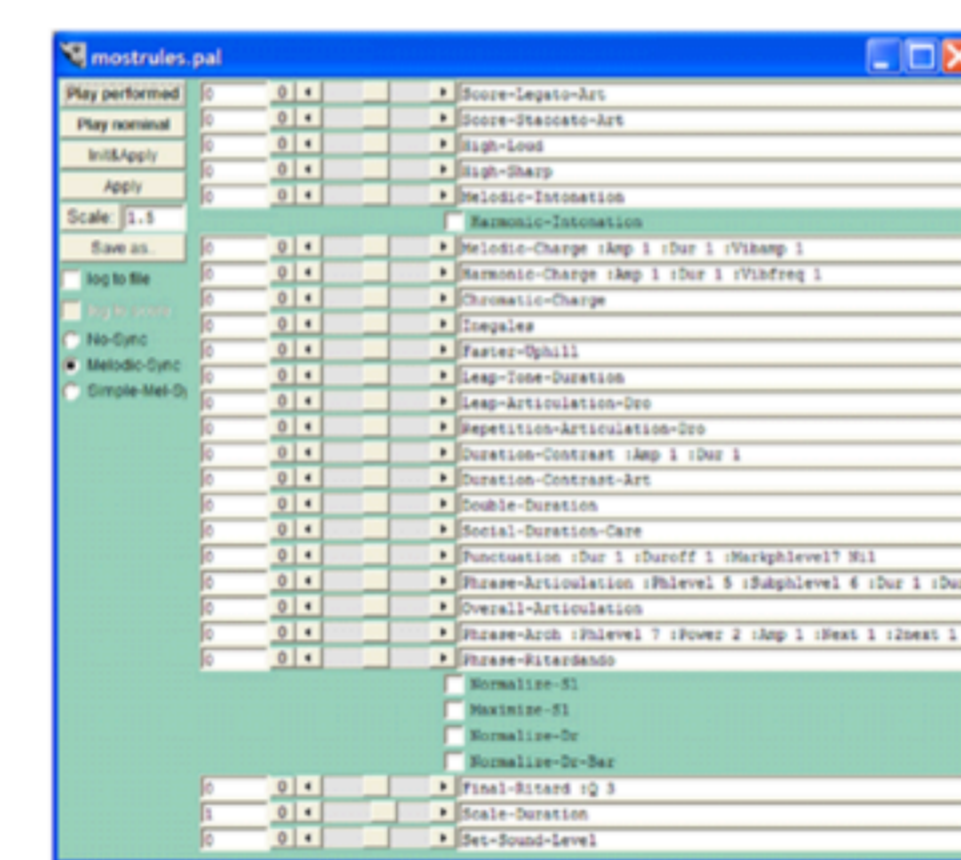
Performer is an important variable in the final audible result of the of a given composition.

Considering this fact the research at KTH Speech, Music and Hearing department analysed the characteristics that were able to change in a performance of a given score and related the quality and quantity of this changes with the expression of given emotions.

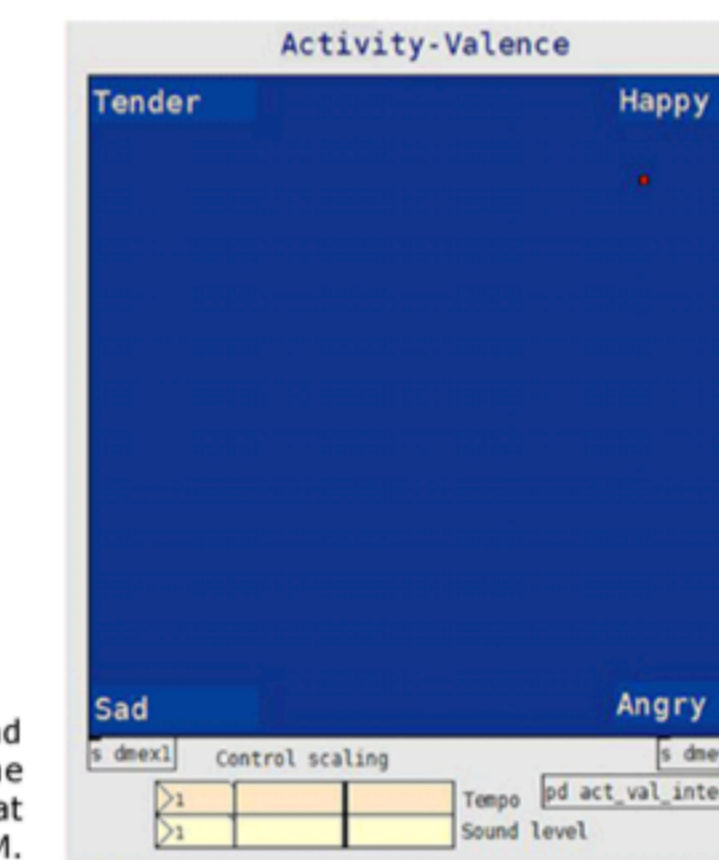
The results of this investigation produced a system of several rules (about 30) that performers use to add certain expressive emotions to a score, covering different aspects of music performance.

Basically the application of the rules produces a rearrange in time and velocity parameters such as "microtiming", articulation, tempo and sound level. (See www.speech.kth.se/music/performance)

Step 2 | Learn the features of the software designed to applied the KTH Performance Rules (DM and pDM)



Director Musices is the main application that implements the rule system (Fridberg et al. 2000.a). DM opens score files with the native .mus extension and MIDI files (type 1 or 0). After opening one of these files one should apply the rules. Those can be selected from a list of preset files containing groups of rules, or can be added individually. After selecting the rules, it is important to choose the quantity of each rule present in the performance.



pDM is a cross-platform pd program used to expand the possibilities of the KTH rule system to real-time proposes. It's application is only possible in files that have been properly prepared in the DM.

Step 3 | Design an application based on pDM to interact with the animation dramatic mood (from the script)

Emotion	peak		ramp		coordinates	
	hour	minute	minute	second	x	y
happy	0	0	0	0	0	0
sad	0	1	0	0	15	0
tender	0	1	25	0	8	400
angry	0	2	50	0	3	400

The first step using the application is to fill a table with the dramatic mood extracted from the script. This can vary around basic emotions like Sad, Tender, Happy or Angry.



After filling the table with data related to the dramatic mood of the movie, the application plays the original score theme and modulate it emotional expression according to it. The user (sound designer) can listen and record the resulting midi file directly to a DAW (Digital Audio Workstation) in order to edit an use digital instruments to achieve the final sound..

Discussion

- Computer Animation production process is complex and time consuming. Therefore, the use of interactive software tools is regarded in the industry as a valuable method to boost productivity in different phases of the production pipeline, including Sound Design and Music Production.
- Same piece can communicate completely different emotions by changing the performance.

Conclusion

- The resulting application proved to be useful according to initial proposal, whoever it is only a prototype that needs further improvements to be used as a real-world application in a Computer Animation production pipeline. For instance, the system is not able to automatically read output data from the animation, and therefore this information must be inserted manually, according to the initial script syntax.

References

- A. Friberg, "pDM: An Expressive Sequencer with Real-Time Control of the KTH Music-Performance Rules". Computer Music Journal, 30:1, pp. 37-48, Spring 2006 © 2006 Massachusetts Institute of Technology.
- A. Fridberg, Directore Musices 2.7 User Manual, KTH 2006.