

# TrakHue - Intuitive Gestural Control of Live Electronics

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## Abstract

A control method for live electronics is discussed which bypasses traditional haptic models through a virtual "landscape" of control parameters activated by a video capture system. The performer navigates the virtual landscape by his/her physical motion, moving through the various sets of parameters.

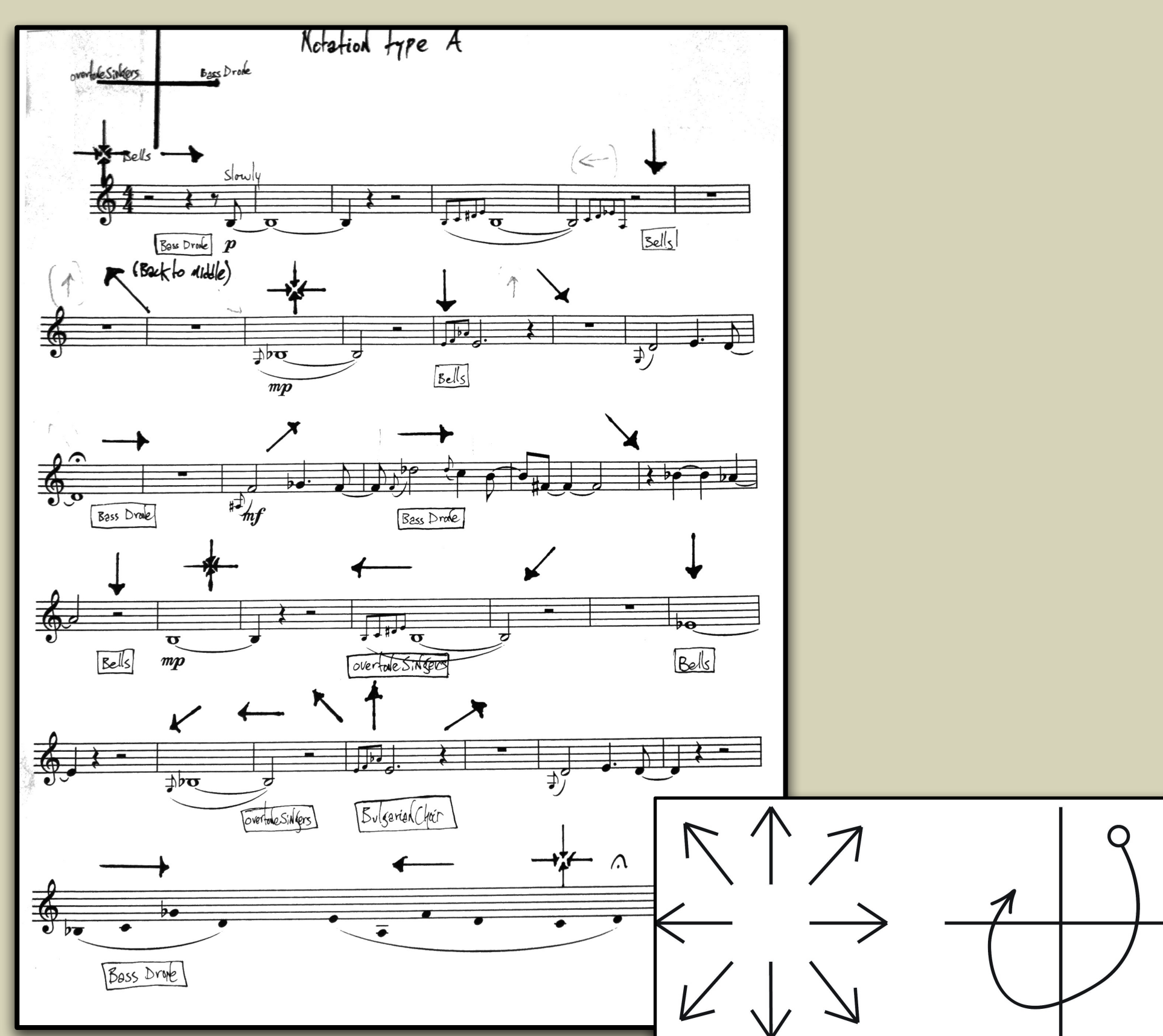
## Initial Problem



- live electronic events are usually triggered/controlled by performer's foot-pedals
- for many musicians foot-pedals are uncomfortable [2]
- lack of subtle controllability through foot-pedals

## Notation

The compositions *Hilbert Space no.1* and *no.2* uses TrakHue whereby a french horn player controls the blend of multiple prerecorded audio samples by head movements. Two notational systems were developed:



Score of Hilbert Space No. 1

## Results

### Cons:

- precision must be learned
- depends on the reliability of the tracker
- limited by the performer's range of motion

### Pros:

- easy to set up
- more intuitive than a foot-pedal
- more expressivity than with a foot-pedal
- discrete technological presence on stage
- colormap can be adapted and personalized

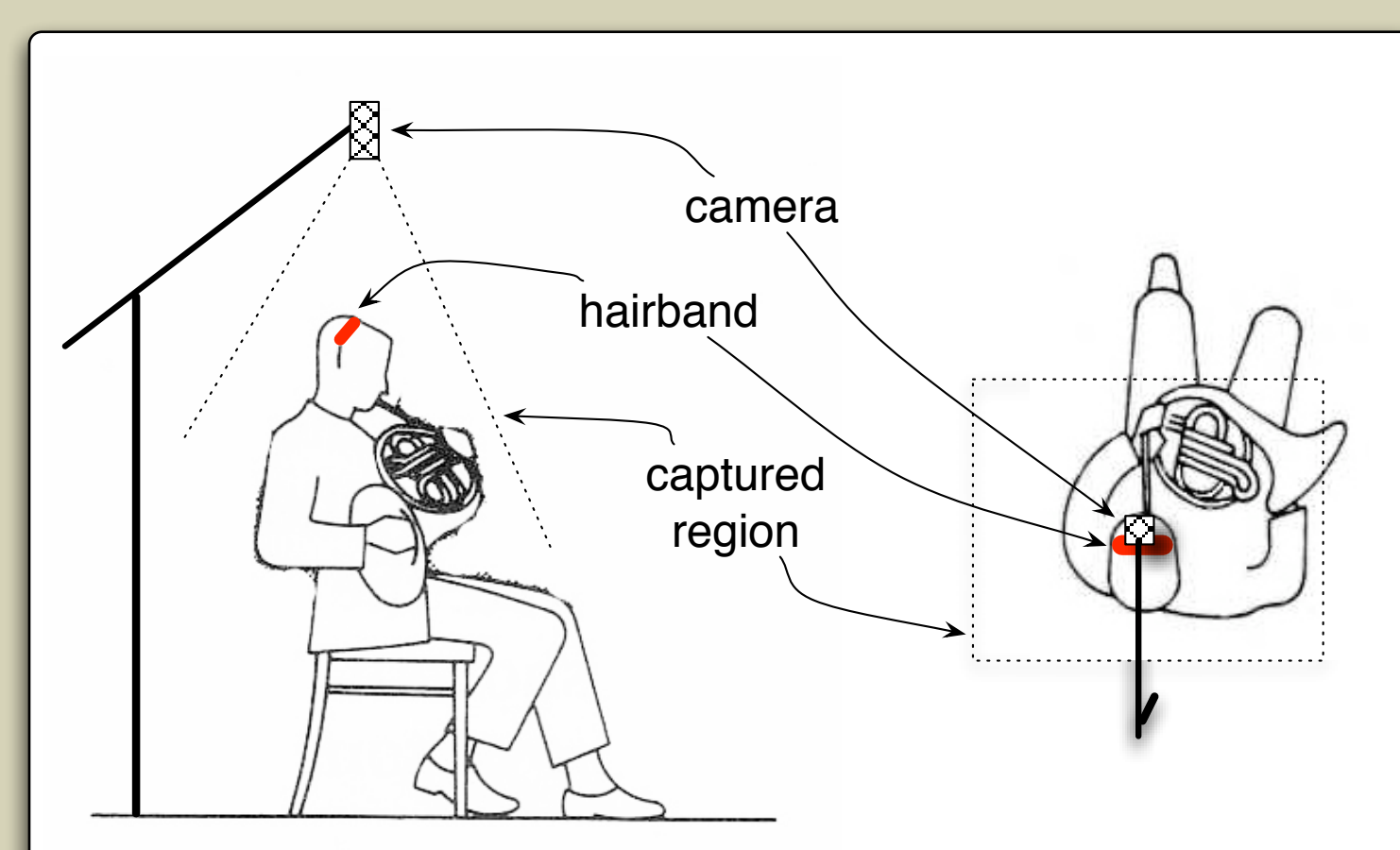
## Conclusion

TrakHue presents an intuitive approach to the gestural control of live electronics.

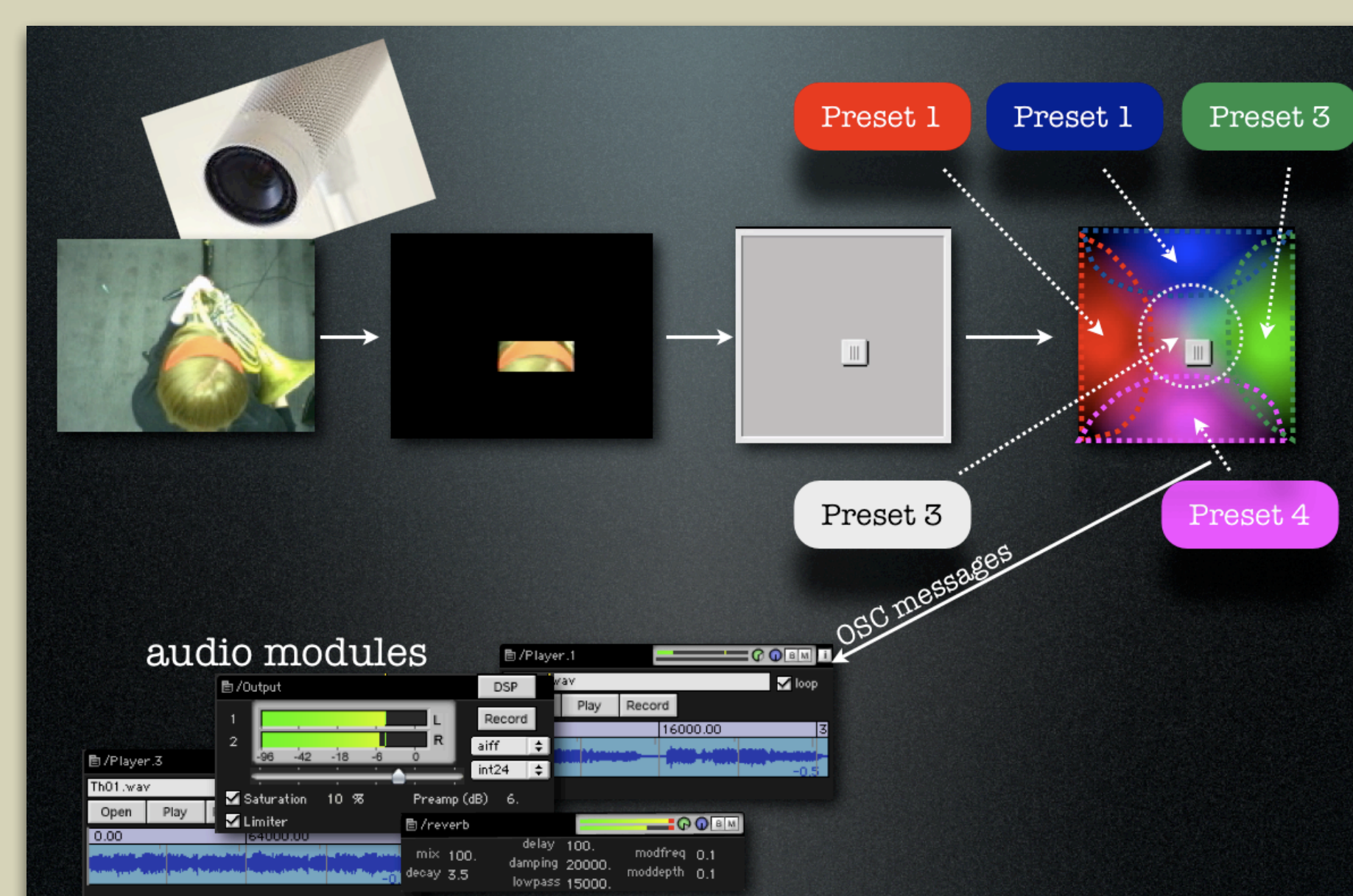
This interdisciplinary collaboration resulted in a system that is simple and inexpensive to set up, facilitates compositional projects and improves the performers control of the electronic part.

## Concept

TrakHue is based on the Max/MSP software environment and uses a small video camera to capture the performers' head movement. A solid colored hairband, worn by the performer, is used as an indicator for head position.



Camera set-up for a french horn player

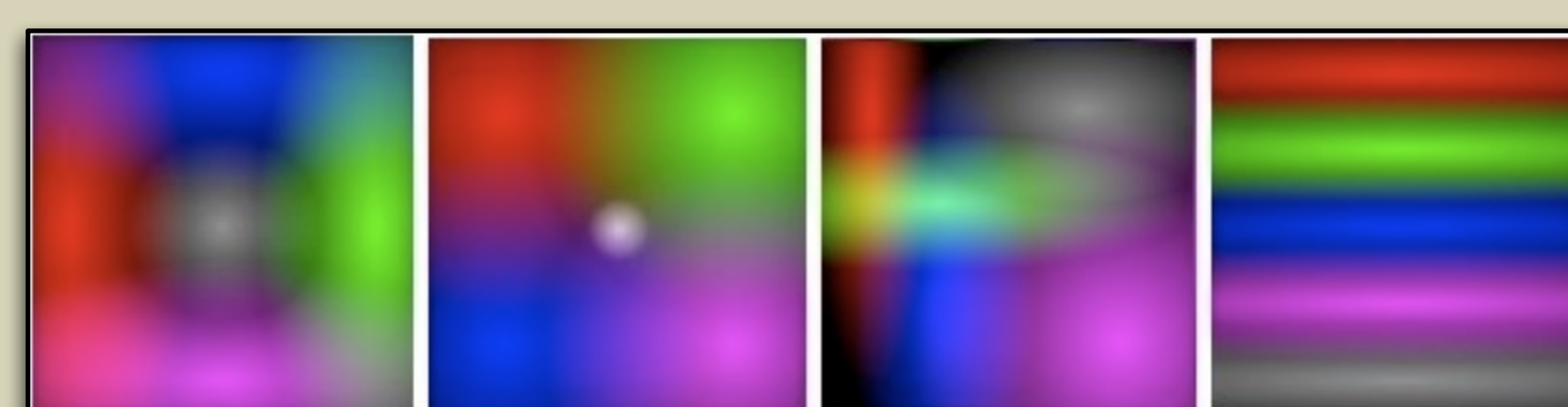


Processing in Max/MSP and Jitter

## Mapping of Head Movements

The colormap object employs a geometric approach to the arrangement of sound processing parameters in a virtual environment, [1]. The colormap is a bird's-eye projection of a set of five gaussian kernels, freely organizable in the virtual space. Each kernel represents a stored cue of parameter settings controlling musical processes for example effects, synthesizer, or sampleplayer.

With the head gestures, the performer essentially controls their location within the map. Depending on their current location within the map, the colormap calculates an appropriate new parameter state through interpolation and weighting between the overlapping kernels and their associated cues.



different colormaps

## Future work

- Experiments with different musicians, both seated and standing
- Compensating for radial distortion by the camera lens
- Perspective-free image when the camera is not directly above the performer
- Testing an infrared camera to compensate for difficult lightning conditions
- More advanced gesture recognition
- Integration of the Gesture Description Interchange Format (GDIF)

## Acknowledgments

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## References

- [1] A. Momeni and D. Wessel. Characterizing and controlling musical material intuitively with geometric models. In *Proceedings of the 2003 conference on New interfaces for musical expression*, pages 54–62, Montreal, Canada, 2003.
- [2] E. McNutt. Performing electroacoustic music: a wider view of interactivity. *Organised Sound*, 8(03):297–304, 2004.