

"Very Nervous System" is a real-time interactive environmental installation. Its predominant input device is a standard video camera. The images from the video camera are analysed by a hand-built video processor that determines the dynamics of physical gestures that take place within the frame. The initial level of analysis is the comparison of consecutive video frames at 30 frames/second with frames being digitized at 128 x 256 pixel resolution with 6 bits of pixel depth. This information is a representation of what has moved within the frame in the last 30th of a second. This information is further processed to give a sense of gesture history. Gesture histories are comprised of the shifts in dynamics (roughly equivalent to movement 'intensity', a combination of velocity and size of the moving object, a sort of 'momentum' perhaps). From this gesture history, more qualitative information is derived, to balance the purely quantitative character of the initial analysis. Therefore, the gathered information ranges from gross amount of perceived movement to time-based notions of consistency, unexpectedness, and rhythm.

The video image can be mapped into up to 255 discrete regions with separate dynamic histories maintained for each region in the frame. A more complex and interesting mapping is possible as well, in which the frame is dynamically mapped by an algorithm that resolves areas of movement into separate moving objects. Each new area of movement within the video frame that cannot be directly associated with an existing area is identified as a new movement 'object'. For instance, a hand suddenly moving might be called object 1. The other hand might then be called object 2, if it was visibly separate from object 1. The object 1 designation would tend to stick to the first hand even as the hand moves about the frame, stops moving, then continues. This algorithm makes a fair number of perceptual errors, but is certainly consistent enough to be valuable for my installations. Up to 16 dynamic objects can be supported.

The gestural information is further processed by a Macintosh computer. Up to six image processor/camera combinations can be attached to one Macintosh via the SCSI bus. The Macintosh a language that I call 'IntAct'. IntAct is a real-time-modifiable pseudo-object-oriented programming language that allows me to define the interactive behaviours of attached input and output devices. For example, physical movement might be translated into music through one, or a set of 'instrument objects'. An instrument object would be a set of algorithms and decisions used to effect the synaesthetic translation from visually-derived movement information into sound information (via MIDI control codes used to control a synthesizer). Many behaviour objects can coexist simultaneously. Behaviours can be created, and shaped while an interaction is in progress (i.e. during a live performance) adding another layer of interaction.

In general, 'Very Nervous System' is used in a configuration which translates movement into sound or music. It has also been used for gesturally interactive video disc installations and for interactive processing of incoming MIDI data for interactive music performance. The system is modular and expandable so that new types of input and output devices can be easily accommodated.

The system is being used by other artists for their own work, and is also being used at physical rehabilitation centers to enable quadriplegics who can barely move, to create music.