(ping) pong

By LASSE SCHERFFIG

Feedback Machines between Computation and Control

What do we do with the computers that surround us? And what do we see on their screens? Three games help understand the nature of 'interaction' as the interplay of controlling and being controlled by symbolic representations – that are created in action.

In 1968, Valie Export presented the installation *ping pong*, a film to be played using a paddle and a ball. At the same time, Ralf Bear constructed the Brown Box – the prototype of a game that later would be named *Pong*, featuring similar game play: hitting a bright spot on screen with an, albeit virtual, paddle. These two ping pong games strangely reflect a third 'game', set up by Norbert Wiener in 1941: an experimental system in which a person had to hit a white spot of light projected onto a wall using a second spot, controlled by a joystick.

ping pong was meant as a critique on the *dispositif* of cinema but also anticipated the format of interactive media art installations to come. As such a transitory piece between old and new media, its criticism of cinema as an apparatus of control anticipated much of the later critique of interactive media that speaks of "conditioning of a viewer

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through a work" (Daniels 176), behaviorism and illusion.

Unlike *ping pong*, the Brown Box technologically couples human action to visual representation, yielding a system in the tradition of the feedback systems from the era of "classical control theory" (Bennett). But commercial success did not arrive until this analog system was re-created as a digital computer and named Pong. This shift changed the man-machine coupling from direct, causal and indexical, to indirect, conventional and symbolic – or illusionary.

Wiener's experiment also is part of the era of classical control. It was built to test the famous *anti-aircraft predictor*: a machine to predict the movement of an airplane. Its core was a feedback mechanism, constantly adjusting predicted to observed behaviour. Although it ultimately failed, it later served as a powerful narrative backing the idea of Cybernetics as a universal science of feedback (Scherffig). But who is controlling the course of an airplane under fire: the pilot evading fire or the gun operator producing it? Generally, the closed loops of feedback yield 'circular causality'. Causes are distributed and effects only emerge as stable patterns within the behaviour of the whole, rendering the very idea of agency problematic.

Feedback Machine

In *Pong*, these two developments converge: an analog feedback system is translated into the digital domain yielding a paradigmatic case of 'interaction'. Pong hence is an early specimen of a new type of machine uniting the

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Universal Turing Machine with the control principle of feedback: the *Feedback Machine*.

The convergence of these traditions implies their respective problems. As digital machines, *Feedback Machines* use symbolic, illusionary representations. As feedback systems, they exhibit circular causality. They thus are not simply mechanisms controlling behaviour but equally are controlled by it. The stable patterns emerging in feedback systems by Heinz von Foerster have been described as 'objects'. The objects at the interface hence may not solely be described as symbolic significations specifying behaviour, they also are enacted through being acted upon – within the dynamics of computation and control, and oscillating between conditioning and freedom. **lscherff@khm.de**

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