

REDISCOVERING HIROSHI KAWANO – JAPAN’S PIONEER OF COMPUTER ART

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The paper that follows stems from interviews and conversations held with Hiroshi Kawano in Japan in 2009 and Germany in 2010, as well as from research undertaken with the support of ZKM|Zentrum für Kunst und Medientechnologie, where the Kawano archive has been held since 2010. The author has also used information gathered through personal correspondence with the artist. This paper forms part of the early stages of an ongoing study into Kawano’s life and work.

It is well known that the 1960s was a pioneering decade in the history of computer art, particularly in the West. However, little attention has so far been paid to equally important work being undertaken in Japan. This paper aims to introduce some of the innovative work that was taking place in Japan at this time, and its origins and activities. With the aim of highlighting the importance of this little known history, particular attention will be paid to the work of Hiroshi Kawano (1925 -). Kawano is a philosopher and aesthetician who was interested in both visual art and music, with the first publication of his visual art as early as 1964 in the *IBM Review*, making him one of the earliest pioneers experimenting with computing technologies in art. The paper will discuss how he first became interested in using computers as a way to apply his theory inspired by Max Bense and Claude Shannon, to visual art. His early theories, influences and experiments in the 1960s will be considered as well as his participation in the First Computer Art Contest Exhibition in Tokyo in 1968 and his first solo exhibition that took place in Tokyo in 1970.

Kawano takes a unique position as a philosopher and aesthetician who approached computing technologies with a view to experimenting with aesthetic theory rather than as an artist or engineer. He first studied traditional approaches to aesthetics in the department of philosophy at the University of Tokyo as both an undergraduate (1948-1951) and graduate student (1951-1955). However, despite his love of traditional aesthetics, Kawano moved away from this approach when he was an assistant in the department of aesthetics at the University of Tokyo.

It was here that Kawano came across the work of German philosopher Max Bense and American mathematician Claude Shannon around 1956. Kawano hoped to find a breakthrough – a new approach to study aesthetics - and after reading Bense (*Aesthetica*, 1954) followed by Shannon (*A Mathematical Theory of Communication* 1948), Kawano saw the potential to use these approaches to aesthetics and the possibility of their application to art. Kawano first published an article about his ideas on Information Aesthetics in 1962 entitled 美学的情報理論の一考察 (*Inquiry into Aesthetic Information Theory*) [1] and soon after began writing about the possibility for using computers for art. In 1964 Kawano began to program computer graphics.

In order to be able to apply these theories, Kawano began to study the Markov process model. Markov chains are probability-based mathematical states demonstrated by sequences of random patterns. The properties of these chains are defined either by their relationship between the present state and that which immediately precedes it, rather than its entire output history, or the present state alone. This approach worked well with Shannon’s theory with regards to language and the letter-based approach if

the alphabet is thought of as a kind of chain. Kawano found that Markov theory had been applied to linguistics and musical expression already, yet he wanted to break from the one-dimensional structure in order to apply the Markov model to visual expression.

Despite studying mathematical approaches such as that of Markov, and grappling with alternative approaches to aesthetics relation to information processing, it was not until a few years later that Kawano began to use computers. Around 1960 the University of Tokyo opened a computer centre that all students, staff and members of the University were permitted to access, and where they could study programming. Kawano began to study programming independently in 1963 in this Computer Centre. He learned the assembler language and used the OKITAC computer. (Fortran, which Kawano first used in 1966, was not introduced in Japan until a few years later). The OKITAC was a room-sized computer made by the Oki Electric Company in Japan that used a magnetic core memory and was attached to a line printer – an output device that influenced, and proved useful for Kawano's approach.

Kawano first published some of his designs made using the OKITAC 5090A in an article about *Computing and Design* in the Japan IMB Review in 1964 [2] and another (*Series of Pattern; Flow*) in November of that year in the Science Yomiuri. [3] Nevertheless, *Series of Pattern: Flow* was actually only "a prototype for his masterpiece *Simulated Colour Mosaic* using a more complex quadruple Markov chain for the vertical and horizontal directions, which was published later in 1969. [4]

Kawano not only saw the potential for creating visual art using the Markov method, but also other art forms such as poems for which he looked to traditional Japanese Tanka poems of 31 letters/characters. Kawano remembers that programming would take many hours, however, the most time consuming aspect to producing works in this way was making the concept for the tree-type Markov model structure. He recalls the concept might have taken as long as one or two months, but writing the program was simple, and generating the poems was even simpler.

In 1967 Japan held its first (and only) computer art contest at the Sankei Building in Tokyo (though there were further exhibitions of computer art in Japan). The exhibition that was held in March 1968 included exhibited works by the CTG, Kawano as well as the first computer animation in Japan. A summary of the exhibition was published a month later in COMPUTOPIA magazine. [5]

Three years later, in 1970 Kawano held his first solo exhibition at the Plaza DIC, Tokyo for ten days between 5th and 14th October. The Plaza DIC is the exhibition hall of the Great Japan Ink Company, a printing company situated in the Nihonbashi area of Tokyo. The exhibition space was found with the help of Kawano's friend and well-known graphic designer of the time, Mitsuo Katsui. The preparation for the exhibition took approximately six months. This included time to complete the programming, printing the output and painting the output. The works were completed on a HITAC 5020 digital computer, designed by Hitachi, using FORTRAN 4 code. In an article about the exhibition published in Kawano is attributed to "planning, Programming and text", the HITAC5020 for "design and works." [6]

The exhibition is significant because not only because it showcased Kawano's work - and in particular, *Simulated Colour Mosaic*, as well as other studies and output, but it also showed his early ideas beginning to develop in relation to artificial intelligence and art, a topic he would come to explore more deeply from the mid 1970's onwards.

This paper has briefly outlined the early stages and work of one of the pioneers of early computer art; Hiroshi Kawano. It has given an introductory overview of the early period in his academic life from when he began to explore new theories and move away from traditional aesthetics in the late 1950s. It has also shown how he progressed to using computing technology to apply his aesthetic ideas to art at a time when internationally, only a few pioneers had begun to explore these areas.

References and Notes:

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