

IIJIMA Taizo (1925-2023)

“Establishment of Information Scientific Epistemology”

1. Biography

Born on September 24, 1925. Graduated from Tokyo Institute of Technology, 1948. Ph.D. Engineering, 1957. Director of the Iijima Special Laboratory, Electrotechnical Laboratory, Agency of Industrial Science and Technology, Ministry of International Trade and Industry, 1969. Professor at Tokyo Institute of Technology, 1972. Professor at Tokyo University of Technology, 1986. Professor and Vice-President at Japan Advanced Institute of Science and Technology, 1991.



Awards

The Order of the Sacred Treasure, Gold Rays with Neck Ribbon (2005). The Medal with Purple Ribbon (1989). The Institute of Electrical Engineers of Japan (IEEJ), Distinguished Paper Award (1954), and Technical Development Award (1963). The Institute of Electronics, Information and Communication Engineers (IEICE), Best Paper Awards (1965, 1973, 1976, 1982), Best Book Award (1970), Achievement Award (1977) and Distinguished Achievement and Contributions Award (1989). The Minister of International Trade and Industry Award (1969, 1973) and the National Institute of Advanced Industrial Science and Technology Award (1973). The Nikkan Kogyo Shimbun, Ltd, 14th Best 10 New Products Awards (1972). The Japan Institute of Invention and Innovation National Invention Award (1982). The Okawa Foundation for Information and Telecommunications, Okawa Publications Prize (1999) and Okawa Prize (2002).

2. Research Achievement

(1) Contribution to Electromagnetic Field Theory and Electrotechnical Standard

Iijima provided an exact solution of the Maxwell's equation on a semi-infinite length hollow cylindrical conductor [1]. This is the third case of obtaining the exact solution for essentially three dimensional problems in the world. He also contributed to developing a standard capacitor from the point of view of electromagnetic field theory [2]. For these contributions, he received Distinguished Paper Award (1954) and Technical Development Award (1963) from IEEJ.

(2) Establishment of the Fundamental Theory of Pattern Recognition and

Development of Ultra-high Performance Character Reader

Iijima joined the first project of developing an electronic reading machine planned by Electrotechnical Laboratory, Ministry of International Trade and Industry. Through this experience, he fully realized that the pattern recognition problem cannot be solved by a mere idea. Then, he

established the pattern recognition theory based on his original philosophy with respect to what is recognition [3], [6], [7]. Based on the fundamental theory, he proposed the blurring theory and the multiple similarity method for character reader and finally developed an ultra-high performance character reader with Toshiba [4]. This machine enabled to read low quality characters and occupied the top position in the world. Due to this result, he received many awards, for example, the Nikkan Kogyo Shimbun, Ltd., 14th Best 10 New Products Awards (1972), and the Japan Institute of Invention and Innovation, National Invention Award (1982). Further, he proposed the compound similarity method as an extension of the multiple similarity method [5]. A Chinese character reader was realized employing the method.

(3) Research on Speech Recognition, Image Processing and Waveform Analysis

Iijima extended his way of thinking cultivated by character recognition to approach speech recognition, image processing and wave form analysis. For example, he established the theory for wave form analysis satisfying the law of causality [9], [10].

3. References (in Japanese)

- [1] T. IIJIMA: “On electromagnetic field from a semi-infinite length hollow cylindrical conductor, I”, Research of the Electrotechnical Laboratory, vol. 518, pp.1-50 (Dec. 1950).
- [2] T. IIJIMA: “The effect of the clearance between the disk and the guard ring upon the capacitance of a standard condenser of G-R type”, Bulletin of the Electrotechnical Laboratory, vol.20, no.12, pp.901-906 (Dec. 1956).
- [3] T. IIJIMA: “Basic theory on pattern observation”, IEICE Technical Report on Automaton and Automatic Control, pp.1-37 (Dec. 1959)
- [4] T. Iijima, H. Genchi and K. Mori: “A theory of character recognition by pattern matching method”, Proc. of The First International Joint Conference on Pattern Recognition, Washington, DC, pp.50-56 (Oct. 1973).
- [5] T. IIJIMA: “A theory of pattern recognition by compound similarity method”, IEICE Technical Report on Pattern Recognition and Learning, no.PRL74-24, pp.45-54 (Sept. 1974).

4. Books (in Japanese)

- [6] Pattern Recognition, Nikkan Kogyo Shimbun, Ltd. (1969).
 - [7] Pattern Recognition, Corona Publishing Co., Ltd. (1973).
 - [8] Fundamental Theory for Visual Information – Origin of the Pattern Recognition Problem, Corona Publishing Co., Ltd. (1999).
 - [9] Theory of Natural Observation Method, Morikita Publishing Co. Ltd. (2000).
 - [10] Digital Natural Observation Method, Morikita Publishing Co., Ltd. (2001).
- etc.

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