

Zdzisław Pawlak: Life and Work

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In the history of mankind, Professor Zdzisław Pawlak, Member of the Polish Academy of Sciences, will be remembered as a great human being with exceptional humility, wit and kindness as well as an extraordinarily innovative researcher with exceptional stature. His legacy is rich and varied. Pawlak's research contributions have had far-reaching implications inasmuch as his works are fundamental in establishing new perspectives for scientific research in a wide spectrum of fields.

Preamble

Professor Pawlak's most widely recognized contribution is his incisive approach to classifying objects with their attributes (features) and his introduction of approximation spaces, which establish the foundations of granular computing and provide frameworks for perception and knowledge discovery in many areas. He was with us only for a short time and, yet, when we look back at his accomplishments, we realize how greatly he has influenced us with his generous spirit and creative work in many areas such as approximate reasoning, intelligent systems research, computing models, mathematics (especially, rough set theory), molecular computing, pattern recognition, philosophy, art, and poetry. This article attempts to give a vignette that highlights some of Pawlak's remarkable accomplishments. This vignette is limited to a brief coverage of Pawlak's work in rough set theory, molecular computing, philosophy, painting and poetry. Detailed coverage of these as well as other accomplishments by Pawlak is outside the scope of this commemorative article.

1 Introduction

This article commemorates the life, work and creative genius of Zdzisław Pawlak. He is well-known for his innovative work on the classification of objects by means

of attributes (features) [25] and his discovery of rough set theory during the early 1980s (see, e.g., [11, 22, 25, 27]). Since the introduction of rough set theory, there have been well over 4000 publications on this theory and its applications (see, e.g., [6, 35, 36, 37, 39, 71] and Section 12).

One can also observe a number of other facets of Pawlak's life and work that are less known, namely, his pioneering work on genetic grammars and molecular computing, his interest in philosophy, his lifelong devotion to painting landscapes and waterscapes depicting the places he visited, his interest and skill in photography, and his more recent interests in poetry and methods of solving mysteries by fictional characters such as Sherlock Holmes. During his life, Pawlak contributed to the foundations of granular computing, intelligent systems research, computing models, mathematics (especially, rough set theory), molecular computing, knowledge discovery as well as knowledge representation, and pattern recognition.

This article attempts to give a brief vignette that highlights some of Pawlak's remarkable accomplishments. This vignette is limited to a brief coverage of Pawlak's works in rough set theory, molecular computing, philosophy, painting and poetry. Detailed coverage of these as well as other accomplishments by Pawlak is outside the scope of this commemorative article.

The article is organized as follows. A brief biography of Zdzisław Pawlak is given in Sect. 2. Some of the very basic ideas of Pawlak's rough set theory are presented in Sect. 3. This is followed by a brief presentation of Pawlak's introduction of a genetic grammar and molecular computing in Sect. 8. Pawlak's more recent reflections concerning philosophy (especially, the philosophy of mathematics) are briefly covered in Sect. 9. Reflections on Pawlak's lifelong interest in painting and nature as well as a sample of paintings by Pawlak and a poem coauthored by Pawlak, are presented in Sect. 10.

2 Zdzisław Pawlak: A Brief Biography

Zdzisław Pawlak was born on 10 November 1926 in Łódź, 130 km south-west from Warsaw, Poland [41]. In 1947, Pawlak began studying in the Faculty of Electrical Engineering at Łódź University of Technology, and in 1949 continued his studies in the Telecommunication Faculty at Warsaw University of Technology. Starting in the early 1950s and continuing throughout his life, Pawlak painted the places he visited, especially landscapes and waterscapes reflecting his observations in Poland and other parts of the world. This can be seen as a continuation of the work of his father, who was fond of wood carving and who carved a wooden self-portrait that was kept in Pawlak's study. He also had extraordinary skill in mathematical modeling in the organization of systems (see, e.g., [20, 24, 28]) and in computer systems engineering (see, e.g., [16, 17, 18, 19, 21]). During his early years, he was a pioneer in the designing computing machines. In 1950, Pawlak presented the first project of a computer called GAM 1. He completed his M.Sc. in Telecommunication Engineering in 1951. Pawlak's publication in 1956 on a new method for random number generation was the first article in informatics