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Abstract

Overview: information compression as a unifying principle in human cognition as a foundation for the SP Theory of Intelligence

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Abstract:

From pioneering research by Fred Attneave, Horace Barlow and others, there has been a progressive accumulation of evidence that compression of information is a unifying principle in human learning, perception, the processing of natural language, several forms of reasoning, and other aspects of human cognition.

These insights provide the foundation for an extended programme of research developing the SP System—meaning the SP Theory of Intelligence and its realisation in the SP Computer Model—and for an exploration of their many potential applications.

Central in the SP System is the powerful concept of SP-multiple-alignment, borrowed and adapted from the concept of 'multiple sequence alignment' in bioinformatics. This provides an effective means of compressing information, and is the key to the SP System's strengths and potential in diverse aspects of intelligence, in the representation of diverse kinds of knowledge, and in the seamless integration of diverse aspects of intelligence and diverse forms of knowledge, in any combination.

There are many potential applications of the SP System. These include helping to solve nine problems with big data, helping to develop human-like intelligence in autonomous robots, helping to understand natural vision and the development of computer vision, providing the basis for the development of an intelligent database system, providing a basis the processing of natural language, and for machine-assisted medical diagnosis, and more.

It is intended that the SP Computer Model will provide the basis for the development of an industrial-strength SP Machine, starting with the application of high levels of parallel processing.

Biography:

J Gerard Wolff PhD CEng MIEEE is the Director of CognitionResearch.org. He has held academic posts in the School of Computer Science and Electronic Engineering, Bangor University, the Department of Psychology, University of Dundee, and the University Hospital of Wales, Cardiff. He has held a Research Fellowship at IBM, Winchester, UK, and has been a Software Engineer with Praxis Systems plc. He received the Natural Sciences Tripos degree from Cambridge University, Cambridge, and the PhD degree from the University of Wales, Cardiff. He is also a Chartered Engineer and Member of the IEEE.

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