

Pursuing the Goal of Language Understanding

John F. Sowa & Arun K. Majumdar

VivoMind Intelligence, Inc.

Computers successfully process language for searching, information retrieval, question answering, and machine translation. But none of them understand language at the level of a child. Recent developments in analogical reasoning have led to a deeper, more human-like level of language analysis. This talk surveys recent applications of high-speed analogy finding to analyzing and reasoning about a wide variety of English texts without requiring any prior semantic tagging. The technology has been implemented and deployed in several commercial applications, including the analysis of 79 documents about oil and gas exploration. Given an English description of any geological site, the VivoMind system finds analogies to the previously analyzed sites, determines which of them are most similar, and generates a report that shows how each of them resembles or differs from the new site. This technology has also been used to compare software documentation to the implemented programs in order to find discrepancies. For medical applications, the same methods can be used to compare descriptions of cancer patients, where the source information can be any combination of structured data or free-form natural language.

Arun K. Majumdar is a cofounder of VivoMind Intelligence Inc. In 1990, he had cofounded Premium Sound 'N Picture, which developed and applied digital technology for the movie industry. He spent 20 years as a Senior Consultant at the Cutter Consortium, where he designed large-scale systems for major corporations. He has published papers on semantic service-oriented architecture, legacy re-engineering, analogical reasoning, and computational linguistics. At VivoMind, he has been developing highly innovative algorithms for analogy finding, semantic distance measures, and collaborative reasoning by a society of agents.

John F. Sowa spent 30 years working on research and development projects at IBM and is a cofounder of VivoMind Intelligence, Inc. He has published several books and numerous articles on artificial intelligence, knowledge representation, and computational linguistics. He is a fellow of the American Association for Artificial Intelligence, and he has been working on ANSI and ISO standards projects, including the ISO/IEC standard for Common Logic. With his colleagues at VivoMind, he has been developing novel methods for using logic and ontology in systems for reasoning and language understanding. The system of conceptual graphs, which he designed, is the primary knowledge representation language for the VivoMind software.