

Title: “Cognitive” Memory and its Applications

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Abstract

Regarding the workings of the human mind, memory and pattern recognition seem to be intertwined. You generally do not have one without the other. Taking inspiration from life experience, a new form of computer memory has been devised. Certain conjectures about human memory are keys to the central idea. The design of a practical and useful “cognitive” memory system is contemplated, a memory system that may also serve as a model for many aspects of human memory. The new memory does not function like a computer memory where specific data is stored in specific numbered registers and retrieval is done by reading the contents of the specified memory register, or done by matching key words as with a document search. Incoming sensory data would be stored at the next available empty memory location, and indeed could be stored redundantly at several empty locations. The stored sensory data would neither have key words nor would it be located in known or specified memory locations. Sensory inputs concerning a single object or subject are stored together as vectors in a single “file folder” or “memory folder.” When the contents of the folder are retrieved, sights, sounds, tactile feel, smell, etc., are obtained all at the same time. Sensor fusion is a memory phenomenon. The sensory signals are not fused, but they are simply recorded together in the same folder and retrieved together. Retrieval would be initiated by a prompt signal from a current set of sensory inputs or patterns. A search through the memory would be made to locate stored data that correlates with or relates to the present real-time sensory inputs. The search would be done by a retrieval system that makes use of auto-associative artificial neural networks. Applications of cognitive memory systems have been made to visual aircraft identification, aircraft navigation, and human facial recognition. Other applications to speech recognition and control systems are being explored.