**Holographic Reduced Representation for Working Memory Concept Encoding**

The field of artificial intelligence (AI) is synergistic with a wide range of disciplines but artificial neural networks (ANNs) is perhaps the most prolific subfield. Not only are biological principles of neural computation and neuroanatomy adapted to solve engineering problems, but ANNs also serve as formal, testable hypotheses of brain function and learning in the cognitive sciences. Still, since ANN models often employ distributed encoding (DE), most have limited application in other areas of AI where symbolic encoding (SE) is the norm (e.g. planning, reasoning, robotics). For example, there is extensive evidence that the brain contains a working memory (WM) system that actively maintains a small amount of task-essential information that focuses attention on the most task-relevant features, supports learning that transfers across tasks, limits the search space for perceptual systems, provides a means to avoid the out-of-sight/out-of-mind problem and more robust behavior in the face of irrelevant events. A software library, the working memory toolkit (WMtk), was developed to aid the integration of ANN-based WM into robotic systems by mitigating the details of ANN design and providing a simple DE interface. However, the DS/SE distinction is problematic to the toolkit since the DE/SE conversion has to be programmed directly by the user and tuned specifically to each learning task. A technique called holographic reduced representation (HRR) may provide technical assistance needed to overcome this limitation. HRRs provide a framework for creating and combining symbolic concepts using a distributed formalism that is compatible with ANNs. We wrote a software engine for managing HRRs and rebuilt the WMtk around the HRR Engine (HRRE). The HRRE automates the encoding process and manages a store of known concepts, while allowing the user to program the WM component using a simple string-passing interface for the state and environment data. By replacing the DE interface of the WMtk with the HRRE, DE/SE conversion is automated, concepts learned from one task will naturally carry over to new tasks, and additional cognitive phenomena (e.g. chunking) may be investigated.