Compressed-Inference: Reinforcement Learning with Random Projections

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Reinforcement learning is an algorithmic approach for teaching AI agents decision making and control tasks by interacting with and receiving feedback from the environment. Learning times can increase with environmental complexity; effective compression of information may help in reducing the complexity of learning. Here we tested the effectiveness of Reinforcement learning algorithms on an environment that's compressed. Compressed sensing is a technique that uses random projections of information that's sparse in some representational domain which can be transformed as a holographic representation in a lower dimension; the sparsity of the information can be exploited for full recovery of the information. In our experiments we show that RL algorithms can successfully learn to perform an RL task using information saved in a lower dimensional space through compressed representations, even without recovering the initial information. We conclude that compressing with random projection preserves orthogonality of information which supports effective learning.

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