

How is information represented in real neural networks? Experimental results continue to provide evidence for presence of spiking patterns in network activity. The concept of polychronous groups attempts to explain these results by proposing that neurons group together to fire in non-synchronous but precise time-locked chains. Several methods for the detection of such groups have been proposed, however, they all employ extensive searching in network structure, which limits their usefulness. We present a new method by observing spiking dependencies in network activity to directly detect polychronous groups. Our method shows comparatively more efficient computation by trading off detection selectivity. The method allows for analysis of polychronous groups emerging in noisy networks. Our results support the existence of structure-forming properties of spontaneous activity in neural network.