

Abstract Submitted
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A Topological Perspective of Neural Network Structure ANN
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SETT, University of Pennsylvania — The wiring patterns of white matter tracts
between brain regions inform functional capabilities of the neural network. Indeed,
densely connected and cyclically arranged cognitive systems may communicate and
thus perform distinctly. However, previously employed graph theoretical statistics
are local in nature and thus insensitive to such global structure. Here we present
an investigation of the structural neural network in eight healthy individuals using
persistent homology. An extension of homology to weighted networks, persistent
homology records both circuits and cliques (all-to-all connected subgraphs) through
a repetitive thresholding process, thus perceiving structural motifs. We report struc-
tural features found across patients and discuss brain regions responsible for these
patterns, finally considering the implications of such motifs in relation to cognitive
function.

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