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## Deep learning to cluster continuous gravitational wave candidates in broad searches

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Searching continuous gravitational waves from unseen objects is computationally expensive and relies on hierarchies of follow-up stages for candidates above a given significance threshold. Clustering is a powerful technique that bunds together nearby candidates in a single follow-up to simplify the follow-ups and reduce the computational cost. We used deep learning methods to automate the clustering procedure. We implemented two networks, one can identify clusters due to large signals, and one can detect clusters due to much fainter signals. These two networks are complementary and using them in cascade achieves an excellent detection efficiency across a wide range of signal strengths. Also, this method shows a false alarm rate lower than the clustering methods currently in use.

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