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Searching gravitational wave signals with autoregressive approach and deep learning

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Abstract: We are developing a novel framework of searching gravitational wave signal by coupling the stochastic autoregressive modeling and deep learning. This proposed framework holds the potential for an automatic pipeline for noise reduction, event candidate detections and template-free parameter estimation. We are also working on a deep learning algorithm by incorporating generative adversarial network. By increasing the training set and resolving the imbalance class problem, we can better separate the environmental/instrumental noise from the astrophysical signals. Currently, we are testing the method with LIGO O1/O2 data.

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