

Clustering Observational Data Using Deep Learning Network

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Detection of Gravitational wave (GW) signals was a milestone in our knowledge of the universe as they can have cosmological or astrophysical origins. Continuous GW (CW) are an important type of GW signals which have not yet been detected due to their weakness.

In detection of CW signals, apart from the super sensitive detectors, we need powerful and optimal methods of determining the signals embedded in the background data. One of these powerful methods is clustering [6, 5, 3]. This method increases the search sensitivity by identifying and “bundling together” candidates due to the same root cause and by distinguishing between bundles caused by noise artefacts or astrophysical signals.

This project aims to improve the clustering method and automate it using a deep learning network. This will be addressed by associating the observational data to an image, as the input data to the network. We consider this problem an instance segmentation network and use Mask R-CNN model [4] to develop our network. This talk will present the details of our network and its performance on LIGO O1 data (20-100 Hz)[1].

References

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