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Deep learning for Core-Collapse Supernova detection

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The detection of gravitational waves from core-collapse supernova explosions is a challenging task, yet to be achieved, in which it is key the connection between multiple messengers, including neutrinos and electromagnetic signals. We present a method for detecting these kind of signals based on machine learning techniques. We tested its robustness by injecting signals in the real noise data taken by the Advanced LIGO-Virgo network during the second observation run, O2.

Using this novel approach we can classify signal from noise and identify the signal more efficiently, in fact, in the case of O2 run, it would have been possible to detect signals emitted at 1 kpc of distance, whilst lowering down the efficiency to 60%, the event distance reaches values up to 14 kpc.

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