Can a computer learn if LIGO and Virgo will observe gravitational waves?[1] DAVIDE GEROSA, GERAINT PRATTEN, ALBERTO VECCHIO, University of Birmingham — We present a novel machine-learning approach to estimate selection effects in gravitational-wave observations. Using techniques similar to those commonly employed in image classification and pattern recognition, we train a series of neural-network classifiers to predict the LIGO/Virgo detectability of gravitational-wave signals from compact-binary mergers. We include the effect of spin precession, higher-order modes, and multiple detectors and show that their omission, as it is common in large population studies, tends to overestimate the inferred merger rate in selected regions of the parameter space. Although here we train our classifiers using a simple signal-to-noise ratio threshold, our approach is ready to be used in conjunction with full pipeline injections, thus paving the way toward including actual distributions of astrophysical and noise triggers into gravitational-wave population analyses. See arxiv:2007.06585.

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