Infinitely large, randomly wired sensors cannot predict their input unless they are close to deterministic

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Abstract

Building predictive sensors is of paramount importance in both biology and science. Can we make a randomly wired sensor ``good enough'' at predicting its input simply by making it larger? We show that infinitely large, randomly wired sensors are nonspecific for their input, and therefore nonpredictive of future input, unless they are close to deterministic. Nearly deterministic, randomly wired sensors can capture $\sim 10\%$ of the predictive information of their inputs for ``typical'' environments.

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Protocol

Guide to make figures

Step 1.

Attached are the python and numpy files that were used to make the figures.