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

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Sarah Marzen[1]

[1]Massachusetts Institute of Technology

👤 **Sarah Marzen**

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Protocol status: Working
We used this protocol in our group and it is working

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Protocol Integer ID: 12108

Keywords: close to deterministic building predictive sensor, deterministic building predictive sensor, wired sensor, nonpredictive of future input, predictive information, future input, input, nonpredictive

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.

Troubleshooting

Guide to make figures

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

   rvodt_sparse.py

   rvodt_figs.py

   locally_optimal_fsms.py

   rvodt_full_ivsn.npz

   rvodt_sparse2_ivsn.npz

   rvodt_bias.py

   rvodt_bias_ivsn.npz

   rvodt_sparse_ivsn.npz