

Reservoir computing

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Reservoir computing is a framework for computation like a neural network. Typically an input signal is fed into a fixed (random) dynamical system called *reservoir* and the dynamics of the reservoir map the input to a higher dimension. Then a simple *readout* mechanism is trained to read the state of the reservoir and map it to the desired output. The main benefit is that the training is performed only at the readout stage and the reservoir is fixed. Liquid-state machines and echo state networks are two major types of reservoir computing.

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Reservoir

The reservoir consists of a collection of recurrently connected units. The connectivity structure is usually *random*, and the units are usually *non-linear*. The overall dynamics of the reservoir is driven by the input, and also affected by the past. A rich collection of dynamical input-output mapping is a crucial advantage over simple time delay neural networks.

Readout

Types

Echo state network

Backpropagation-decorrelation

Backpropagation-Decorrelation (BPDC)

Liquid-state machine

See also

- Optoelectronic Reservoir Computing

(<http://www.nature.com/srep/2012/120227/srep00287/full/srep00287.html>), Scientific Reports
February 2012

External links

- Reservoir Computing website (<http://www.reservoir-computing.org/>)

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Categories: Artificial neural networks

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