

Data Analysis and Machine Learning:

Recurrent neural networks

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Recurrent neural networks: Overarching view

We have mostly looked at feedforward neural networks, where the activations flow only in one direction, from the input layer to the output layer.

A recurrent neural network (RNN) looks very much like a feedforward neural network, except it also has connections pointing backward. Let's look at the simplest possible RNN, composed of just one neuron receiving inputs, producing an output, and sending that output back to itself.

RNNs are used to analyze time series data such as stock prices, and tell you when to buy or sell. In autonomous driving systems, they can anticipate car trajectories and help avoid accidents. More generally, they can work on sequences of arbitrary lengths, rather than on fixed-sized inputs like all the nets we have discussed so far. For example, they can take sentences, documents, or audio samples as input, making them extremely useful for natural language processing systems such as automatic translation and speech-to-text.