



## Why

1

### Definition

A *neural network* is a sequence of functions from with several properties. First, the codomain and domain of two subsequence functions in the sequence match. Second, each function is a composition of a function wit We associate a neural network with a predictor which is the composition of the functions in the sequence.

### Notation

Let  $g^1 : \mathbf{R}^d \rightarrow \mathbf{R}^k$ ,  $g^2 : \mathbf{R}^k \rightarrow \mathbf{R}^k$ ,  $g^3 : \mathbf{R}^k \rightarrow \mathbf{R}^m$ . Then  $(g^1, g^2, g^3)$  is a neural network. Notice that the codomain of  $g^1$  ( $\mathbf{R}^k$

### Activation functions

An activation function  $h : \mathbf{R} \rightarrow \mathbf{R}$  is nonlinear.

---

<sup>1</sup>Future editions will include.



