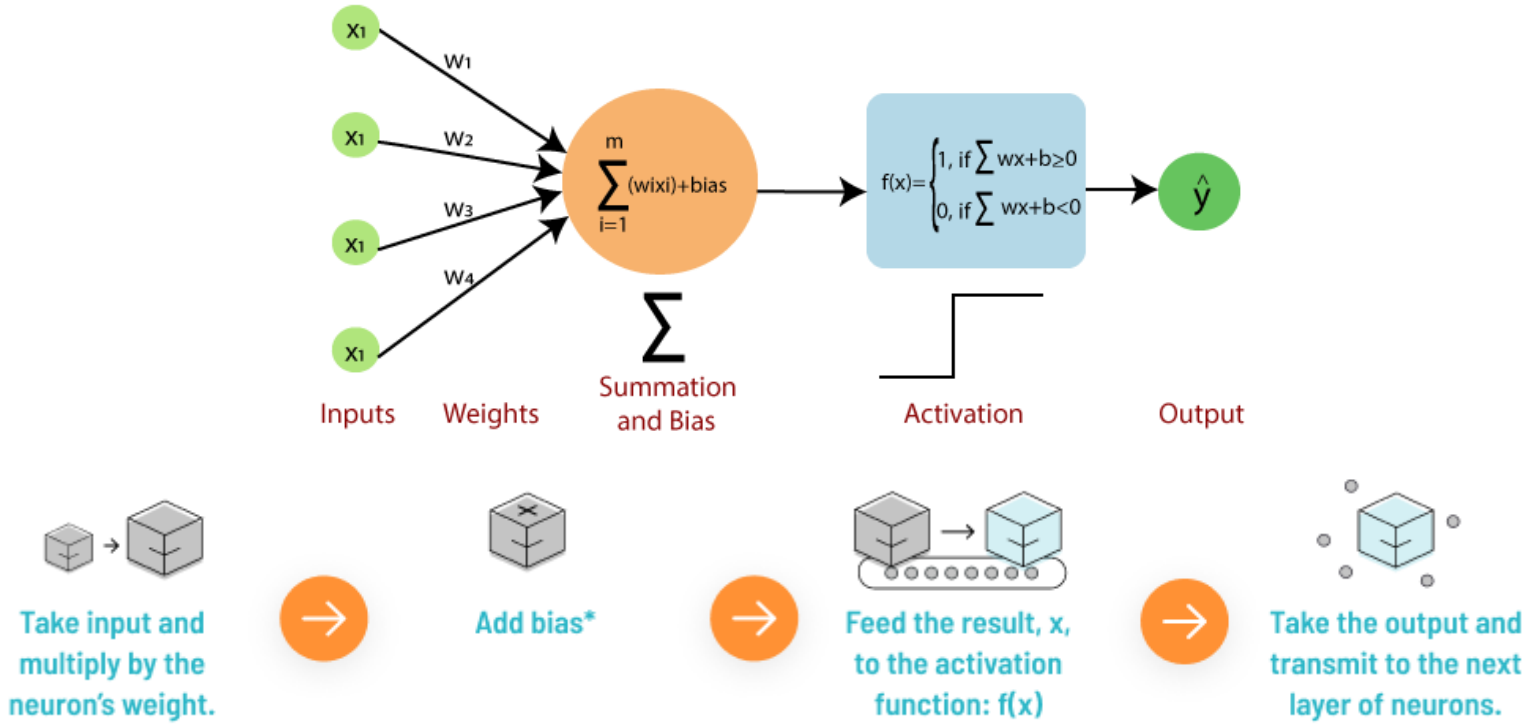
NN: **Aktivierung eines Neurons (Single Percepton)**

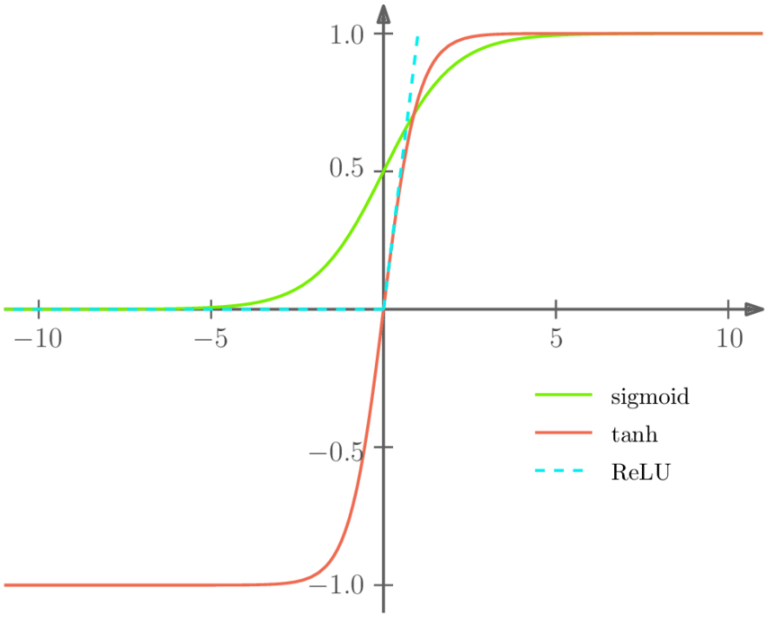


Ein **Neuron** (auch als **Percepton** bezeichnet) **summiert** sämtliche **gewichteten Eingaben** (hier: $w_i * x_i$). Dazu kommt noch ein **bias-Wert b**.

Der **Output-Wert** wird mit Hilfe einer **Aktivierungsfunktion** ermittelt.
Es gibt mehrere lineare und nichtlinear **Aktivierungsfunktionen**,
wie **Step**, **Linear**, **Sigmoid**, **ReLU**, **Tanh**.

Forward-Propagation: Jedes **Neuron** berechnet einen **Output-Wert** und gibt diese an die nächste **Schicht** (bzw. Ausgang) weiter.

NN: **Nichtlineare Aktivierungsfunktionen**



- **Sigmoid Activation Function** (Werte zwischen 0 und 1)
- **Tanh Activation Function** (Werte zwischen -1 und 1)
- **ReLU Activation Function** (positive Werte; **Rectified Linear Unit**)

Nichtlineare Aktivierungsfunktionen werden bevorzugt,
weil meist **nichtlinear verteilte Daten** verarbeitet werden.
Es gibt **weitere nichtlineare Aktivierungsfunktionen** (z.B. **softmax**).

7 Types of Neural Network Activation Functions: How to Choose?
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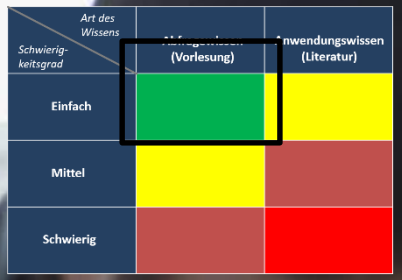
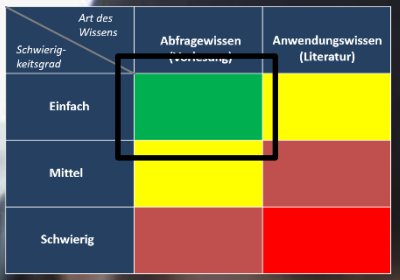
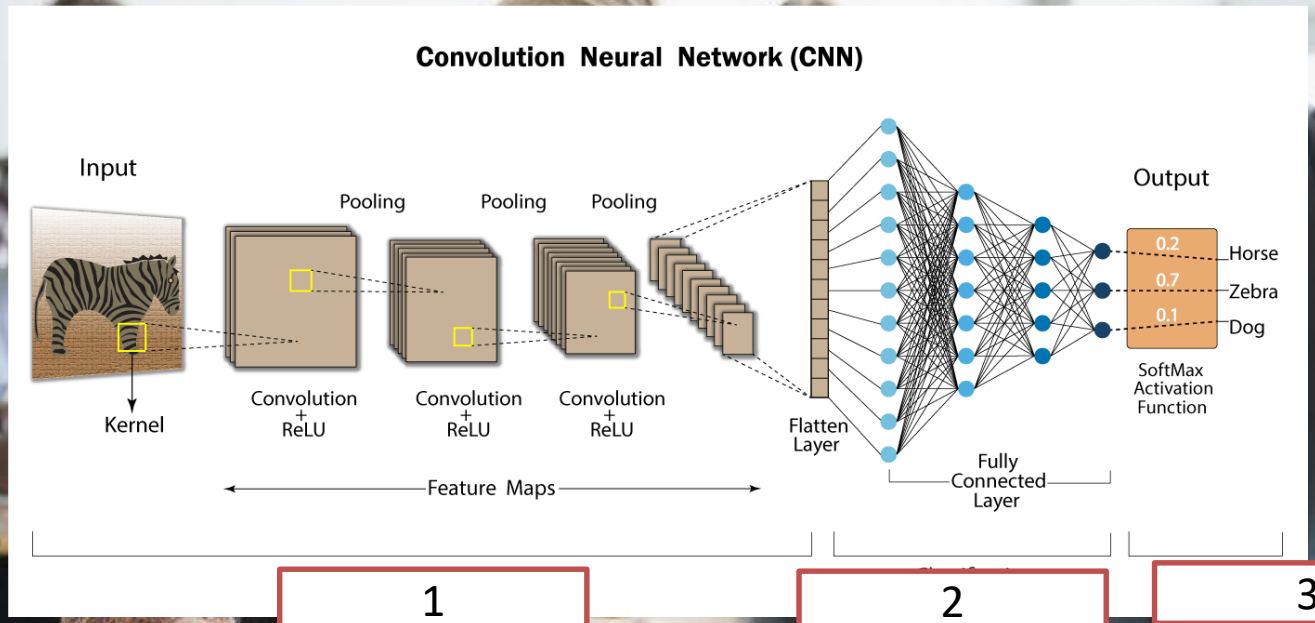
What is not part of the baseline CNN Structure?



a) **Convolution Layer**
b) **Pooling Layer**
c) **Fully Connected Layer**
d) **Activation Function**
e) **Gated Recurrent Unit**

Fill in the blank





a) Classification | Feature extraction | Probabilistic distribution

b) Feature extraction | Classification | Probabilistic distribution

c) Classification | Probabilistic distribution | Feature extraction

d) Feature extraction | Probabilistic distribution | Classification

e) Probabilistic distribution | Feature extraction | Classification

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Deep learning

From Wikipedia, the free encyclopedia

Deep learning (also known as **deep structured learning**) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised.[1][2][3]

Deep-learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, machine vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases surpassing human expert performance.[4][5][6]

Artificial neural networks (ANNs) were inspired by information processing and distributed communication nodes in biological systems. ANNs have various differences from biological brains. Specifically, neural networks tend to be static and symbolic, while the biological brain of most living organisms is dynamic (plastic) and analog.[7][8][9]

The adjective "deep" in deep learning comes from the use of multiple layers in the network. Early work showed that a linear perceptron cannot be a universal classifier, and then that a network with a nonpolynomial activation function with one hidden layer of unbounded width can on the other hand so be. Deep learning is a modern variation which is concerned with an unbounded number of layers of bounded size, which permits practical application and optimized implementation, while retaining theoretical universality under mild conditions. In deep learning the layers are also permitted to be heterogeneous and to deviate widely from biologically informed connectionist models, for the sake of efficiency, trainability and understandability, whence the "structured" part.

Part of a series on
Machine learning and data mining

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Clustering	[show]
Dimensionality reduction	[show]
Structured prediction	[show]
Anomaly detection	[show]
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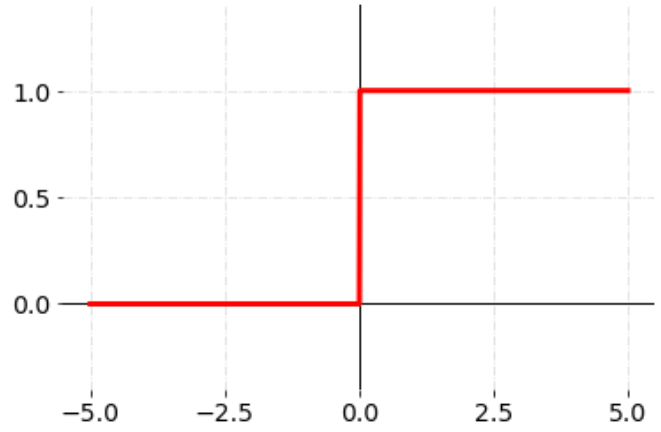
Machine-learning venues	[show]
Glossary of artificial intelligence	[show]
Related articles	[show]

V • T • E

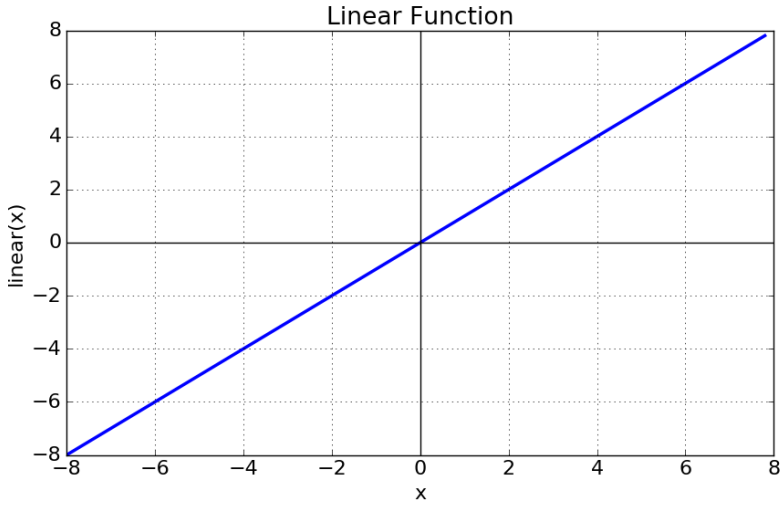
Part of a series on
Artificial intelligence

Major goals	[show]

NN: **Lineare Aktivierungsfunktionen**



(Binary) Step Activation Function



Linear Activation Function

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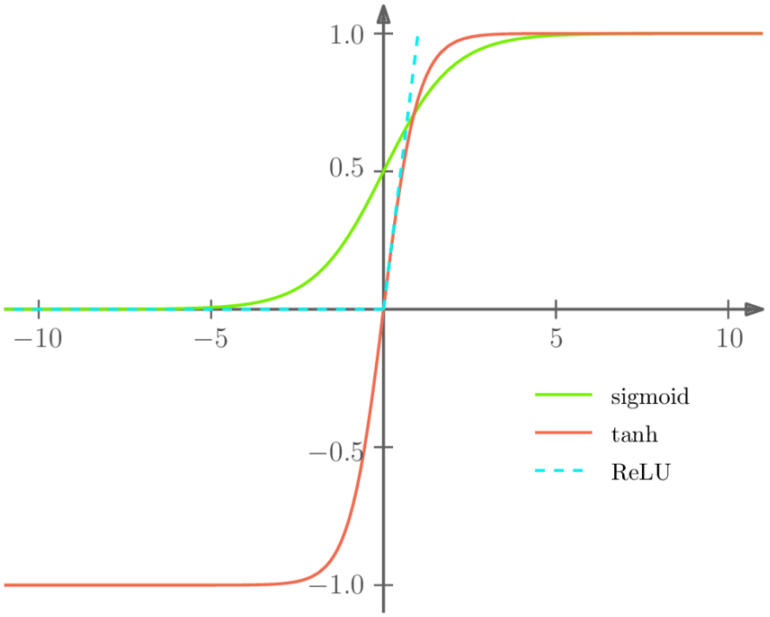
NN: **Nichtlineare Aktivierungsfunktionen**



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Which statement on RNN/LSTM is correct?

Art des Wissens / Schwierigkeitsgrad	Abfragewissen (Vorlesung)	Anwendungswissen (Literatur)
Einfach		
Mittel		
Schwierig		

a) **LSTMs suffer from Vanishing Gradient Problem**
b) **RNNs** are **suitable** for **long-term memories.**
c) **Output Gate** of LSTMs **controls** what **Information is passed**.
d) **RNNs find Application** in **large technology companies**
e) **RNNs and LSTMs** do **not require** an **Activation Function**