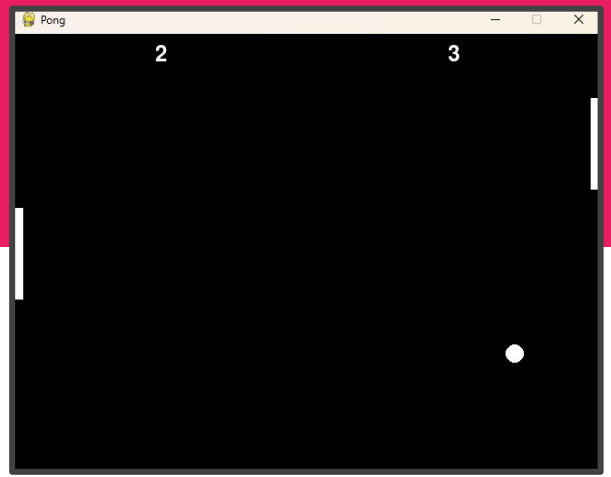
Neural Networks & Pong



Im InfoLab Saar

Wo wird AI verwendet?

Was ist AI?

Was ist AI?

Anwendungsbeispiele NNs

Image Generation

“A Boston Terrier jedi holding a dark green lightsaber, photorealistic”

Taken from the article [Stable Diffusion: Best Open Source Version of DALL·E 2]

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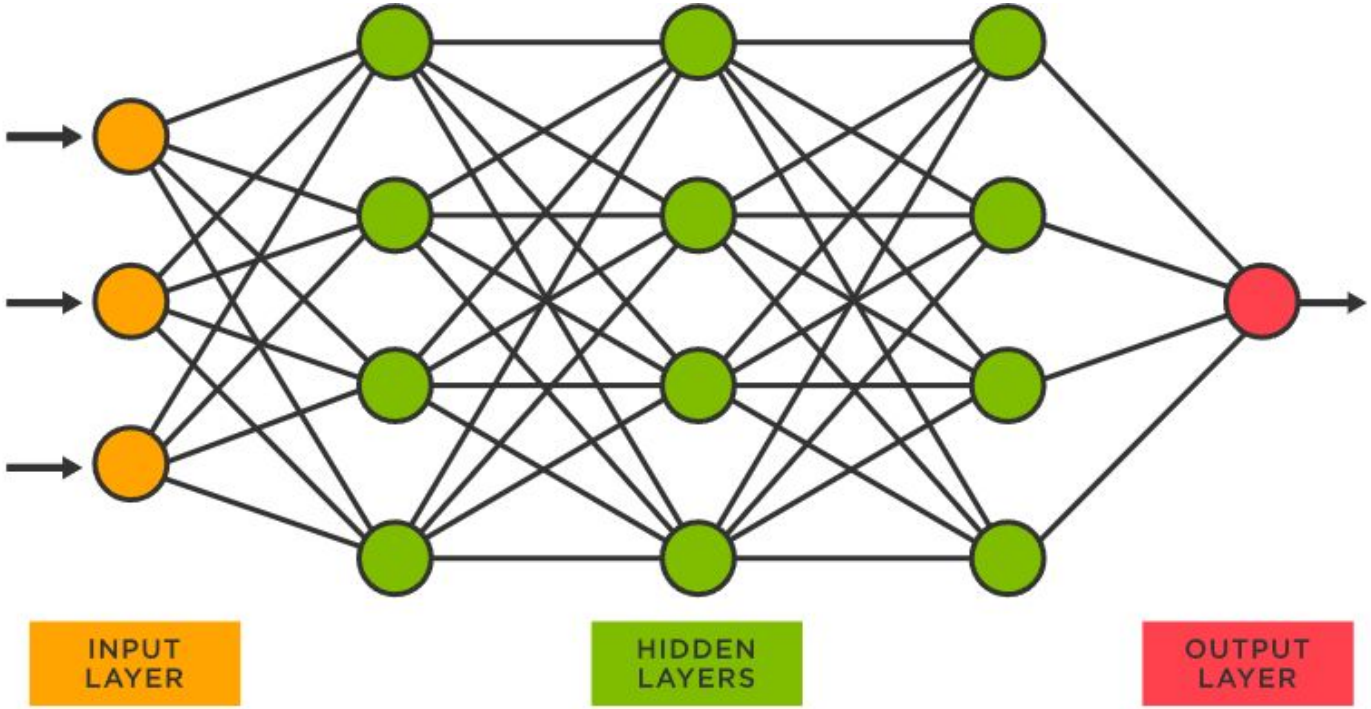
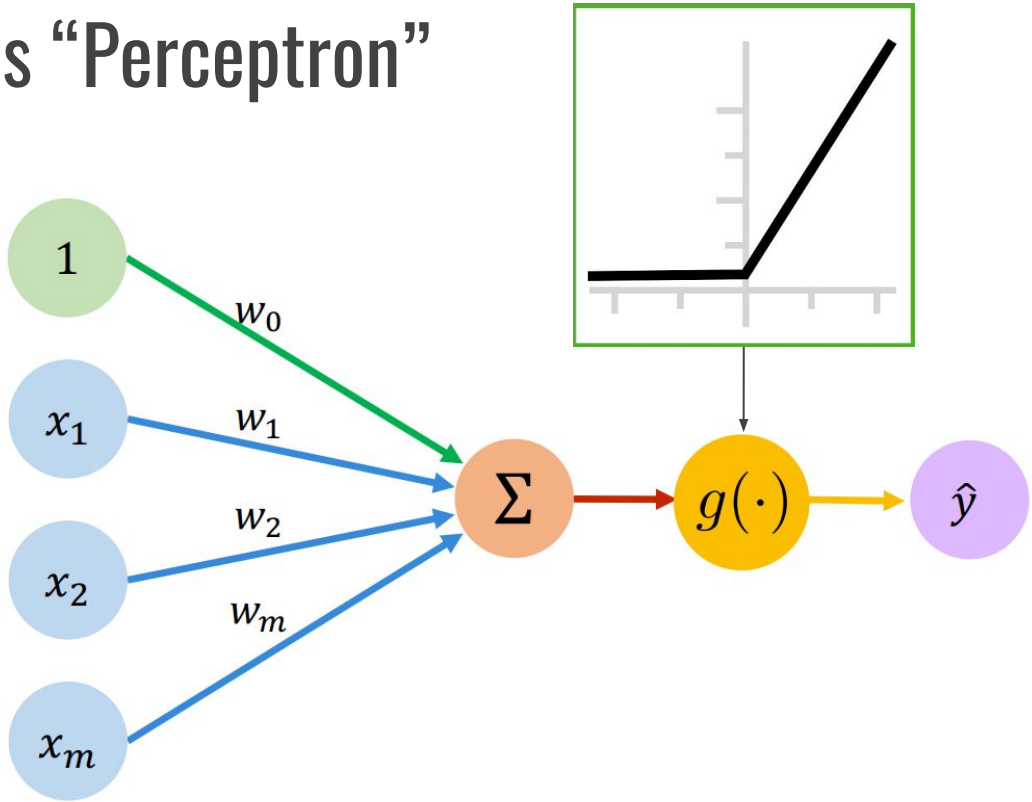
Drag Your GAN

Was ist ein Neural Network?

Was ist ein Neural Network?



Ein einzelnes “Perceptron”

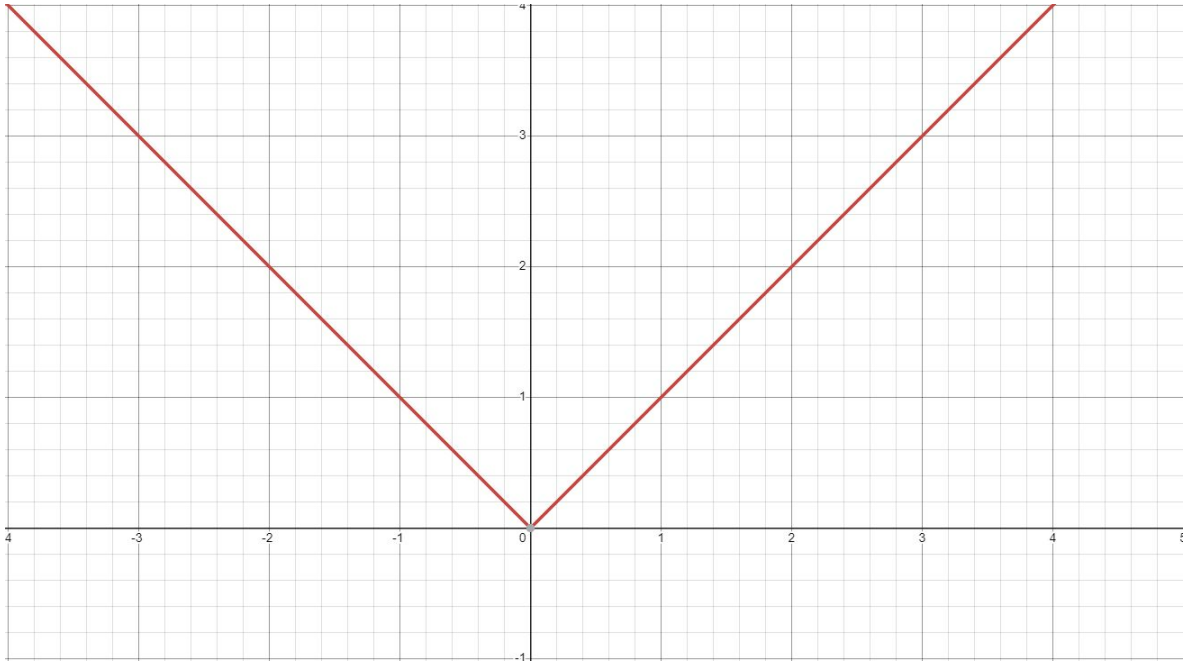


Inputs Weights Sum Non-Linearity Output

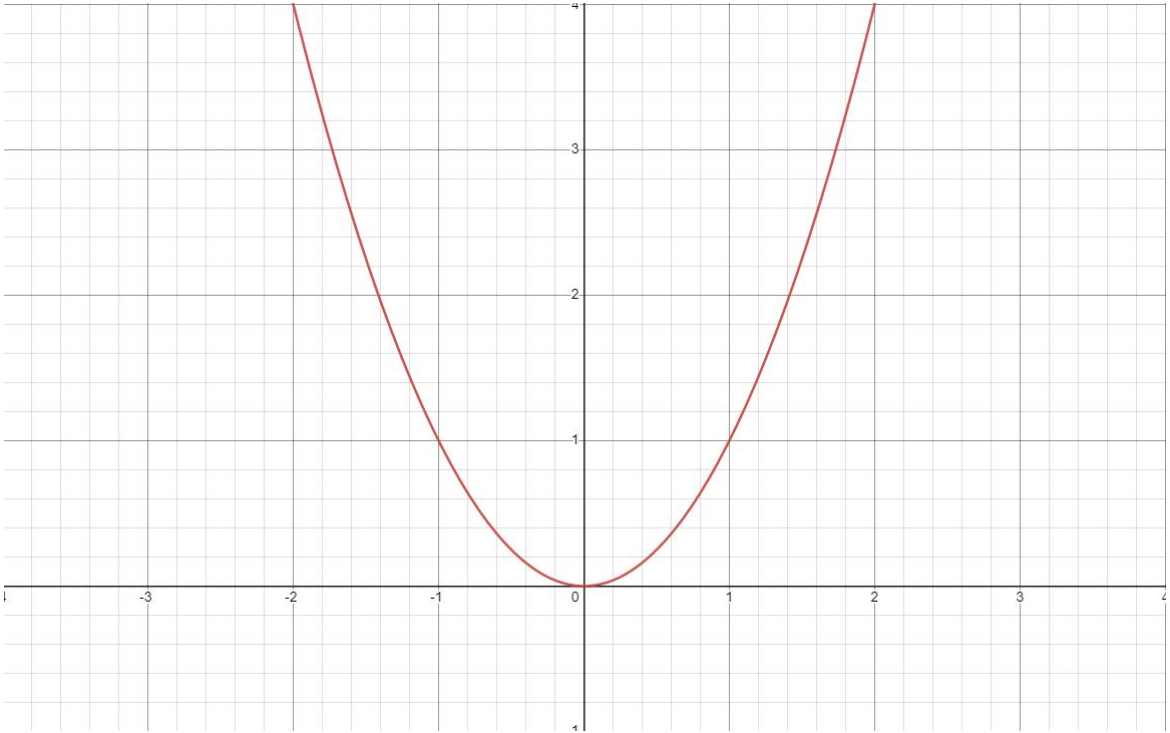
https://www.geogebra.org/calculator/cage2t6v

Wie trainiert man ein Neural Network?

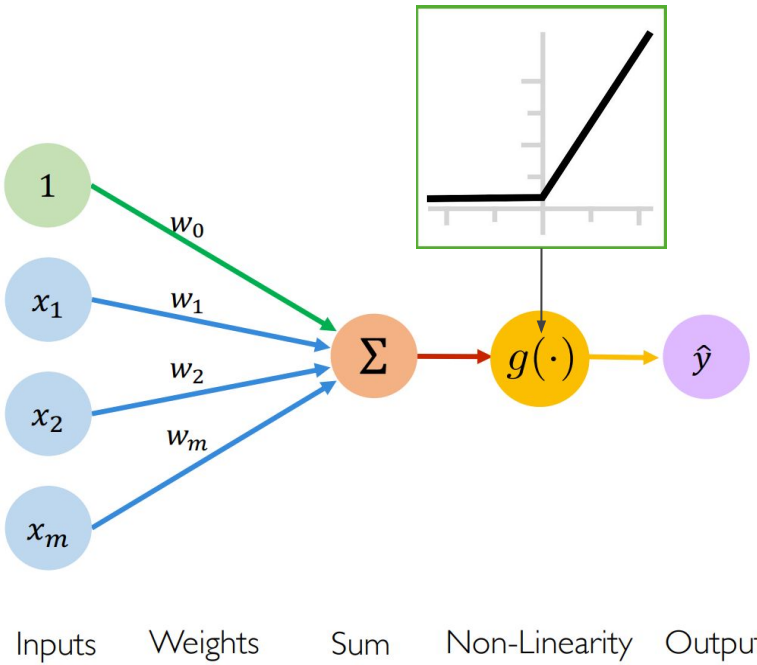
Loss: Absoluter Loss

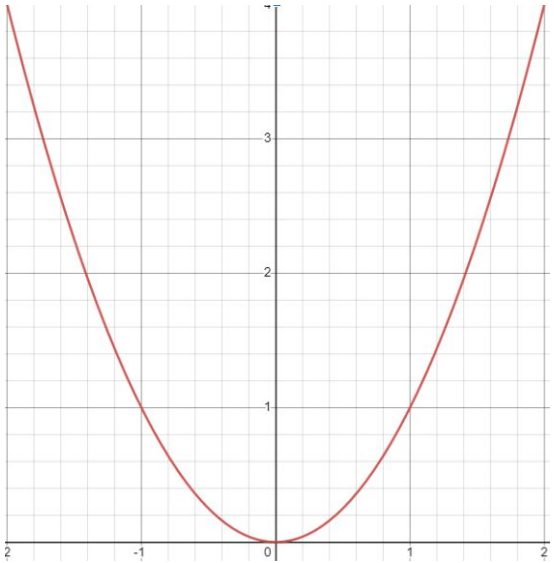


Loss: Squared Loss



Loss minimieren <-> Weights Optimieren





http://introtodeeplearning.com

https://www.geogebra.org/calculator/jbvckv5j

AI vs. Neural Network?

Sind AI bzw. Neural Networks Algorithmen?

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Tensorflow Playground

Important factors: classification task, inputs, width and depth

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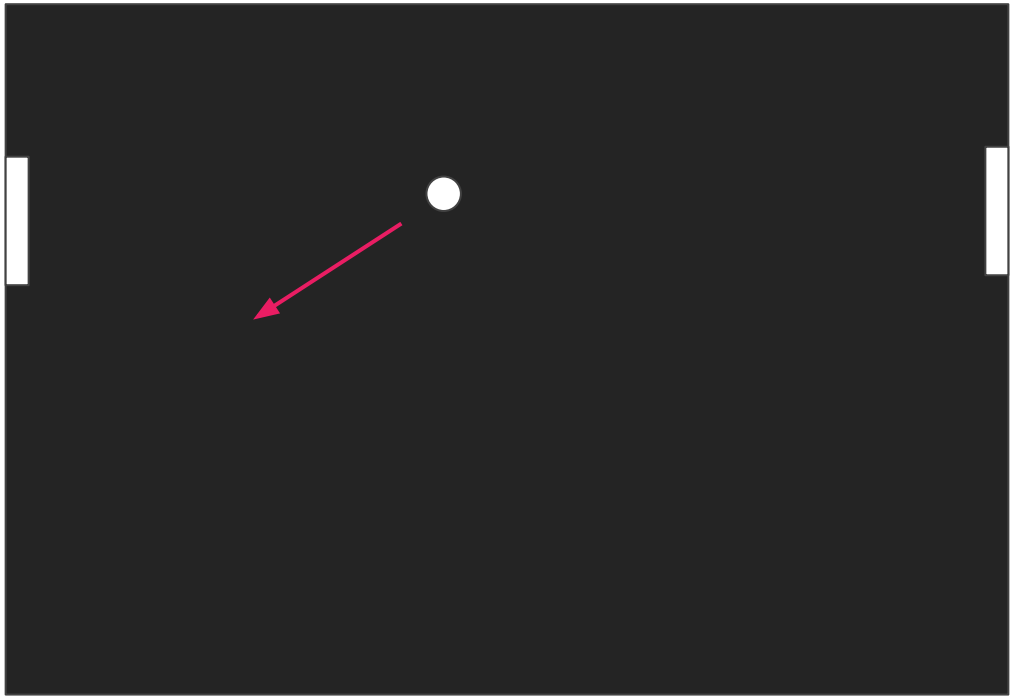
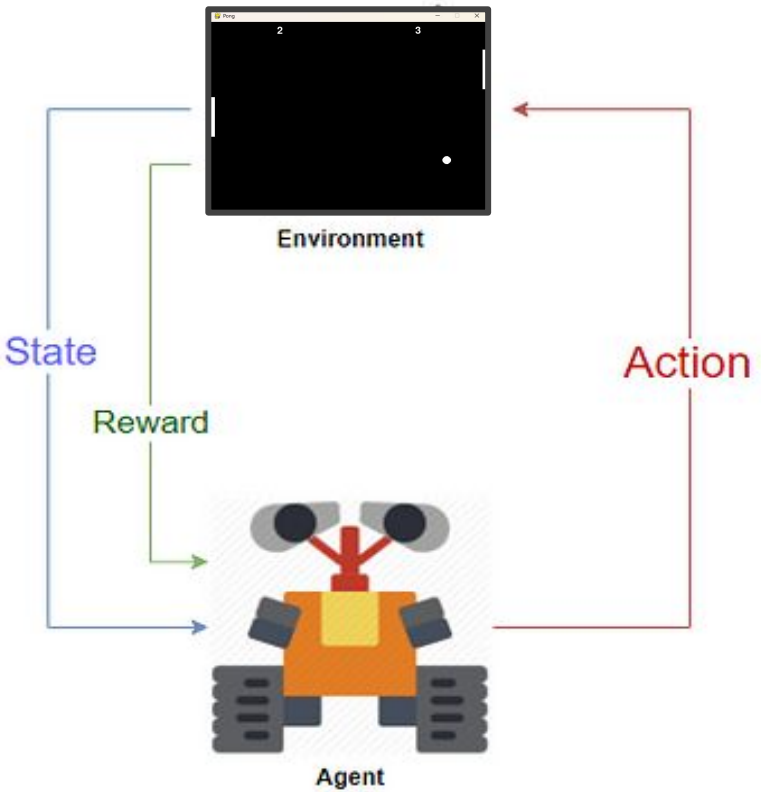
Pause!

Jetzt zu Pong!

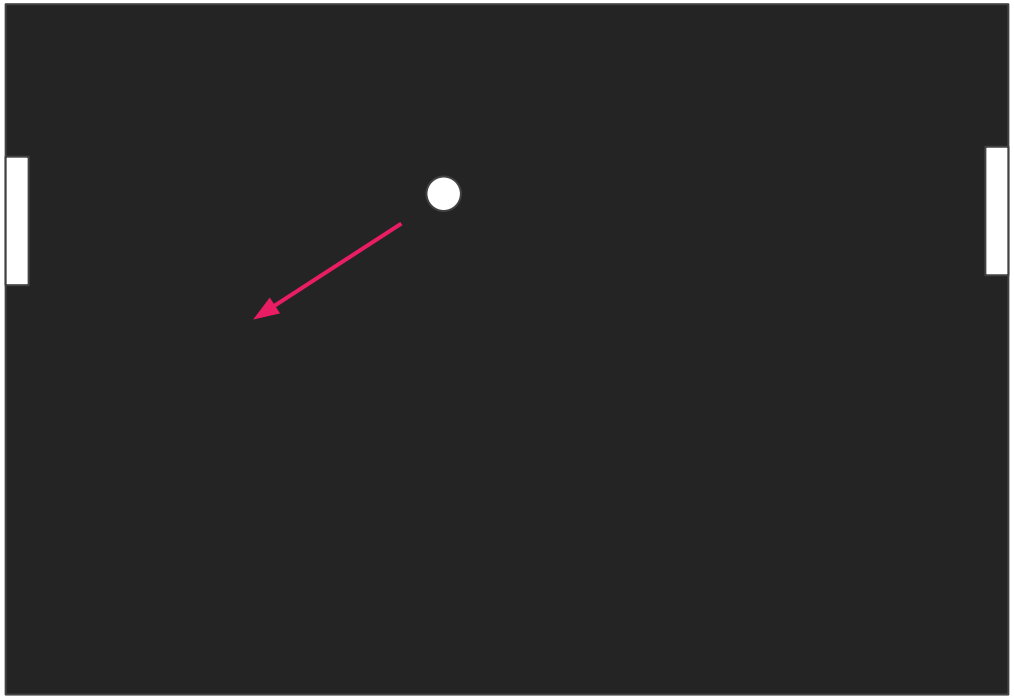


Reinforcement Learning



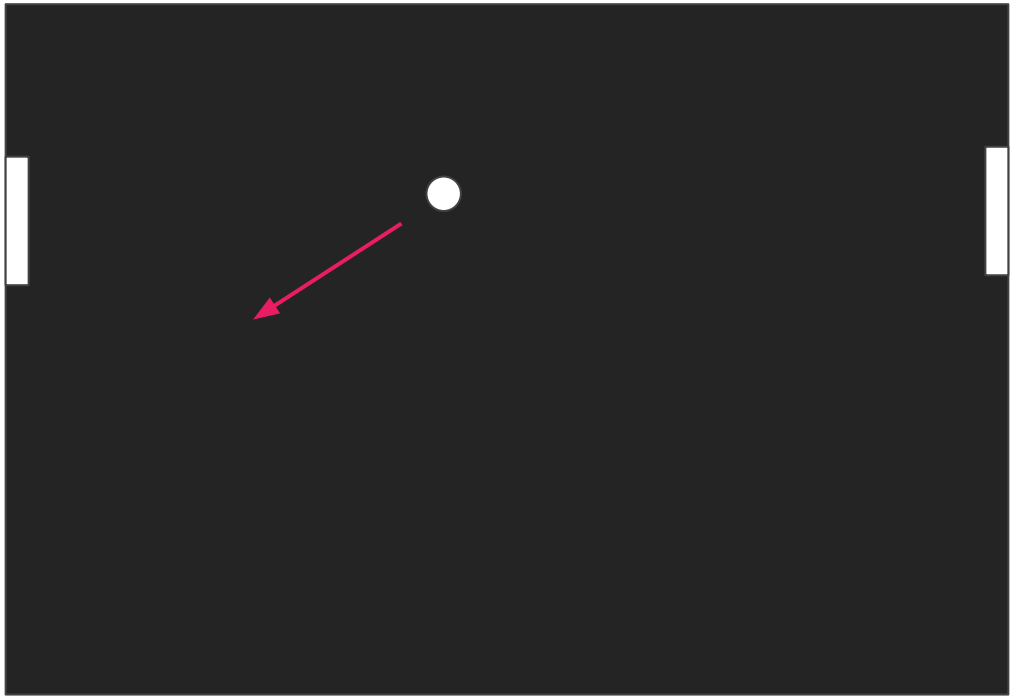
Image

War das gut? - Vorher



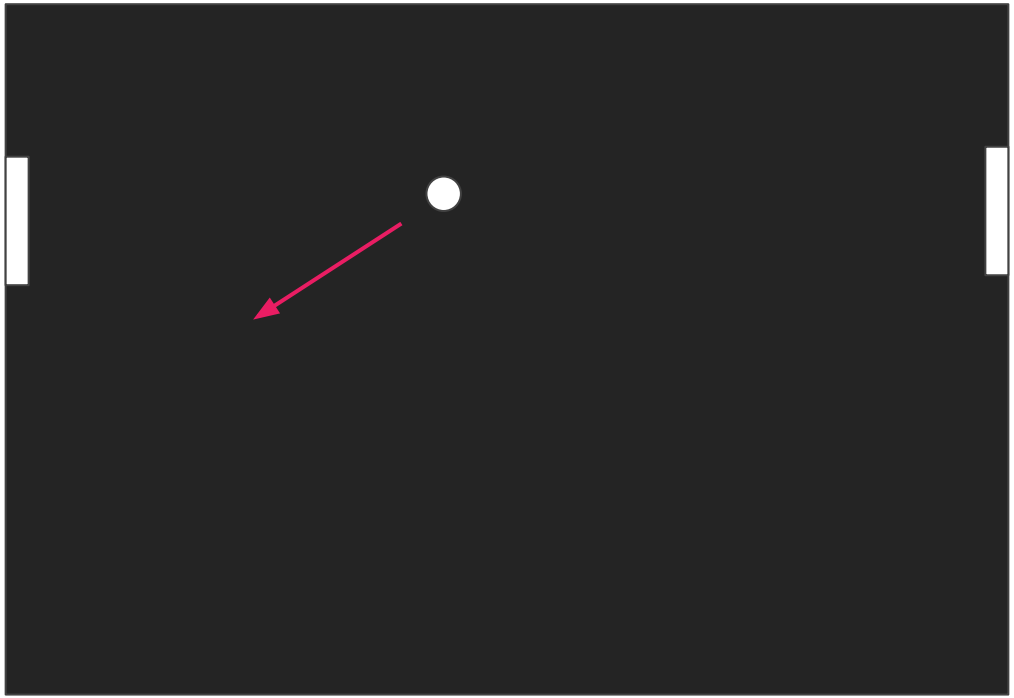
War das gut? - Nachher

War das gut? - Vorher



War das gut? - Nachher

War das gut? - Vorher

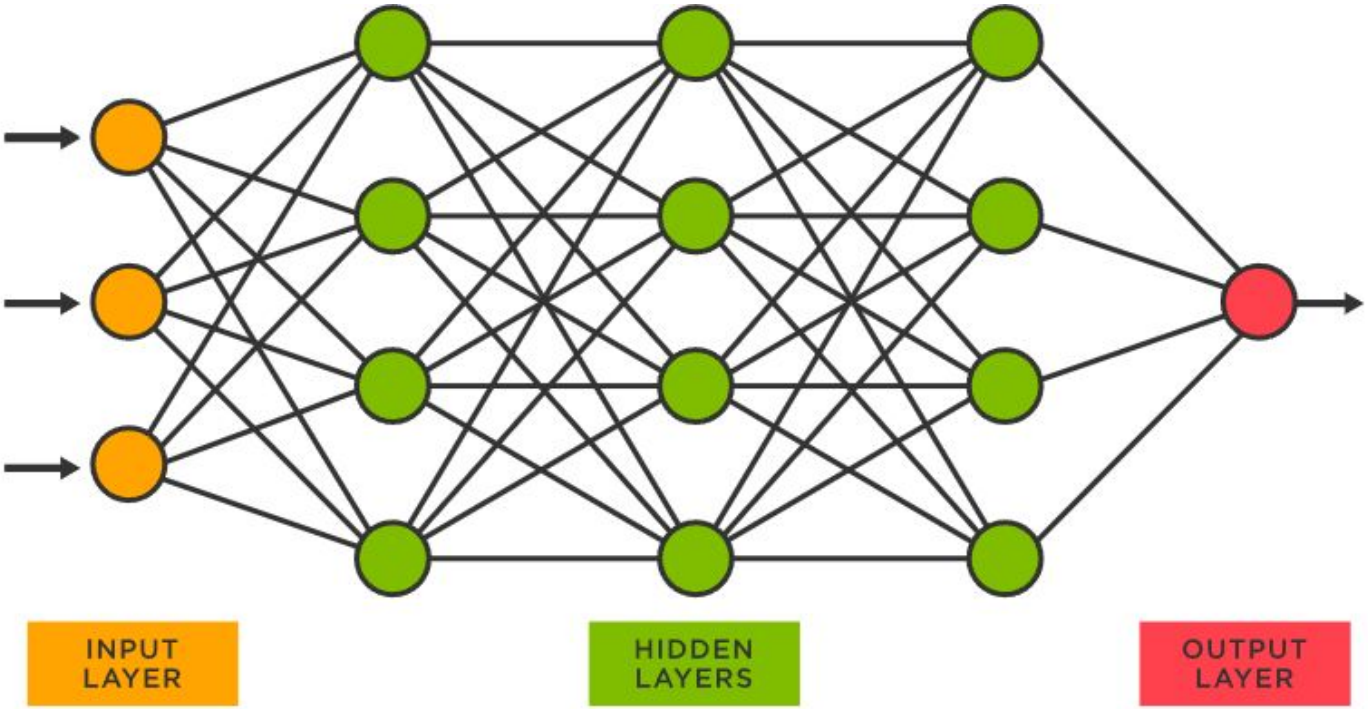


War das gut? - Nachher

Tabular Reinforcement Learning

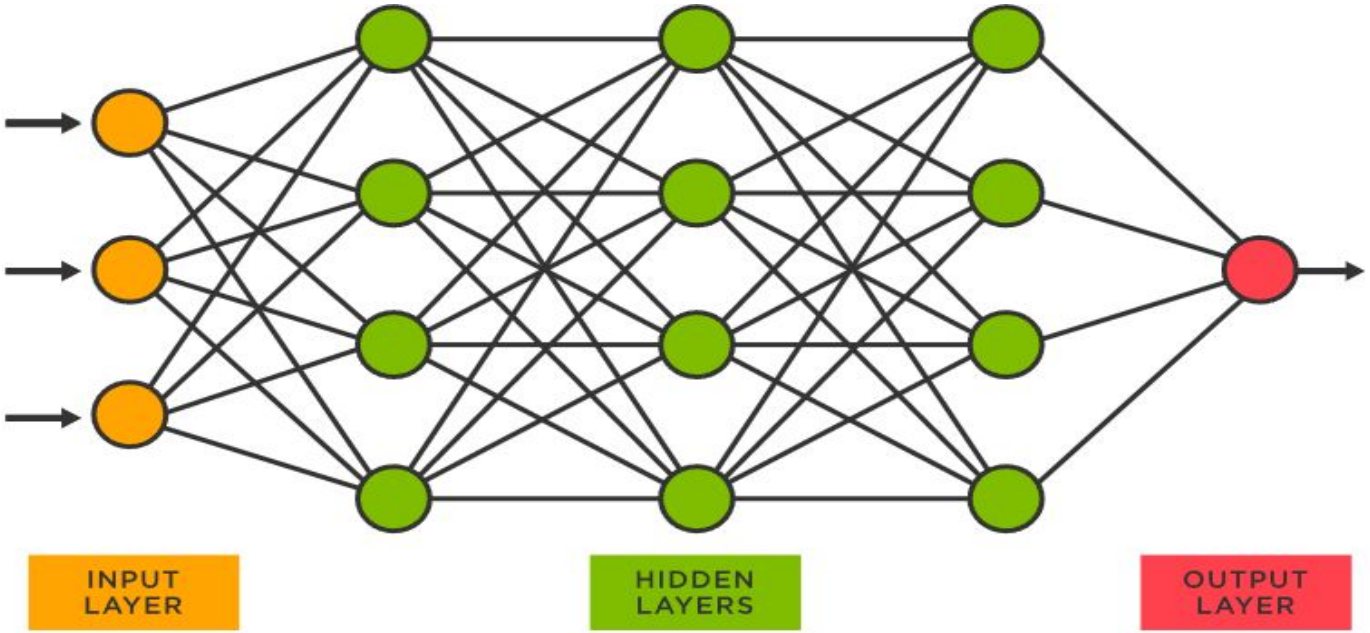
r_up	r_down	r_nop	x	y	dx	dy	paddle_y
30	100	50	200	200	-10	0	0
-10	100	95	400	50	-5	-5	500
10	-50	-40	20	80	-4	-3	50

Deep Reinforcement Learning



Wie muss das Netzwerk aussehen?

r_up	r_down	r_nop	x	y	dx	dy	paddle_y



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Lets implement it!

Notebook Funktionen, Invincibility, Training Time

Koordinatensystem des Spiels