

COMO FUNCIONAM AS REDES NEURAIIS

Júlio C. Batista

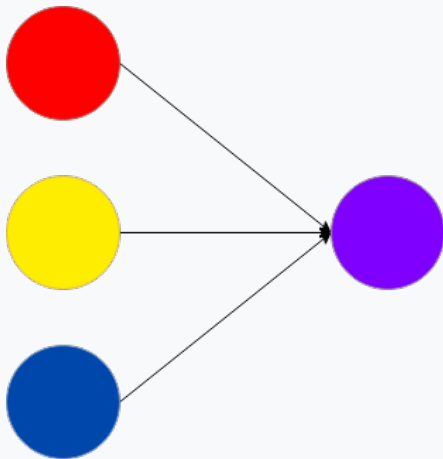
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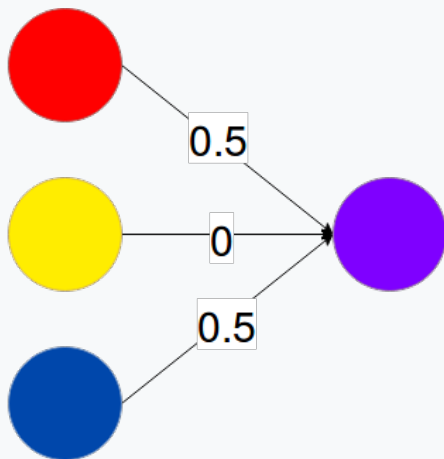
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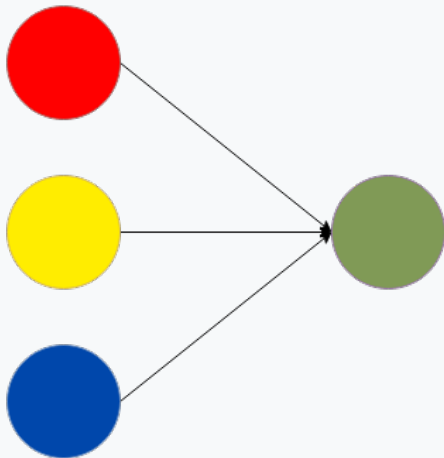
Como criar o roxo?



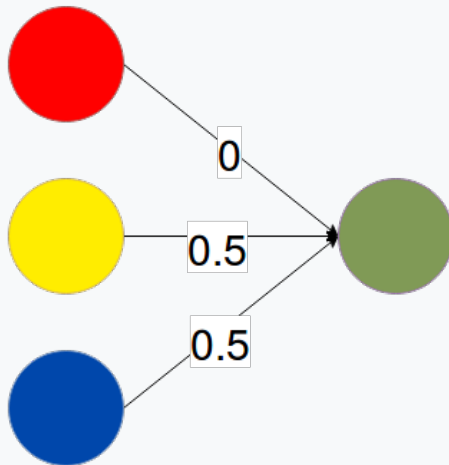
Como criar o roxo?



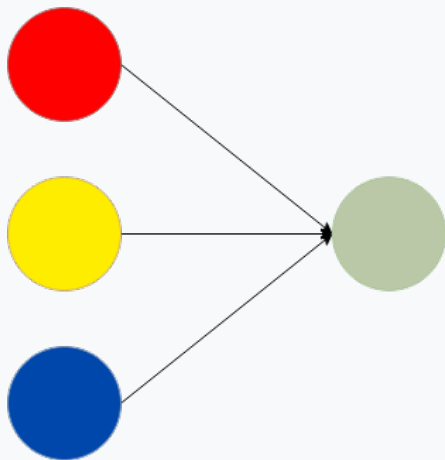
Como criar o verde?



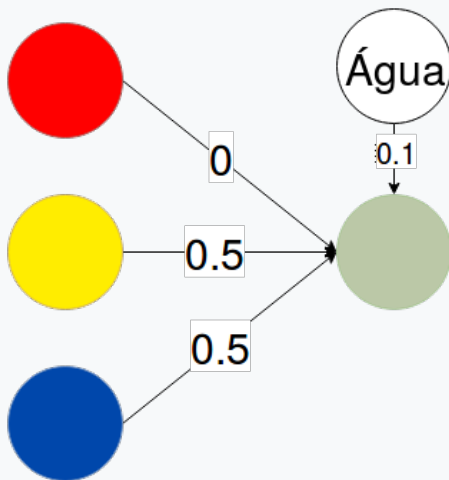
Como criar o verde?



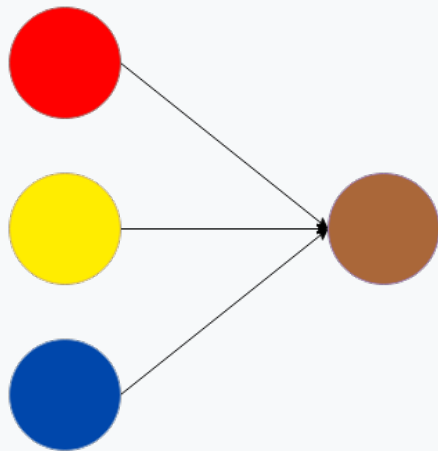
Como fazer o verde transparente?



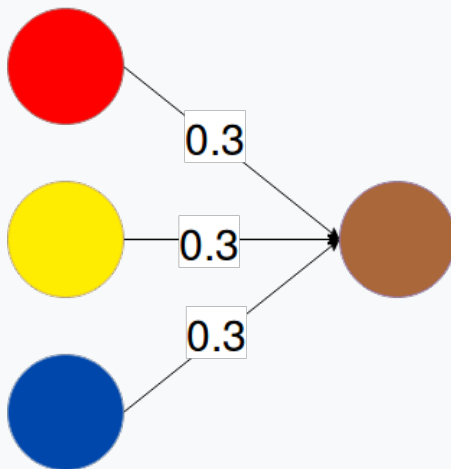
Como fazer o verde transparente?



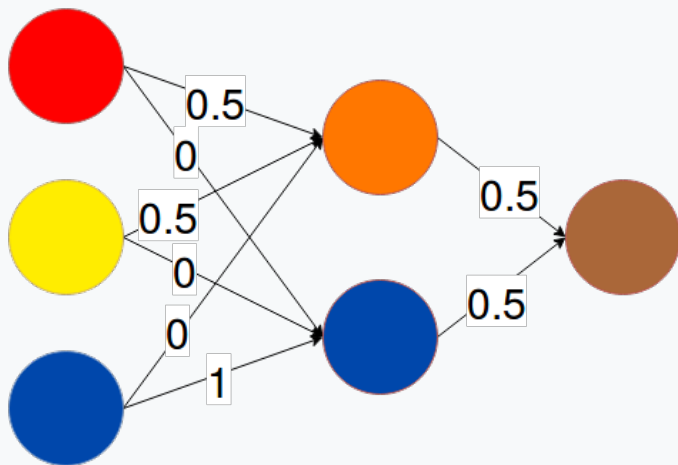
Como criar o marrom?



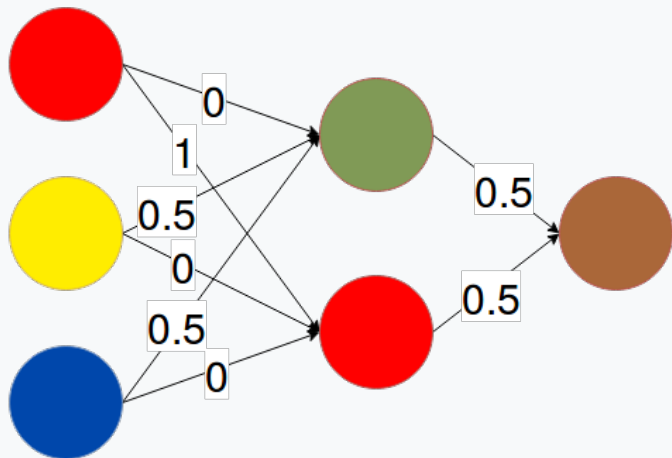
Como criar o marrom?



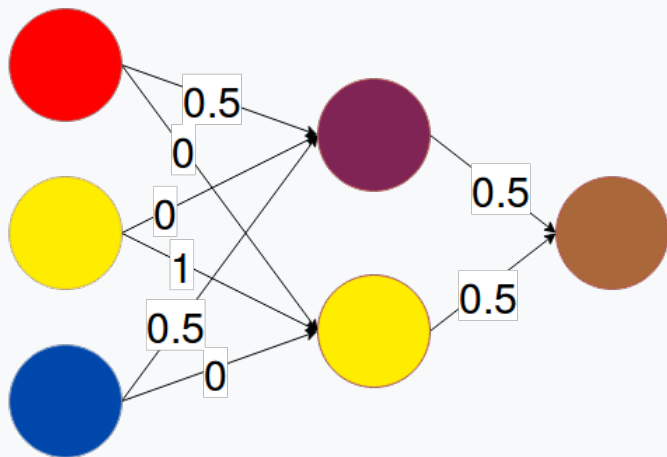
Como criar o marrom?



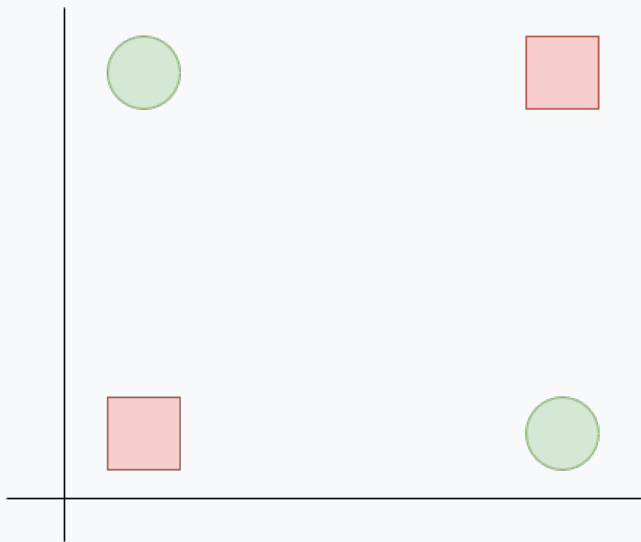
Como criar o marrom?



Como criar o marrom?



Operador XOR



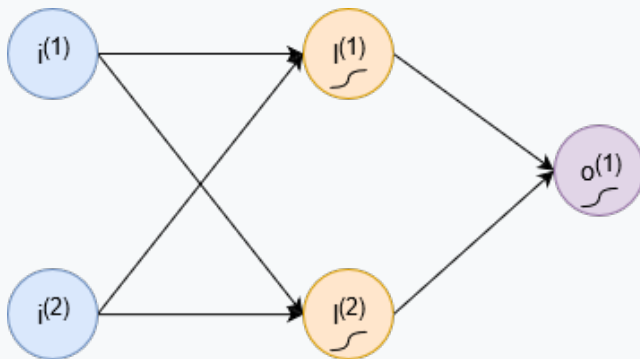
$$\mathbf{x} = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$$\mathbf{y} = \begin{bmatrix} 1 \end{bmatrix}$$

Aprendizado = minimizar "loss"

$$\operatorname{argmin}_{\theta} \mathcal{L}(\hat{\mathbf{y}}, \mathbf{y}; \theta) = \frac{1}{2m} \sum_m (\mathbf{y} - \hat{\mathbf{y}})^2$$

Rede proposta

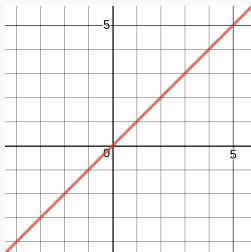


$$\mathbf{l}^{(1)} = \sigma(\theta^{(1)}\mathbf{i} + \mathbf{b})$$

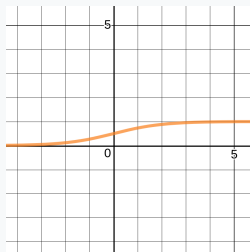
$$\mathbf{l}^{(2)} = \sigma(\theta^{(2)}\mathbf{i} + \mathbf{b})$$

$$\mathbf{o}^{(1)} = \sigma(\theta^{(3)}\mathbf{l} + \mathbf{b})$$

Não linearidades



(a) Linear: $y = \theta x + b$



(b) Sigmóide: $\sigma(\theta x + b) = \frac{1}{1 + e^{-(\theta x + b)}}$

Gradient Descent

Repete até convergir: $\theta_j := \theta_j - \alpha \frac{\partial}{\partial \theta_j} \mathcal{L}$

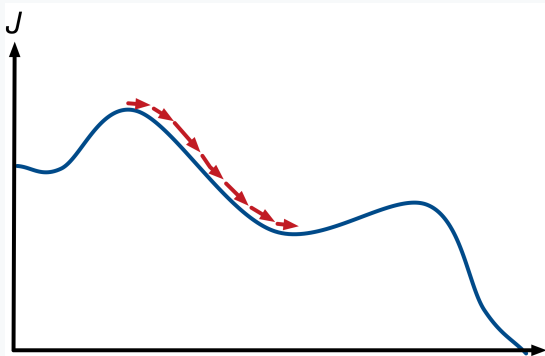


Figure: Fonte: <http://www.deepideas.net/deep-learning-from-scratch-iv-gradient-descent-and-backpropagation/>

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