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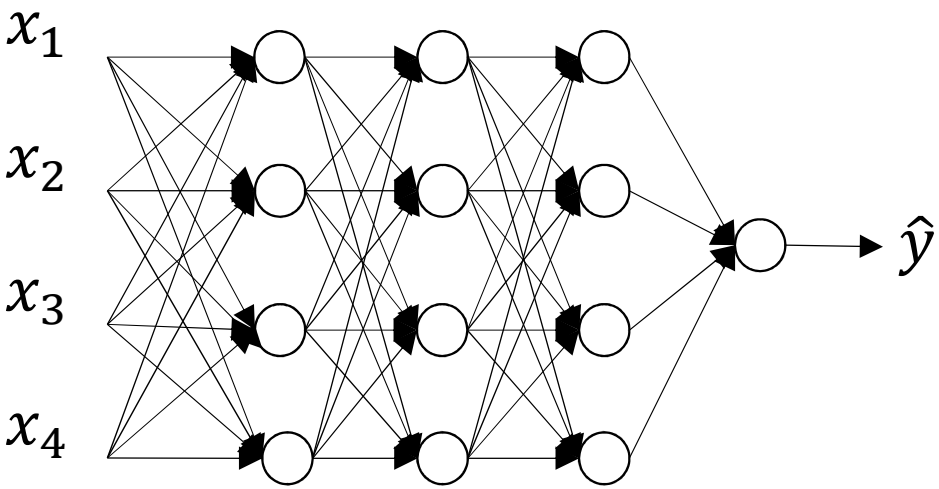
Regularizing your neural network

Dropout regularization

Dropout regularization



0.5 0.5 0.5

Implementing dropout ("Inverted dropout")

Illustrate with layer $l = 3$. keep-prob $= 0.8$ (0.2)

$d3 = np.random.rand(a3.shape[0], a3.shape[1]) < keep\text{-}prob$

$a3 = np.multiply(a3, d3)$ # $a3 *= d3$.

$a3 /= keep\text{-}prob$

50 units. ⇝ 10 units shut off

$z^{[4]} = w^{[4]} \cdot a^{[3]} + b^{[4]}$

$a^{[3]}$ reduced by 20%. Test

$/= 0.8$

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Making predictions at test time

$a^{[0]} = X$

No drop out.

$z^{[1]} = W^{[1]} a^{[0]} + b^{[1]}$

$a^{[1]} = g^{[1]}(z^{[1]})$

$z^{[2]} = W^{[2]} a^{[1]} + b^{[2]}$

$a^{[1]} = \ldots$

$\hat{y}$

$/= keep\text{-}prob$

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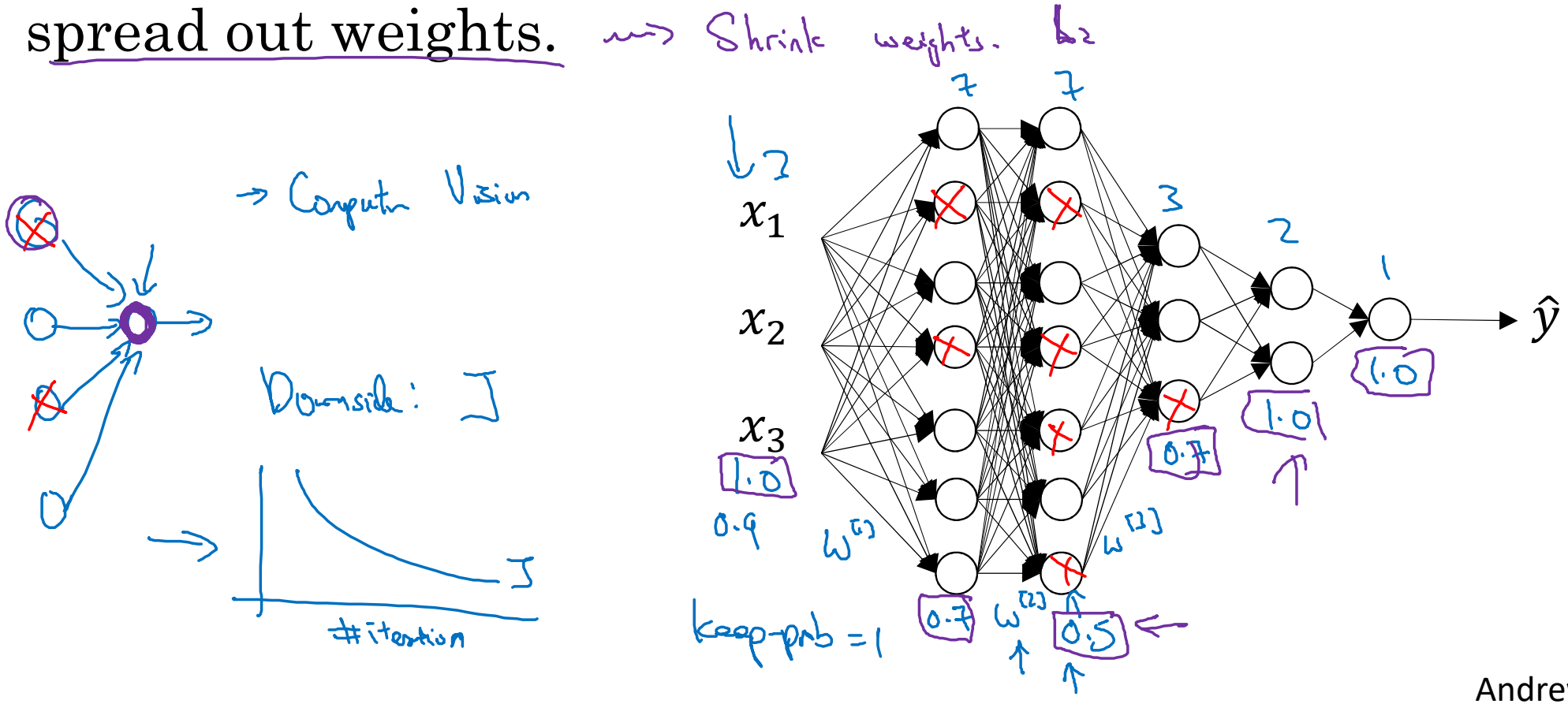
Understanding dropout

Why does drop-out work?

Intuition: Can't rely on any one feature, so have to spread out weights.



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