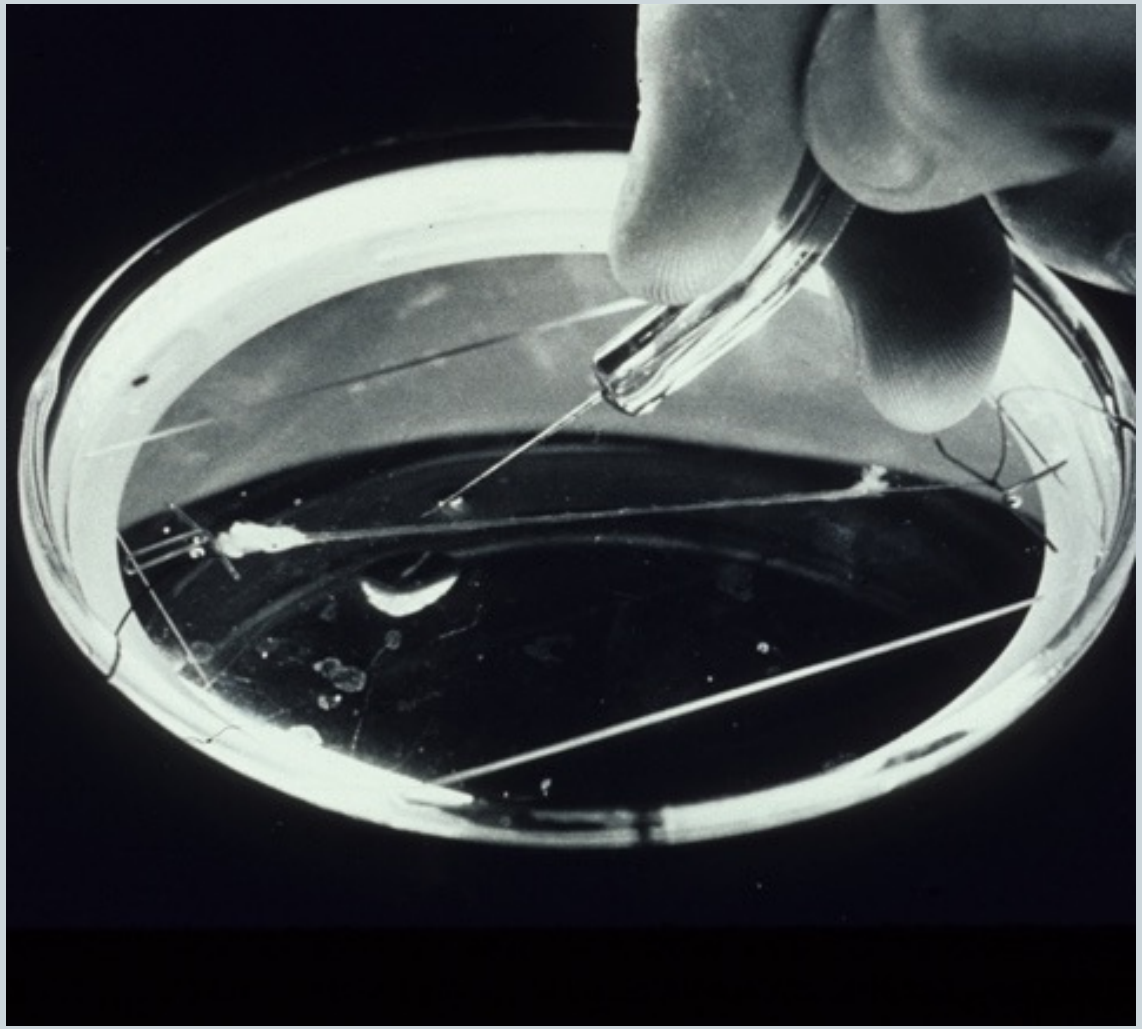
Neural Networks

BHI Youth Awards

KING'S College LONDON

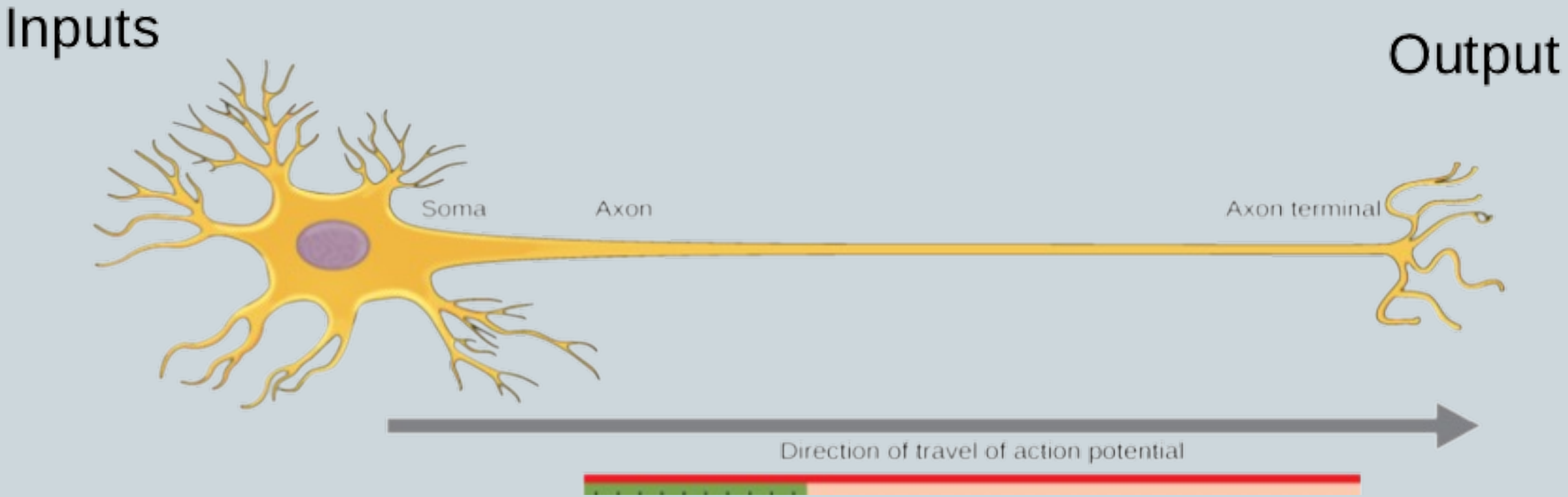
NIHR | Maudsley Biomedical Research Centre

Giant squid axon

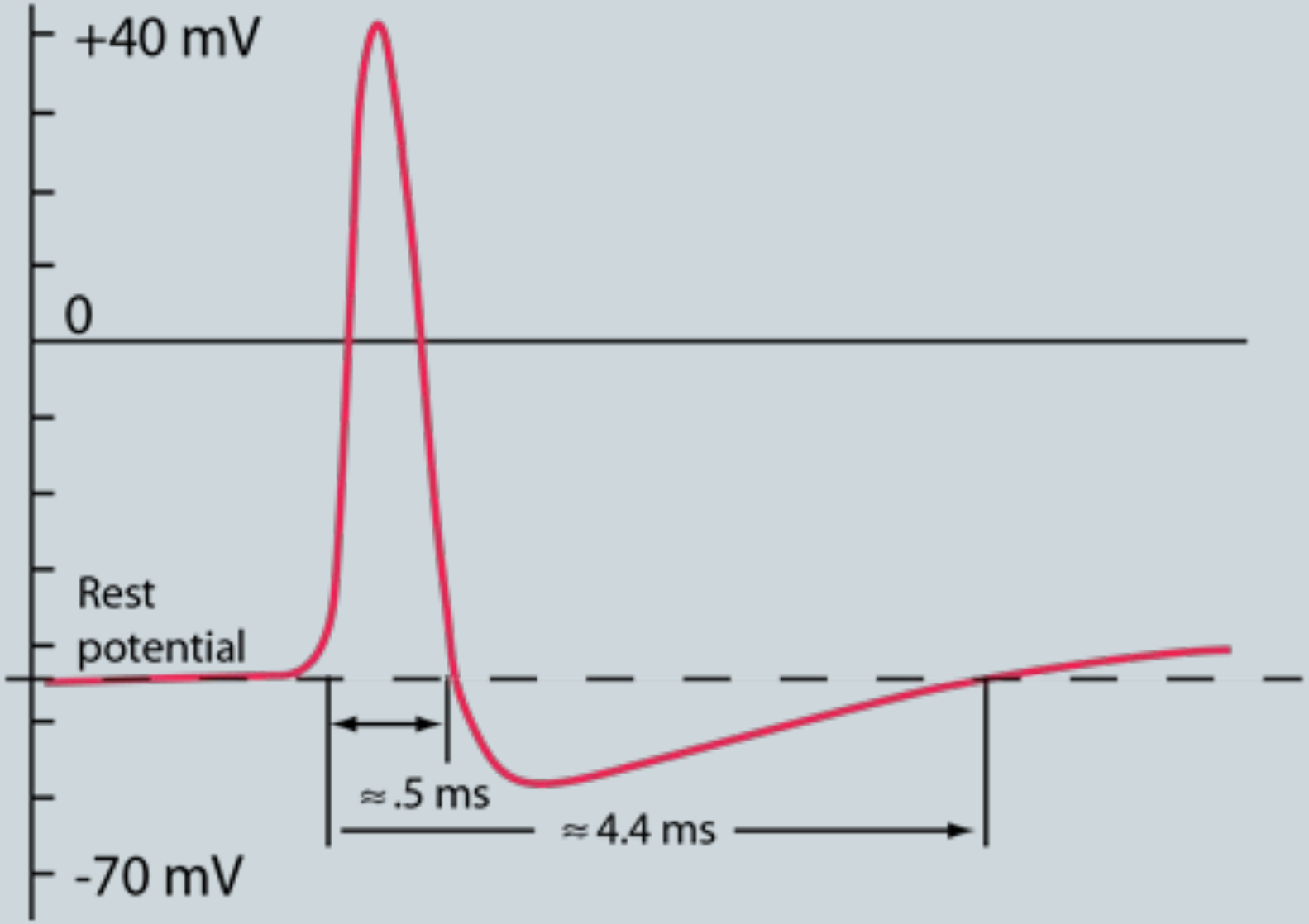


- Large axon used to control squid locomotion
- Electrical properties investigated by Hodgkin and Huxley in 1952

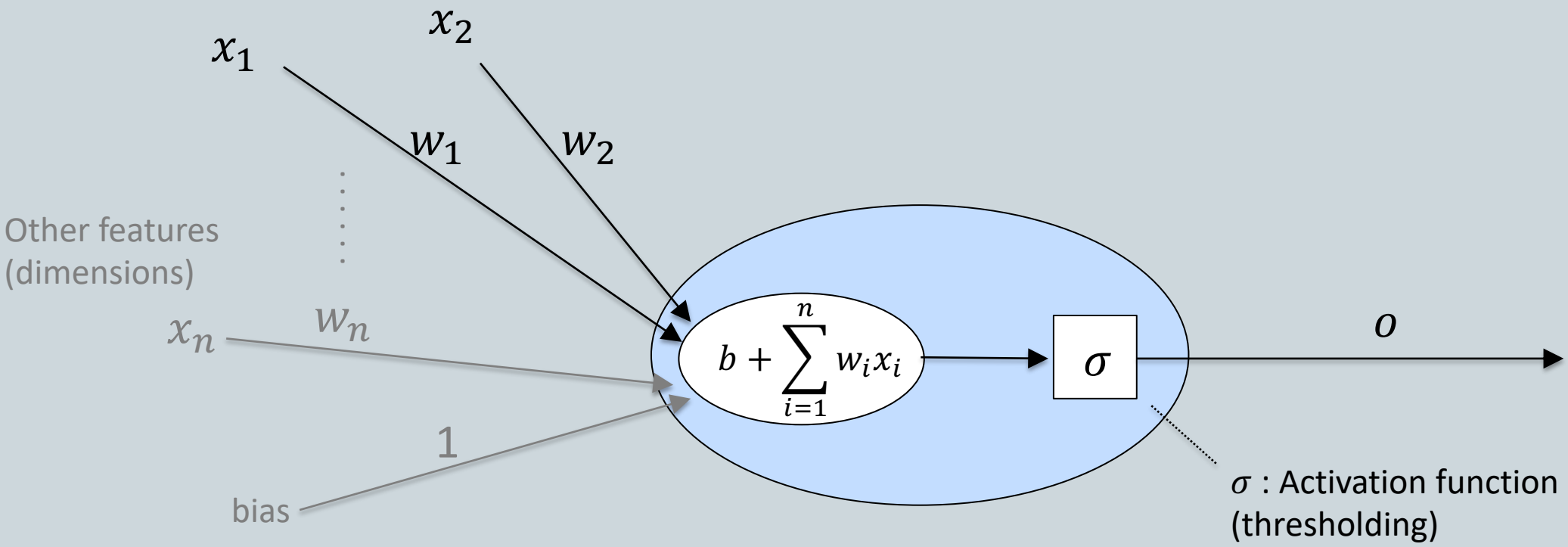
Input and output



Action potential

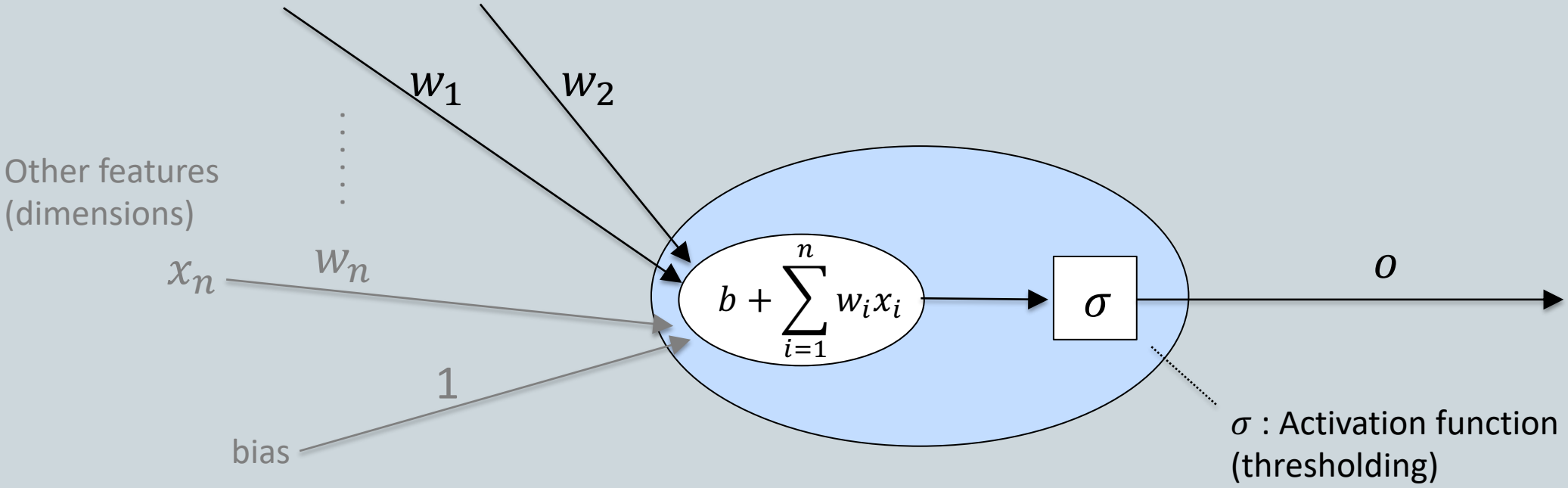


A single perceptron (artificial neuron)



A single perceptron (artificial neuron)

	x_1 Placental	x_2 Lactates	y (output) Mammal
Dog	1	1	**1**
Cat	1	1	**1**
Bull shark	1	0	**0**
Pigeon	0	1	**0**
Lizard	0	0	**0**



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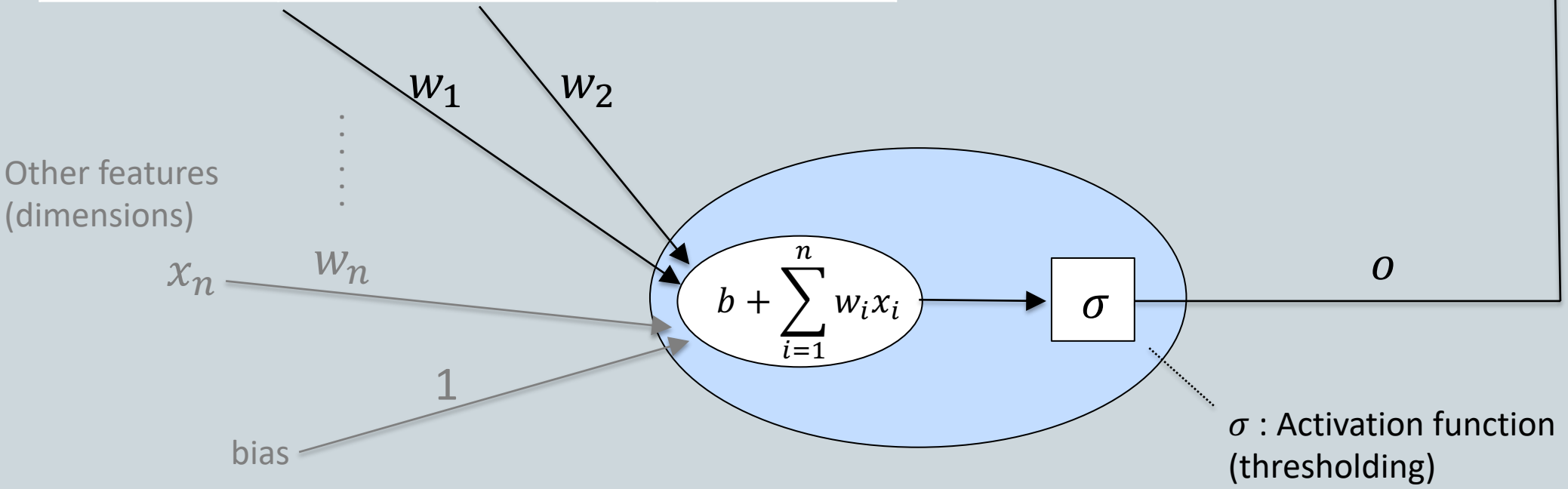
$$\Delta w_i = \eta(y - o)x_i$$



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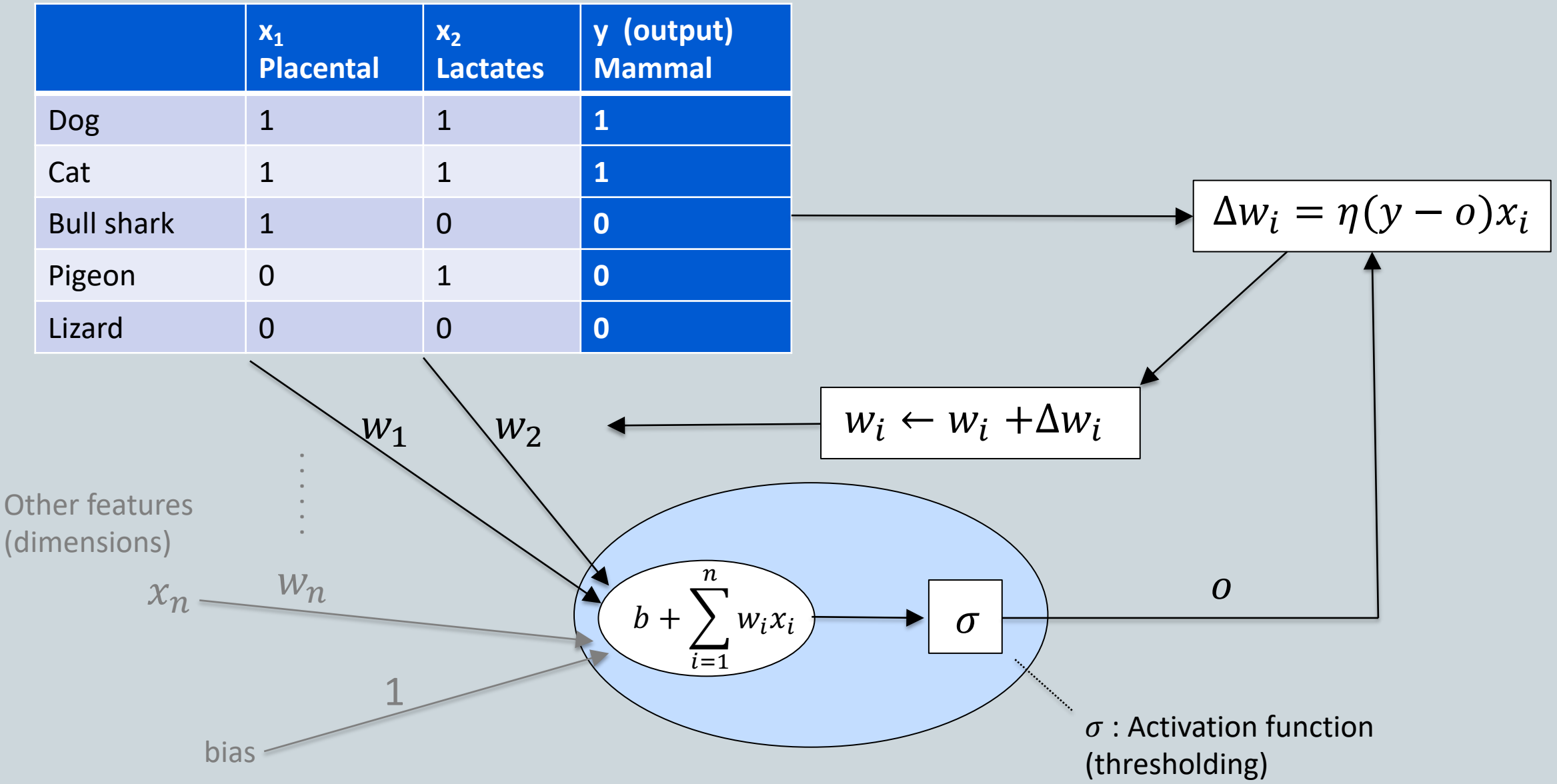
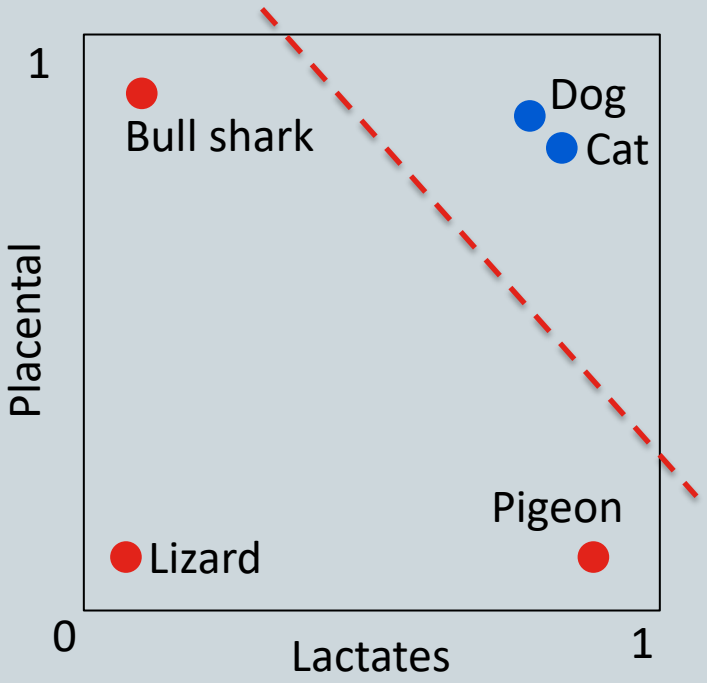
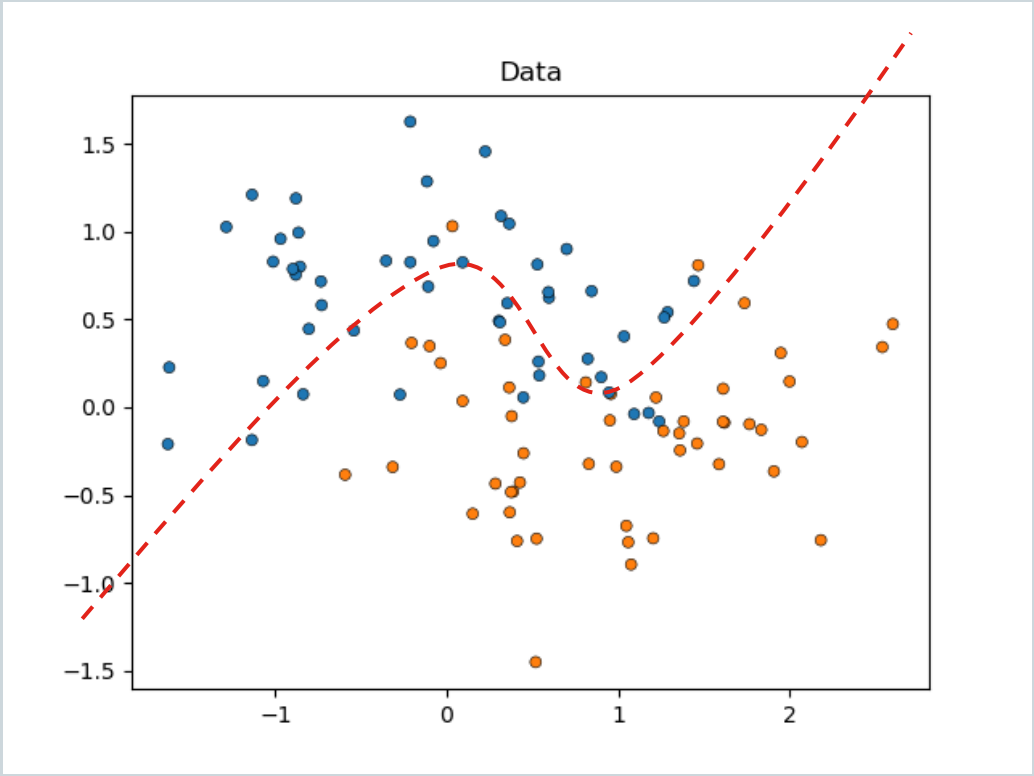
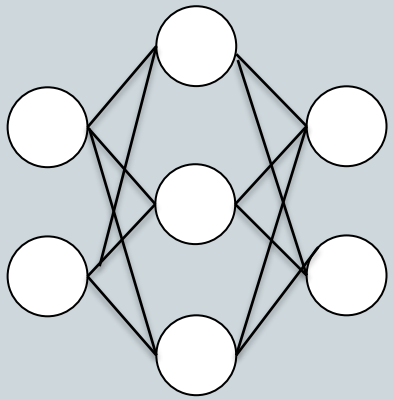


A single perceptron can only model linearly separable problems

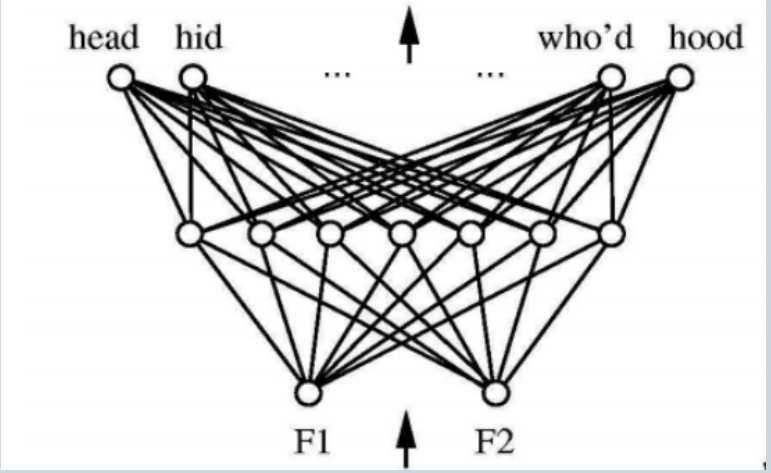




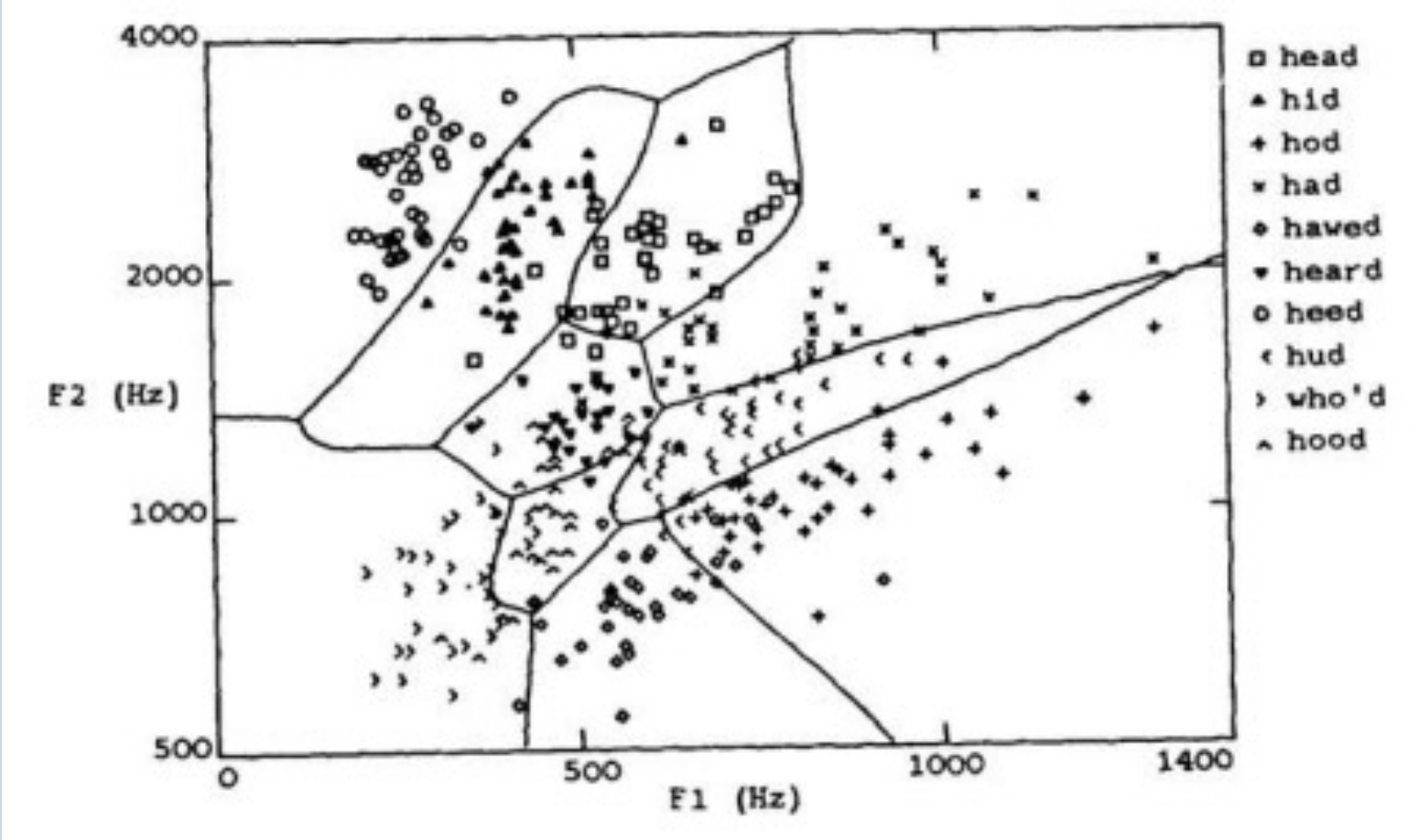
Solvable with 12 parameters (weights)



More complex problems: hidden layers

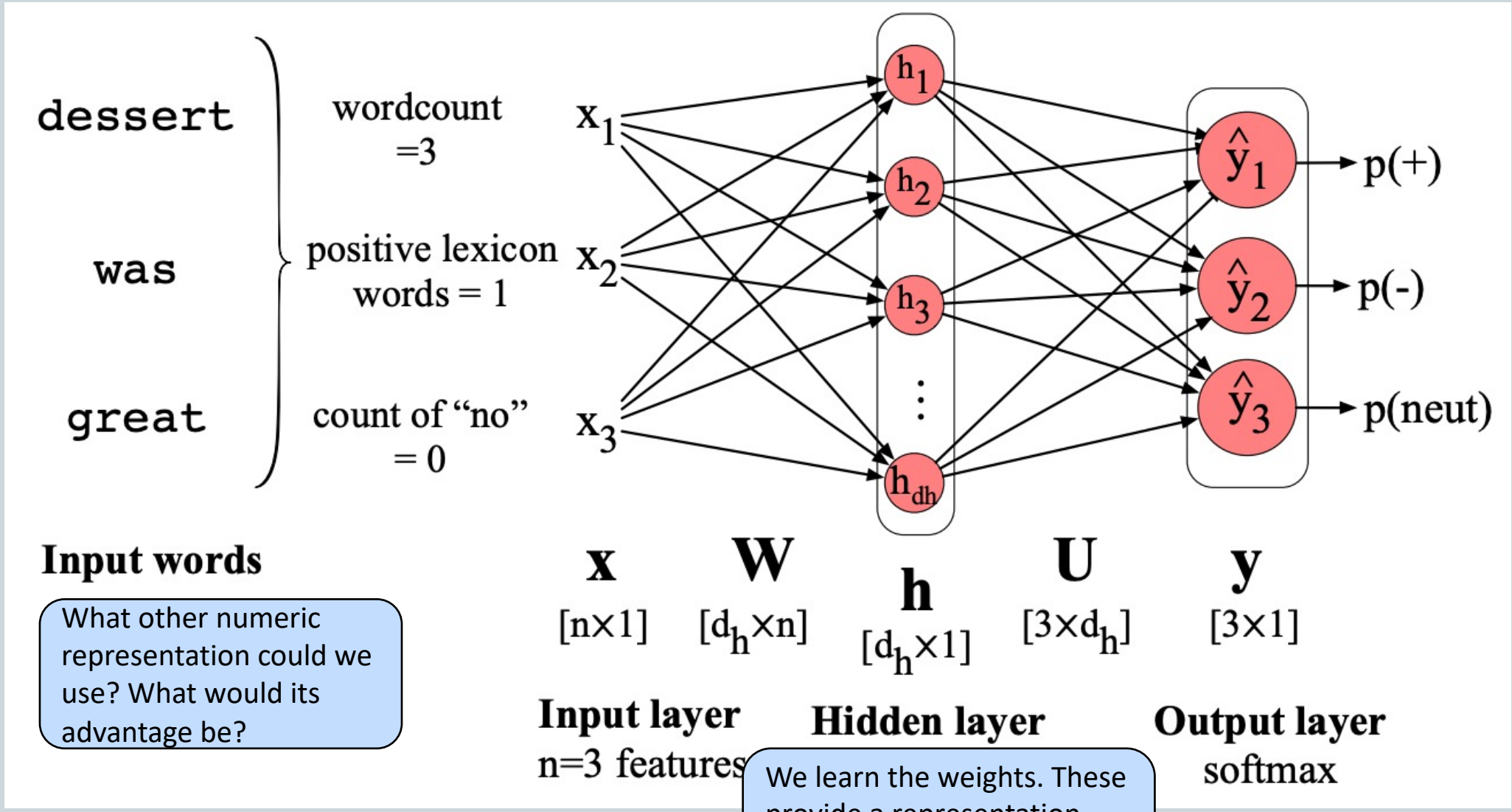


- Two layers
- 100 nodes
- 1200 parameters (estimate)



Credit: Huang & Lippmann, NIPS 1988

How do we model language in a neural network?



What other numeric representation could we use? What would its advantage be?

We learn the weights. These provide a representation that will map input to output.

(Jurafsky and Martin, Fig. 7.10)

Thank you

angus.roberts@kcl.ac.uk
https://www.kcl.ac.uk/people/angus-roberts