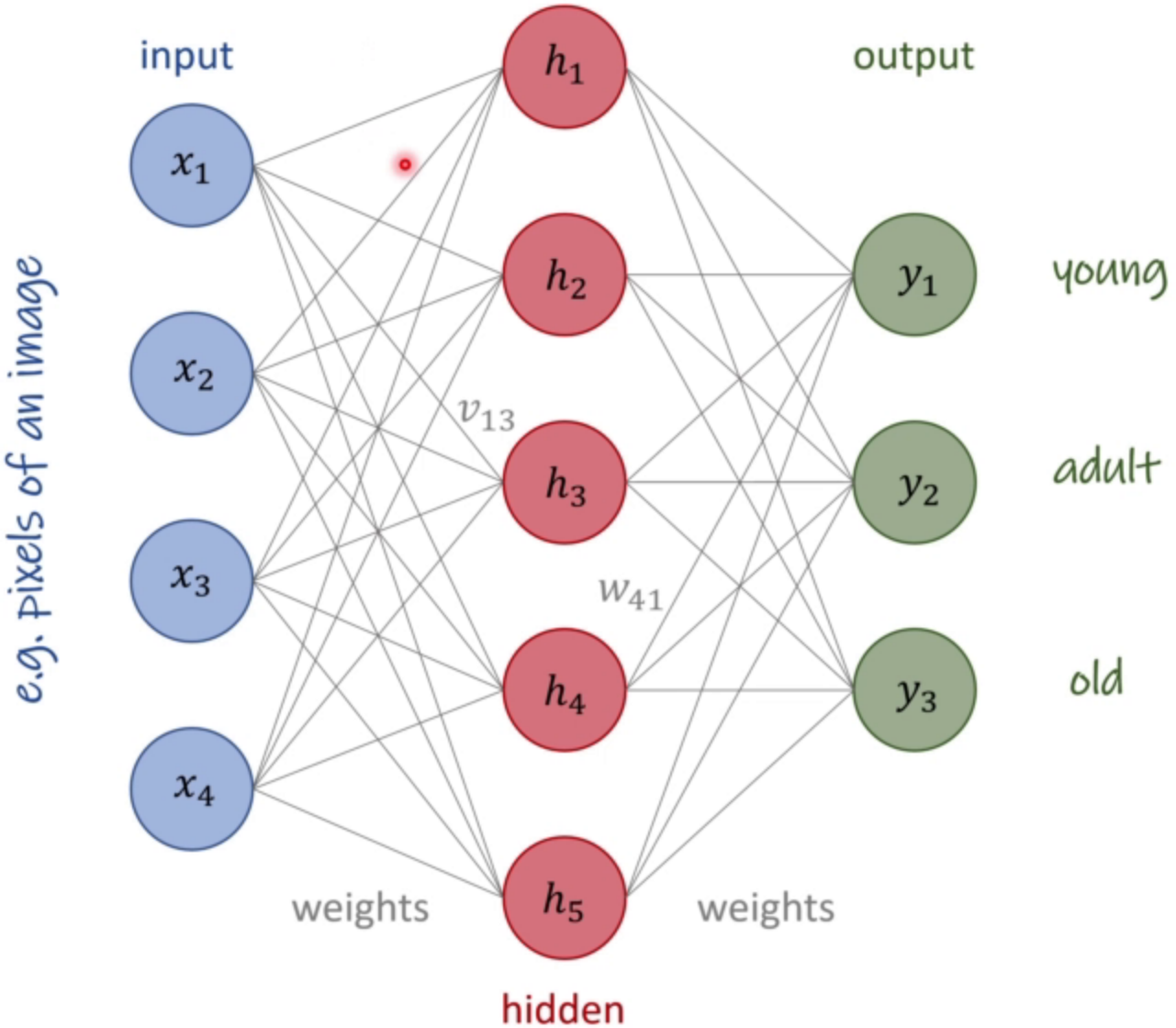
# Neural networks



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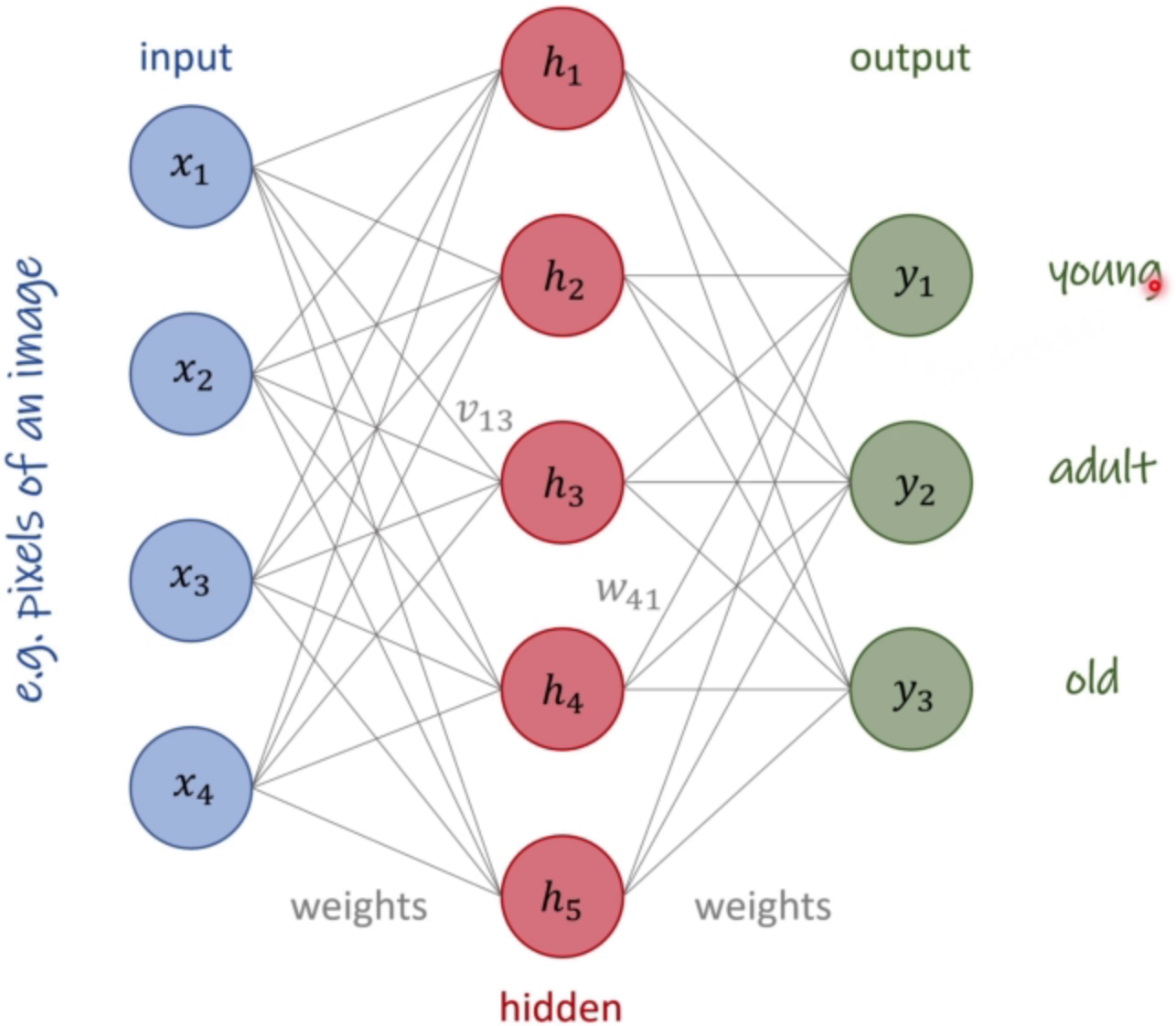


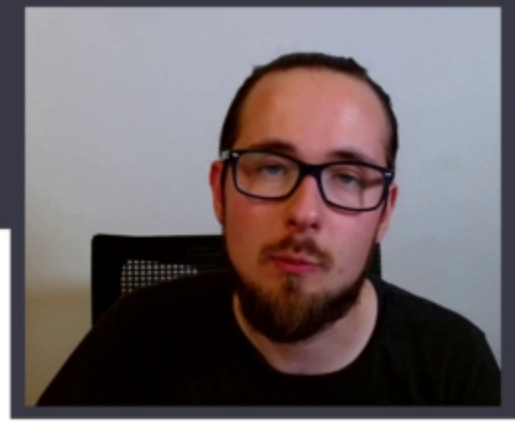

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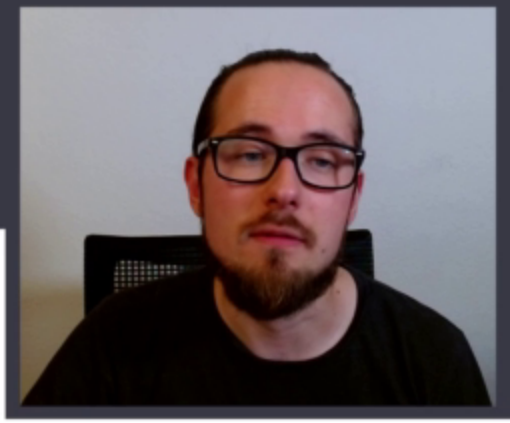

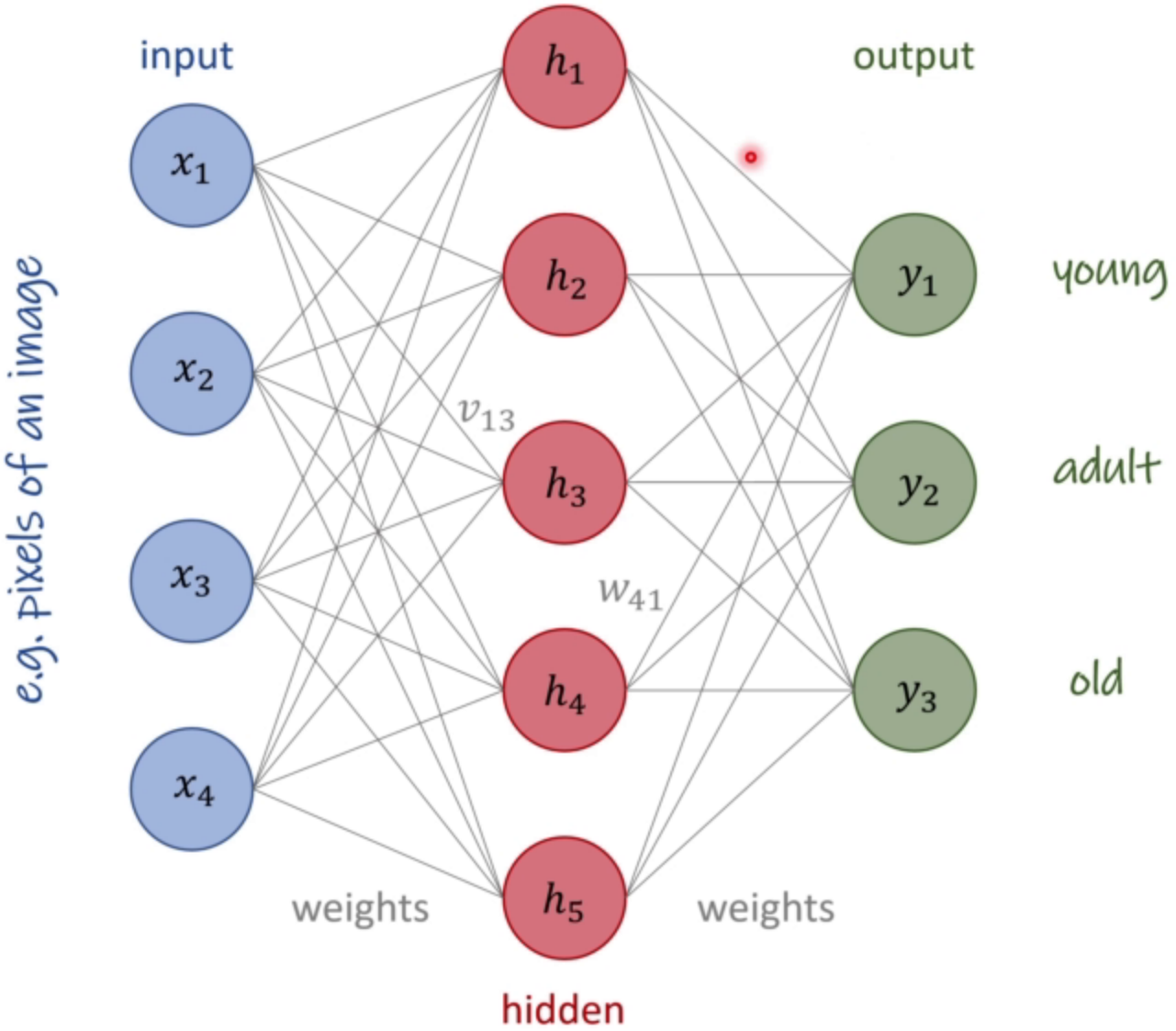


$$h_1 = v_{01} + v_{11}x_1 + \cdots + v_{14}x_4$$

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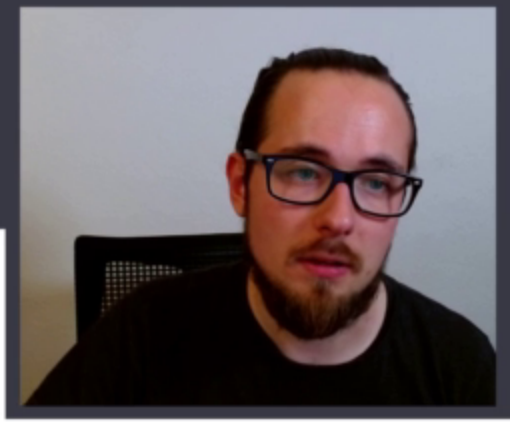
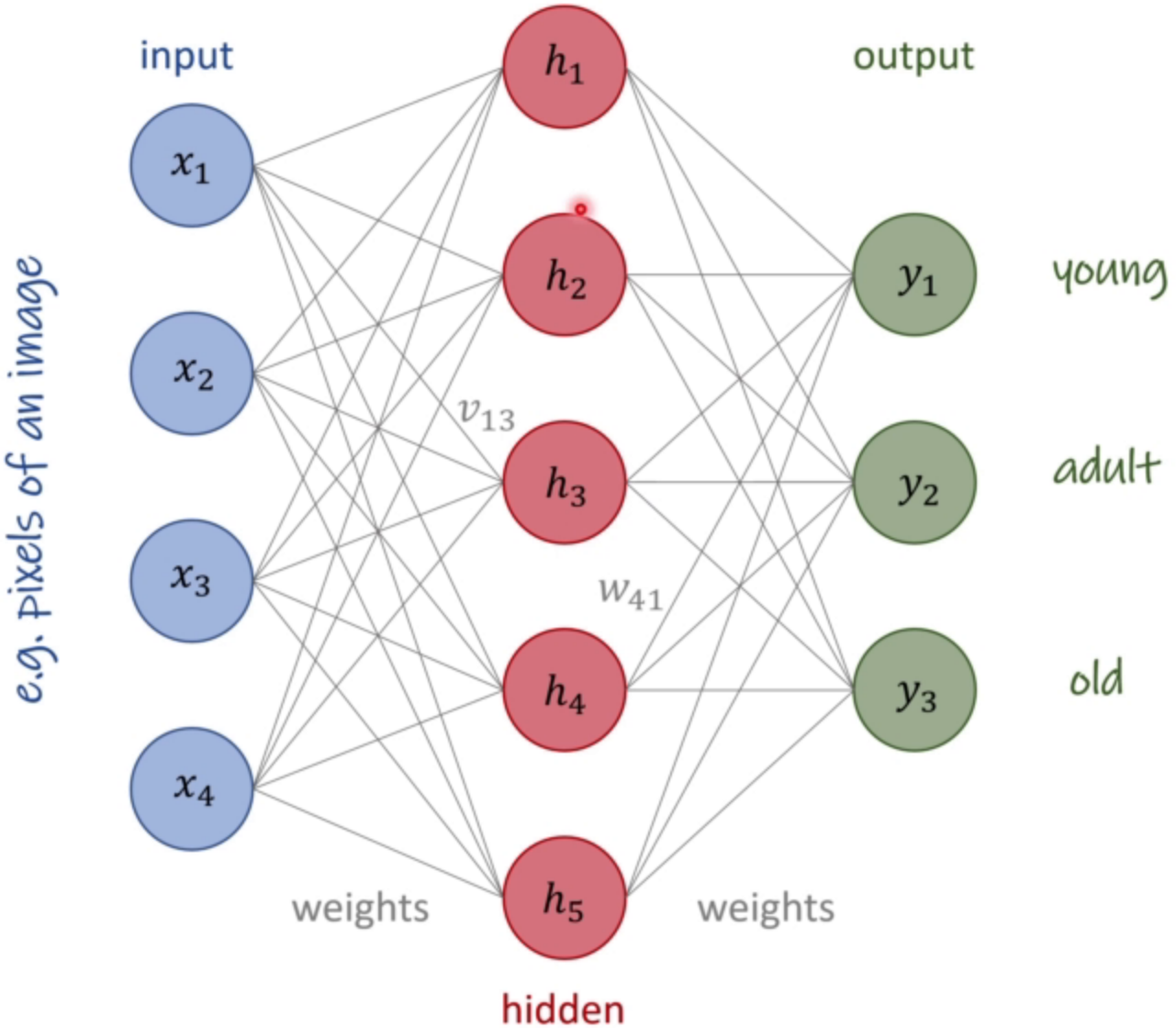
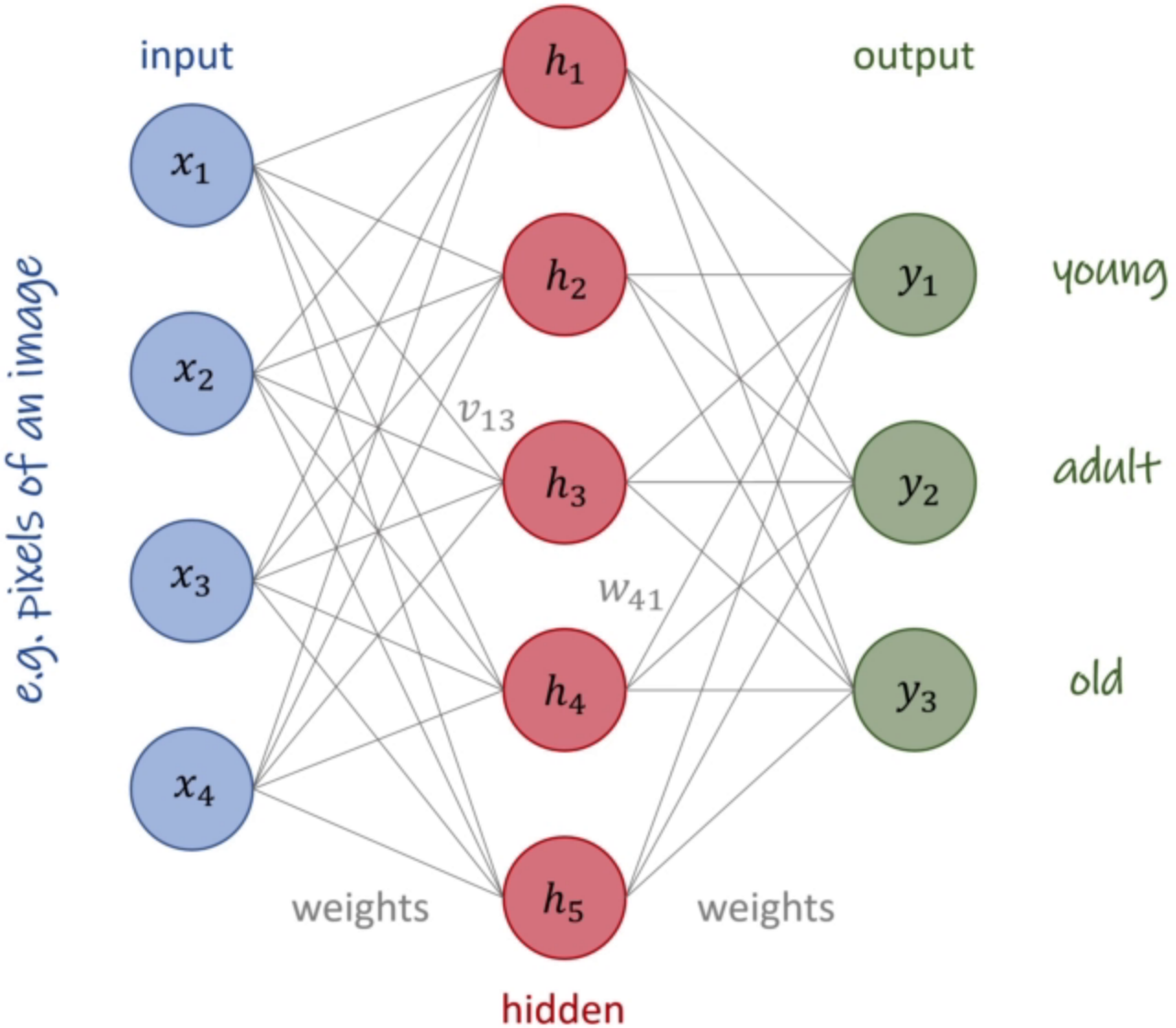


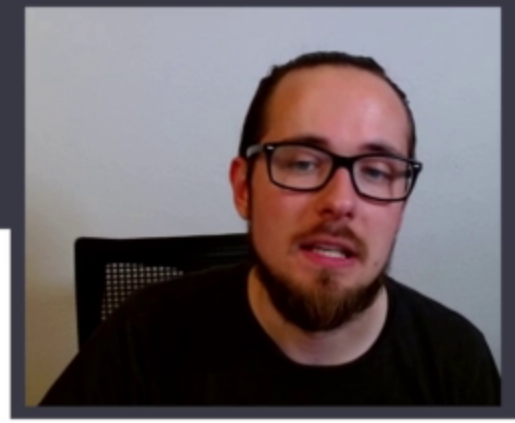



$$h_1 = v_{01} + v_{11}x_1 + \cdots + v_{14}x_4$$

$$y_1 = w_{01} + w_{11}h_1 + \cdots + w_{15}h_5$$

# Neural networks



$$h_1 = v_{01} + v_{11}x_1 + \cdots + v_{14}x_4$$

$$y_1 = w_{01} + w_{11}h_1 + \cdots + w_{15}h_5$$

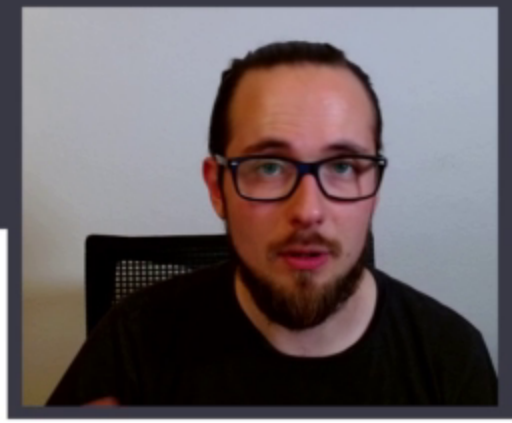
- Find fit (ideal weights & biases)

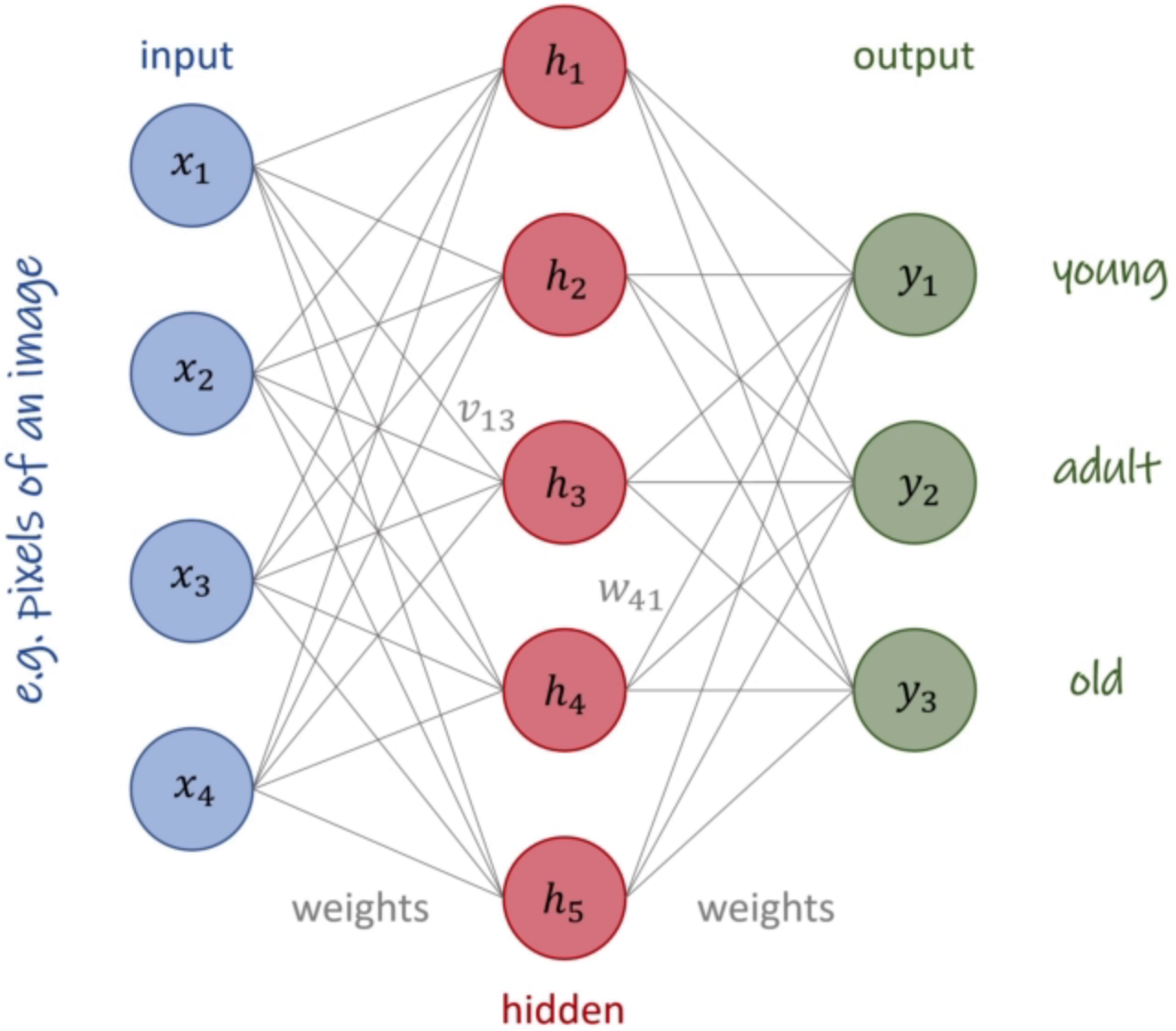
$$v_{11}, \ldots, v_{45} \quad w_{11}, \ldots, w_{53}$$

$$v_{01}, \ldots, v_{05} \quad w_{01}, \ldots, w_{03}$$

Udemy

# Neural networks






$$h_1 = v_{01} + v_{11}x_1 + \cdots + v_{14}x_4$$

$$y_1 = w_{01} + w_{11}h_1 + \cdots + w_{15}h_5$$

- Find fit (ideal weights & biases)

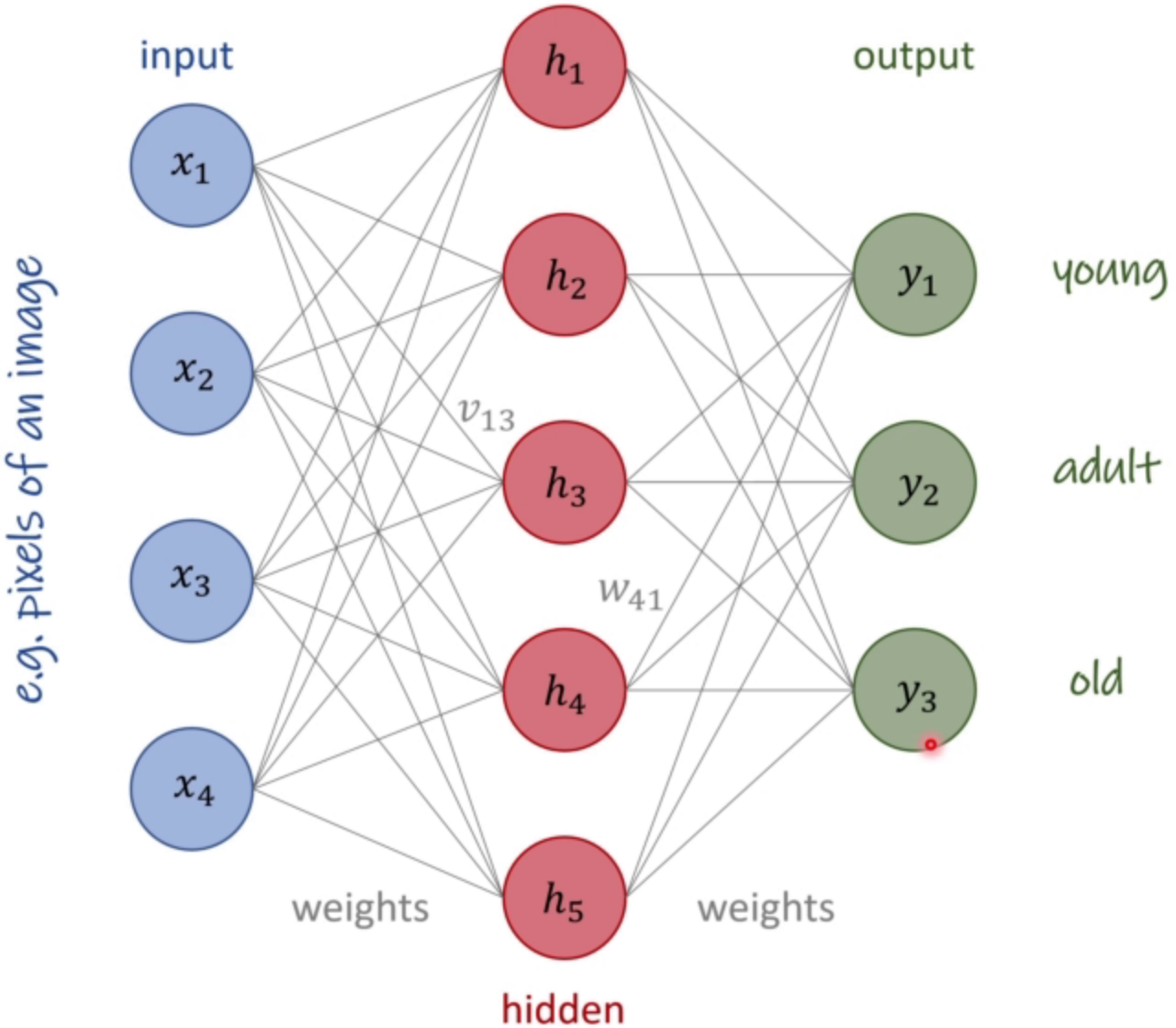
$$v_{11}, \ldots, v_{45} \qquad w_{11}, \ldots, w_{53}$$

$$v_{01}, \ldots, v_{05} \qquad w_{01}, \ldots, w_{03}$$

- By minimizing error

$$\Delta = \sum_{i=1}^{5} (\underbrace{n + mx^{(i)}}_{\text{Predicted}} - \underbrace{y^{(i)}}_{\text{True}})^2$$

# Neural networks




$$h_1 = v_{01} + v_{11}x_1 + \cdots + v_{14}x_4$$

$$y_1 = w_{01} + w_{11}h_1 + \cdots + w_{15}h_5$$

- Find fit (ideal weights & biases)

$$v_{11}, \ldots, v_{45} \qquad w_{11}, \ldots, w_{53}$$

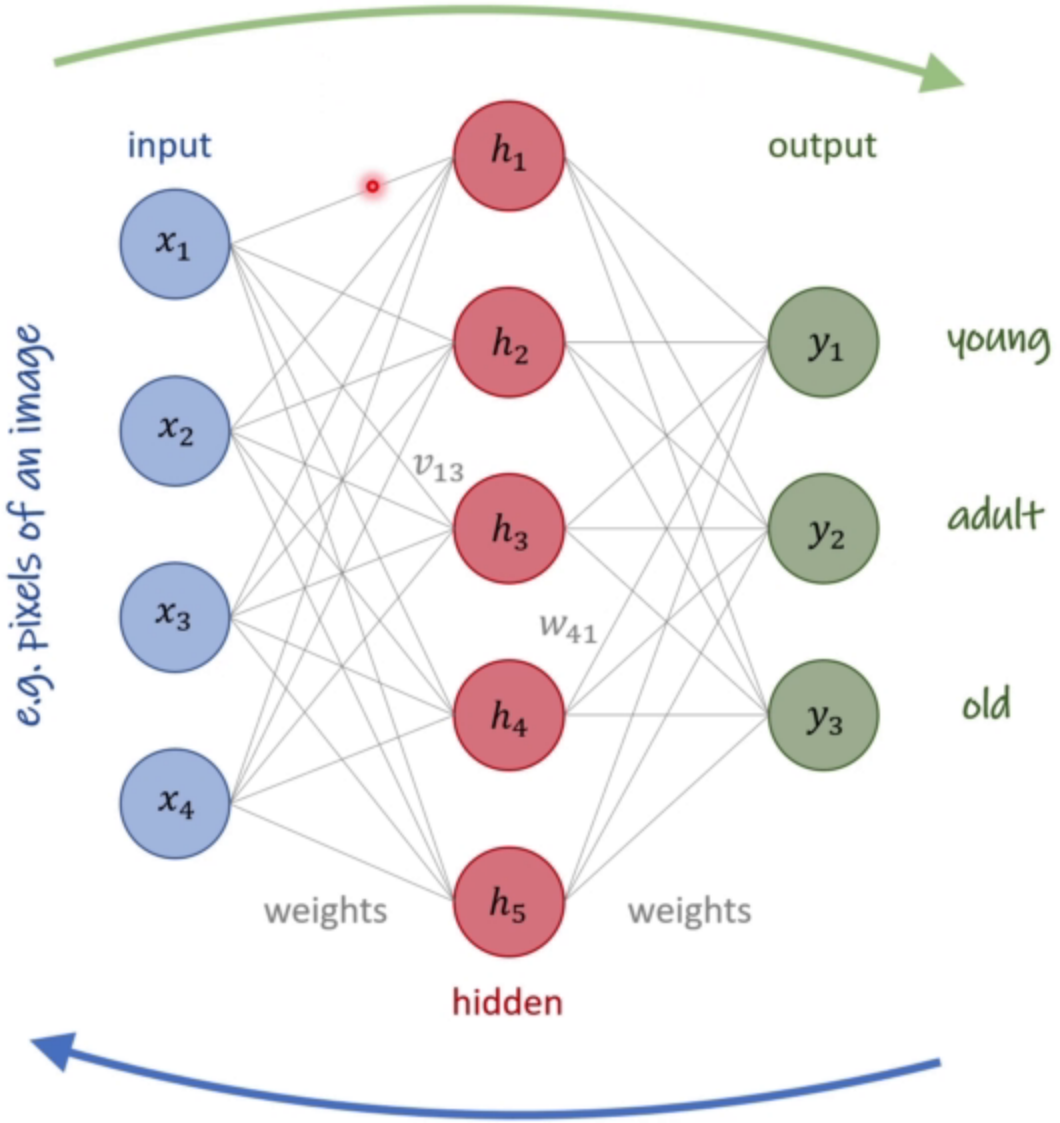
$$v_{01}, \ldots, v_{05} \qquad w_{01}, \ldots, w_{03}$$

- By minimizing error

$$\Delta = \sum_{i=1}^{5} (y_i - t_i)^2$$

$y_i$: Predicted; $t_i$: True (1 or 0)

# Training!



- Calculate output

$$h_1 = \sigma(v_{01} + v_{11}x_1 + \cdots + v_{14}x_4)$$

$$y_1 = \sigma(w_{01} + w_{11}h_1 + \cdots + w_{15}h_5)$$

- Find better weights & biases that decrease error

$$v_{11}, \ldots, v_{45} \qquad w_{11}, \ldots, w_{53}$$

$$v_{01}, \ldots, v_{05} \qquad w_{01}, \ldots, v_{05}$$

$$\Delta = \sum_{i=1}^{5} (y_i - t_i)^2$$

$y_i$: Predicted; $t_i$: True (1 or 0)

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