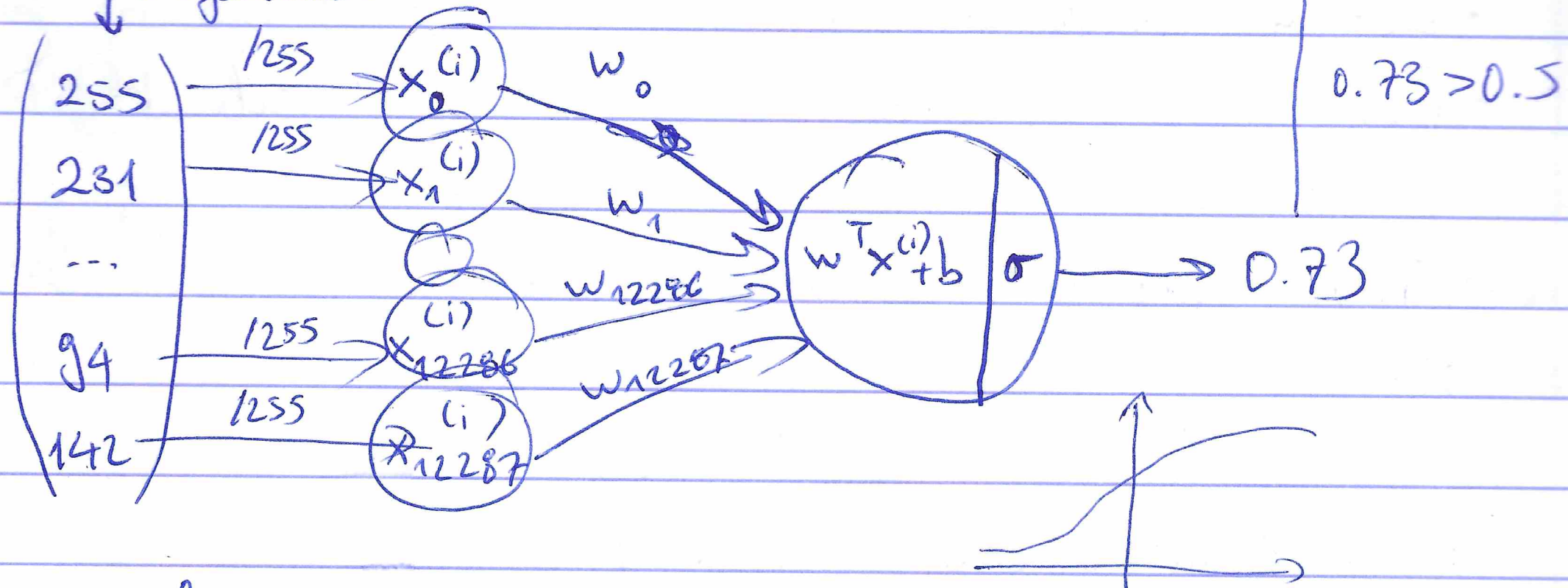


& maths

- Architecture of learn. alg.:



image2vector



For example $x^{(1)}$:

$$z^{(1)} = w^T x^{(1)} + b$$

$$\hat{y}^{(1)} = a^{(1)} = \text{sigmoid}(z^{(1)})$$

$$L(a^{(1)}, y^{(1)}) = -y^{(1)} \log(a^{(1)}) - (1 - y^{(1)}) \log(1 - a^{(1)})$$

$$J = \frac{1}{m} \sum_{i=1}^m L(a^{(i)}, y^{(i)})$$

- Main steps for building a NN:

1. Define the model's structure (n. of input features)

2. Initialise the model's parameters

3. Loop:

- Calc. current loss (for prop.)
- Calc. current gradient (backprop.)
- Update parameters (GD)

- For. prop.

• Get X

• Compute $A = \sigma(w^T X + b) = (a^{(1)}, a^{(2)}, \dots, a^{(m-1)}, a^{(m)})$

• Calc. CF: $J = -\frac{1}{m} \sum_{i=1}^m y^{(i)} \log(a^{(i)}) + (1 - y^{(i)}) \log(1 - a^{(i)})$

$$\frac{\partial J}{\partial w} = \frac{1}{m} X(A - Y)^T$$

$$\frac{\partial J}{\partial b} = \frac{1}{m} \sum_{i=1}^m (a^{(i)} - y^{(i)})$$