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DLI Accelerated Data Science Teaching Kit

Module 16.3 - Multilayer Perceptron



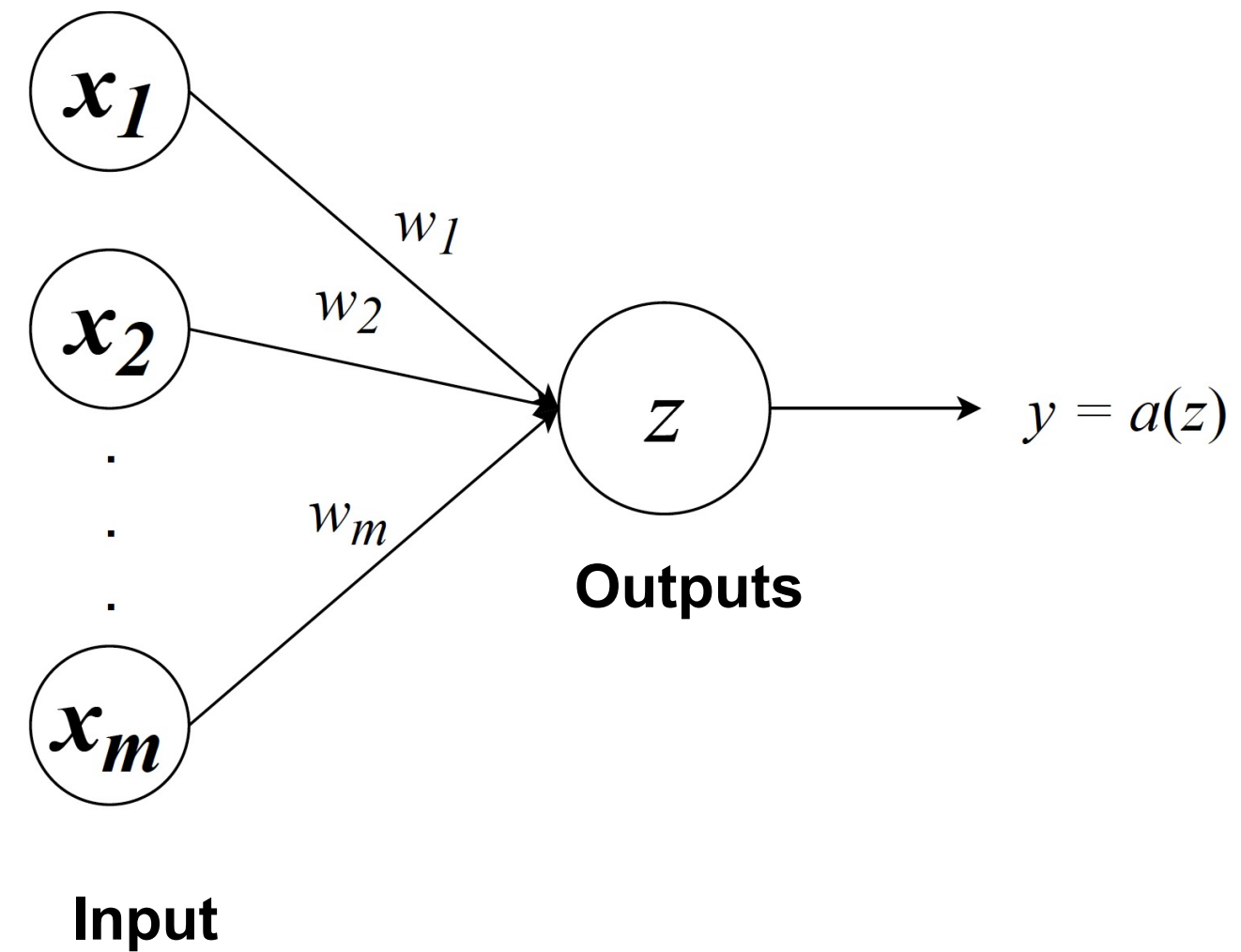
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Perceptron

Feedforward neural networks

- Single Artificial Neuron

$$z = w_0 + \sum_{j=1}^m x_j w_j$$

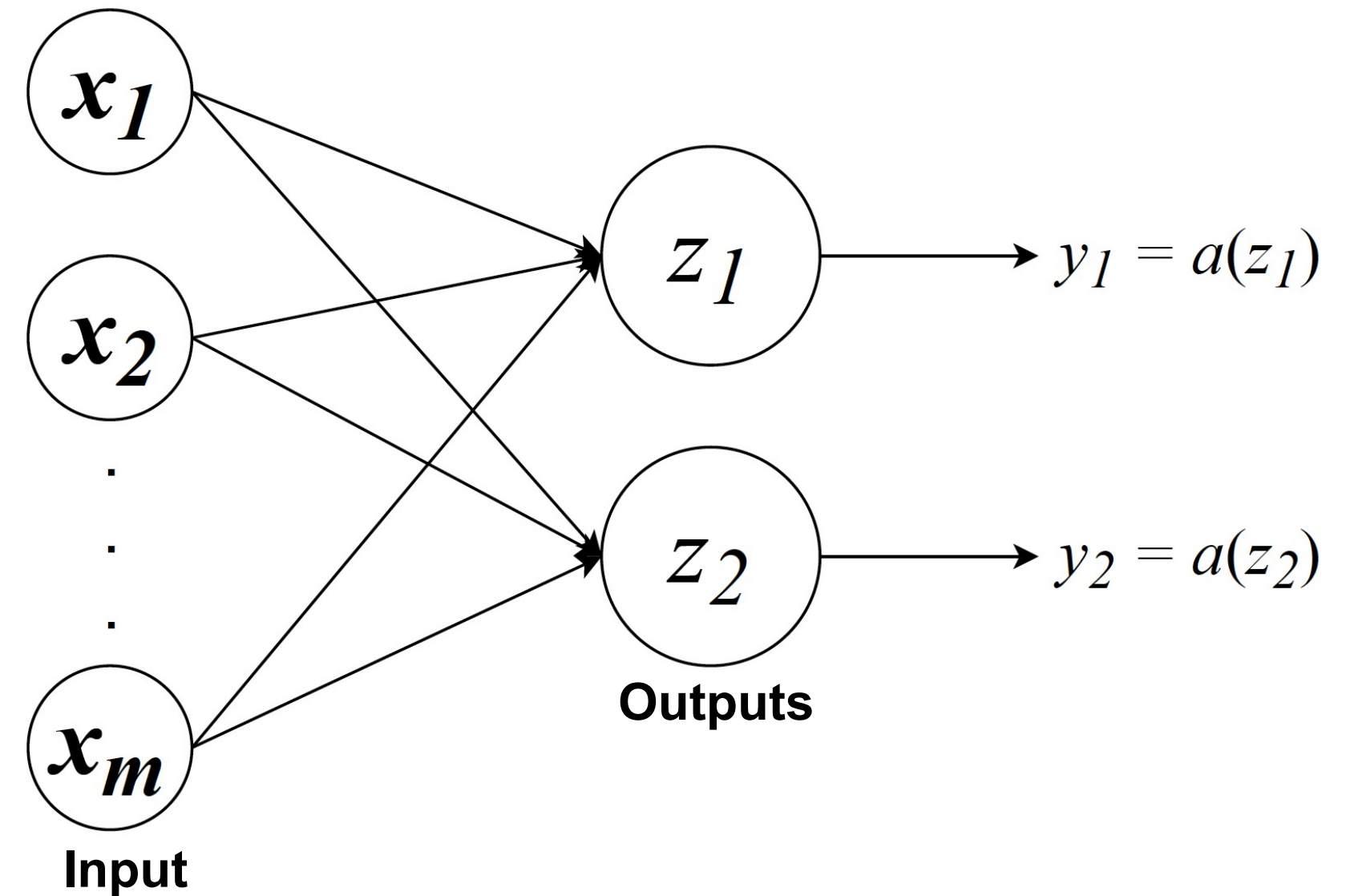


Perceptron with Two Outputs

Feedforward neural networks

- Two Artificial Neurons

$$z_i = w_{0,i} + \sum_{j=1}^m x_j w_{j,i}$$



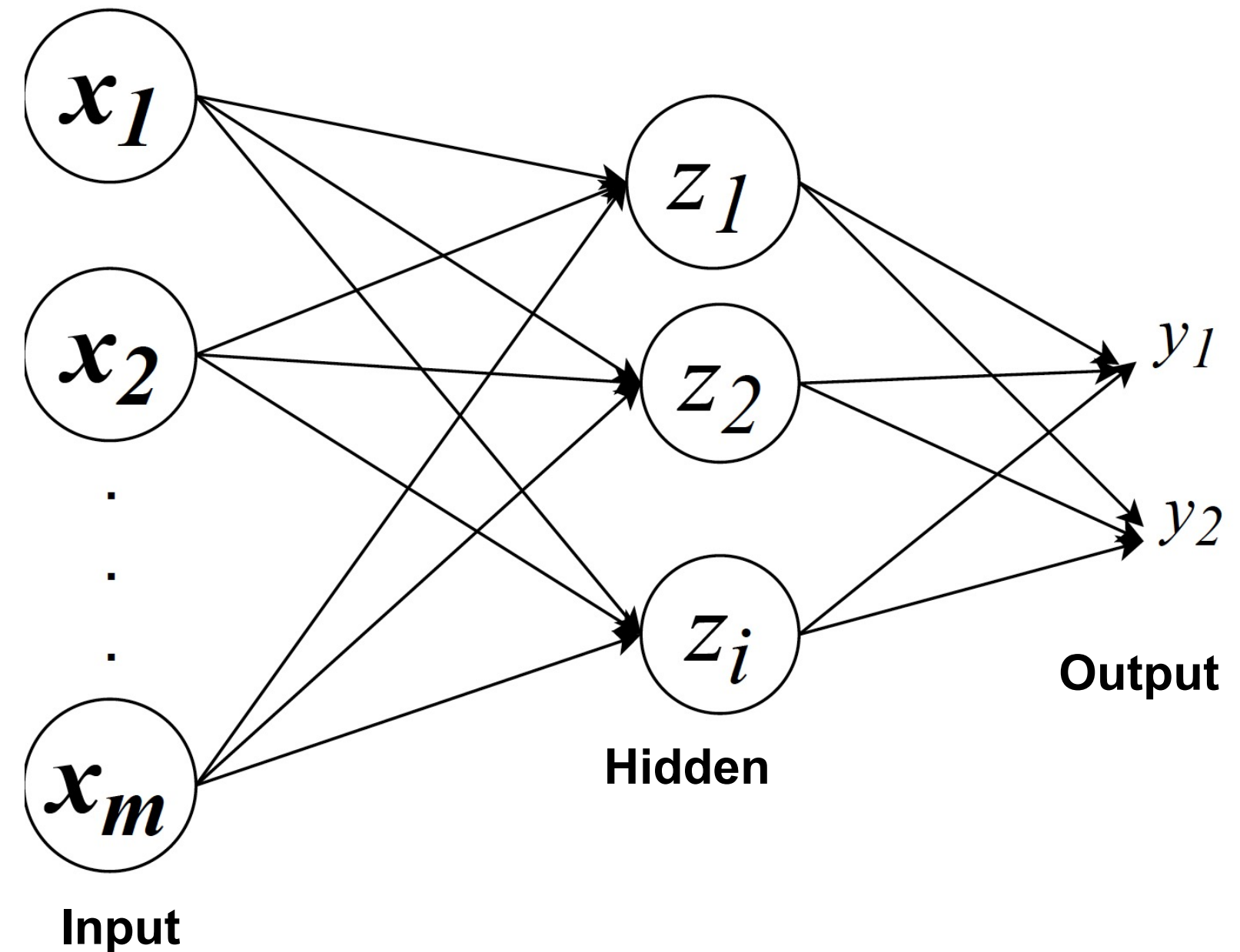
A Single Hidden Layer Perceptron with Two Outputs

Feedforward neural networks

- A Layer of Artificial Neurons

$$z_i = w_{0,i}^{(1)} + \sum_{j=1}^m x_j w_{j,i}^{(1)}$$

$$y_i = a(w_{0,i}^{(1)} + \sum_{j=1}^m g(z_j) w_{j,i}^{(2)})$$

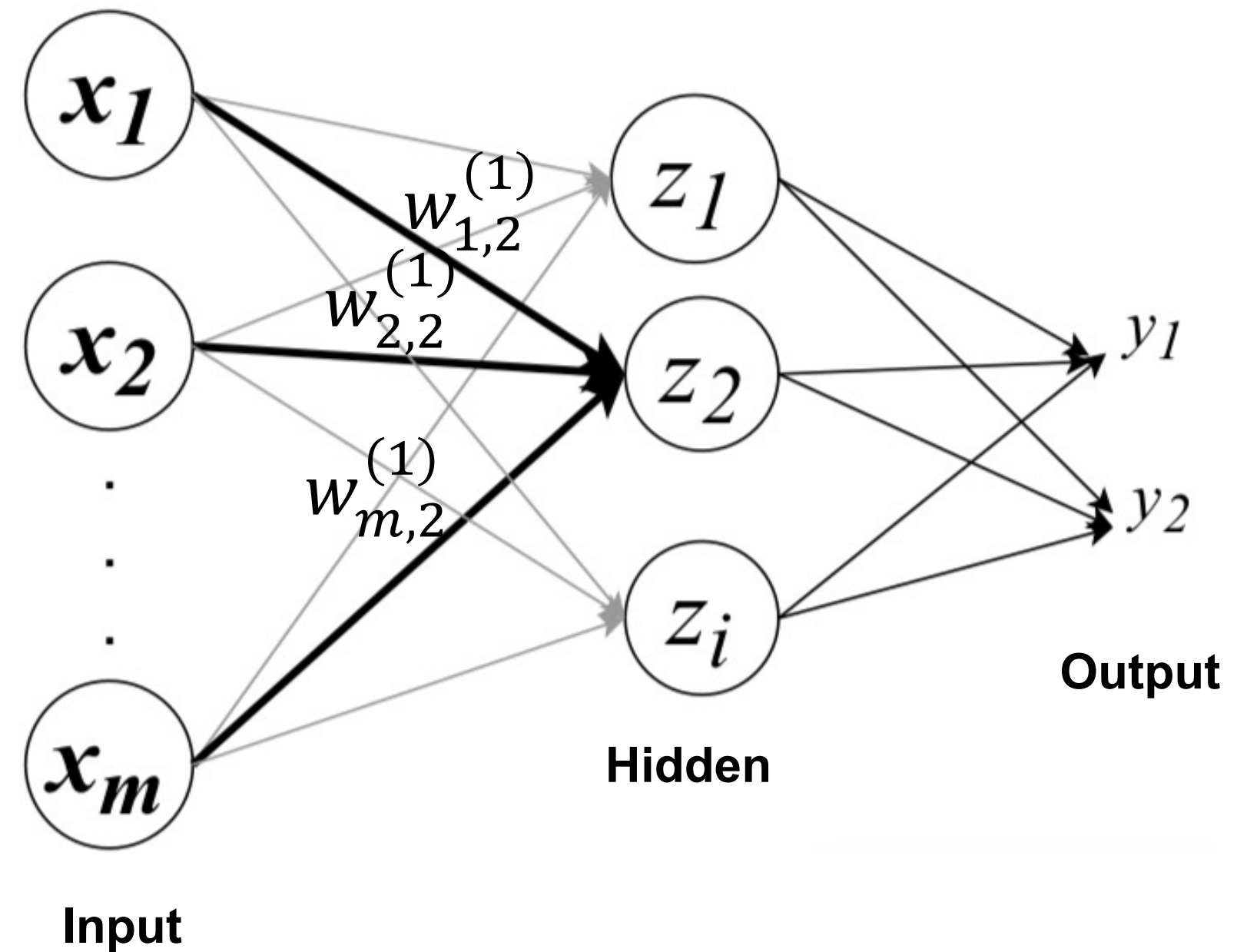


A Single Hidden Layer Perceptron with Two Outputs

Feedforward neural networks

- A Layer of Artificial Neurons

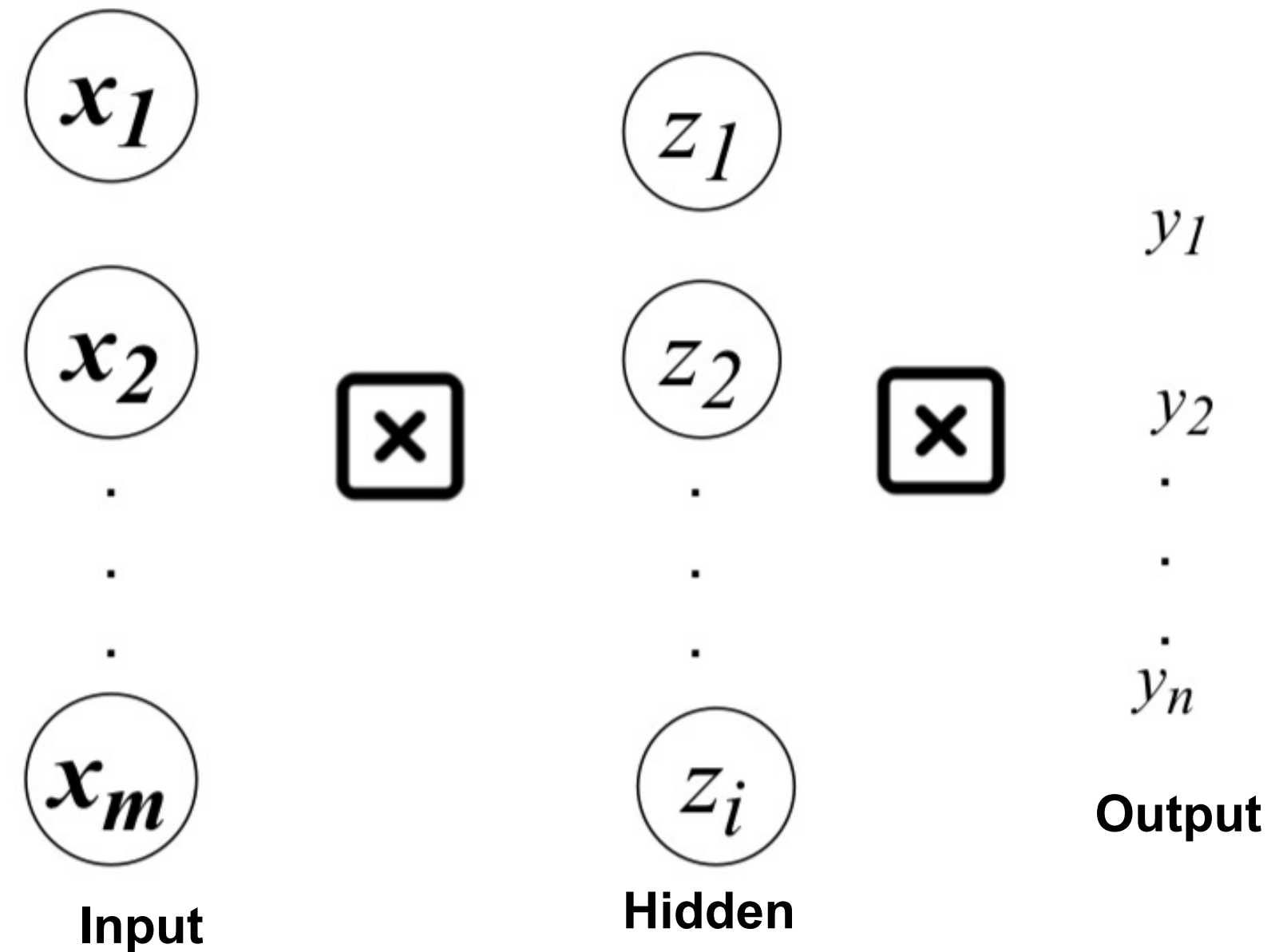
$$\begin{aligned} z_2 &= w_{0,2}^{(1)} + \sum_{j=1}^m x_j w_{j,2}^{(1)} \\ &= w_{0,2}^{(1)} + x_1 w_{1,2}^{(1)} + x_2 w_{2,2}^{(1)} + x_m w_{m,2}^{(1)} \end{aligned}$$



A Single Hidden Layer Perceptron with Multiple Outputs

Feedforward neural networks

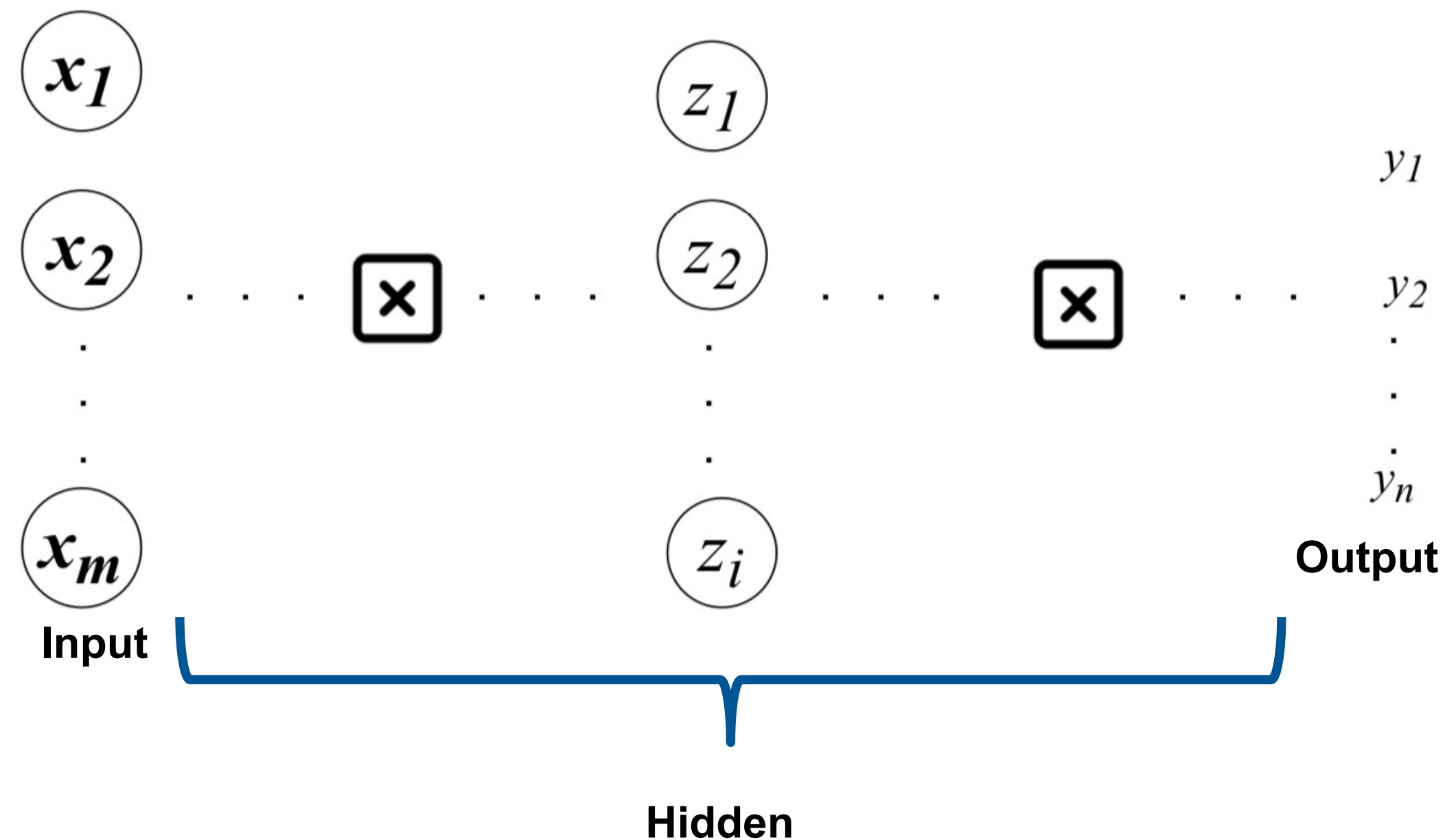
- Multiple outputs
- Fully connected



Multilayer Perceptron

Feedforward neural networks

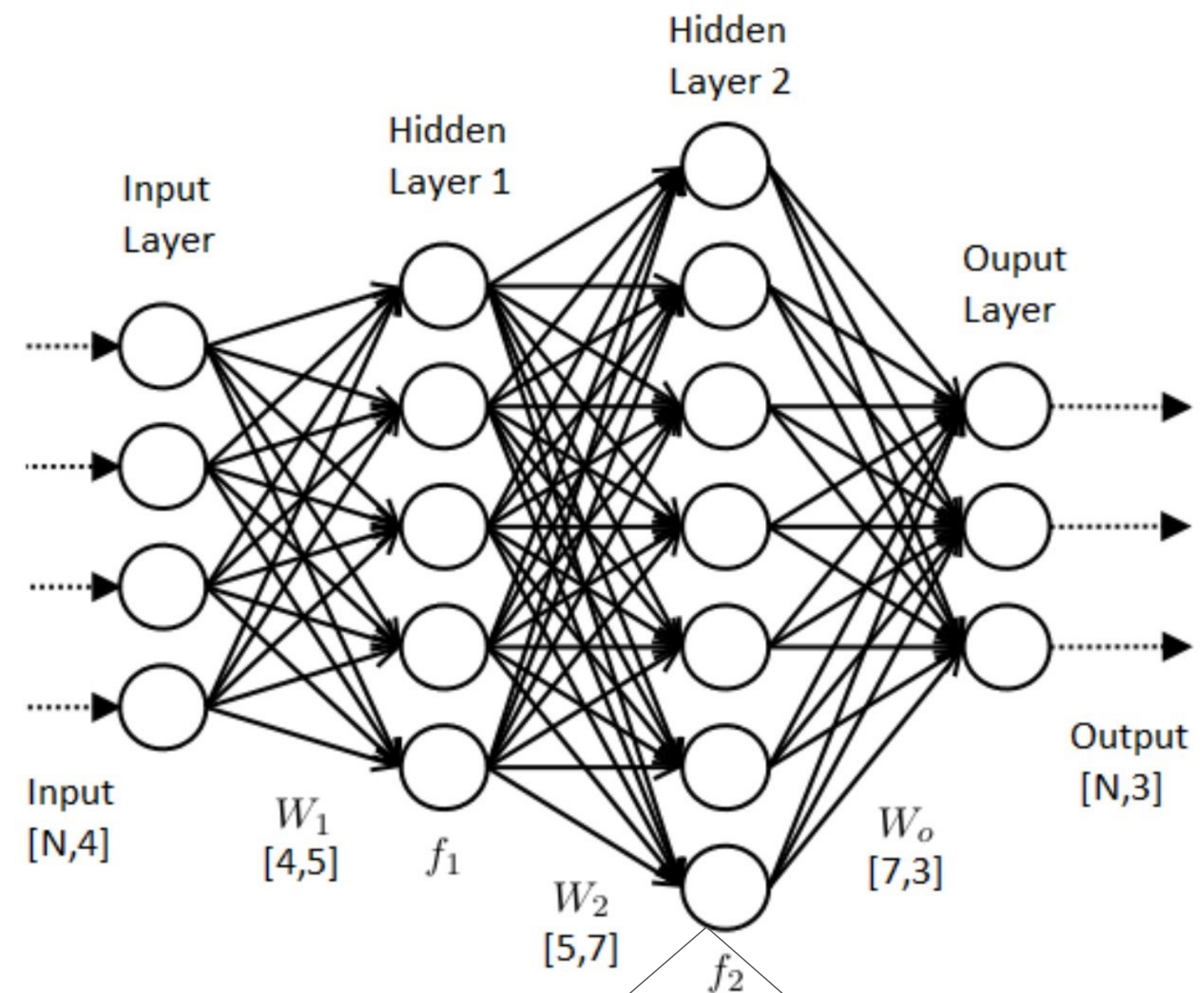
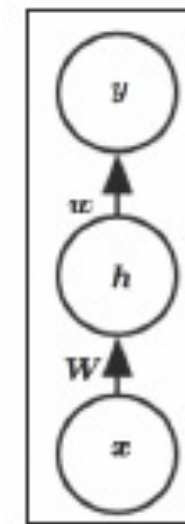
- Multiple outputs
- Fully connected
- Multiple hidden layers



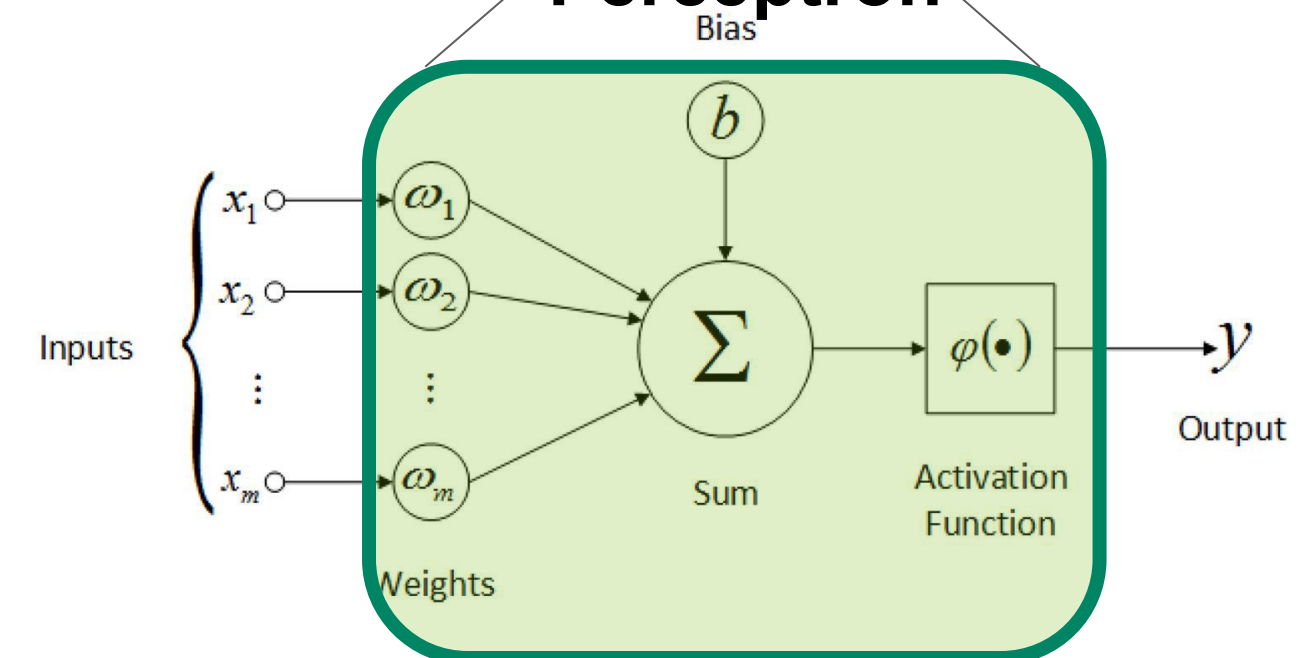
Multilayer Perceptron

Feedforward neural networks

- Information flows through function being evaluated from x through intermediate computations used to define f and finally to output y
- No feedback connections
- Many different neurons (Perceptron)
- A directed acyclic graph



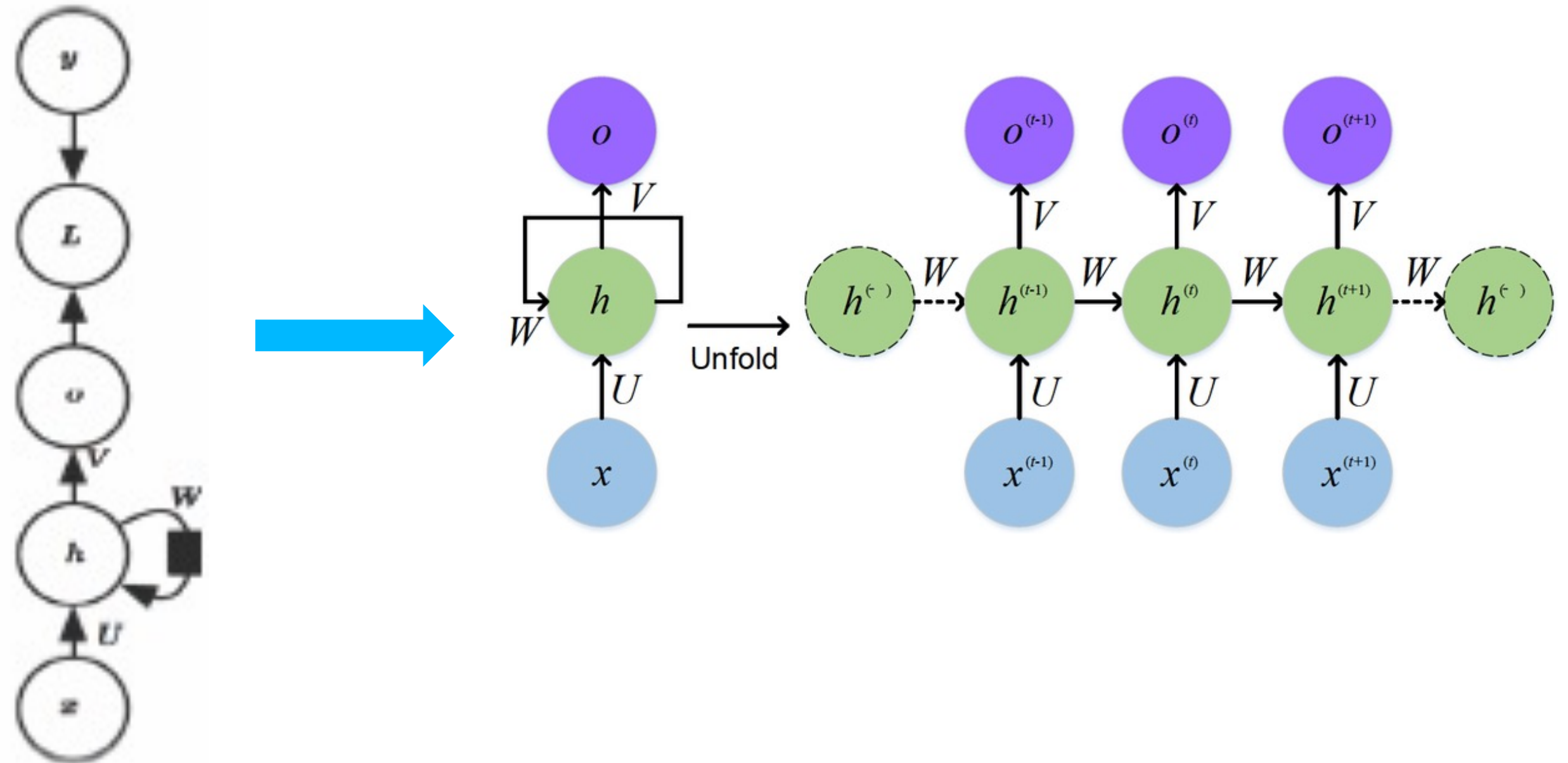
Perceptron



Special Multilayer Perceptron

Recurrent Neural Networks

- “Feedback connections”





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Thank You