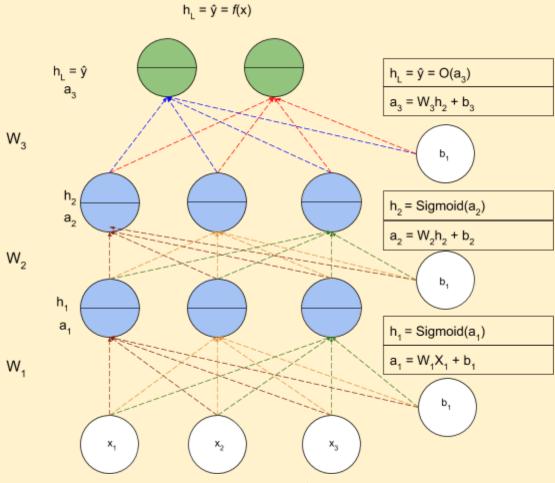
## PadhAl: Deep Neural Networks

## One Fourth Labs

## The Output Layer of a Deep Neural Network

How do we decide the output layer?

- 1. Here are the dimensions of our values
  - a. *m*: number of neurons in a layer
  - b. n: number of inputs to a layer
  - c.  $a_i = W_i x_{i-1} + b_i$ 
    - i.  $a_i \in \mathbb{R}^m$
    - ii.  $W_i \in \mathbb{R}^{m \times n}$
  - iii.  $\mathbf{x}_i \in \mathbb{R}^{n \times 1}$
  - iv.  $b_i \in \mathbb{R}^m$
  - d.  $h_i = \sigma(a_i)$ 
    - i.  $h_i \in \mathbb{R}^m$
- 2. Here is a quick sample



- 3. Here, it is possible to write the output function  $\hat{y}$  completely in terms of x
- 4.  $\hat{y} = f(x) = O(W_3 g(W_2 g(W_1 x + b_1) + b_2) + b_3)$
- 5. Here  $\hat{\mathbf{y}} \in \mathbb{R}^K$  where K is the number of output units