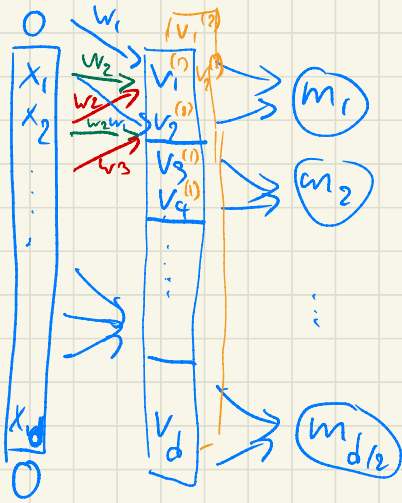


1.4.2020

Convolutional Neural Networks

$$\mathbb{R}^d \rightarrow \mathbb{R}^{d/2}$$



$$j = 1 \dots k$$

$$v_1^{(j)} = \varphi(v_1^{(j)} \cdot 0 + w_2^{(j)} \cdot x_1 + w_3^{(j)} \cdot x_2 + b^{(j)})$$

$$v_2^{(j)} = \varphi(w_1^{(j)} \cdot x_1 + w_2^{(j)} \cdot x_2 + w_3^{(j)} \cdot x_3 + b^{(j)})$$

$$v_i^{(j)} = \varphi(w_1^{(j)} \cdot x_{i-1} + w_2^{(j)} \cdot x_i + w_3^{(j)} \cdot x_{i+1} + b^{(j)})$$

$$v = \varphi(Wx)$$

$$m_i = \max(v_{i-1}, v_i)$$

$$W = \begin{pmatrix} w_1 & w_2 & w_3 & 0 & & \\ & w_1 & w_2 & w_3 & & \\ & & w_1 & w_2 & w_3 & \\ & & & \ddots & \ddots & \ddots \\ & & & & & \ddots \\ & & & & & & \ddots \\ & & & & & & & \ddots \\ & & & & & & & & \ddots \end{pmatrix}$$