Excercise CNN FC and Softmax

Q: (a) FC = ? (b) Softmax = ?

Solution (a) $FC = wx + b$

$$= \begin{bmatrix} 0 & 3 & 7 & 8 \\ 1 & 8 & 0 & 0 \\ 0 & 8 & 1 & 0 \end{bmatrix} \begin{bmatrix} 0.3 \\ 0 \\ 0.2 \\ 0.1 \end{bmatrix} + \begin{bmatrix} -1 \\ 1 \\ 2 \end{bmatrix}$$

$$= \begin{bmatrix} 1.2 \\ 1.3 \\ 2.2 \end{bmatrix}$$

(b) Softmax normalization

$$P_j = \frac{e^{z_j}}{\sum_k e^{z_k}}$$

$$e^{1.2} + e^{1.3} + e^{2.2} = 16.0144$$

$$P_{1.2} = \frac{e^{1.2}}{16.0144} = 0.2073$$

$$P_{1.3} = \frac{e^{1.3}}{16.0144} = 0.2291$$

$$P_{2.2} = \frac{e^{2.2}}{16.0144} = 0.5636$$