

nlp4kor

<https://github.com/bage79/nlp4kor>

<https://facebook.com/nlp4kor>

왕초보를 위한 RNN



Luis Serrano

<https://youtu.be/UNmqTiOnRfg>



Fei-Fei Li

http://cs231n.stanford.edu/slides/2017/cs231n_2017_lecture10.pdf

Vectors



$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$



$$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$



$$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

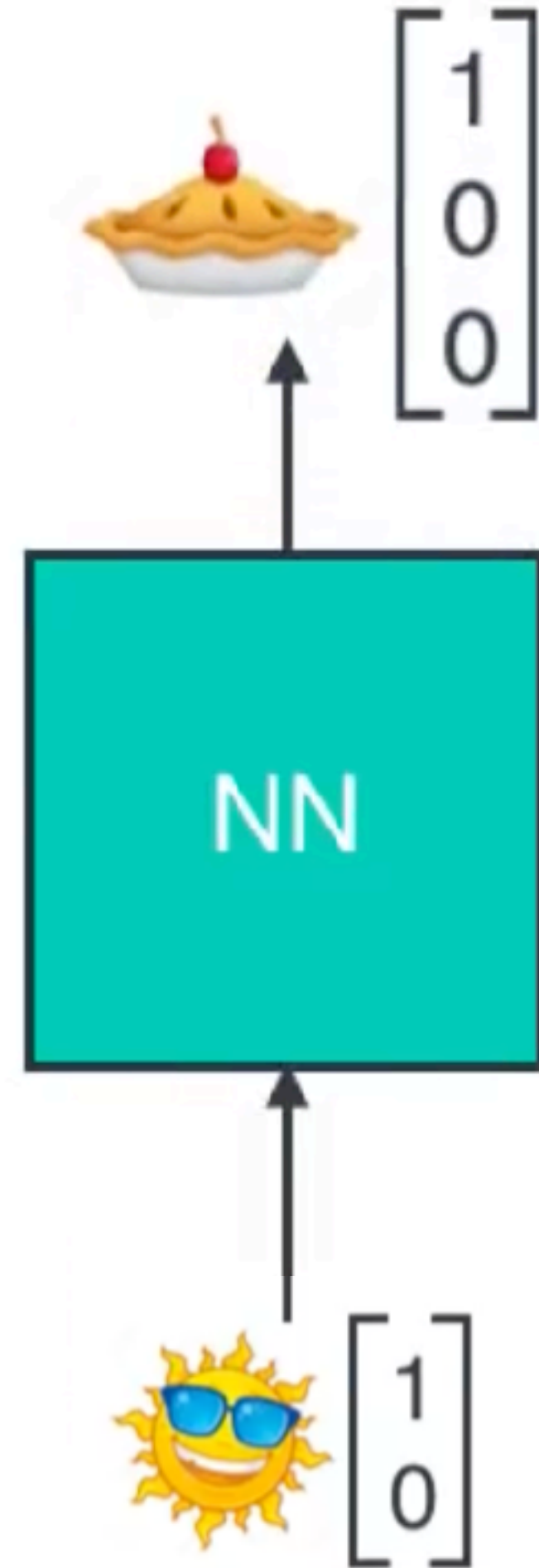


$$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

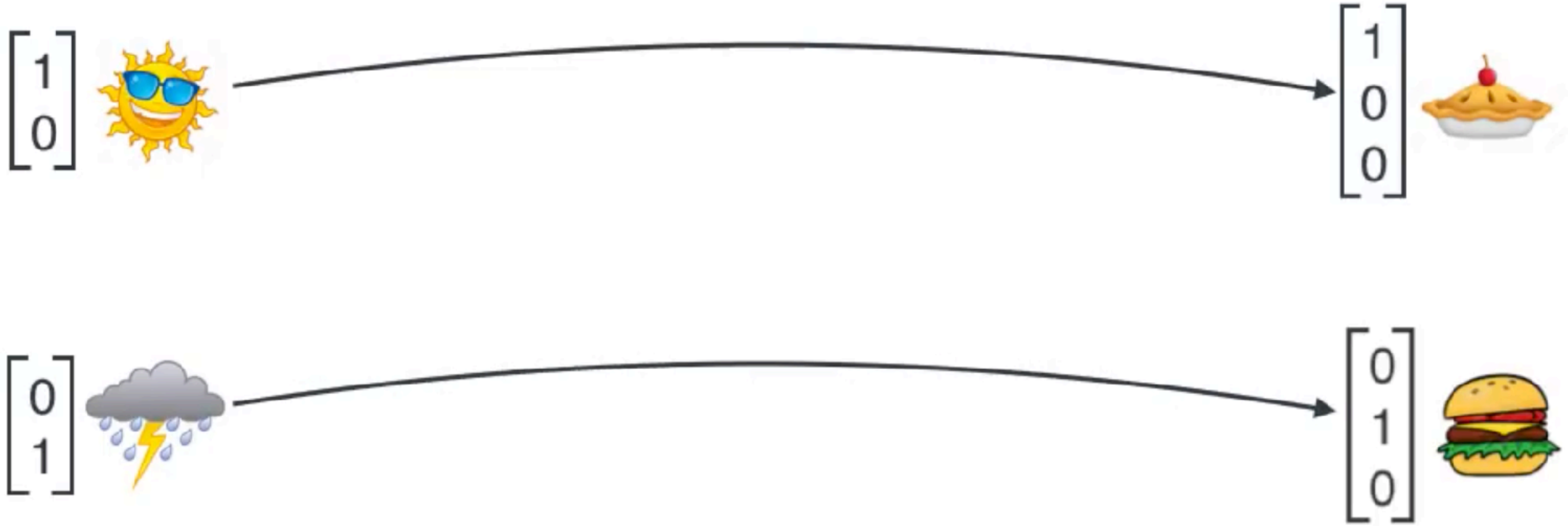


$$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

Neural Network



Neural Network



Neural Network

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \end{bmatrix} \text{☀️} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{🥧}$$

Neural Network

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \end{bmatrix} \text{☀️} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{🥧}$$

Neural Network

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \text{☁️⚡️} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \text{🍔}$$

Neural Network

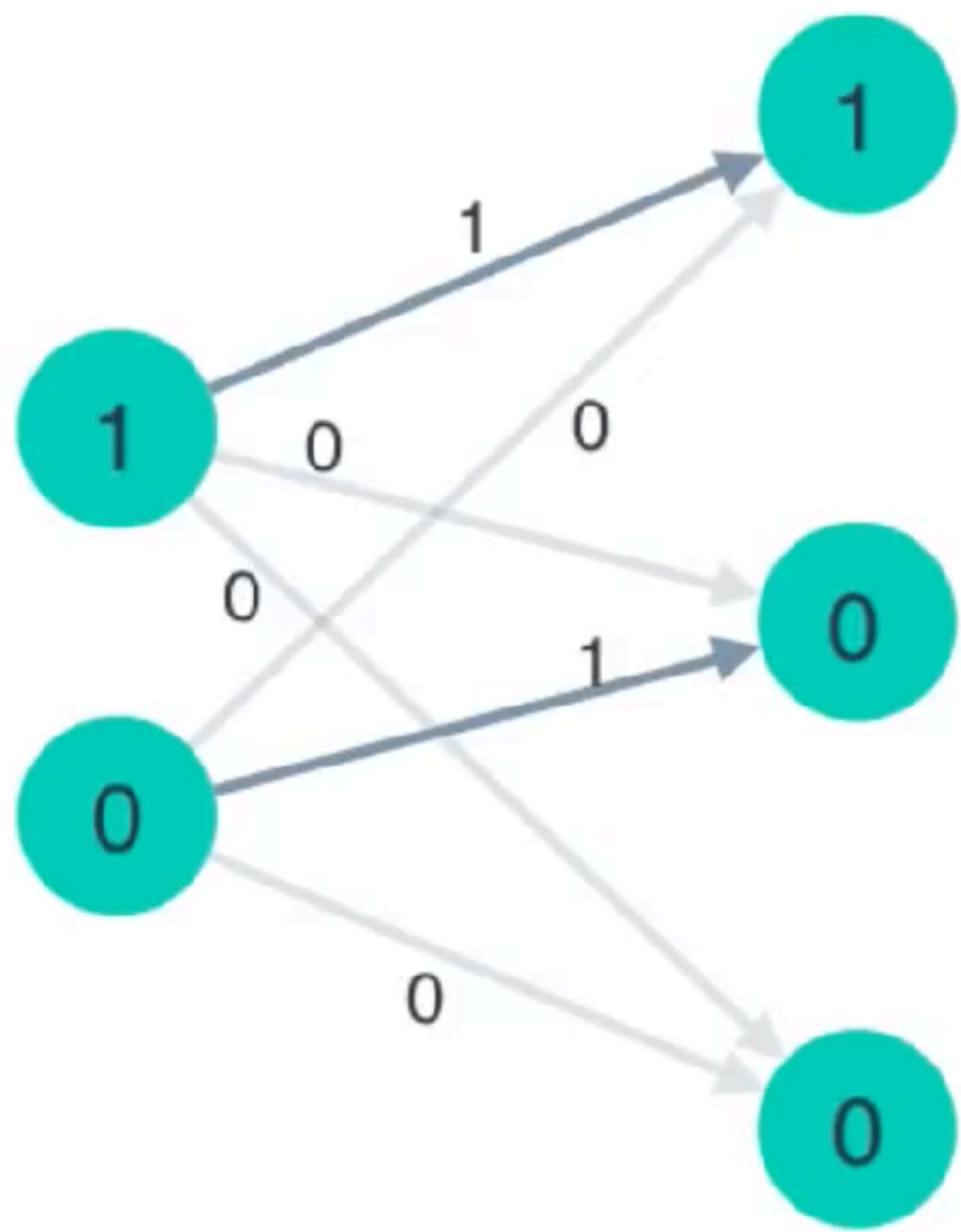


Neural Network

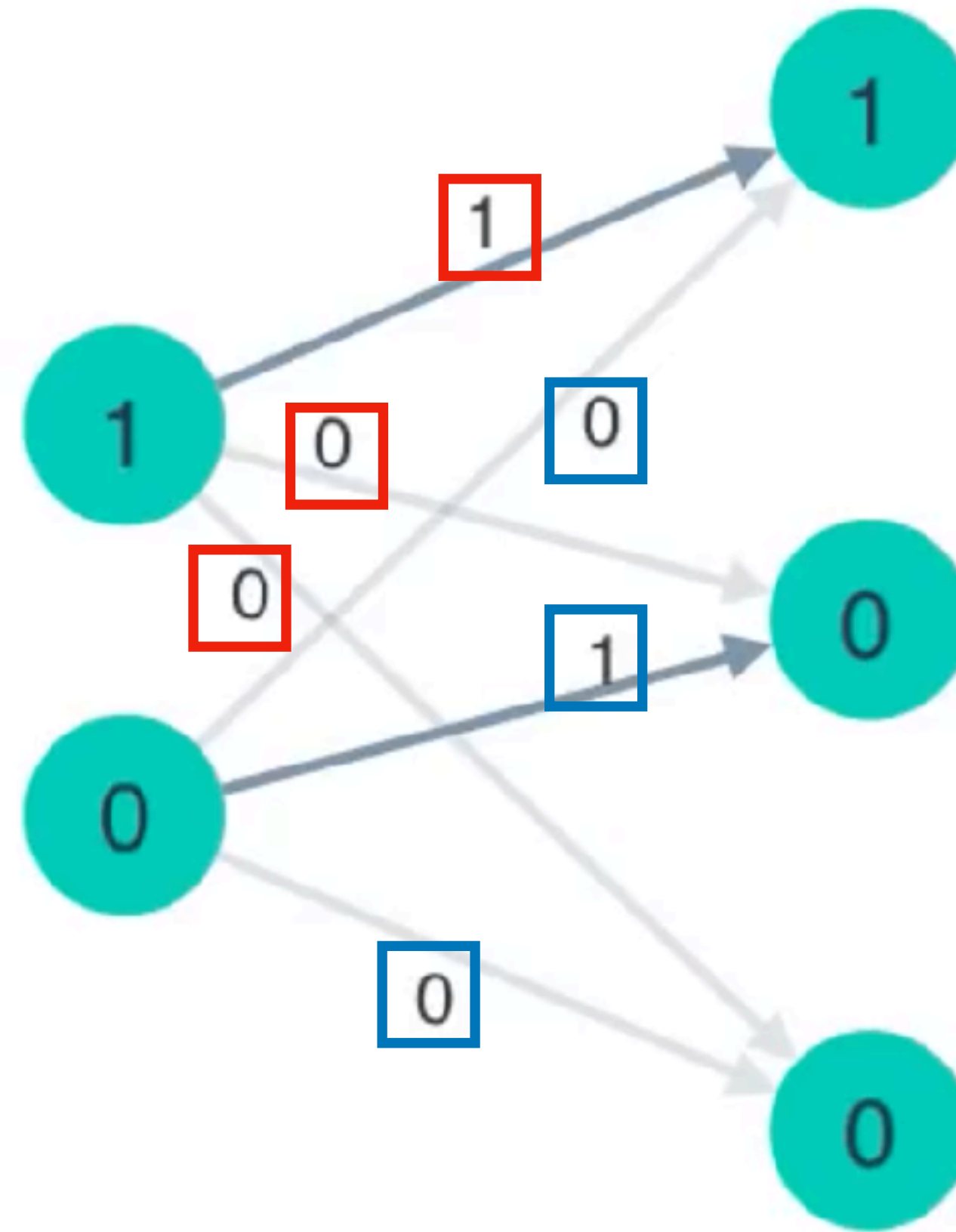
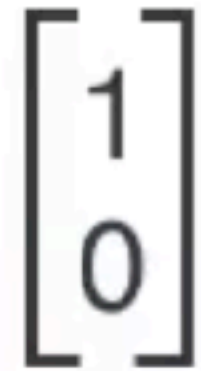
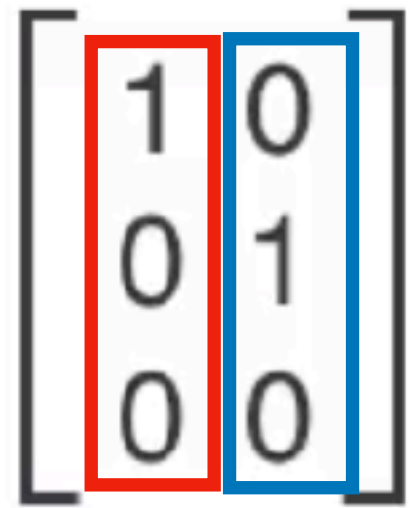
$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$$



$$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

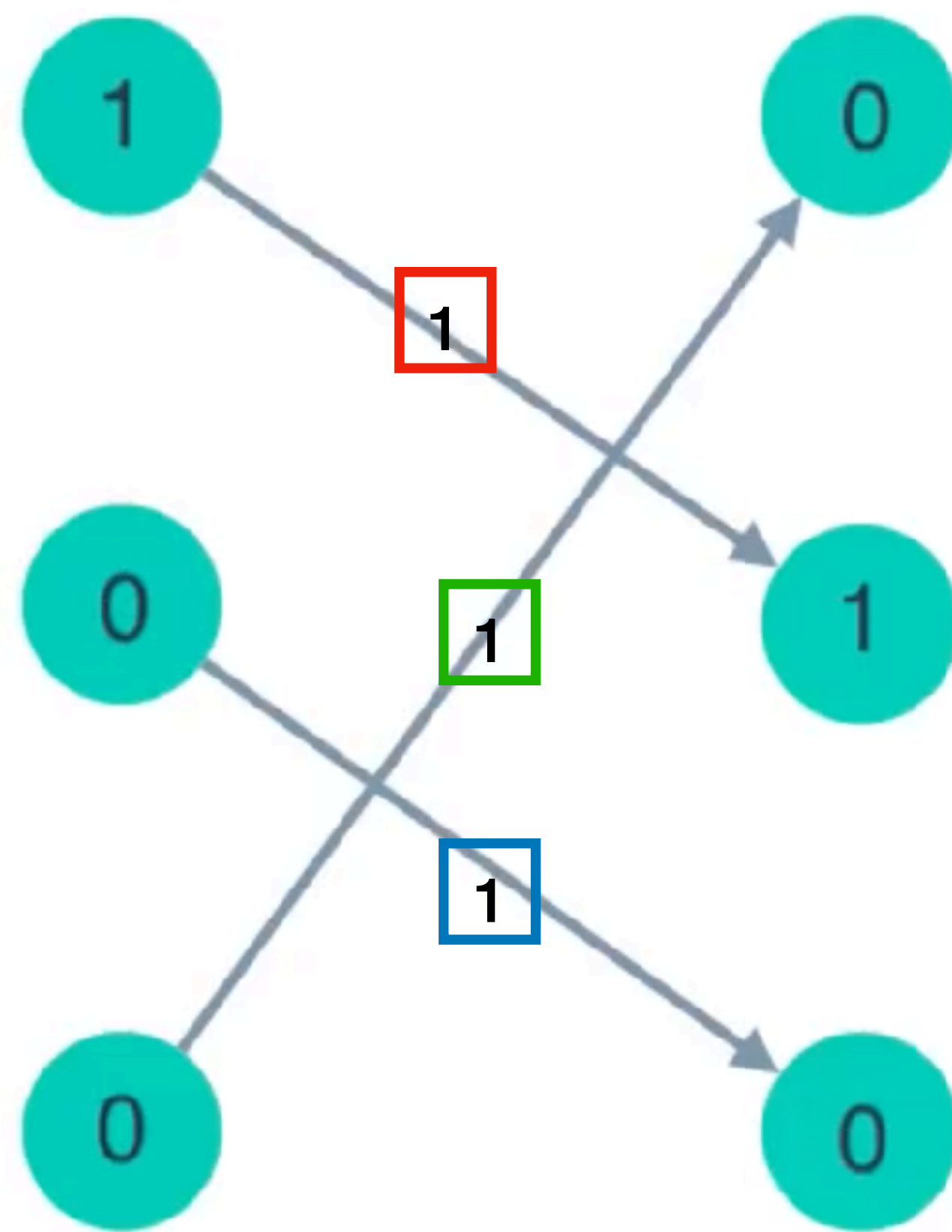


Neural Network

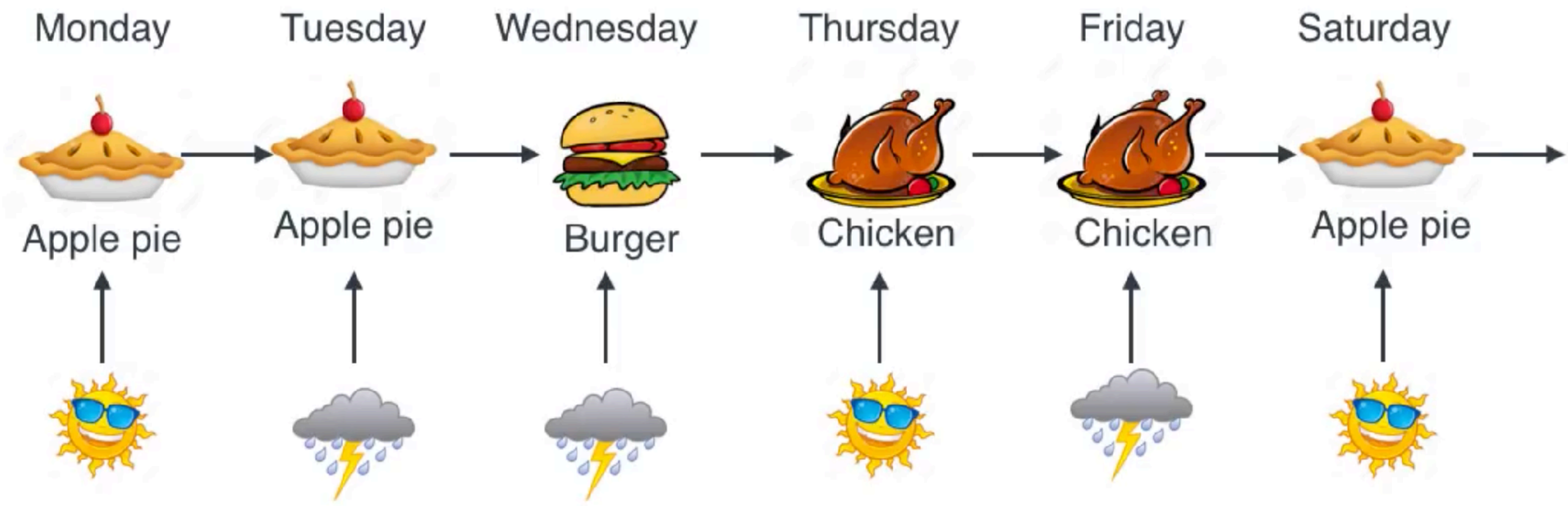


Simple (Recurrent) Neural Network

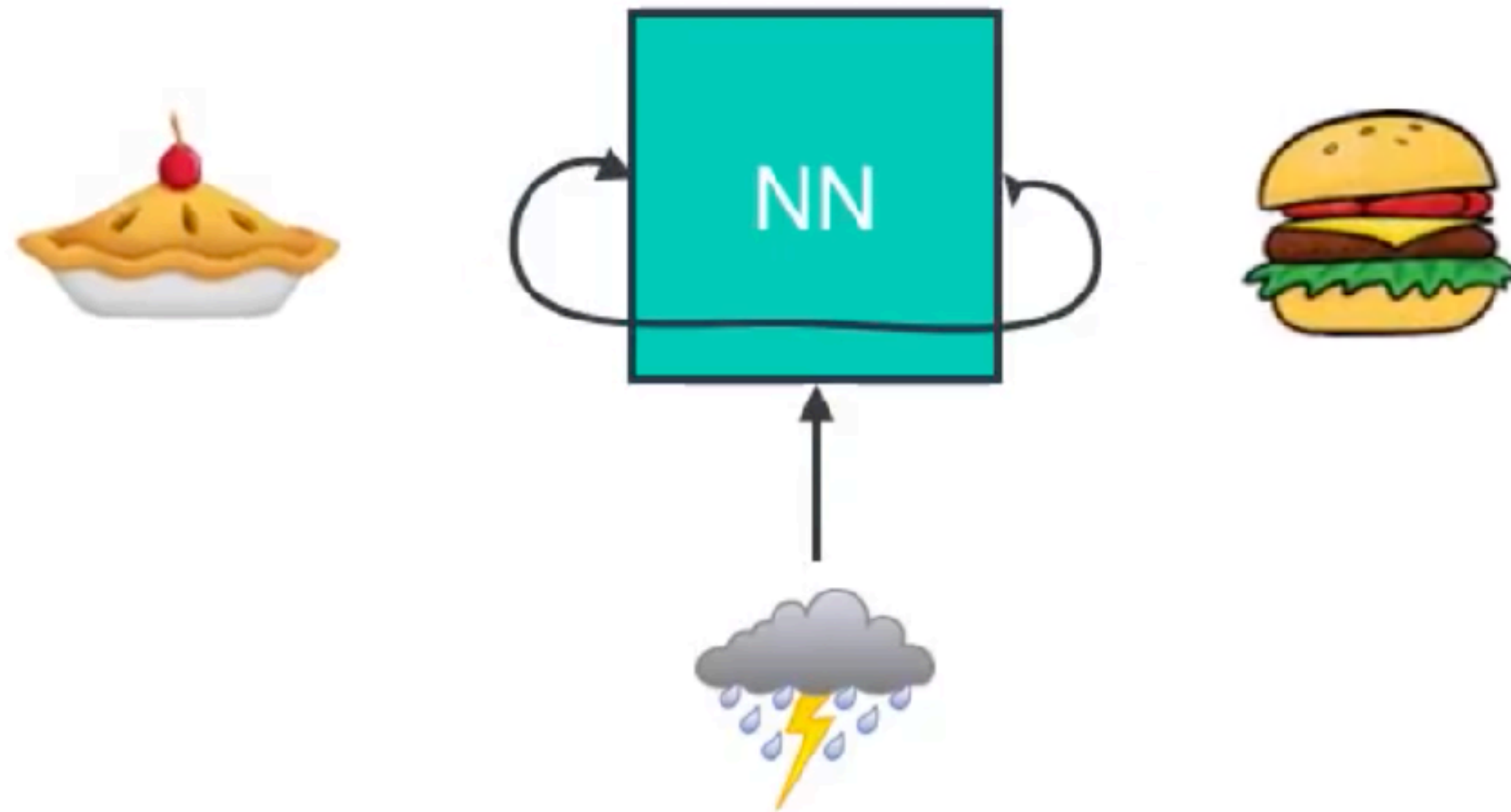
$$\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$






Cooking Schedule




Recurrent Neural Network




Food

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ \hline 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ \hline 0 \\ 1 \\ 0 \end{bmatrix}$$

Food





Same




Next day

Food

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$


$$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$


$$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$


$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ \hline 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

Food

$$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$



=


$$\begin{bmatrix} 0 \\ 1 \\ 0 \\ \hline 0 \\ 0 \\ 1 \end{bmatrix}$$





Same

Next day

Food

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$


$$\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$


$$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$


$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ \hline 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

Food

$$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$



=

$$\begin{bmatrix} 0 \\ 0 \\ 1 \\ \hline 1 \\ 0 \\ 0 \end{bmatrix}$$

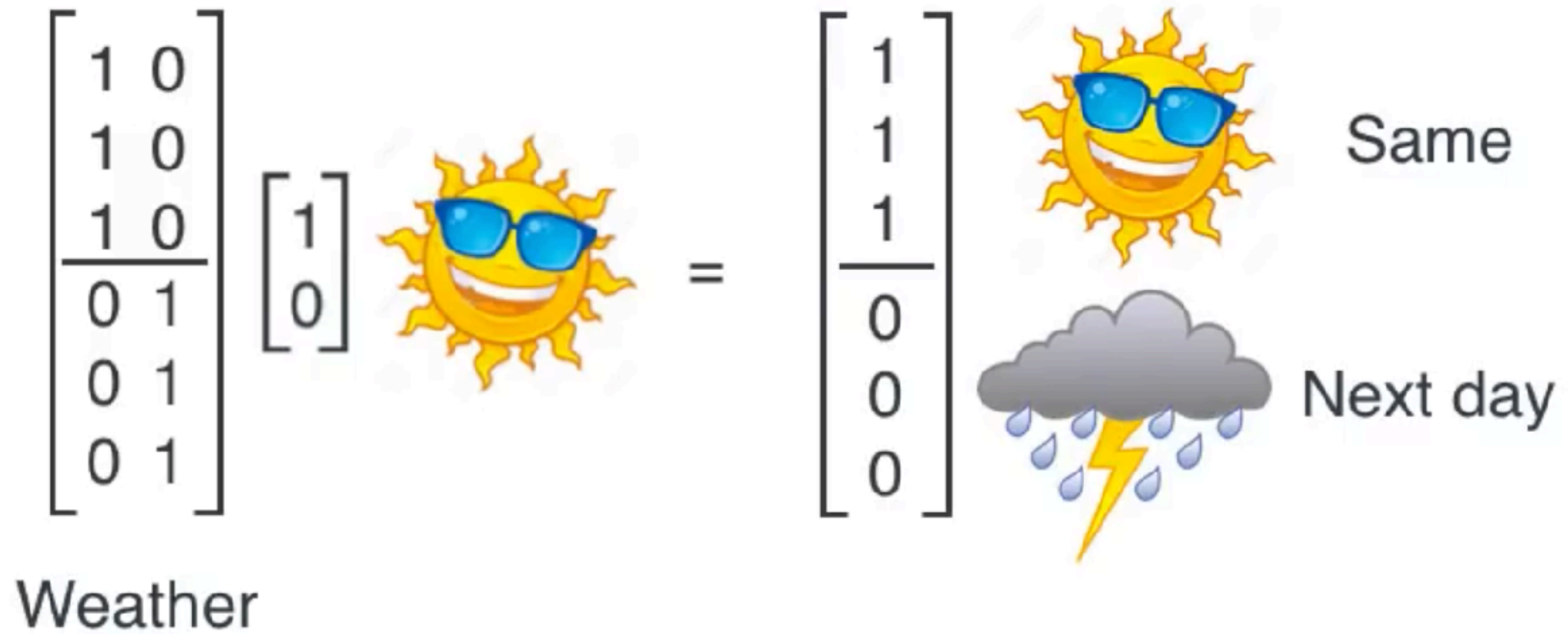
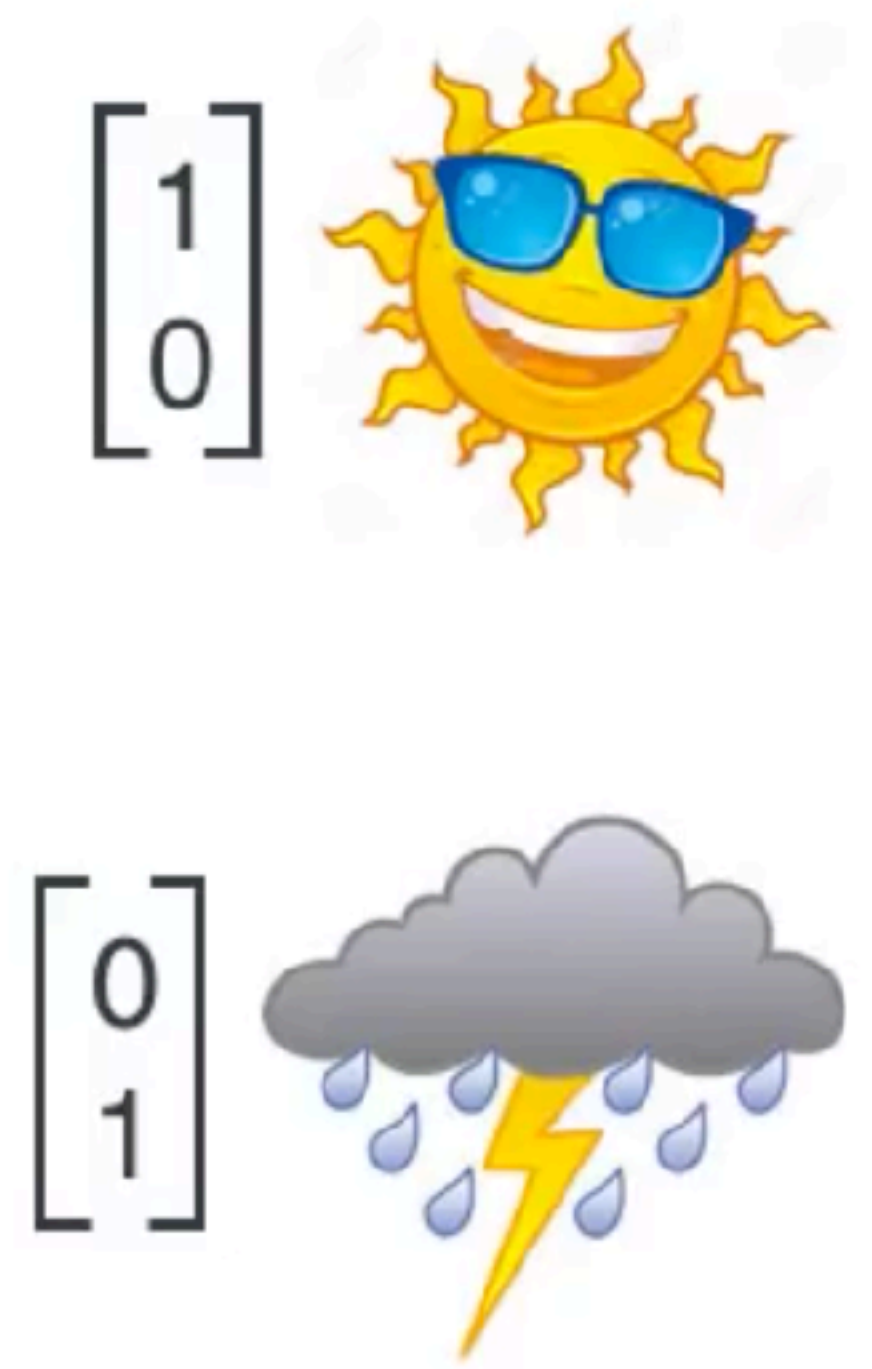


Same

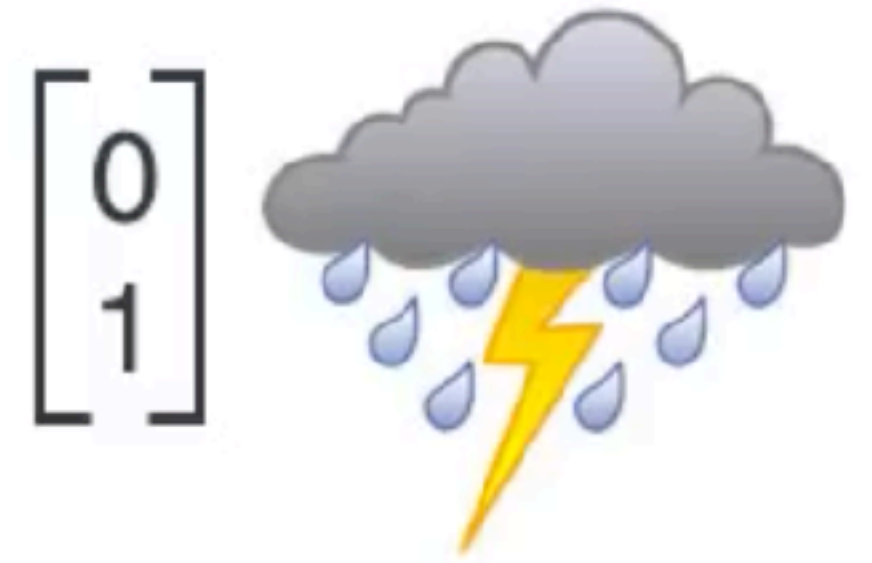
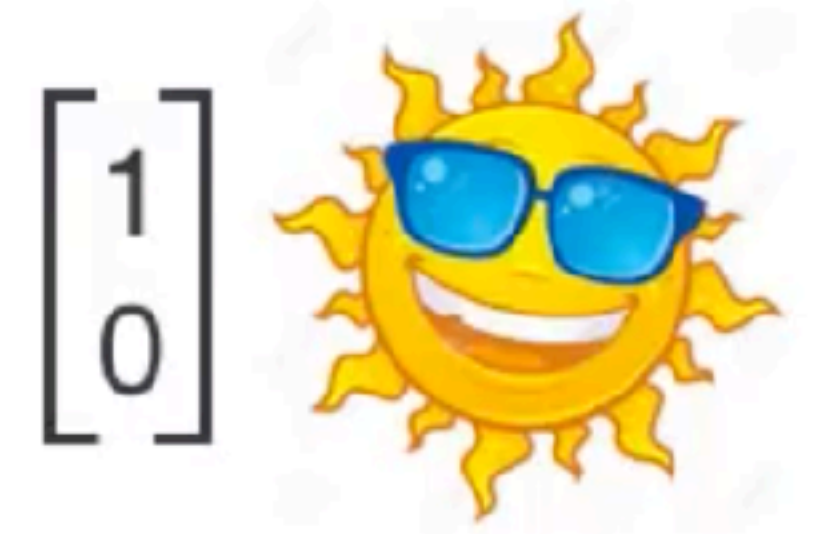


Next day

Weather



Weather



$$\begin{bmatrix} 1 & 0 \\ 1 & 0 \\ 1 & 0 \\ \hline 0 & 1 \\ 0 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

Weather



=

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \hline 1 \\ 1 \\ 1 \end{bmatrix}$$



Same

Next day

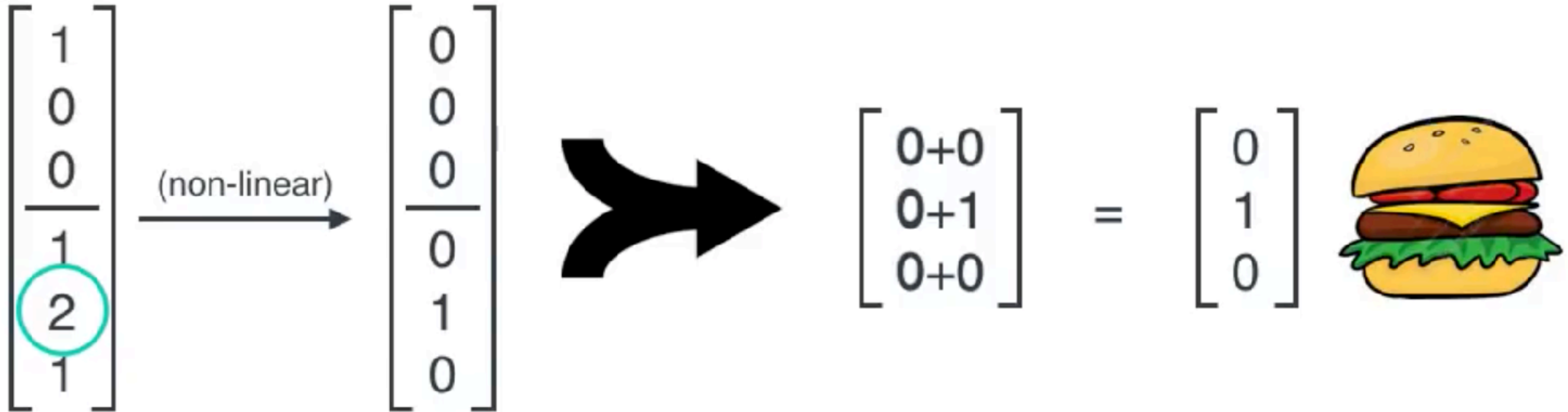


Add

$$\begin{bmatrix} 1 \\ 0 \\ 0 \\ \hline 0 \\ 1 \\ 0 \end{bmatrix} \begin{matrix} \text{Pie} \\ \text{Same} \\ \text{Burger} \\ \text{Next day} \end{matrix} + \begin{bmatrix} 0 \\ 0 \\ 0 \\ \hline 1 \\ 1 \\ 1 \end{bmatrix} \begin{matrix} \text{Sun} \\ \text{Same} \\ \text{Rain} \\ \text{Next day} \end{matrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ \hline 1 \\ 2 \\ 1 \end{bmatrix}$$



Merge





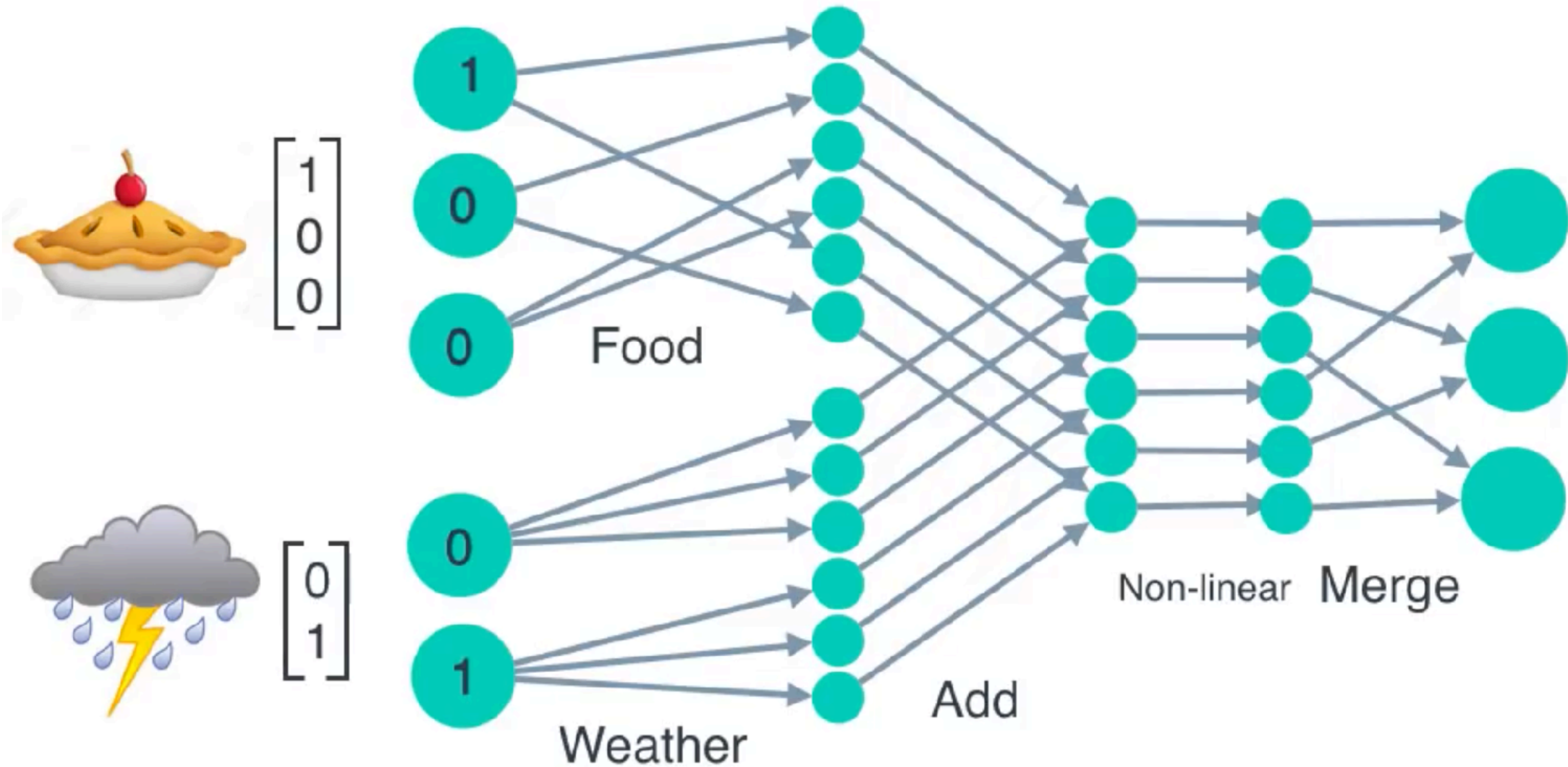
Merge

$$\begin{array}{c}
 \left[\begin{array}{ccc|ccc}
 1 & 0 & 0 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 & 1 & 0 \\
 0 & 0 & 1 & 0 & 0 & 1
 \end{array} \right] \left[\begin{array}{c}
 0 \\
 0 \\
 0 \\
 \hline
 0 \\
 1 \\
 0
 \end{array} \right] = \left[\begin{array}{c}
 0+0 \\
 0+1 \\
 0+0
 \end{array} \right] = \left[\begin{array}{c}
 0 \\
 1 \\
 0
 \end{array} \right] \text{ 🍔}
 \end{array}$$

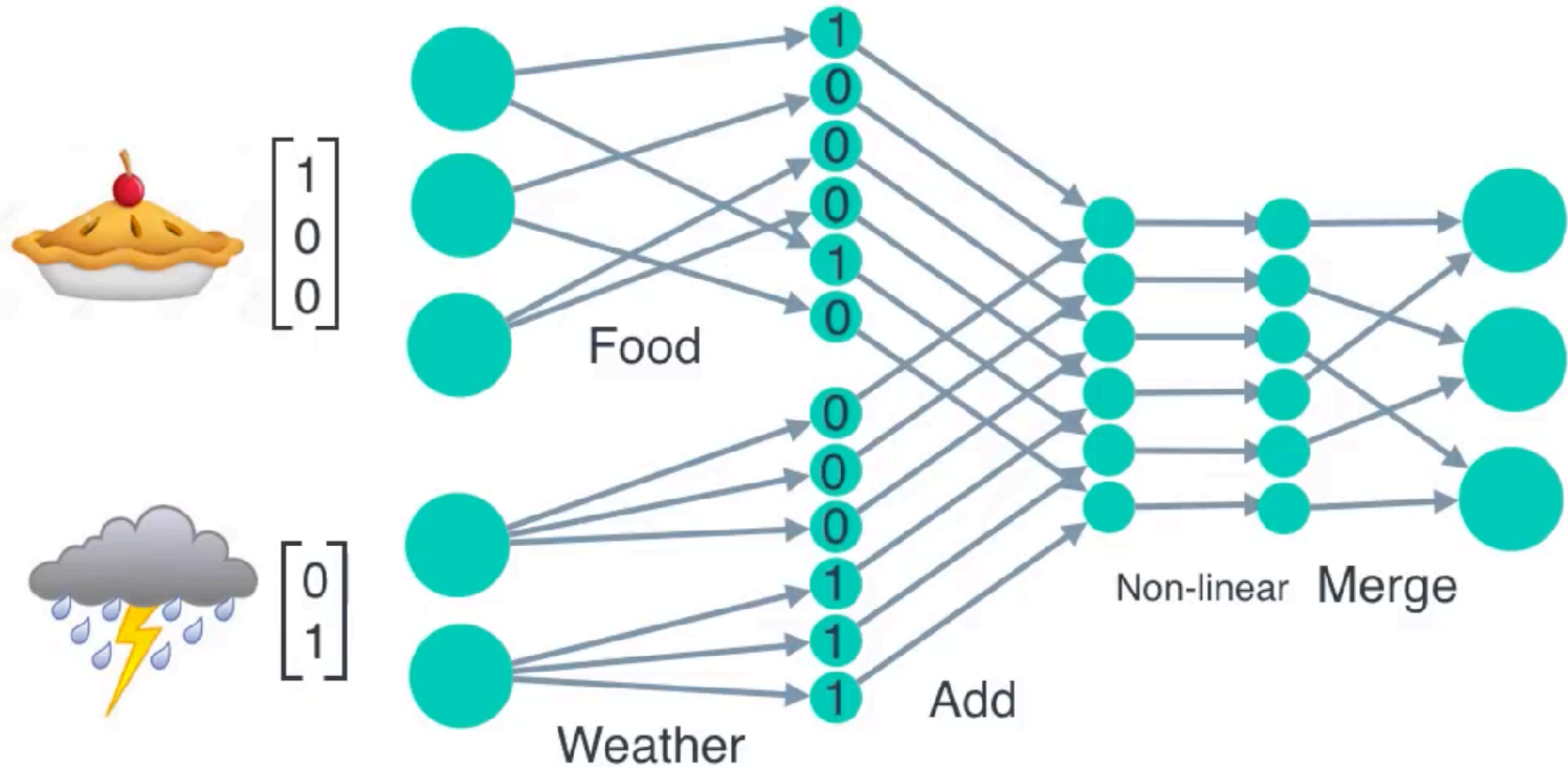
Merge



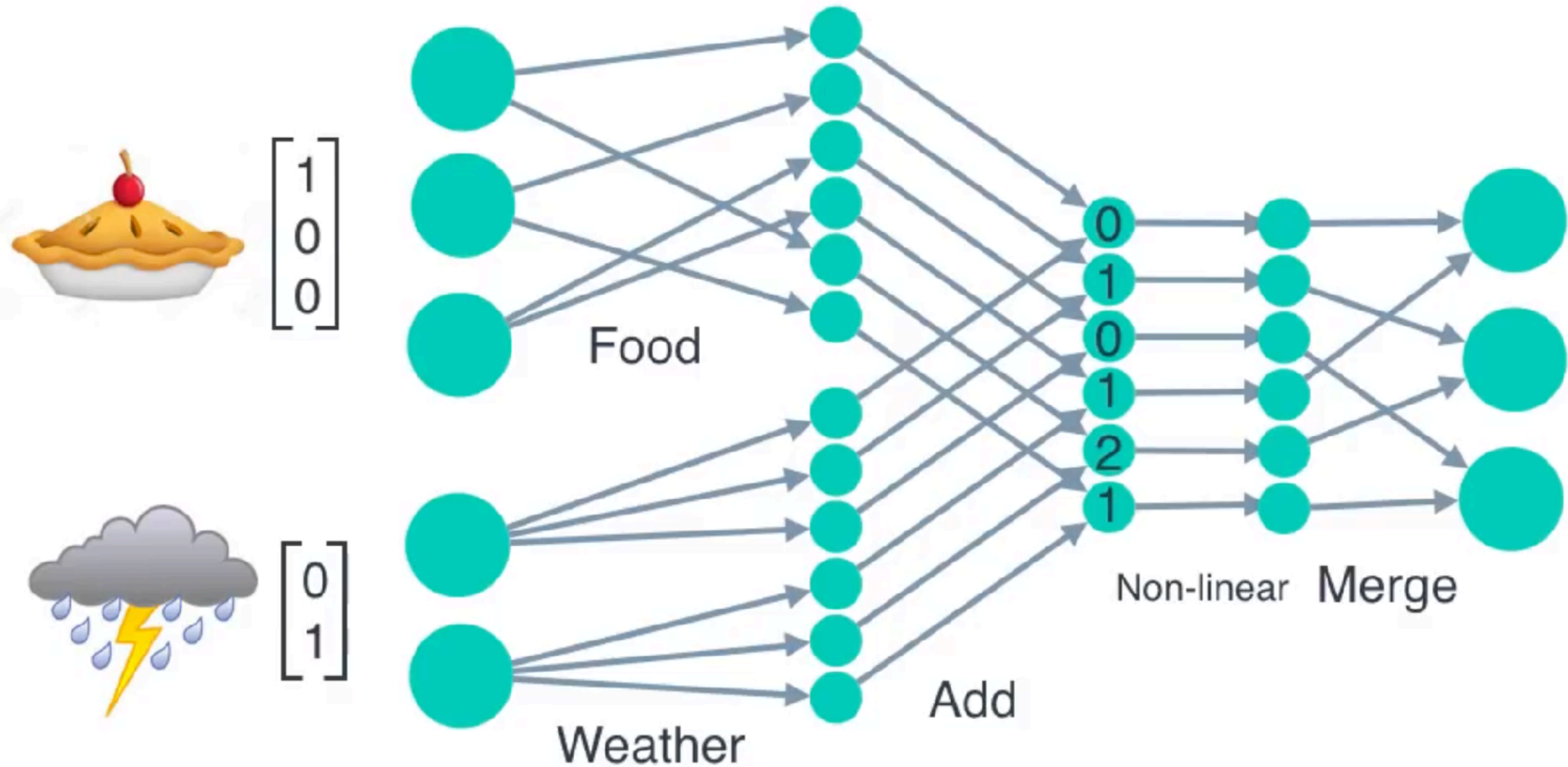
Recurrent Neural Network



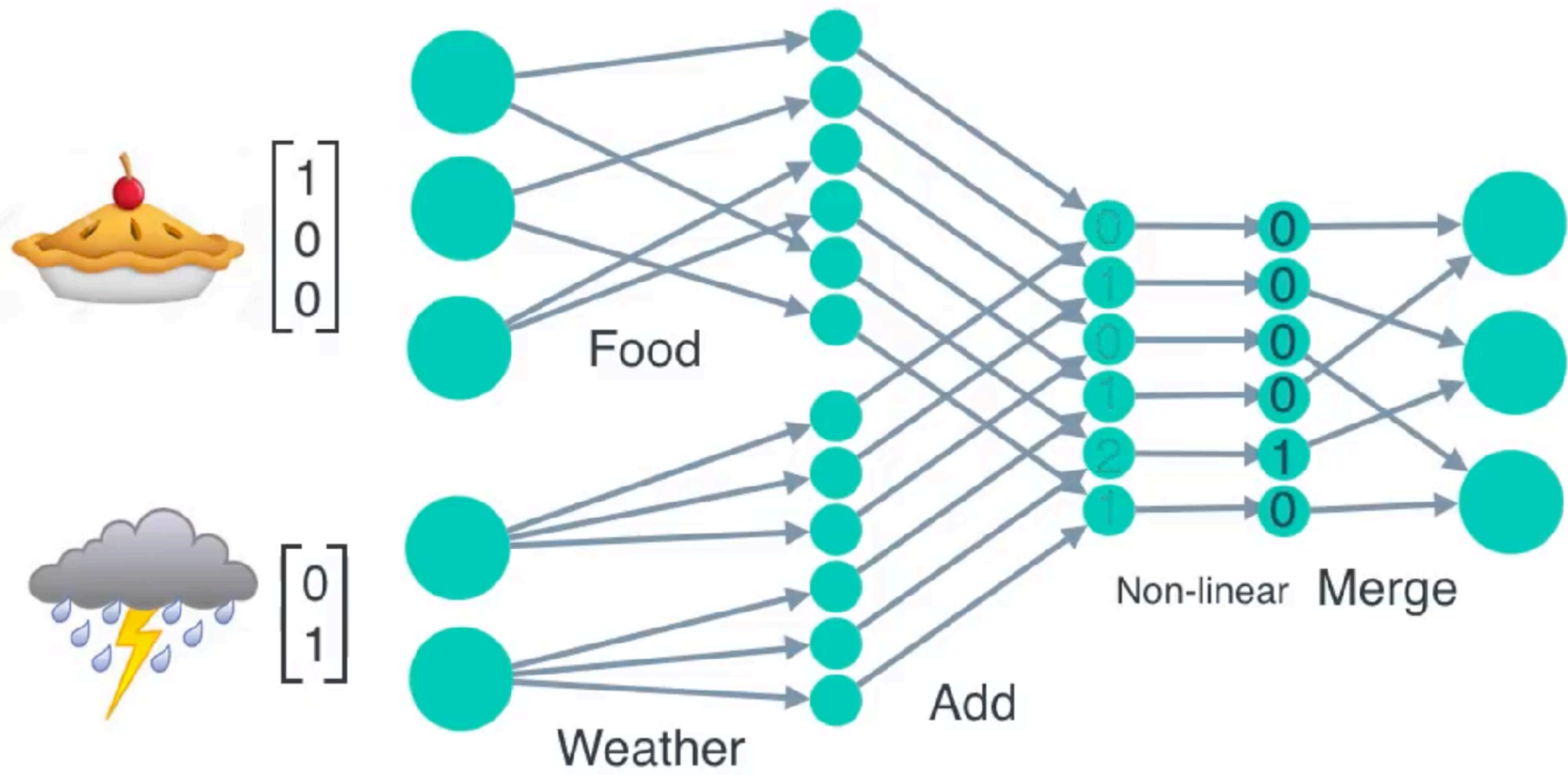
Recurrent Neural Network



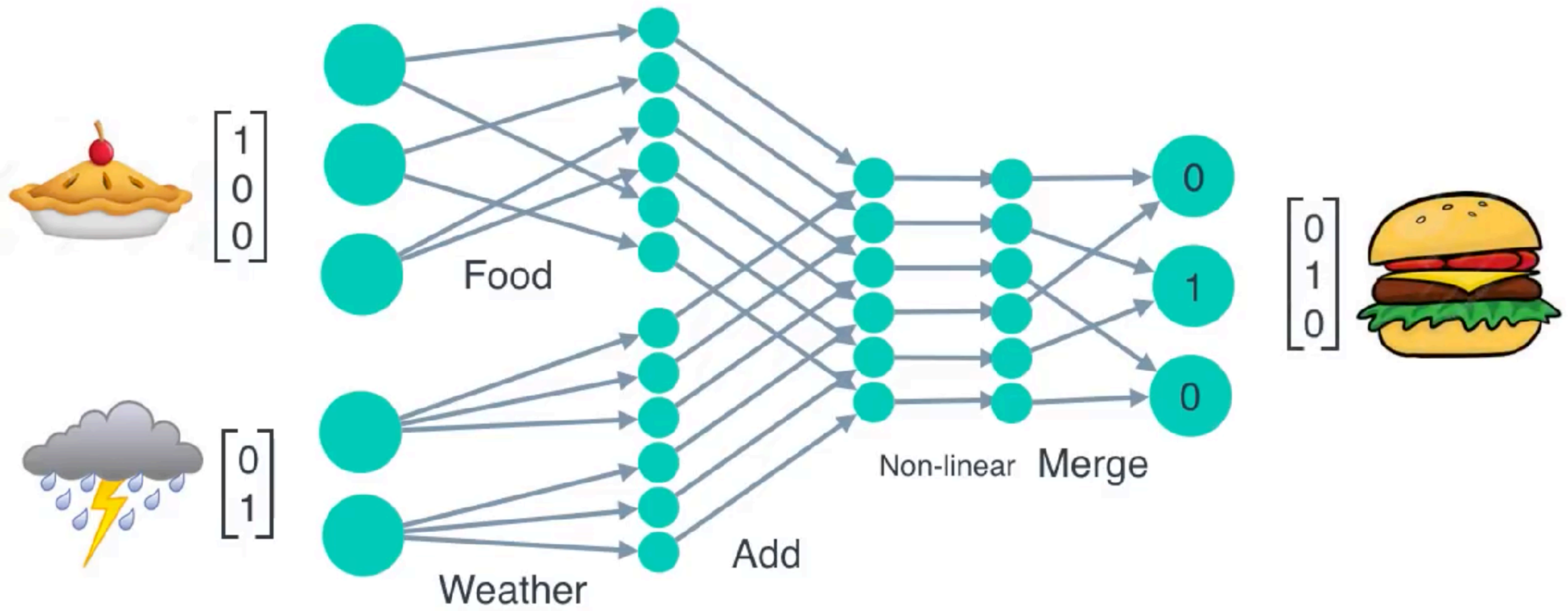
Recurrent Neural Network

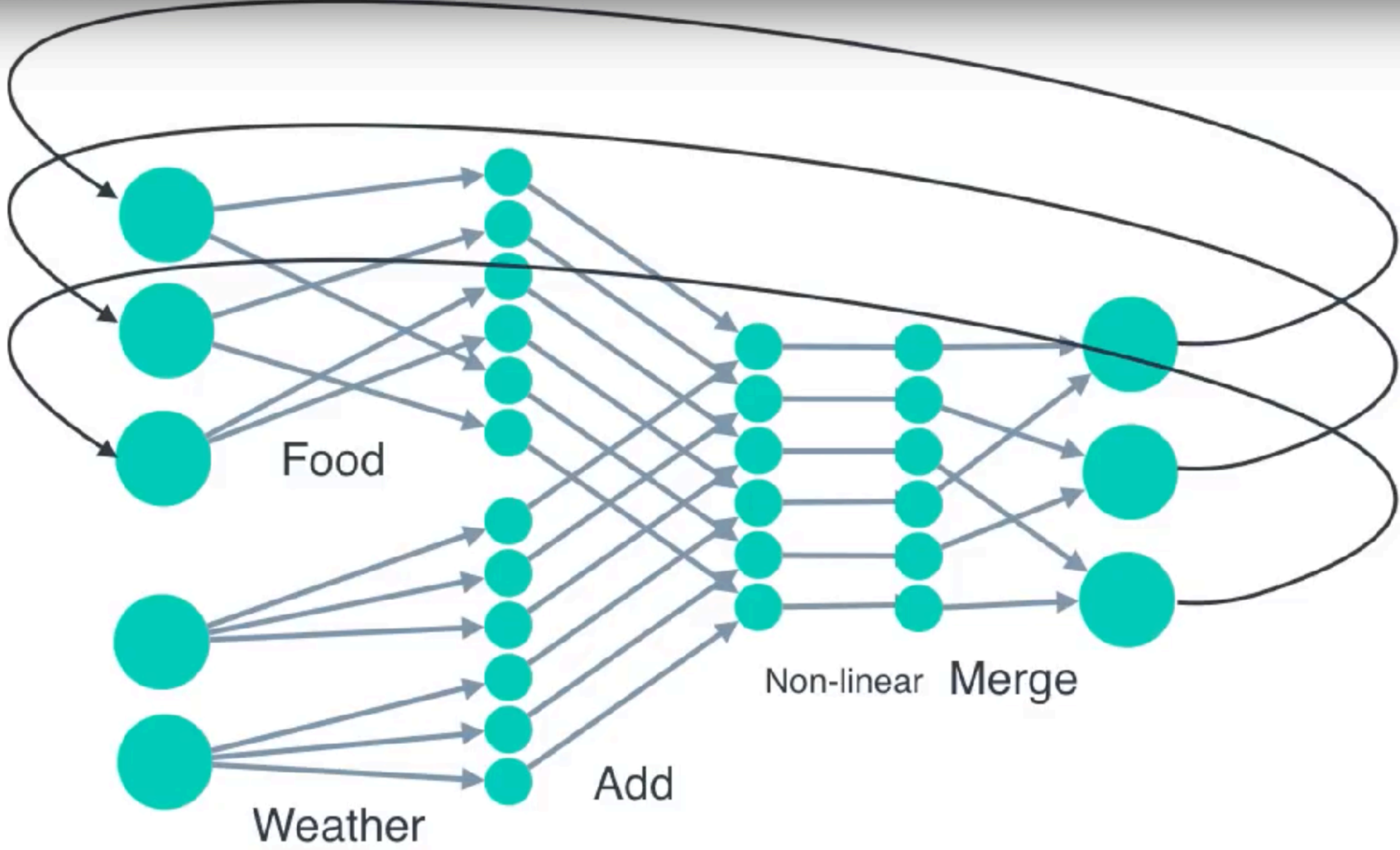


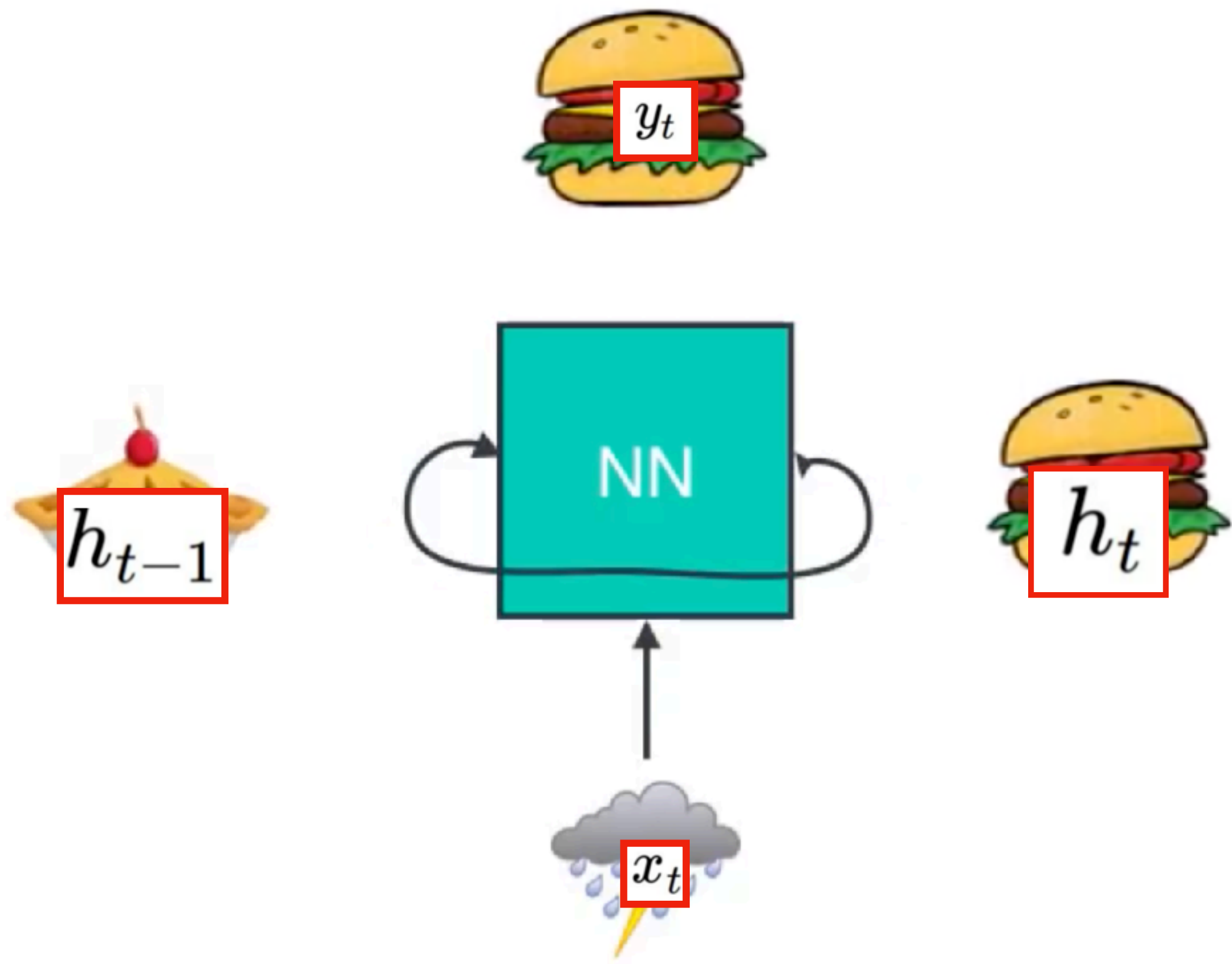
Recurrent Neural Network



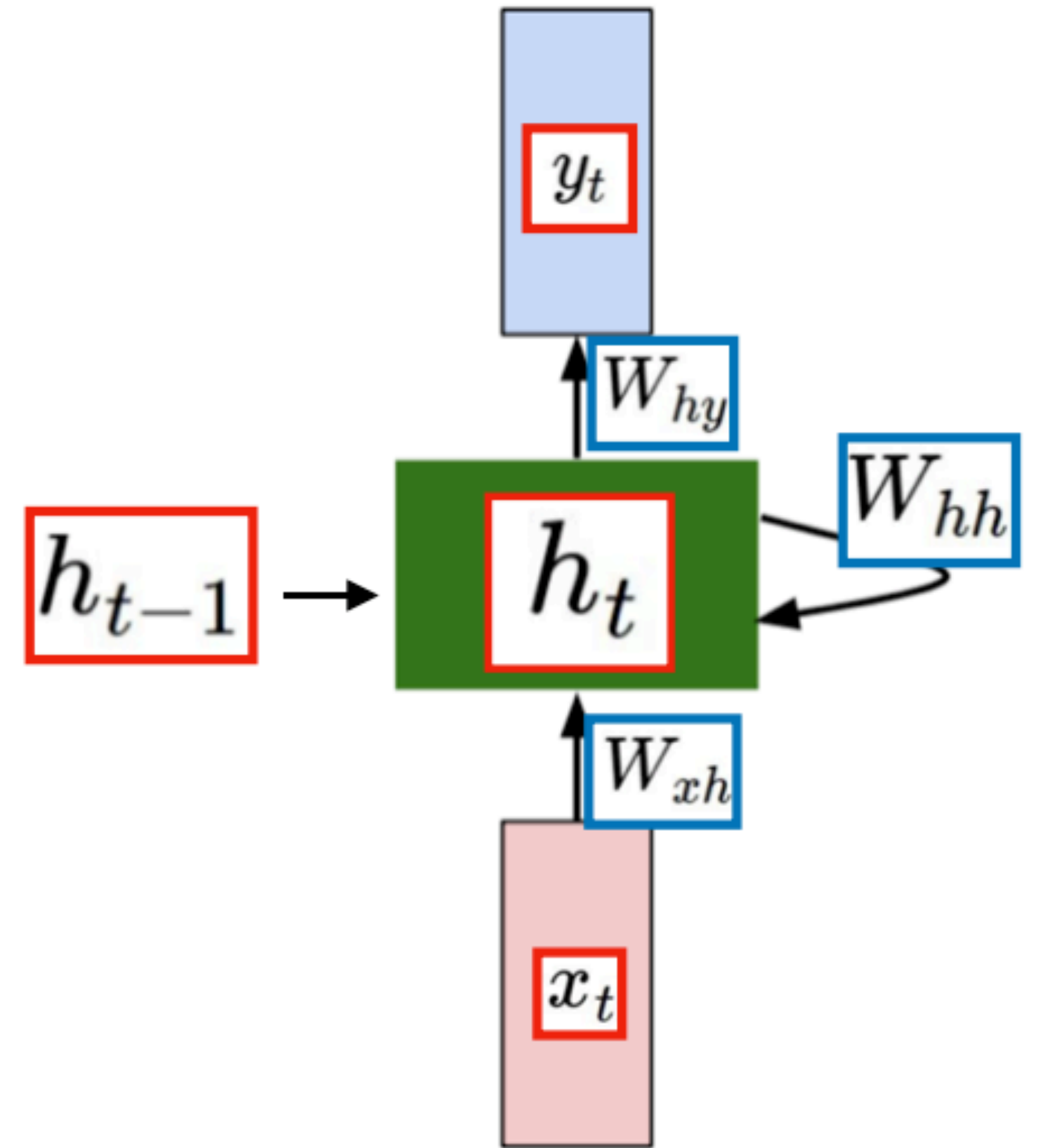
Recurrent Neural Network







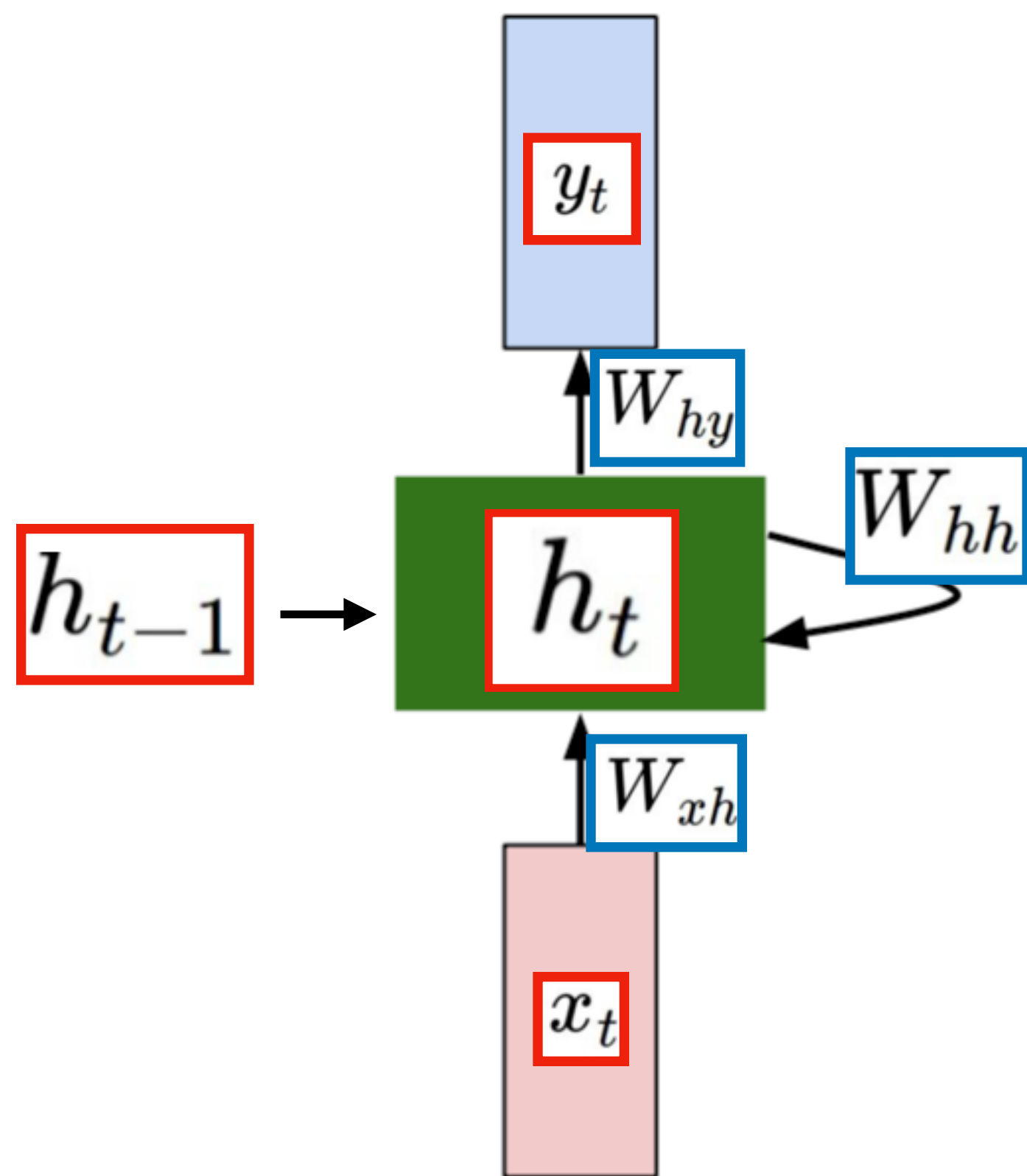
$$y_t = h_t$$



$$y_t \neq h_t$$

<https://youtu.be/UNmqTiOnRfg>

http://cs231n.stanford.edu/slides/2017/cs231n_2017_lecture10.pdf

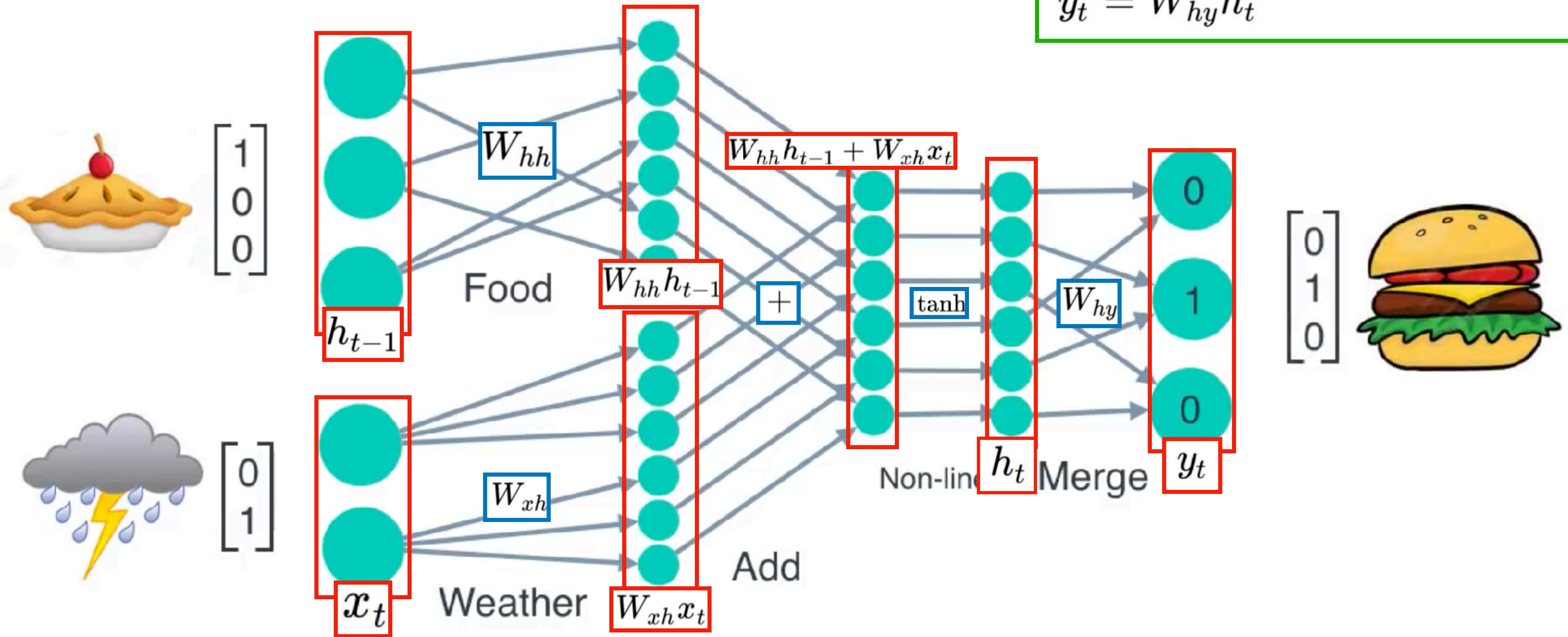


$$h_t = \tanh(W_{hh}h_{t-1} + W_{xh}x_t)$$

$$y_t = W_{hy}h_t$$

Recurrent Neural Ne

$$h_t = \tanh(W_{hh}h_{t-1} + W_{xh}x_t)$$
$$y_t = W_{hy}h_t$$



<https://youtu.be/UNmqTiOnRfg>

http://cs231n.stanford.edu/slides/2017/cs231n_2017_lecture10.pdf