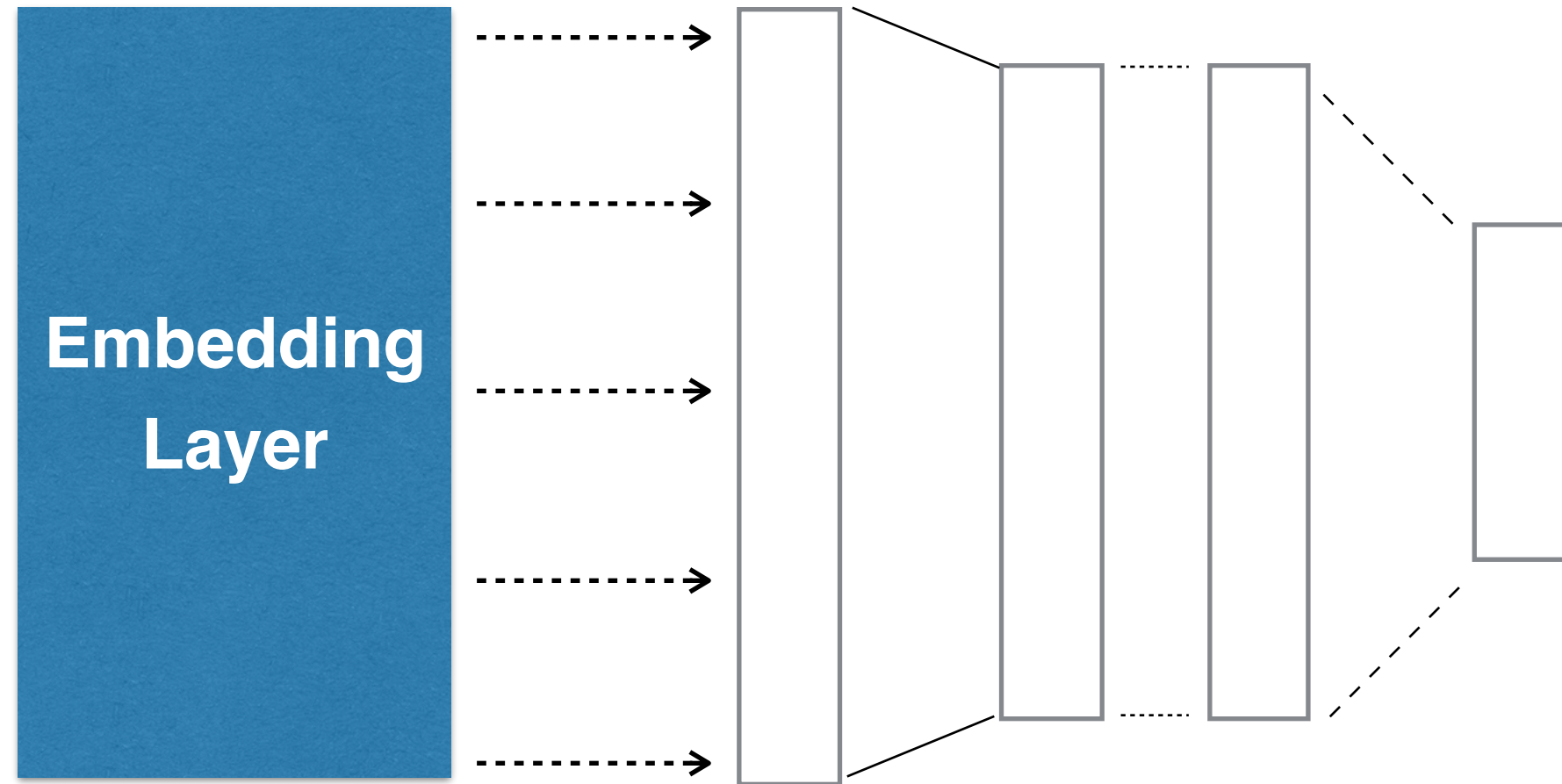


5. Recurrent Neural Networks (RNN)

Recurrent Neural Networks (RNN)



**Recurrent Algorithm
for 1D Dataset**

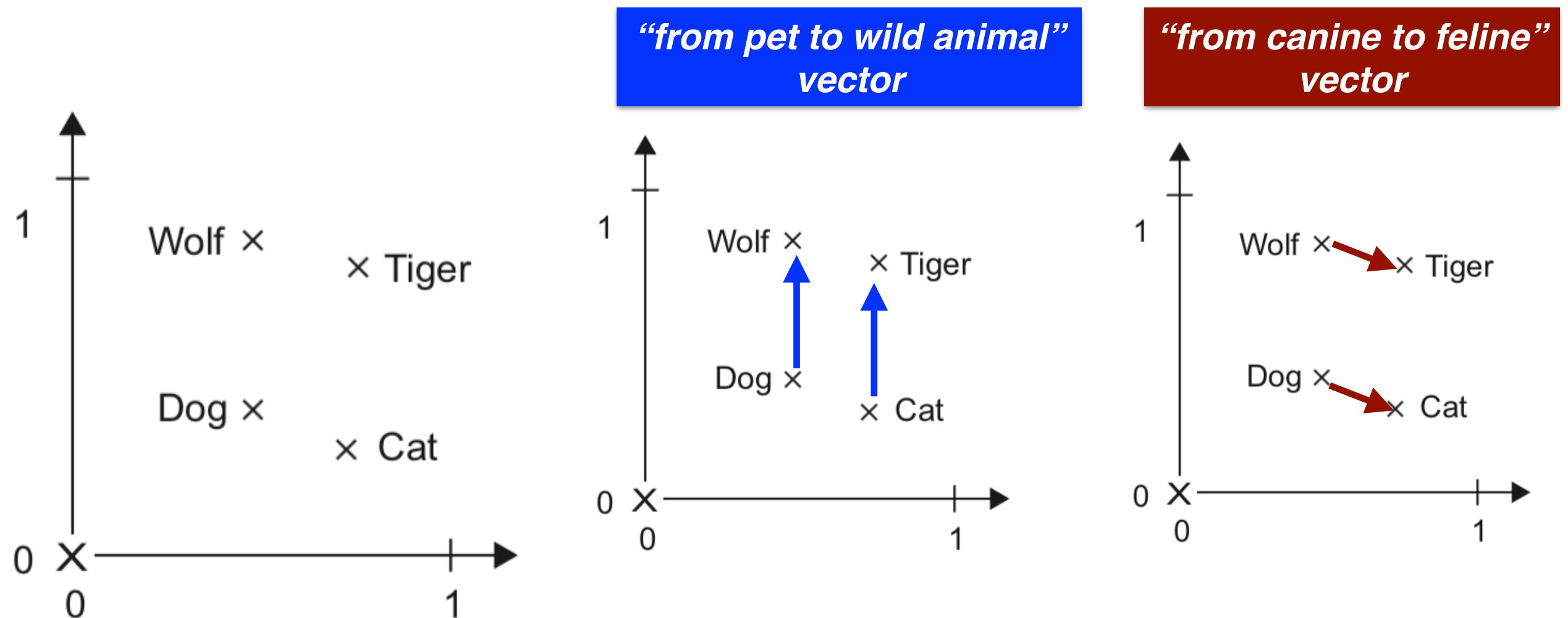
+

Fully-connected NN

Recurrent Neural Networks (RNN)

Embedding Layer for 1D Text Applications

- One-hot encoding
- Word embeddings



Learning word embeddings with Embedding Layer — **WORD-to-Vector**

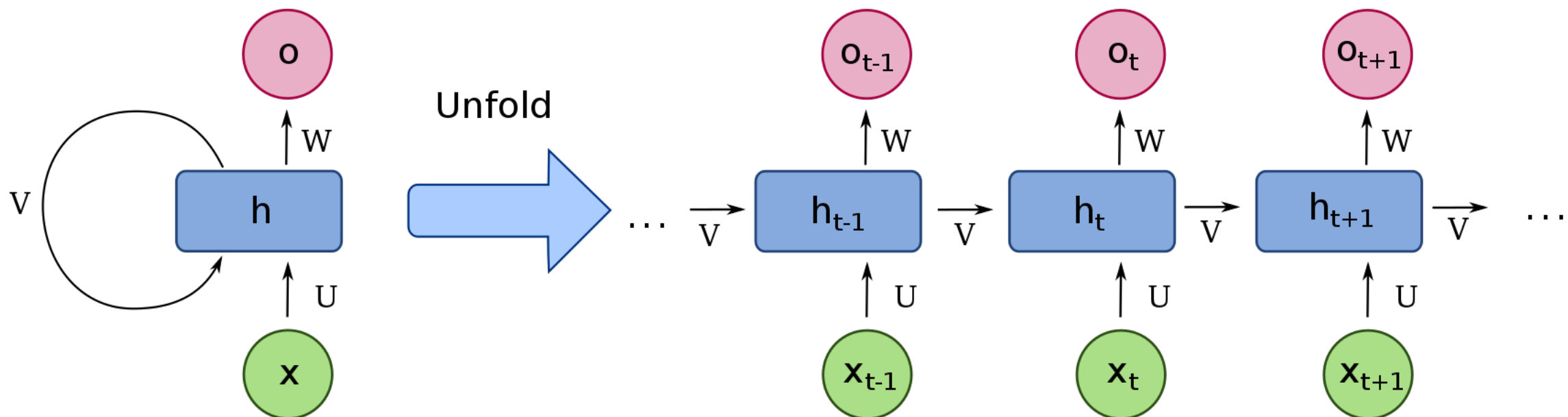
RNN

(cont'd)

RNN — Hidden Markov Model

$$h_t = AF(W_x x_t + W_h h_{t-1} + b)$$

(AF : Activation Function)



from Wikipedia: Recurrent Neural networks

https://en.wikipedia.org/wiki/Recurrent_neural_network#/media/File:Recurrent_neural_network_unfold.svg

RNN

(cont'd)

Implementation of a simple RNN

$$h_t = AF(W_x x_t + W_h h_{t-1} + b)$$

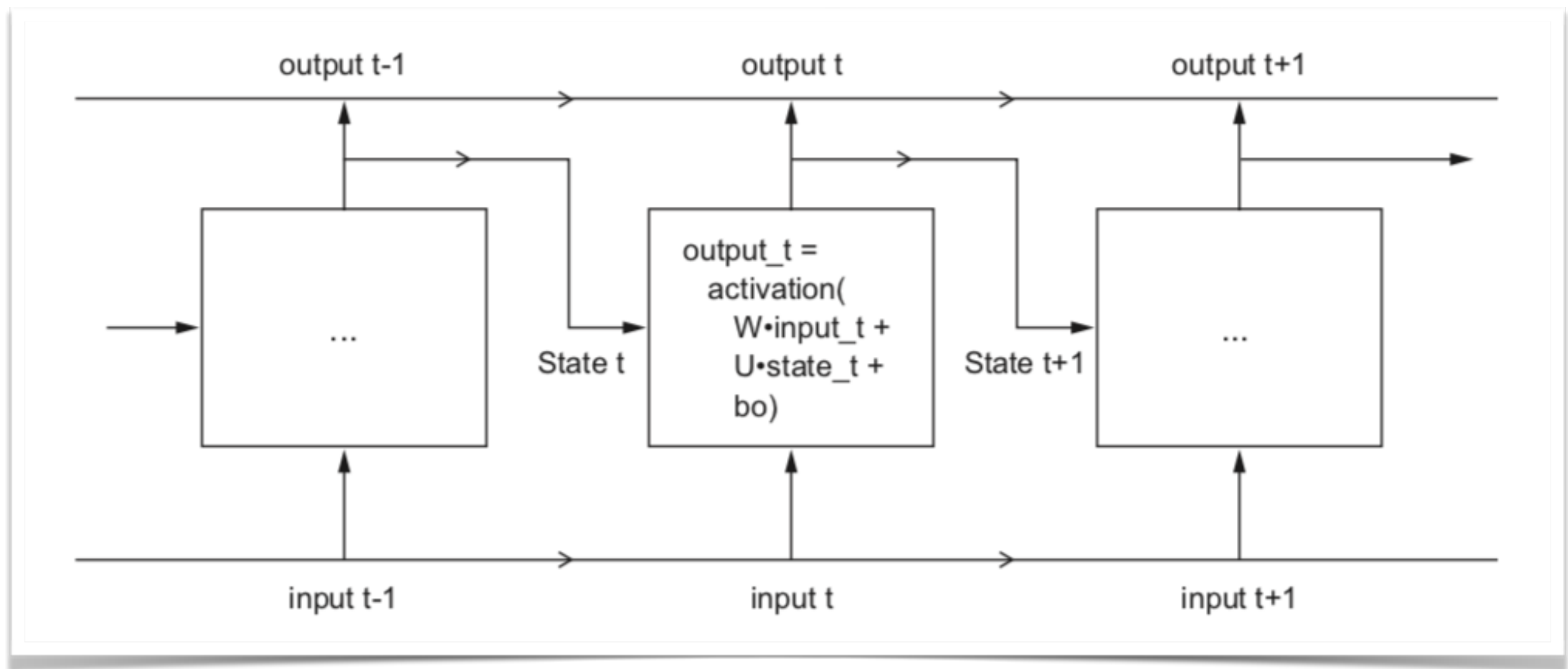


Figure from *Deep Learning with Python, Chapter 6*, 2018 by Chollet

RNN

(cont'd)

RNN Implementation with LSTM (Long-Short-Term-Memory)

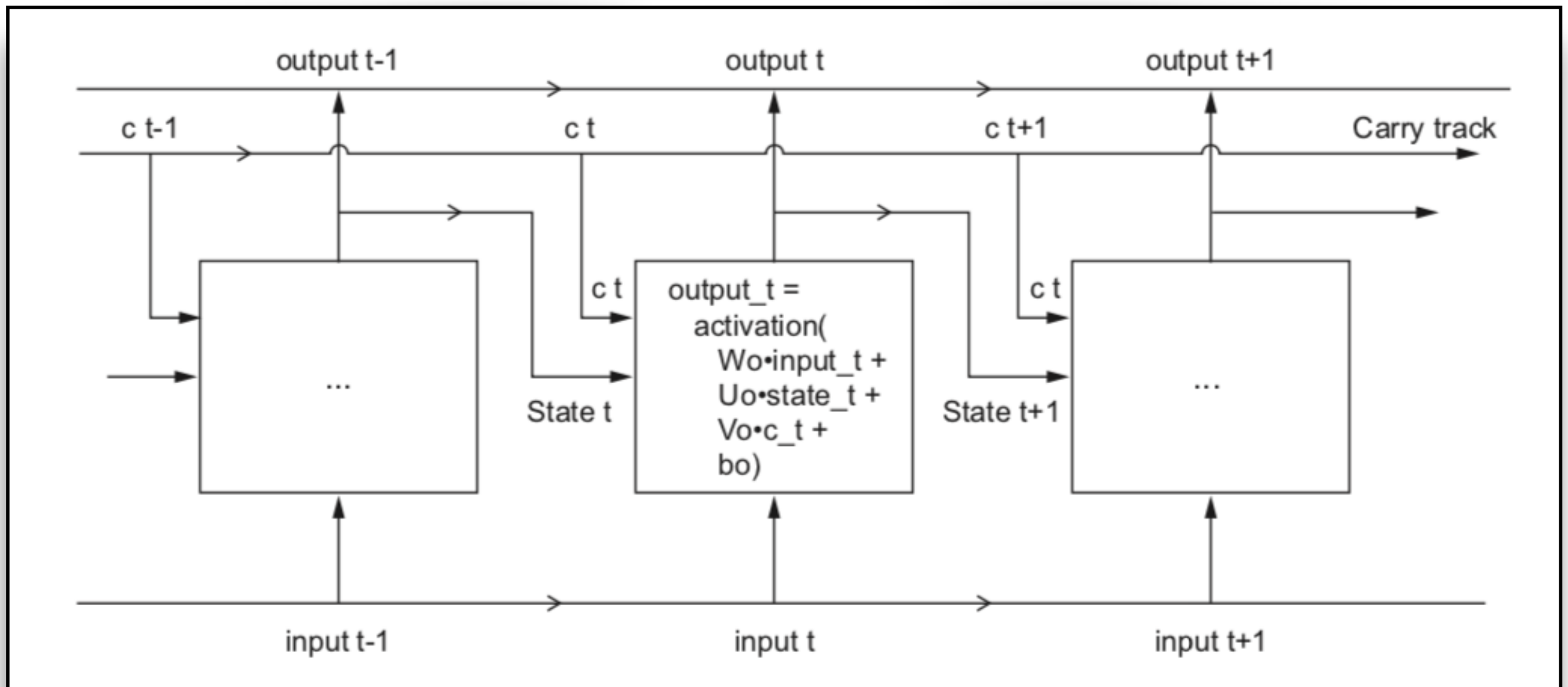


Figure from *Deep Learning with Python, Chapter 6*, 2018 by Chollet