Bi-Directional RNN

Purpose: Take confirmations from both earlier and later in the sequence.

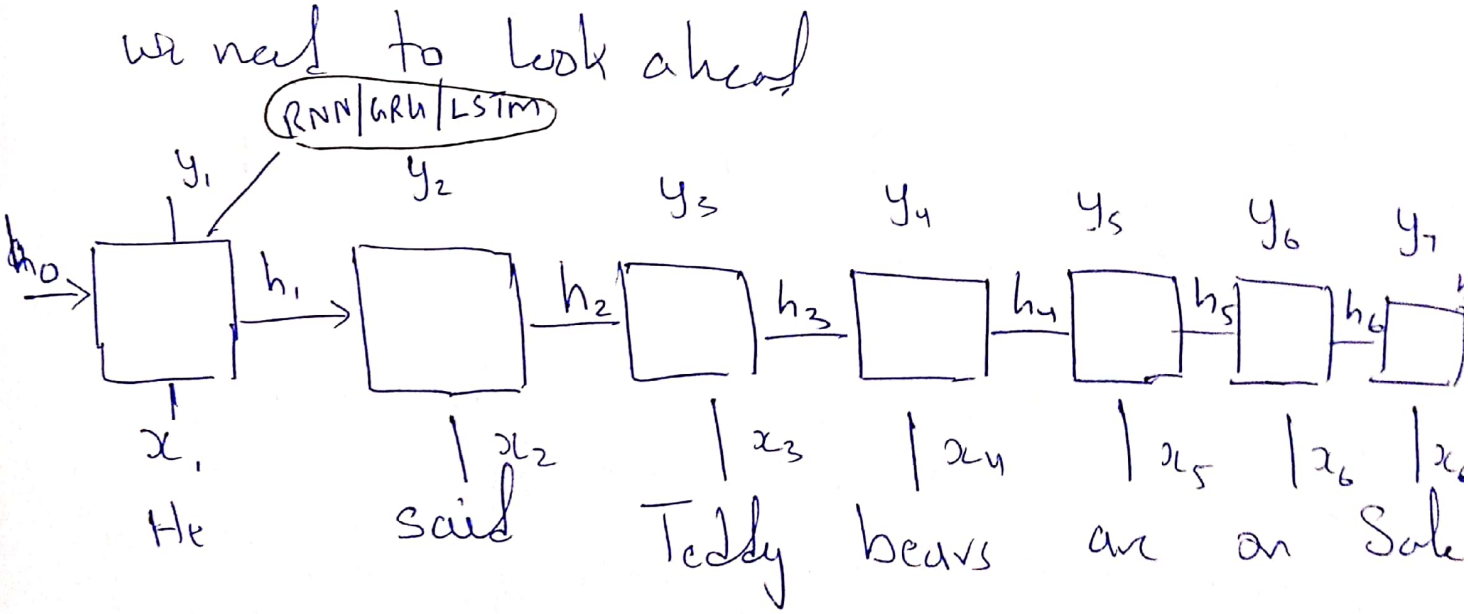
Example:

He said, "Teddy bears are on sale!"

He said, "Teddy Roosevelt was a great President"

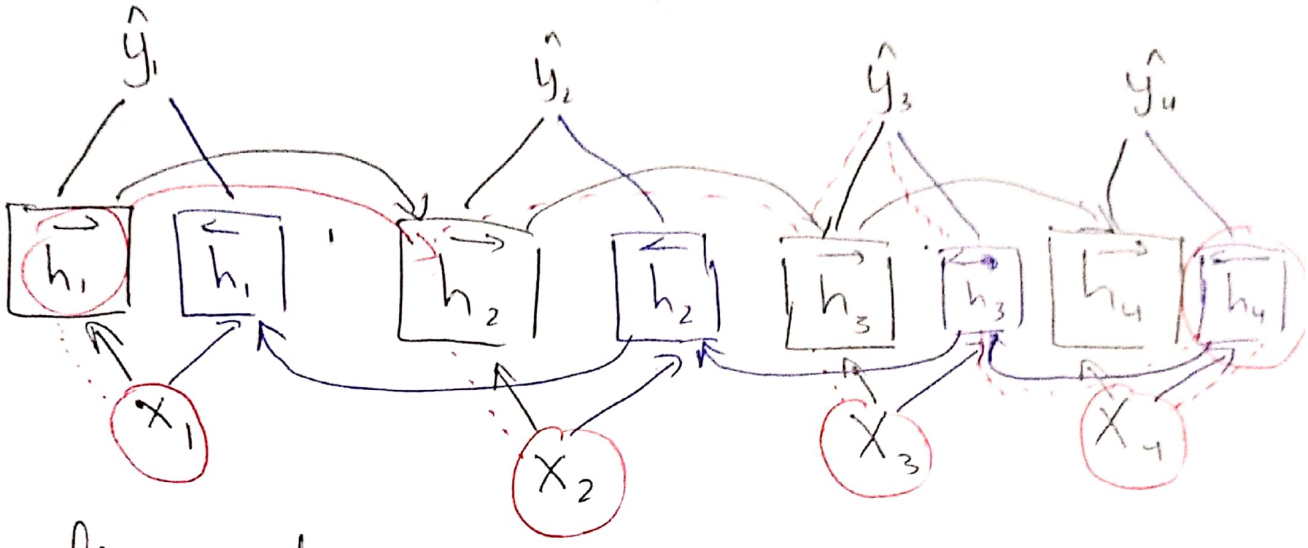
At time $t = 3$, Teddy < Person / Animal.

We need to look ahead



Bidirectional RNN / BRNN

Consider a 4-time step sequence



Acyclic graph

forward n/w and a backward n/w

NN will utilize both the forward and backward activations.

$$\hat{y}_t = g\left(W_y\left(\overrightarrow{h_t}, \overleftarrow{h_t}\right) + b_y\right)$$

Prediction at time = t_3

forward propagation from X_1 and X_2

Current input from X_3

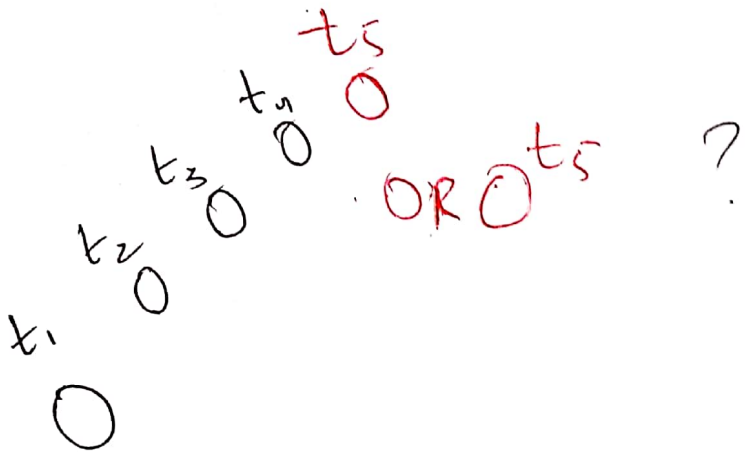
and backward propagation from X_4

The whole path is highlighted in Red.

He said (Teddy) Roosevelt

↑ Predictit.

BRNN → can be used with LSTM, GRU
used for NLP



predict at $t = t_5$? two possibilities

Need entire series of data
e.g. Speech recognition
Cannot be used for real-time apps.