



deeplearning.ai

Recurrent Neural Networks

Language model and
sequence generation

What is language modelling?

Speech recognition

The apple and pair salad.

→ The apple and pear salad.

$$P(\text{The apple and pair salad}) = 3.2 \times 10^{-13}$$

$$P(\text{The apple and pear salad}) = 5.7 \times 10^{-10}$$

$$P(\text{Sentence}) = ?$$

$$P(y^{(1)}, y^{(2)}, \dots, y^{(T)})$$

Language modelling with an RNN

Training set: large corpus of english text.

Tokenize

Cats average 15 hours of sleep a day. \downarrow $\langle \text{EOS} \rangle$

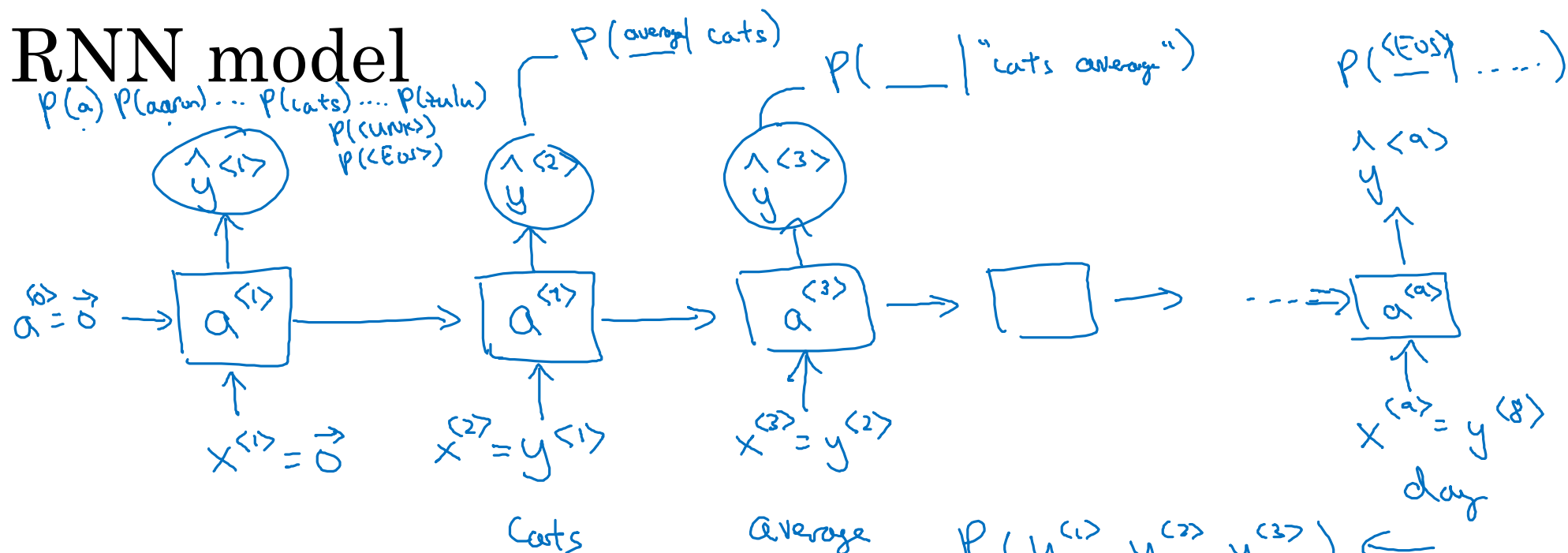
$y^{(1)}$ $y^{(2)}$ $y^{(3)}$... $y^{(8)}$ $y^{(9)}$
 $x^{(t)} = y^{(t-1)}$

The Egyptian ~~Mau~~ is a breed of cat. $\langle \text{EOS} \rangle$

10,000

$\langle \text{UNK} \rangle$

RNN model



→ Cats average 15 hours of sleep a day. <EOS>

$$\mathcal{L}(\hat{y}^{<t>}, y^{<t>}) = - \sum_i y_i^{<t>} \log \hat{y}_i^{<t>}$$

$$\mathcal{L} = \sum_t \mathcal{L}^{<t>}(\hat{y}^{<t>}, y^{<t>})$$

$$P(y^{(1)}, y^{(2)}, y^{(3)}) \leftarrow$$

$$= \frac{P(y^{(1)}) P(y^{(2)} | y^{(1)})}{P(y^{(3)} | y^{(1)}, y^{(2)})}$$