Hyperparameter tuning

Using an **appropriate scale** to **pick hyperparameters**

deeplearning.ai

Picking hyperparameters at random

$\rightarrow n^{[\ell]} = 50, \ldots, 100$

$$\underbrace{[x \quad x_{x} x \quad x_{x} \quad x \quad x \quad x]}_{50 \qquad\qquad\qquad\qquad 100}$$
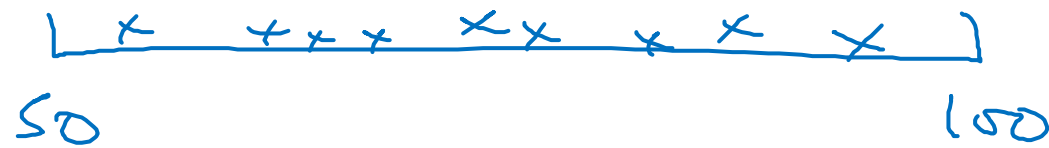
$\rightarrow$ #layers $\quad L: \quad 2 - 4$

$$2, 3, 4$$

Appropriate scale for hyperparameters

$\alpha = 0.0001 \ldots , 1$

0.0001

0.1 — — — — — — — —1

0.0001   0.001   0.01   0.1

10^{-4} 10^0 10^6

10^a

$a = \log_{10} 0.0001$ $r = -4 * np.random.rand()$ $\leftarrow$ $r \in [-4, 0]$ $b = \log_{10} 1 = 0$

$= -4$ $\alpha = 10^r$ $\leftarrow$ $10^{-4} \ldots 10^0$

$10^a \ldots 10^b$ $r \in [a, b]$ $\alpha = 10^r$

$[-4, 0]$
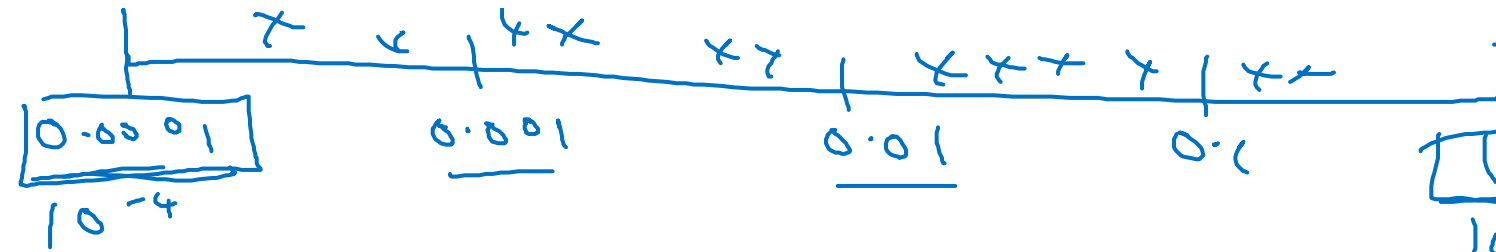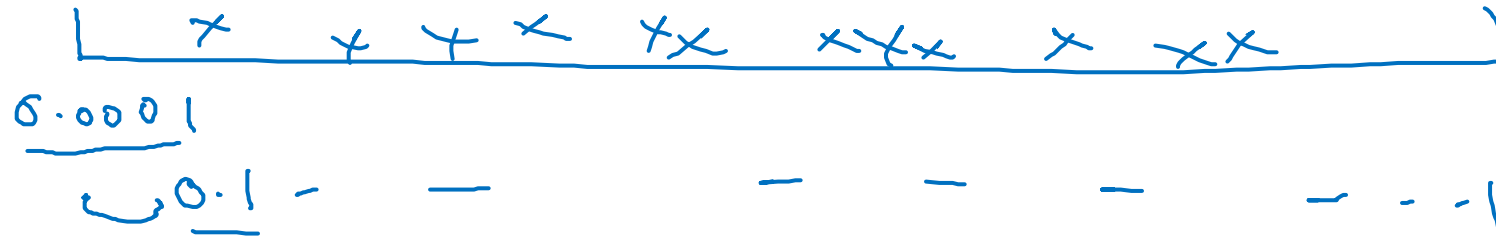
Hyperparameters for exponentially weighted averages

$\beta = 0.9 \quad \cdots \quad 0.999$

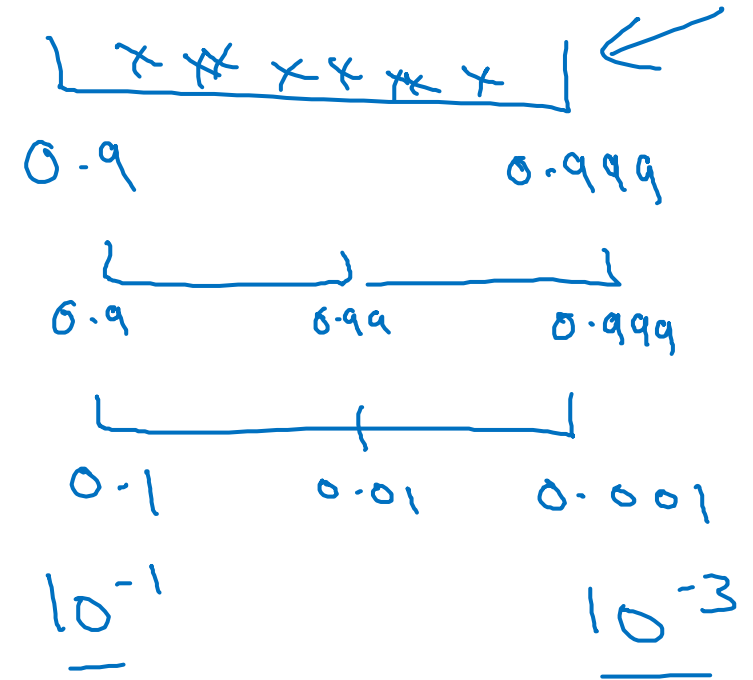$\qquad \downarrow \qquad\qquad\quad \downarrow$

$\qquad 10 \qquad\qquad\quad 1000$

$1-\beta = 0.1 \quad \cdots \quad 0.001$

$\beta: \quad 0.9000 \rightarrow 0.9005 \quad \} \sim 10$

$\beta: \quad 0.999 \rightarrow 0.9995$

$\qquad\quad \sim 1000 \qquad\qquad \sim 2000$

$\dfrac{1}{1-\beta}$

$0.9 \qquad\qquad\qquad 0.999$

$0.9 \qquad\quad 0.99 \qquad\quad 0.999$

$0.1 \qquad\quad 0.01 \qquad 0.001$

$10^{-1} \qquad\qquad\qquad\qquad 10^{-3}$

$r \in [-3, -1]$

$1-\beta = 10^{r}$

$\beta = 1 - 10^{r}$

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