



deeplearning.ai

# Batch Normalization

---

## Batch Norm at test time

# Batch Norm at test time

$$\begin{aligned} \rightarrow \quad \underline{\mu} &= \frac{1}{\underline{m}} \sum_i \underline{z^{(i)}} \\ \rightarrow \quad \underline{\sigma^2} &= \frac{1}{\underline{m}} \sum_i (\underline{z^{(i)}} - \underline{\mu})^2 \end{aligned}$$

$$\rightarrow \quad z_{\text{norm}}^{(i)} = \frac{z^{(i)} - \mu}{\sqrt{\sigma^2 + \epsilon}} \quad \leftarrow$$

$$\rightarrow \quad \tilde{z}^{(i)} = \gamma \underline{z_{\text{norm}}^{(i)}} + \beta$$

