



deeplearning.ai

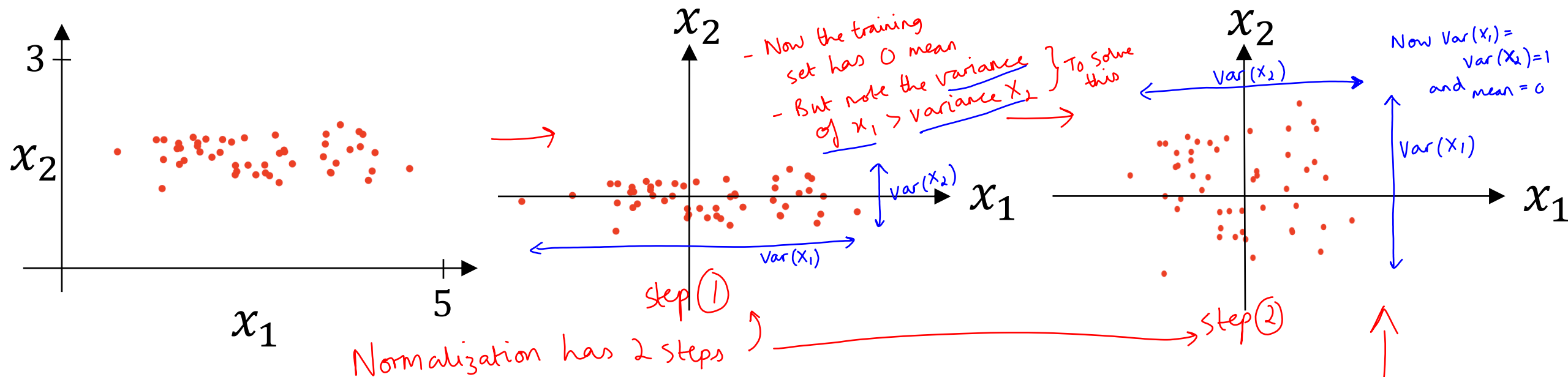
Setting up your
optimization problem

Normalizing inputs

Normalizing training sets

say $X = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

~~Tip~~ Tip: use the same μ and σ^2 that you get from your training set & normalize your test set



① Subtract out the mean
Find $\mu = \frac{1}{m} \sum_{i=1}^m x^{(i)}$

then $X = X - \mu$

② Normalize Variance
Find $\sigma^2 = \frac{1}{m} \sum_{i=1}^m x^{(i)} \cdot x^{(i)}$

then $X = X / \sigma^2$
 \rightarrow element wise squaring of vector X

so all in all we do 2 things

① Find mean μ & update $X = X - \mu$

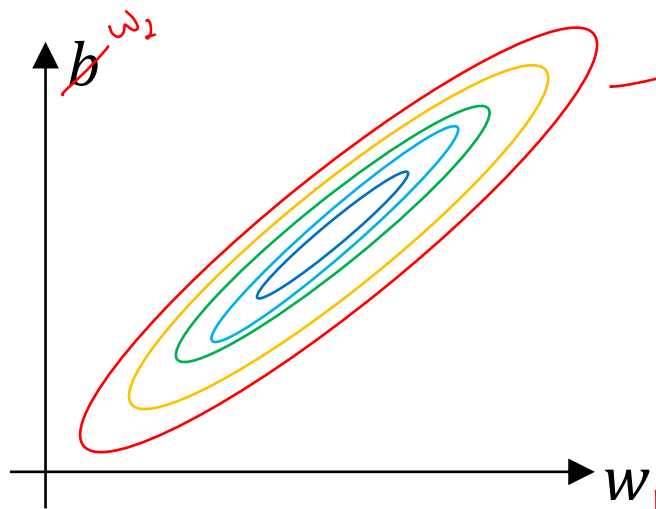
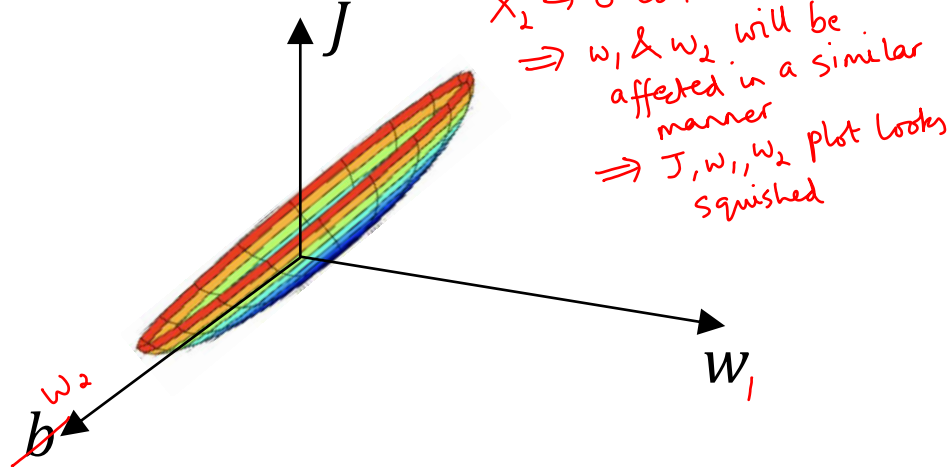
② Find σ^2 & update $X = X / \sigma^2$

$\Rightarrow X = \frac{X - \mu}{\sigma^2}$

Why normalize inputs?

$$J(w, b) = \frac{1}{m} \sum_{i=1}^m \mathcal{L}(\hat{y}^{(i)}, y^{(i)})$$

Unnormalized:



Normalized:

