

function

linear  
regression

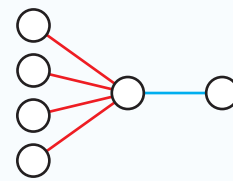
$$Y = f(X, w_1, b_1)$$

$$f(x, w, b) = x \cdot w + b$$

matrices

$$\begin{matrix} X \\ \dots \end{matrix} \cdot \begin{matrix} w \\ \dots \end{matrix} + \begin{matrix} b \\ \dots \end{matrix} = \begin{matrix} Y \\ \dots \end{matrix}$$

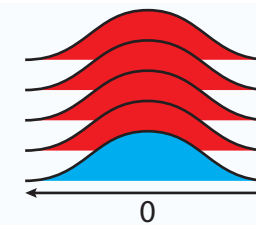
computational graph



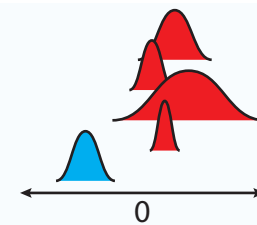
priors

$$w_{1,i} \sim N(0, 100)$$

$$b_1 \sim N(0, 100)$$



posteriors



$$Z = f(X, w_1, b_1)$$

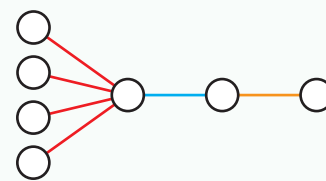
$$Y = g(Z)$$

logistic  
regression  
(classification)

$$g(x) = \frac{1}{1 + e^{-x}}$$

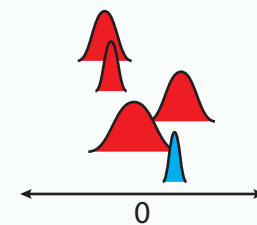
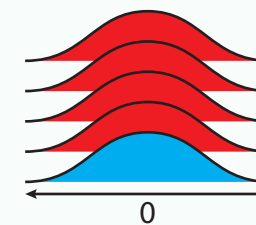
$$\begin{matrix} X \\ \dots \end{matrix} \cdot \begin{matrix} w \\ \dots \end{matrix} + \begin{matrix} b \\ \dots \end{matrix} = \begin{matrix} Z \\ \dots \end{matrix}$$

$$\begin{matrix} Z \\ \dots \end{matrix} \xrightarrow{g} \begin{matrix} Y \\ \dots \end{matrix}$$



$$w_{1,i} \sim N(0, 100)$$

$$b_1 \sim N(0, 100)$$

deep net  
regressor

$$Z = \tanh(f(X, w_1, b_1))$$

$$Y = \text{ReLu}(f(Z, w_2, b_2))$$

$$\text{ReLu}(x) = \max(x, 0)$$

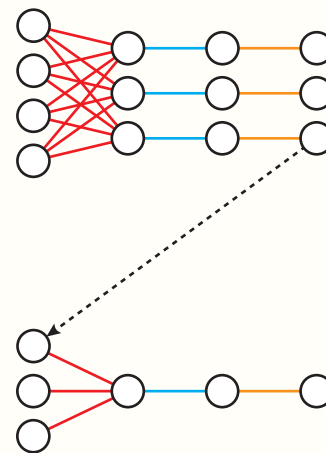
$$\tanh x = \frac{e^{2x} - 1}{e^{2x} + 1}$$

$$\begin{matrix} X \\ \dots \end{matrix} \cdot \begin{matrix} w_1 \\ \dots \end{matrix} + \begin{matrix} b_1 \\ \dots \end{matrix} = \begin{matrix} Z' \\ \dots \end{matrix}$$

$$\begin{matrix} Z' \\ \dots \end{matrix} \xrightarrow{\tanh} \begin{matrix} Z \\ \dots \end{matrix}$$

$$\begin{matrix} Z \\ \dots \end{matrix} \cdot \begin{matrix} w_2 \\ \dots \end{matrix} + \begin{matrix} b_2 \\ \dots \end{matrix} = \begin{matrix} Y' \\ \dots \end{matrix}$$

$$\begin{matrix} Y' \\ \dots \end{matrix} \xrightarrow{\text{relu}} \begin{matrix} Y \\ \dots \end{matrix}$$



$$w_{1,i} \sim N(0, 1)$$

$$b_{1,i} \sim N(0, 1)$$

$$w_{2,i} \sim N(0, 1)$$

$$b_{2,i} \sim N(0, 1)$$

