$$X_1 \xrightarrow{W_{11}} Y_1$$

W_{12}

W_{21}

X_2

W_{22}

Y_2

$$Y_1 = W_{11} X_1 + W_{21} X_2$$

$$Y_2 = W_{12} X_1 + W_{22} X_2$$

$$\begin{bmatrix} Y_1 \\ Y_2 \end{bmatrix} = \begin{bmatrix} W_{11} & W_{21} \\ W_{12} & W_{22} \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

$$Y = W X.$$

$$Y_{output} = \sigma(Wx).$$

plt.scatter(data_frame.x1, data_frame_1.x2)

$$error = (Y\_actual - Y_{output})^2.$$

$$\frac{d\,error}{dw_{ij}} = \frac{d.error}{dw_{ij}}$$

$$= \frac{d.error}{d\,output} \cdot \frac{d.output}{d.w_{ij}}$$

$$\frac{d.error}{dw_{ij}} = 2(y_{actual} - y_{output}) \cdot \boxed{\frac{d.\sigma(Wx)}{dw_{ij}}}$$

$$\frac{d.error}{dw_{ij}} = 2(error) \cdot \sigma(wx)(1-\sigma(wx)) \cdot x$$

$$\Delta W = \text{Learn rate} \cdot 2 \cdot error \cdot \sigma(wx)(1-\sigma(wx)) \cdot x$$

$$\boxed{\Delta W = \text{Learn rate} \cdot error \cdot y_{output}(1- y_{output}) \cdot x.}$$

$$\sigma(x) \rightarrow \frac{d\sigma}{dx} = \sigma(x)(1-\sigma(x)).$$

Top-left plot:

tinggi x_1

otot (red, scattered points)

V cup (green, scattered points)

x_2 berat badan.

Lower-left plot:

tinggi x_1

↙ otot (blue) ✗

✗ ↙ V cup

→ berat badan x_2

Top-right diagram:

x_1 tinggi — W_{11} → otot → y_1

x_2 BB — W_{22} → V cup → y_2

W_{12} $-W=1$ $+$ $-$ $+$

Middle-right:

x_1 — W_{11} → ∑ → σ y_1
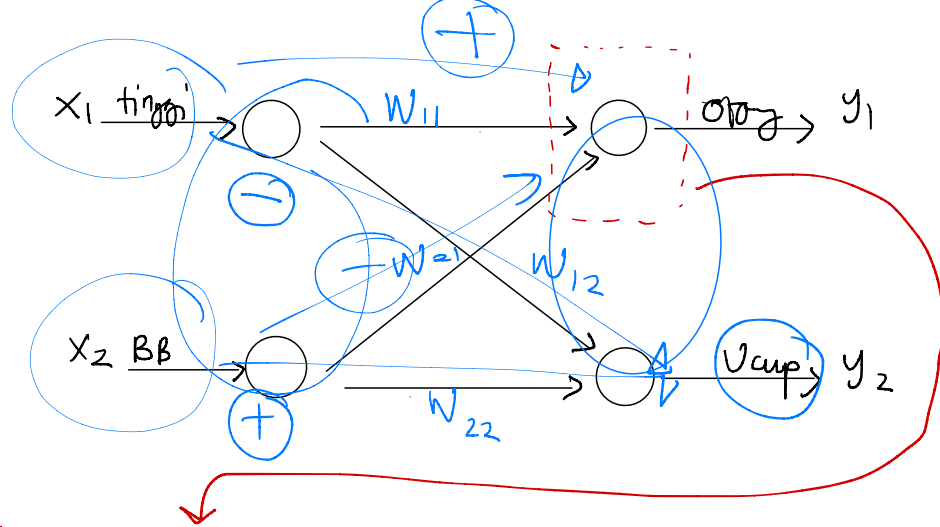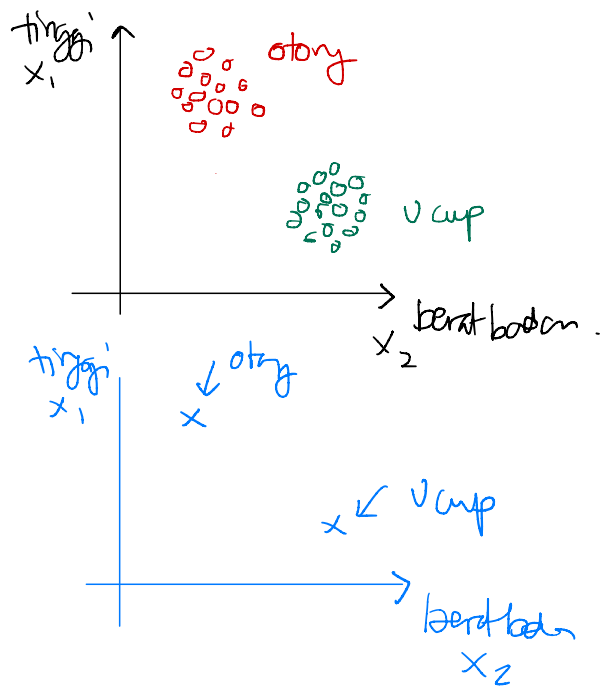
x_2 — W_{21} →

data tinggi →

data berat →

$$y_1 = x_1 \cdot W_{11} + x_2 \cdot W_{21}$$

$$y_2 = x_1 \cdot W_{12} + x_2 \cdot W_{22}$$

Bottom-left:

$$Y_{Hidden} = W \cdot X$$

$$Y_{output} = \sigma(W \cdot X)$$

Bottom-center matrix:

$$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} W_{11} & W_{21} \\ W_{12} & W_{22} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

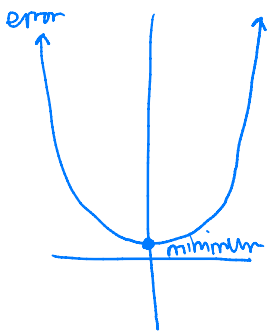$$\begin{bmatrix} 0 \\ 1 \end{bmatrix} \rightarrow V \, cup$$

$$\begin{bmatrix} 1 \\ 0 \end{bmatrix} \rightarrow otot.$$

kita cari

$X_1 = 180$

$X_2 = 40$

$y_1 = 1$

$y_2 = 0$

Label = "dog"

X_1 ○ —W_{1l}→ ○ —0→ y_1

W_{12} W_{21}

X_2 ○ —N_{2v}→ ○ —1→ y_2 (vap)

$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$ y prediksi.
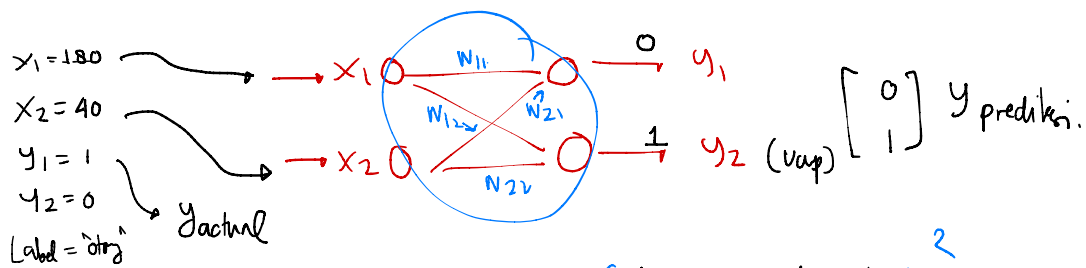
y actual

$$\text{Error} = \left(y_{actual} - y_{prediksi} \right)^2$$

$$\frac{derror}{dW} = 0$$

error

minimum

$$\Delta W = \text{Learning rate} \cdot error \cdot y\text{-output} (1 - y\text{-output})$$

○

$$W_{baru} = W_{lama} + \Delta W \, ○$$

y_ouput

$y\ hidden$

x_1 — ◯
x_2 — ◯
x_3 — ◯

◯ — y_1
◯ — y_2
◯ — y_3

Layer
input

hidden Layer.

Layer output

deep lerning