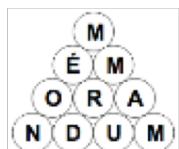


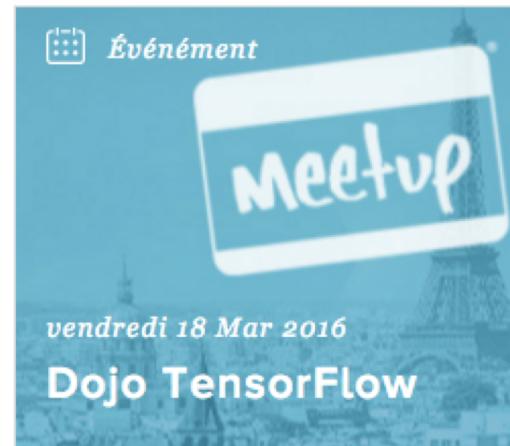


Dojo Tensorflow #1

Chez Sfeir



Le **développeur** au coeur du **digital**



 @sfeir

Marre de stagner? Envie de vous tester sur de nouveaux challenges techniques? Venez passer les Playoffs!

#SFEIRCode

<https://t.co/7xJBzlwRwY>

09:05 - 14 Mar 2016 

 @sfeir

Félicitations @cbalit !!!
Nouveau #gde chez les Sfeiriens !
<https://t.co/h6moPbLMIm>

14:47 - 11 Mar 2016 

Mémorandum

Mémorandum est un cabinet de **conseil en data stratégie**.

Nous intervenons en trois phases :

1. Réflexion sur l'usage de la donnée dans votre entreprise
2. Analyse de vos données
3. Industrialisation de solutions informatiques

Nous apportons :

- Une méthodologie mélant stratégie et technique.
- Des preuves de concepts “machine learning” avec les outils en pointe de la communauté open source
- Des méthodes agiles et de Lean Analytics qui garantissent des résultats adaptés



Romain Jouin - Associé

INT Management 2006 - Télécom Paris 2013
7 ans de commercial
25 ans d'informatique

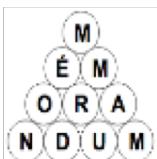


Denis Oblin - Associé

Centrale 1994 - Télécom Paris 2013
10 ans de conseil en stratégie
7 ans en direction opérationnelle Groupama

Mémorandum a trois expertises majeures :

- Technique
 - ◆ Big Data
 - ◆ Machine Learning
- Fonctionnelle
 - ◆ Stratégie de la micro décision
 - ◆ Marketing
- Métier
 - ◆ Relation client
 - ◆ Force de vente



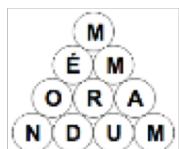
 Installation

Lesson 1

Lesson 2 (to do)

Lesson 3 (to do)

Lesson 4 (to do)



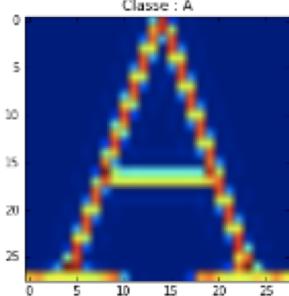
$$\frac{3}{39} \left[\frac{3}{2} (y+1)^2 + (y+1) + \frac{2}{3} (x+1)^2 \right]$$



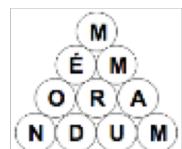
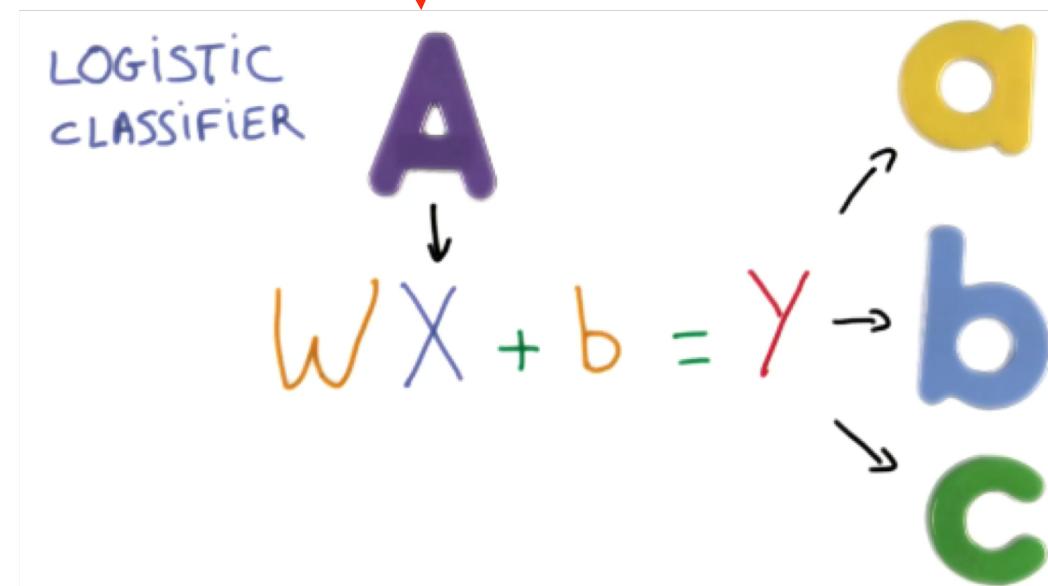
12 millions de paramètres



Logistic classifier et softmax



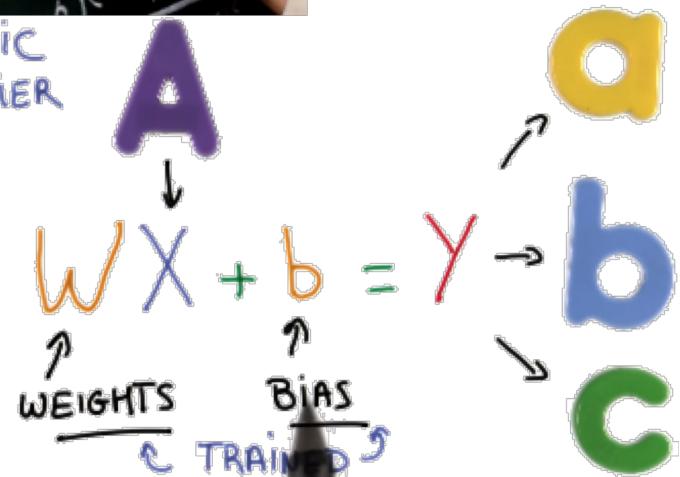
$$28 * 28 = 756$$



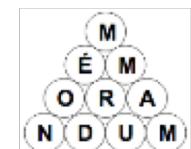
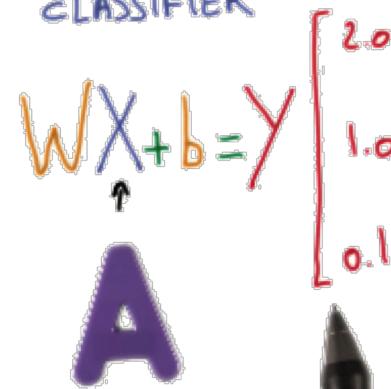
$$\frac{3a(y+2)^2 + (y+4)h}{39}$$

$$\frac{a^2(3-1)(y+A)}{39} + \frac{2}{3}(y+4)^2(x+1)$$

LOGISTIC
CLASSIFIER

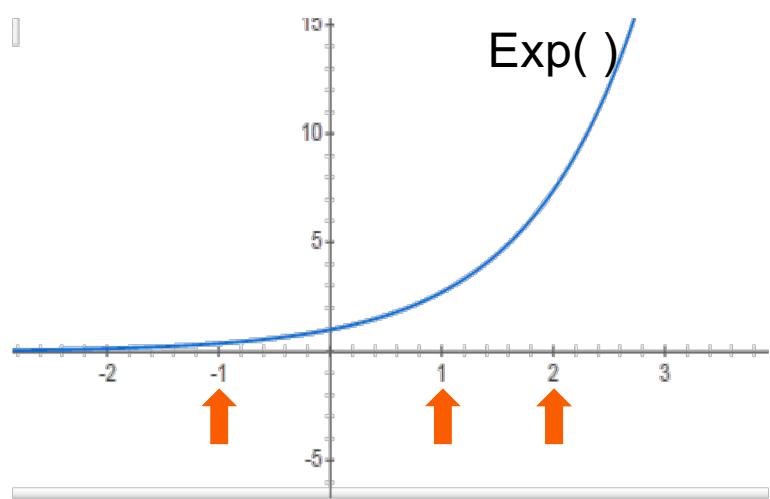
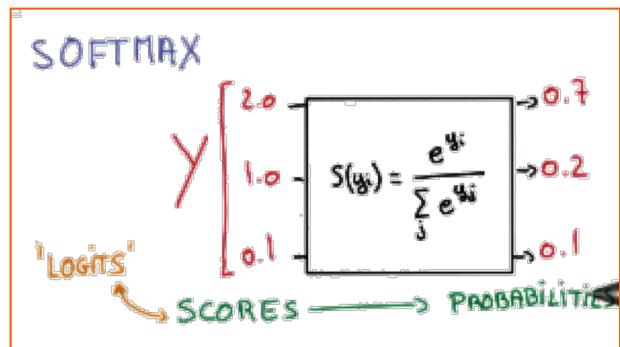


LOGISTIC
CLASSIFIER



$$\frac{3a(y_1 + z_2)^2 + (z_3y_1 + z_4A(x_1 + z_5))}{39}$$

Soft max x²



	$\text{Exp}()$	$\frac{\text{Exp}()}{\Sigma(\text{Exp}())}$
-1	0,36	0,03
1	2,71	0,26
2	7,38	0,70

Transforme en un chiffre positif en préservant la relation d'ordre

$\text{Exp}()$

$\Sigma(\text{Exp}())$

0,36
2,71
7,38

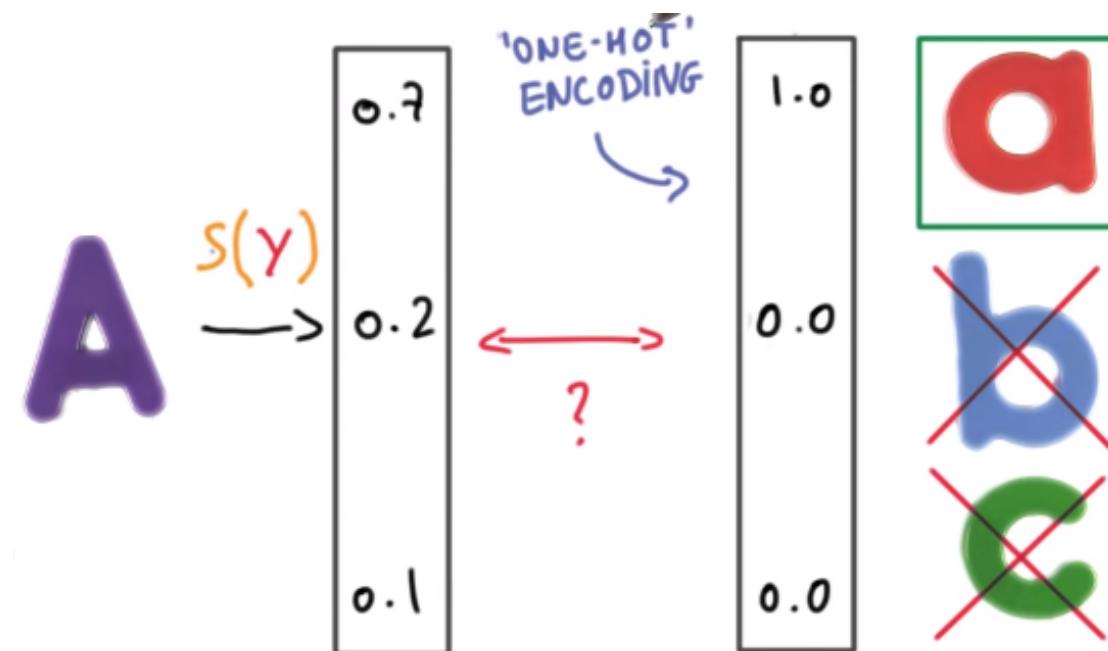
0,03
0,26
0,70

Transforme en probabilité :

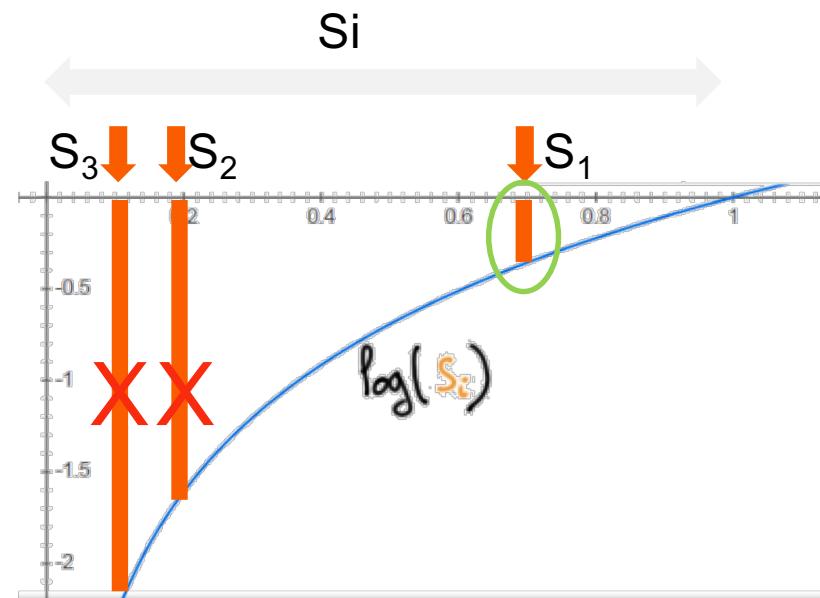
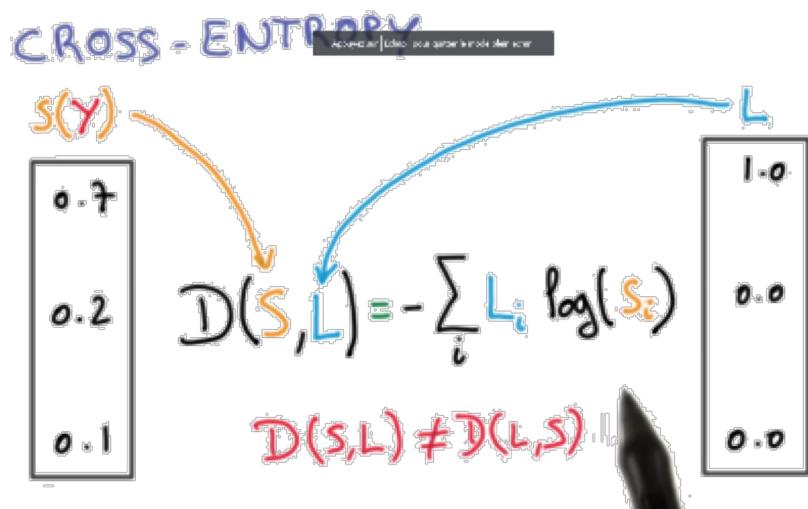
- Entre 0 et 1
- Somme = 1



$$\begin{aligned}
 & 3a(y+1)^2 + (3y + 4)h \\
 & \frac{9}{39} (y+1)^2 + (y+4)(x+1)
 \end{aligned}$$

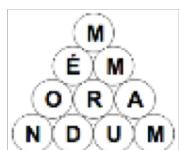


$$\frac{\partial^2}{\partial x^2} \left[3a(y+1)^2 + (3y + 1) + 4(x+1) \right]$$



Seule la probabilité calculée de la bonne classe est prise en compte (le coefficient L des autres classes est à 0)
 Pour la bonne classe l'erreur est calculée comme $-\log(S_1)$

$$D(S, L) = - \log(S_1)$$





Test de progression significative

3000

EXAMPLES

80% → 81%

80% → 80.5%

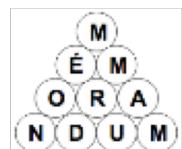
80% → 80.1%

1% * 3000 = 30 OK !

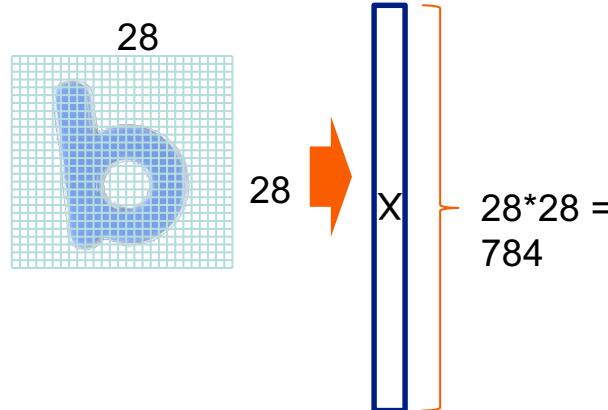
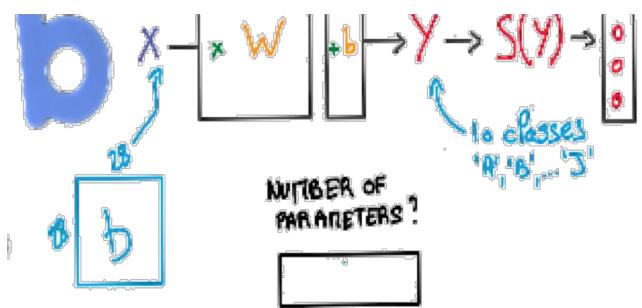
0,5% * 3000 = 15 KO !

0,1% * 3000 = 3 KO !

Une progression portant sur plus de 30 unités considérée comme significative
→ La taille de son test set définit le niveau de précision de réglage du modèle que vous pouvez chercher



$$3a(y+1)^2 + 3y + 4(x+1)^2 = 39$$

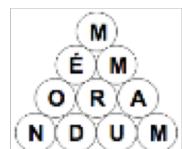


$$\begin{matrix} & 784 \\ & \overbrace{\hspace{10em}}^{\text{10}} \\ 10 & \left\{ \begin{matrix} & \text{W} \\ & \end{matrix} \right\} \\ & \overbrace{\hspace{10em}}^{1} \\ & 10 \end{matrix} \quad \begin{matrix} \text{WX} & + & \text{b} \end{matrix}$$

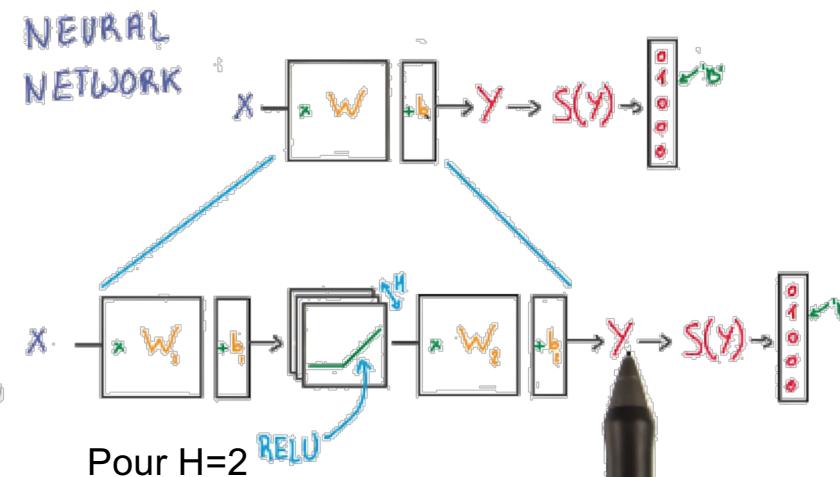
10 cibles : a, b, c, d, ...

Vecteur de $28 \times 28 = 784$

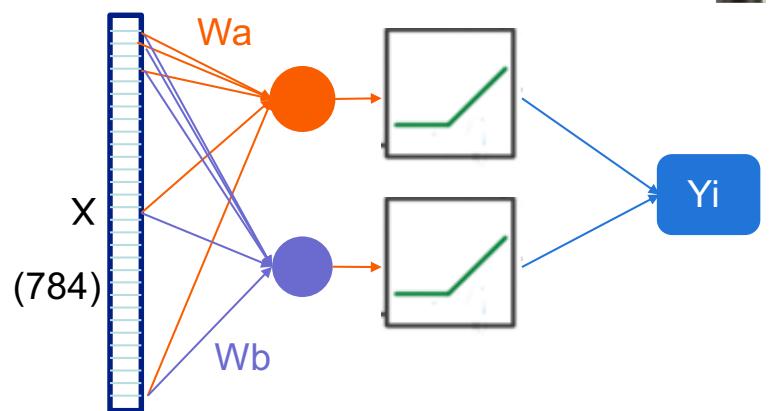
Nombre de paramètres :
 784×10 (pour w) + 10 (pour b) : 7850



$$\begin{aligned}
 & 3a(y+1)^2 + (y+1) + \\
 & \frac{a^2(3)}{39} (y+1)^3 + \frac{2}{3} a^2 (y+1)^2 (x+1)
 \end{aligned}$$

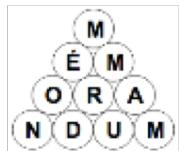


Pour chaque cible



Il y a donc
784*10*2 paramètres
W pour la première
couche

Il y a
2*10 paramètres W
pour la 2è couche

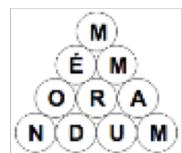
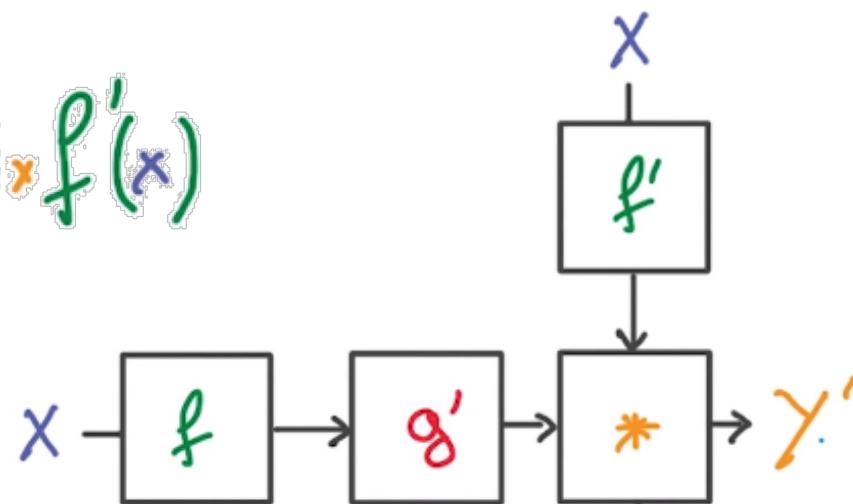
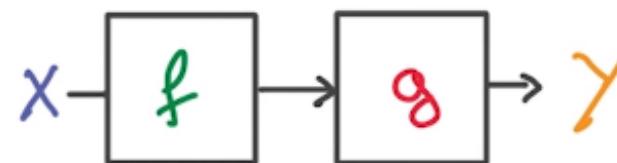


$$\begin{aligned} & 3a(y+z)^2 + (y+z+4)(x+z) \\ & \frac{a^2(z+1)}{39} (y+A)^{13} + \frac{2}{3}(z+4)^2(x+z) \end{aligned}$$

$$[g(f(x))]' = g'(f(x)) \cdot f'(x)$$



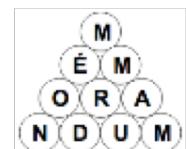
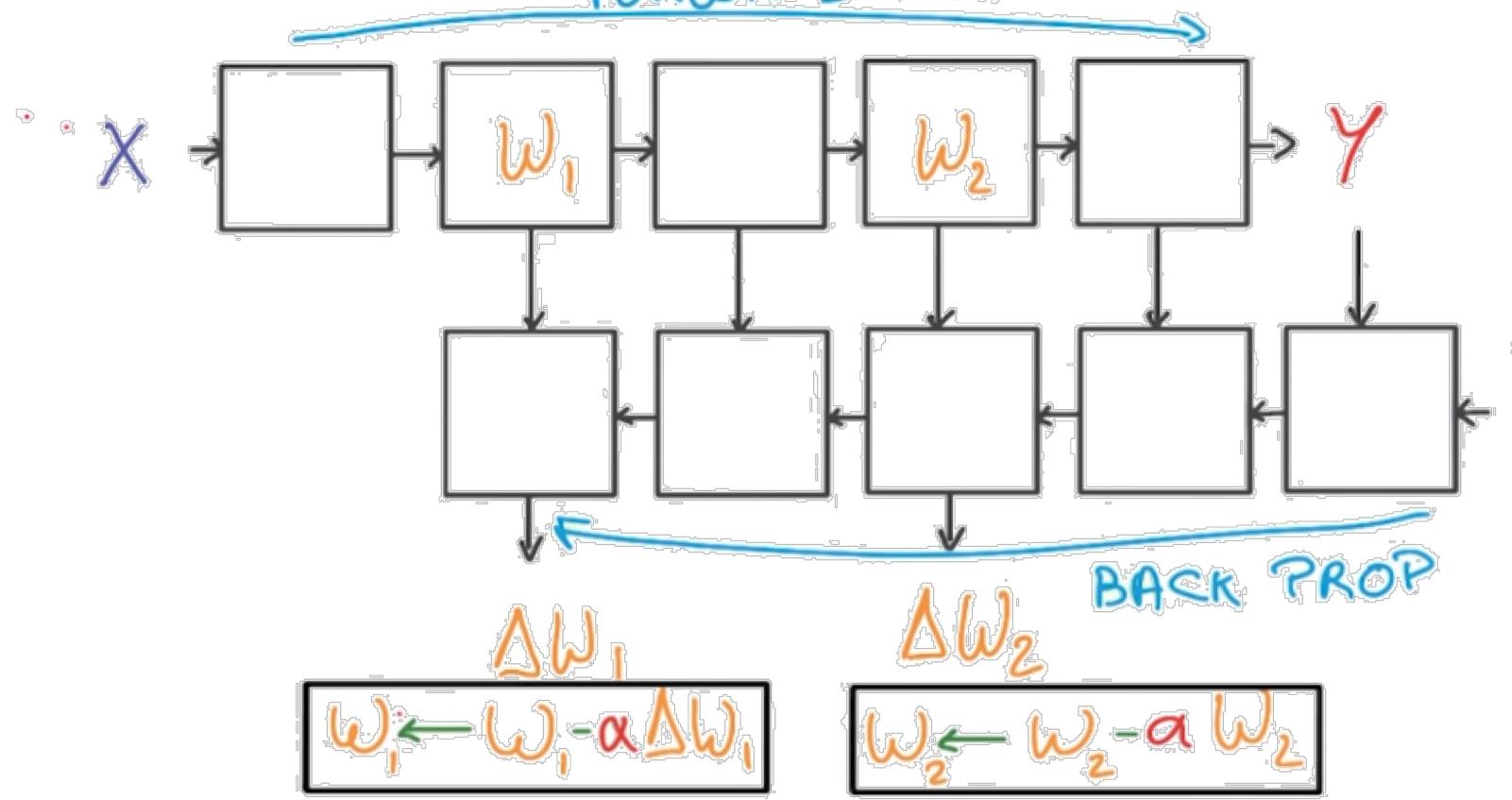
WX



$$\begin{aligned}
 & 3a(y+2)^2 + (y+4) \\
 & \frac{9(y+2)}{3} (y+4) \\
 & 39
 \end{aligned}$$

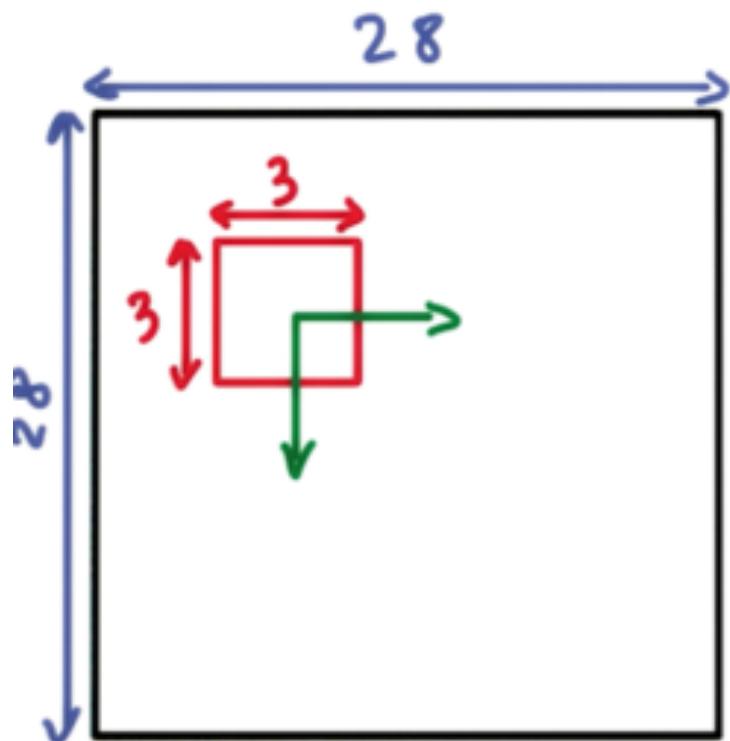
BACK - PROPAGATION

FORWARD PROP



$$\frac{3}{39} \left[a(y+1)^2 + (3y + 4)A(x+1) + 2(y+A)^3 + \frac{2}{3}(y+A)^2(x+1) \right]$$

STRIDES, DEPTH & PADDING



INPUT DEPTH = 3
OUTPUT DEPTH = 8

OUTPUT				
PADDING	STRIDE	WIDTH	HEIGHT	DEPTH
'SAME'	1	28	28	8
'VALID'	1	26	26	8
'VALID'	2	13	13	8

