

A large red square with a white border, centered on a white background. Inside the square, the text "Making AI about cats again" is written in white.

**Making AI
about cats
again**

Susana M. Guzman

@CapricaReloaded



CATS CATS CATS

$$V = \frac{1}{3} \pi r^2 \cdot h$$



$$y = ax^2 + bx + c$$

$$(x_1, x_2) = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\Delta = \sqrt{b^2 - 4ac}$$

	30°	45°	60°
sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
tan	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

A right-angled triangle with angles 30°, 60°, and 90°. The side opposite the 30° angle is labeled 'x'. The side opposite the 60° angle is labeled 'x√3'. The hypotenuse is labeled '2x'. A right-angle symbol is at the vertex between the two labeled sides.

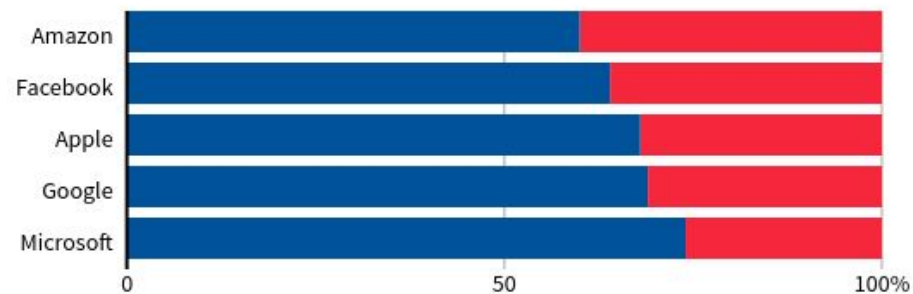
A right-angled triangle with angles 45°, 45°, and 90°. The two legs are labeled 's'. The hypotenuse is labeled 's√2'. A right-angle symbol is at the vertex between the two 's' sides.

12%

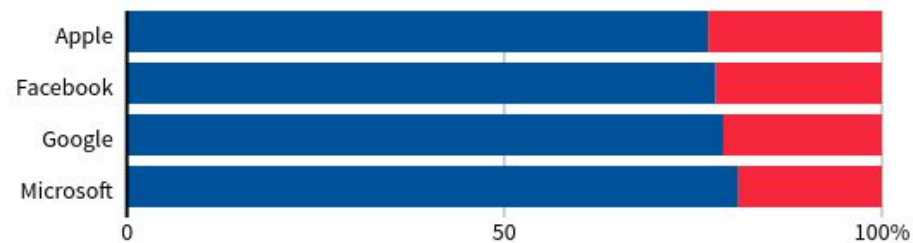
<https://www.wired.com/story/artificial-intelligence-researchers-gender-imbalance/>

GLOBAL HEADCOUNT

■ Male ■ Female



EMPLOYEES IN TECHNICAL ROLES



Note: Amazon does not disclose the gender breakdown of its technical workforce.

Source: Latest data available from the companies, since 2017.

By Han Huang | REUTERS GRAPHICS

DETECTAR IDIOMA

ALEMÁN

INGLÉS

ESPAÑOL

↔

INGLÉS

ALEMÁN

ESPAÑOL

Es una doctora

×

14/5000

🔊

Is a doctor

☆

📄 ✎ 🔗

DETECTAR IDIOMA

ALEMÁN

INGLÉS

ESPAÑOL

↔

INGLÉS

ALEMÁN

ESPAÑOL

Es un doctor

×

12/5000

🔊

He's a doctor

☆

📄 ✎ 🔗

Gender Shades audit, 2018

Accuracy in gender classification

	Darker Male	Darker Female	Lighter Male	Lighter Female	Largest Gap
IBM	88.0%	65.3%	99.7%	92.9%	34.4%
Face++	99.3%	65.5%	99.2%	94.0%	33.8%
Microsoft	94.0%	79.2%	100.0%	98.3%	20.8%

Chart: MIT Technology Review • Source: [Joy Buolamwini & Timnit Gebru](#) • Created with [Datawrapper](#)

Gender Shades II audit, 2019

Accuracy in gender classification

	Darker Male	Darker Female	Lighter Male	Lighter Female	Largest Gap
Amazon	98.7%	68.6%	100.0%	92.9%	31.4%
Kairos	98.7%	77.5%	100.0%	93.6%	22.5%
IBM	99.4%	83.0%	99.7%	97.6%	16.7%
Face++	98.7%	95.9%	99.5%	99.0%	3.6%
Microsoft	99.7%	98.5%	100.0%	99.7%	1.5%

Chart: MIT Technology Review • Source: [Joy Buolamwini & Inioluwa Deborah Raji](#) • Created with [Datawrapper](#)

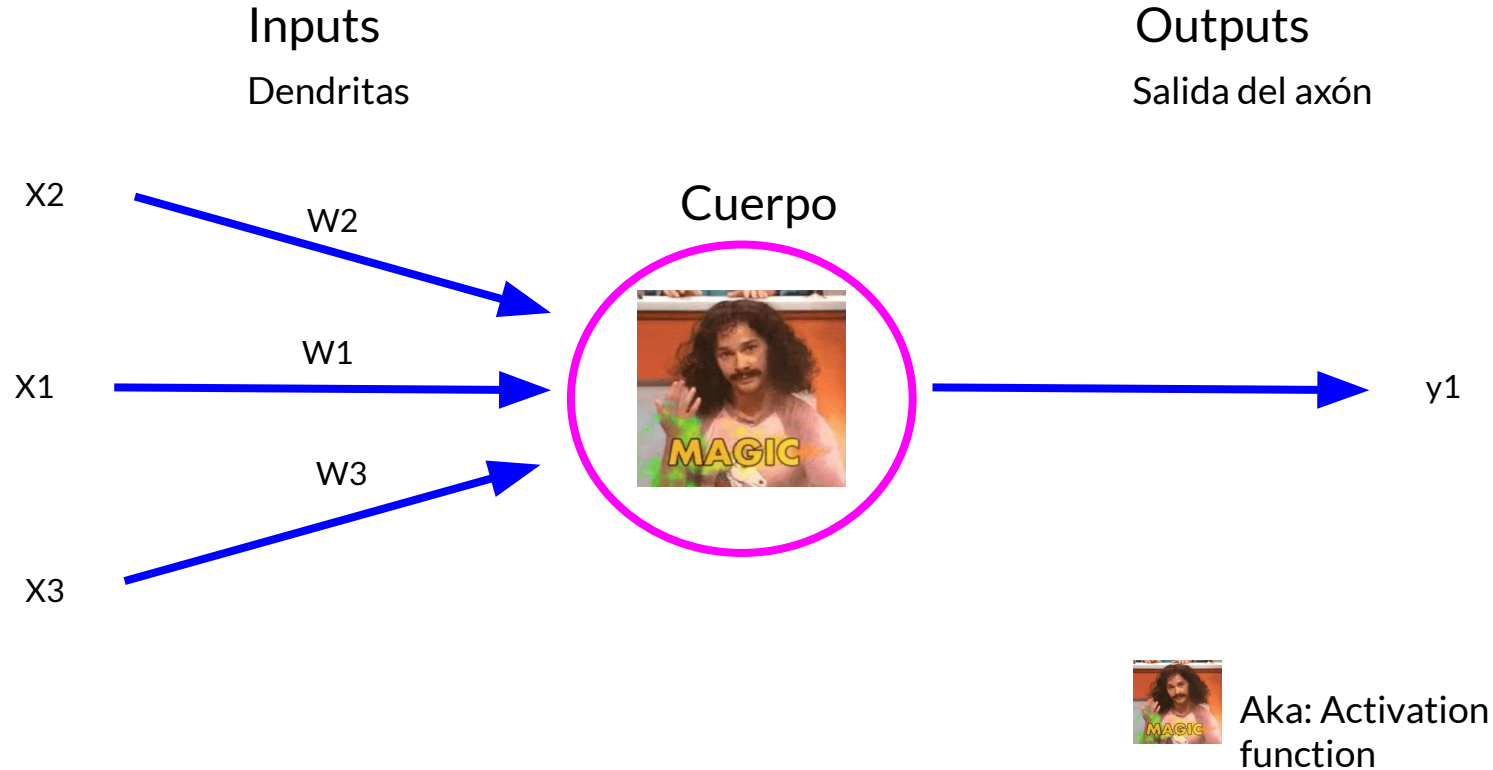
People with no idea
about AI, telling me my
AI will destroy the world

Me wondering why my
neural network is
classifying a cat as a dog..

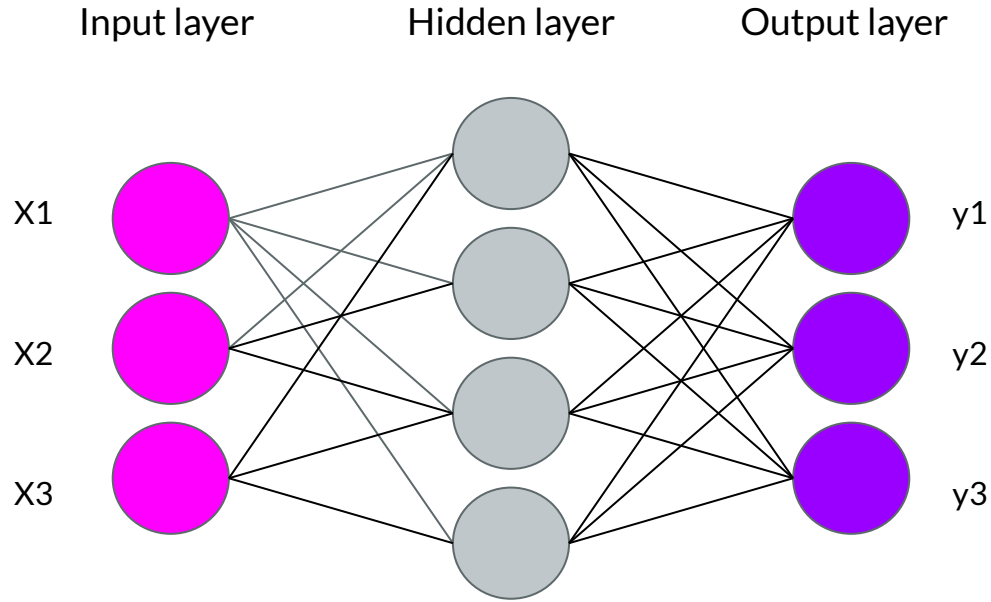


SCIENCEEEEE

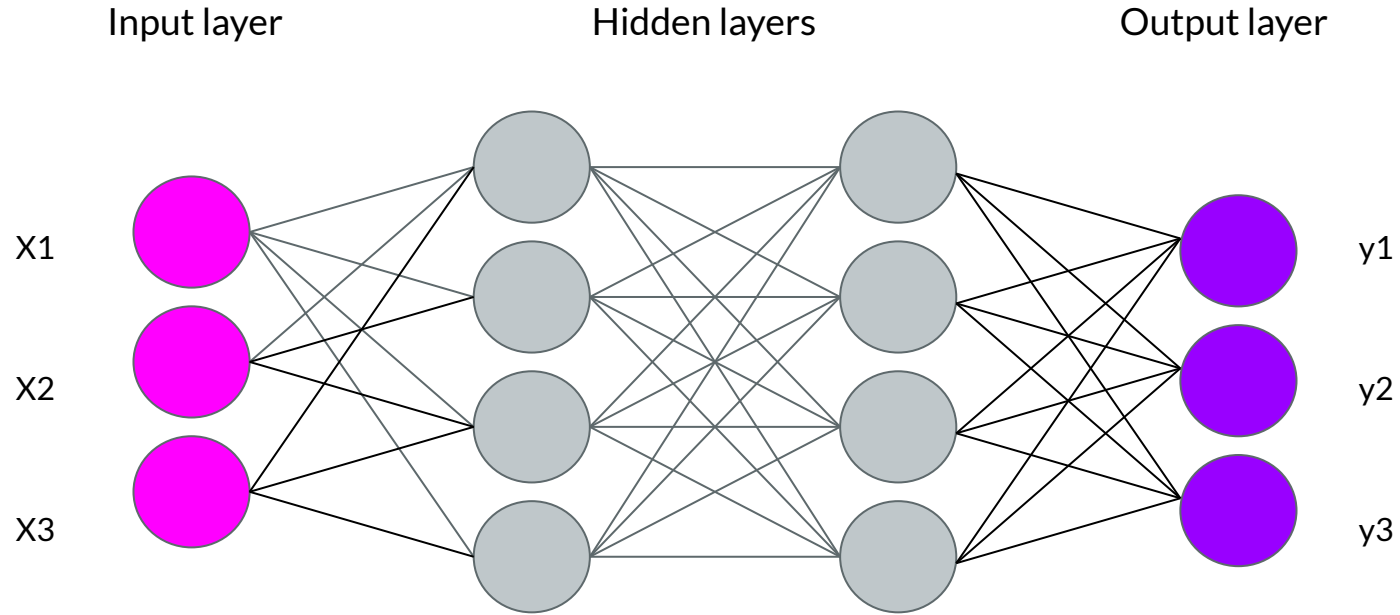
Perceptron unicapa



Perceptron multicapa



Perceptron multicapa



784!!!

Simplemente en la capa de entrada

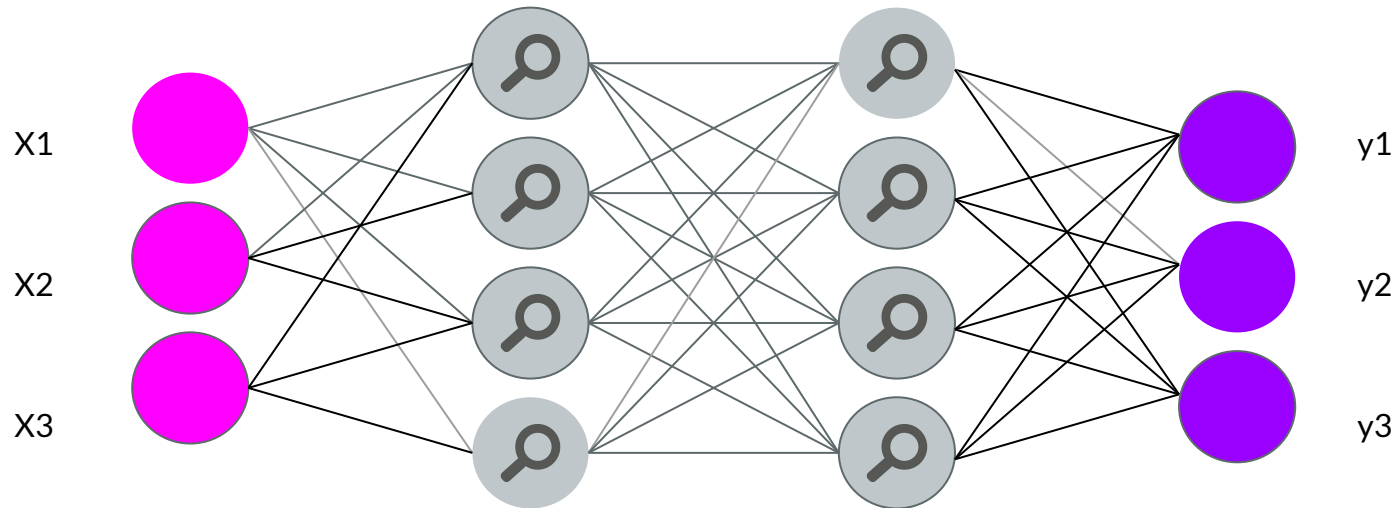
En blanco y negro

28x28x1

$$28 \times 28 \times 3 = 2352$$

Convolutional Neural Networks (ConvNets)

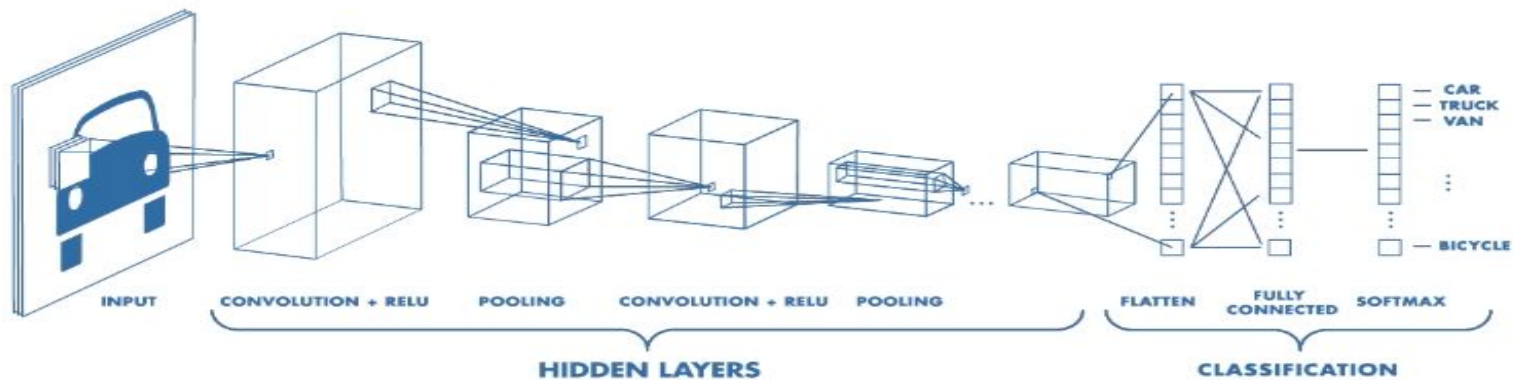
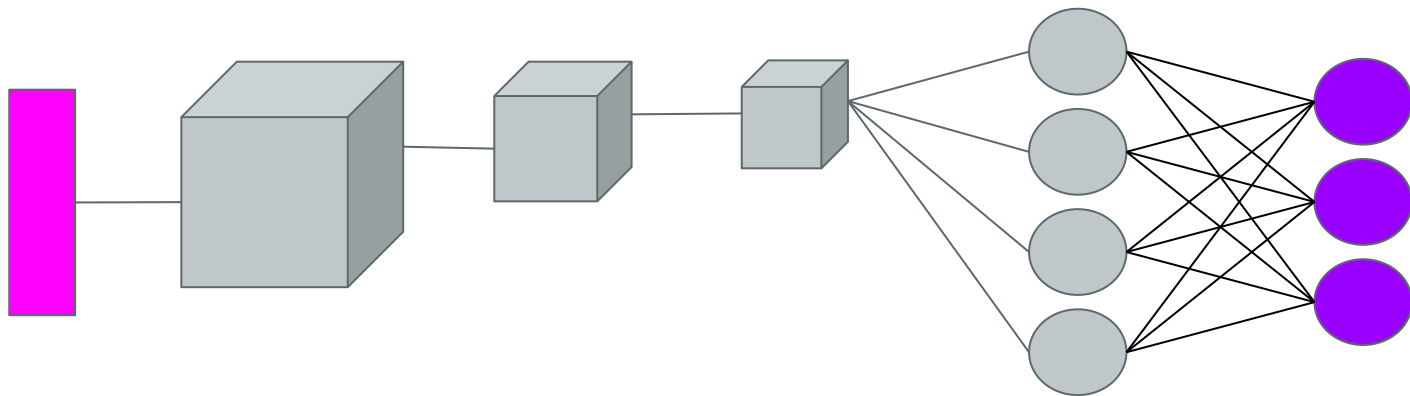
Convolutional layers



Input layer

Hidden layers

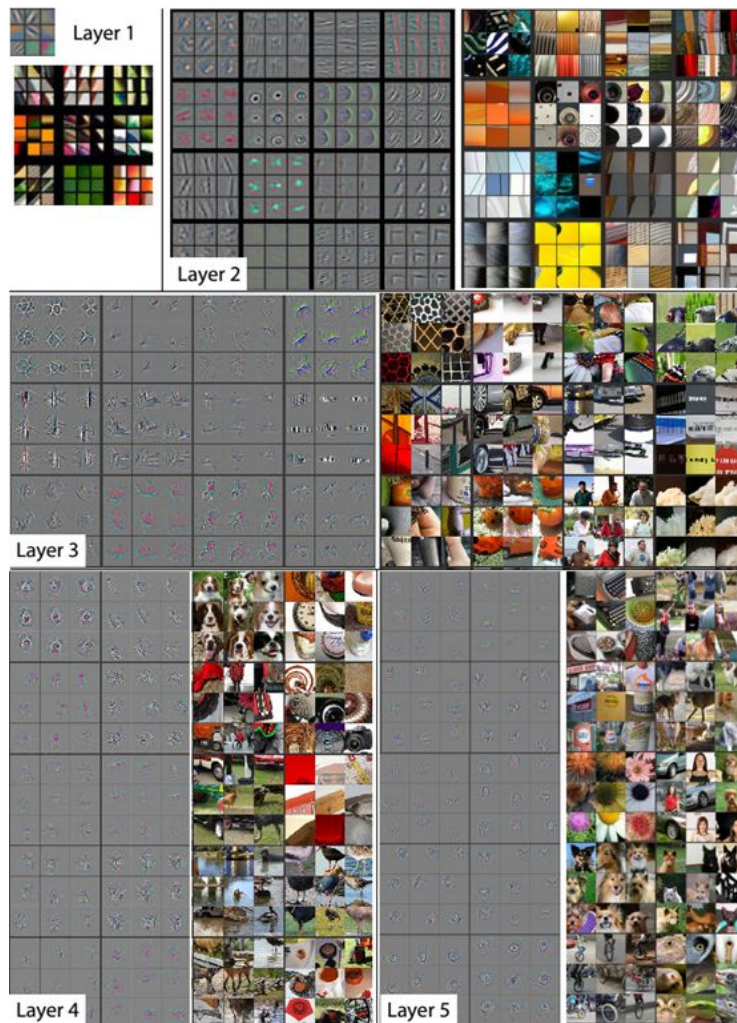
Output layer

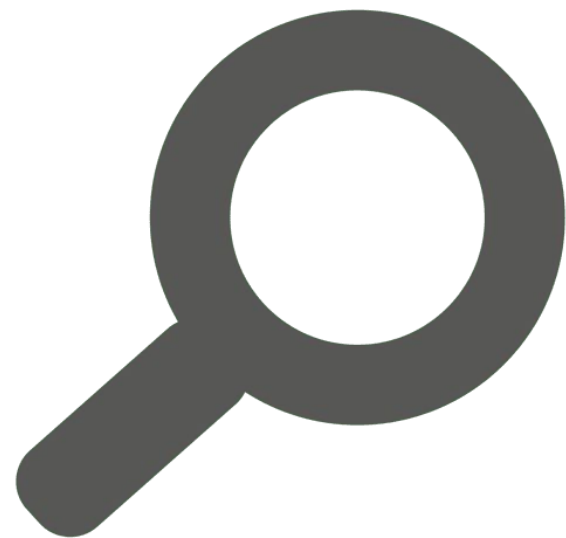






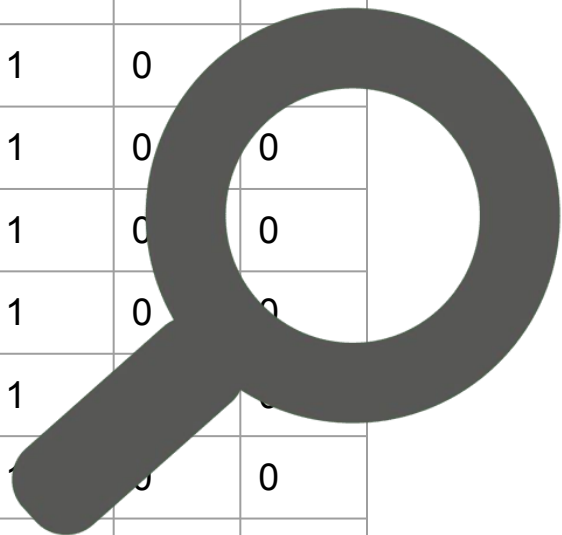






[illegible]

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1		
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0





Filtro (kernel) para bordes de 3x3

0	1	0
0	1	0
0	1	0

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0

0	1	0
0	1	0
0	1	0

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0

0	1	0
0	1	0
0	1	0

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0

0	1	0
0	1	0
0	1	0

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0

0	1	0
0	1	0
0	1	0

Imagen

	0	1	2
0	0	0	0
1	0	0	0
2	0	0	0

*

Filtro

	0	1	2
0	0	1	0
1	0	1	0
2	0	1	0

= 0

$$\begin{aligned}
 &(0 * 0) + (0 * 1) + (0 * 0) + \\
 &(0 * 0) + (0 * 1) + (0 * 0) + \\
 &(0 * 0) + (0 * 1) + (0 * 0)
 \end{aligned}$$

Input: 12x12x1

0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	0	1	1	1	1	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	0	0	1	1	0	0	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0
0	0	1	1	1	0	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	0	0	0
0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0

Filter: 3x3x1

0	1	0
0	1	0
0	1	0

Ouput: 10x10x1
Feature map

0	0	3	2	1	1	2	3	0	0
0	1	3	3	2	2	3	3	1	0
0	2	2	3	3	3	3	2	2	0
0	3	1	2	3	3	2	1	3	0
0	3	0	1	3	3	1	0	3	0
0	3	1	1	3	3	1	1	3	0
0	3	2	2	2	2	2	2	3	0
0	2	3	3	2	2	3	3	2	0
0	1	2	3	2	2	3	2	1	0
0	1	2	3	3	3	3	2	1	0

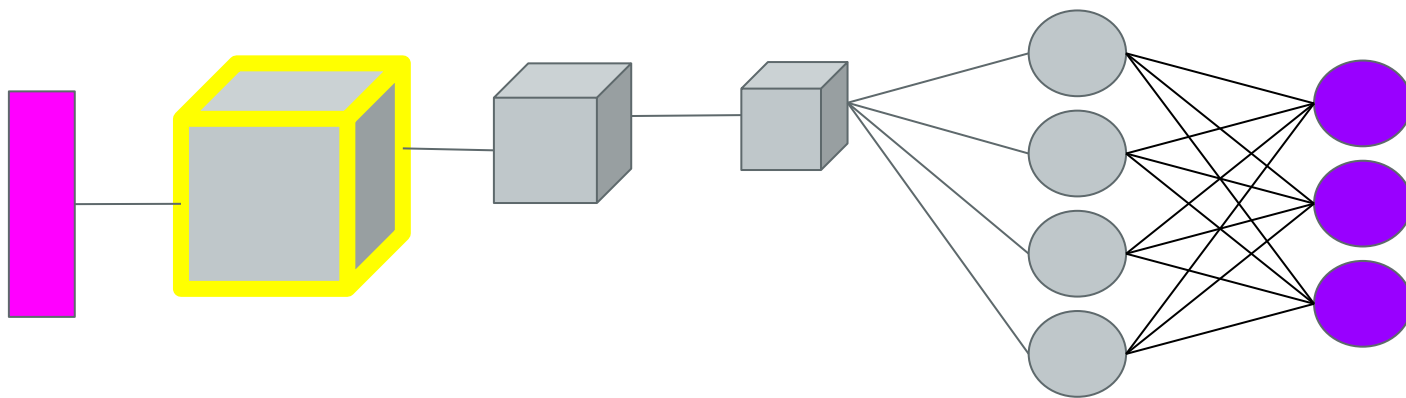
<https://ujjwalkarn.me/2016/08/11/intuitive-explanation-convnets/>



Input layer

Hidden layers

Output layer

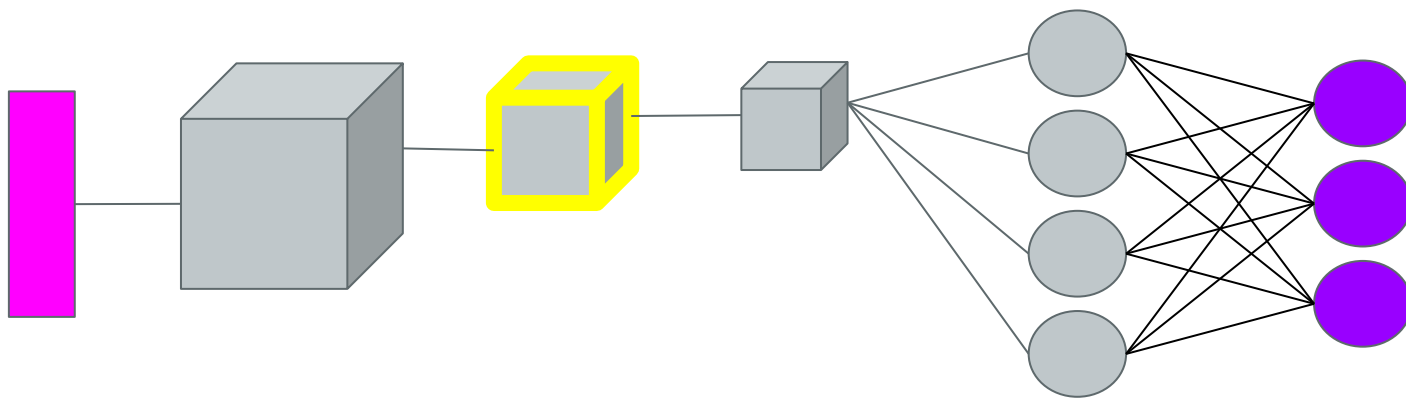


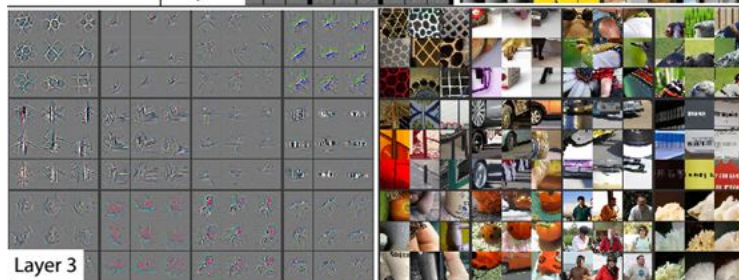
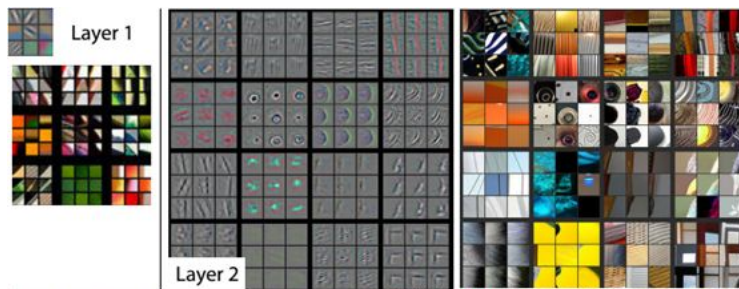


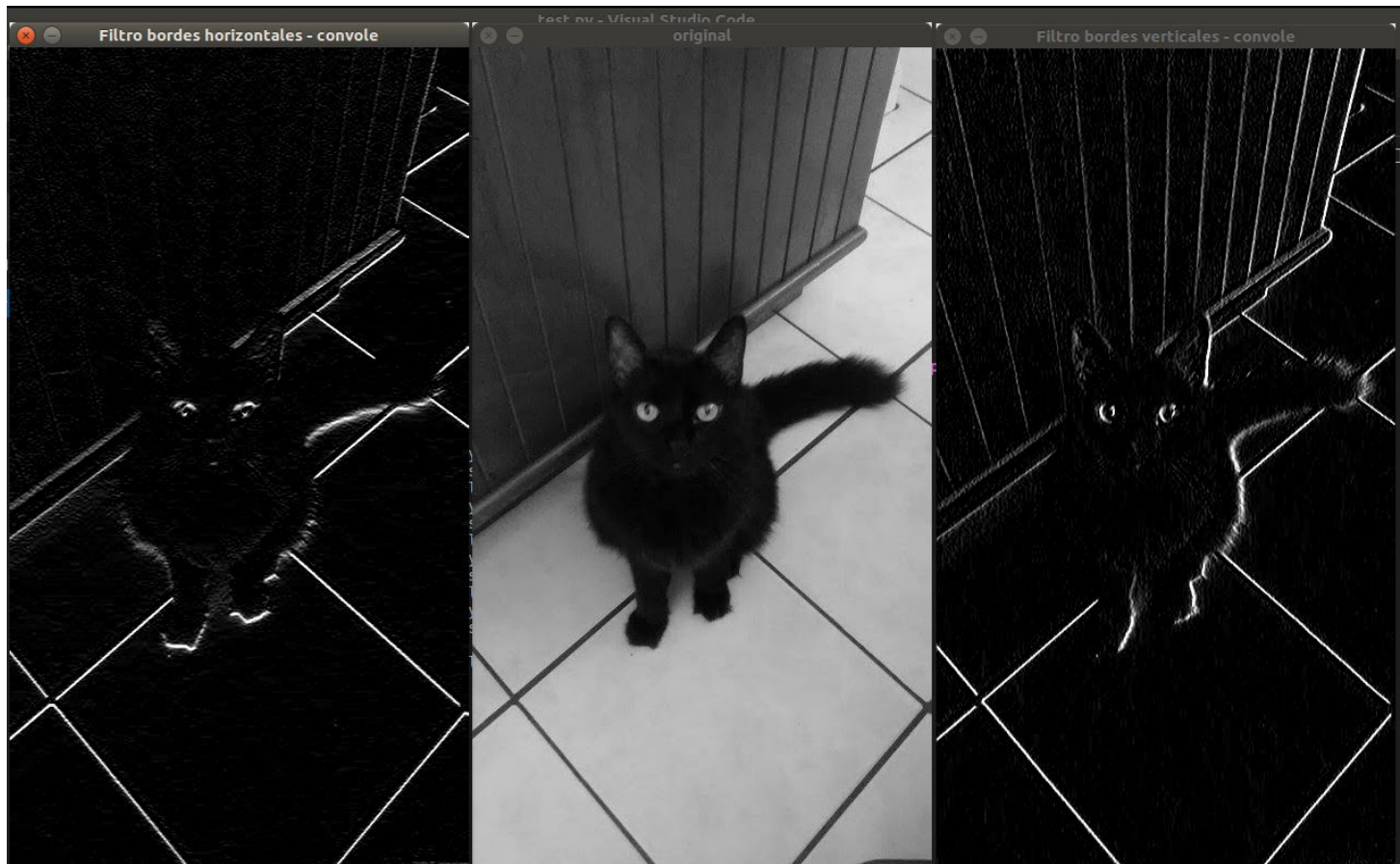
Input layer

Hidden layers

Output layer







TensorBoard

tf.nn.conv2d | TensorFlow: x | FloorplansAugmented20: x | FloorplansAugmented20: x | satellite_unet.py

Not secure | rigd:6006/#images&runSelectionState=eyJTYXRibGxpdmVbmV0LTlwNDh4MTAyNC1sc18wMDAyLWJhdGNoXzZmZmlyc3RfYGF5ZjZLTzE2LWRibG9ja3NFOS9TYXRibGxpdmVbmV0LTZlZTE5LzE2LTZlZTE1LTU4ljp0cnVl...

TensorBoard

SCALARSIMAGESGRAPHSTEXT

INACTIVE

☐ Show actual image size

Brightness adjustment

RESET

Contrast adjustment

RESET

Runs

Write a regex to filter runs

☒ ☐ SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

☒ ☐ SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56/test



train/outputs/image/0

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)





train/outputs/image/1

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)



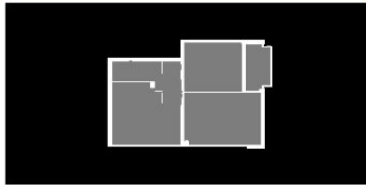


train/outputs/image/2

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)



train/targets/image/0

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)



train/targets/image/1

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)

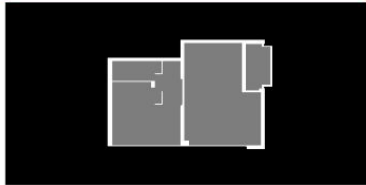


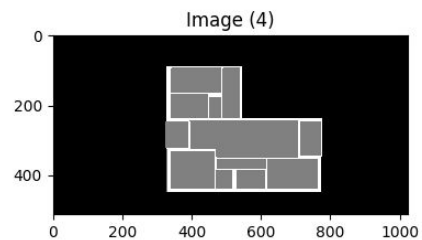
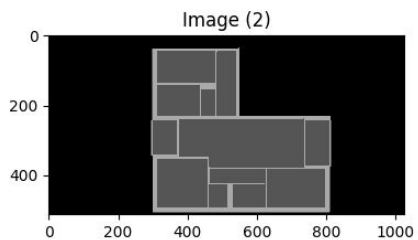
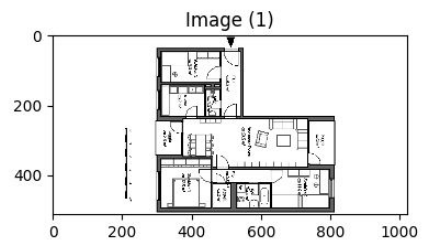
train/targets/image/2

SatelliteUnet-2048x1024-lr_2e05-batch_3-first_layers-16-dblocks_10/SatelliteUnet-17-09-19-13-12-56

step 90,732

Wed Sep 18 2019 11:24:28 GMT+0200 (Central European Summer Time)





Gracias!

Susana M. Guzman

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Preguntas?