Je vois avec mes yeux

Jeff Abrahamson

20 avril 2017

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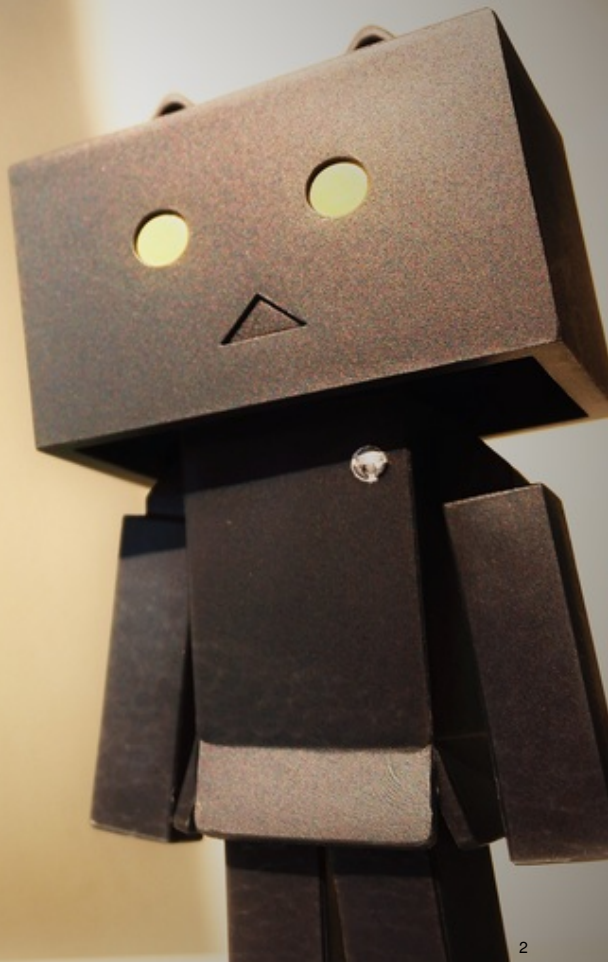
Le problème

Comprendre ce que je fais



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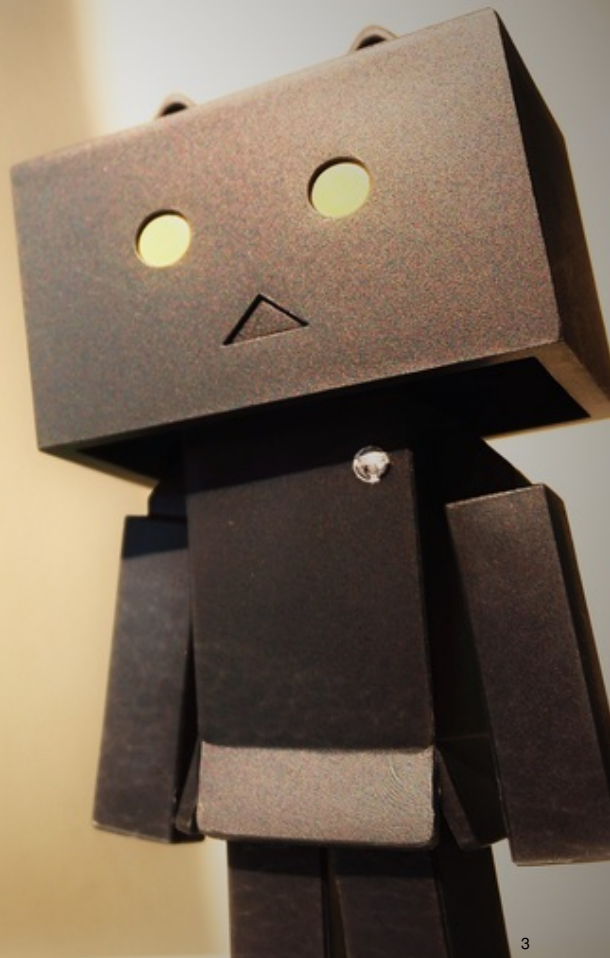
Le problème

Prédire



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Quelles données ?

Quelles données ?
Mon ordinateur

Quelles données ?
Titre de fenêtre

Quelles données ?
Miniature d'image de fenêtre

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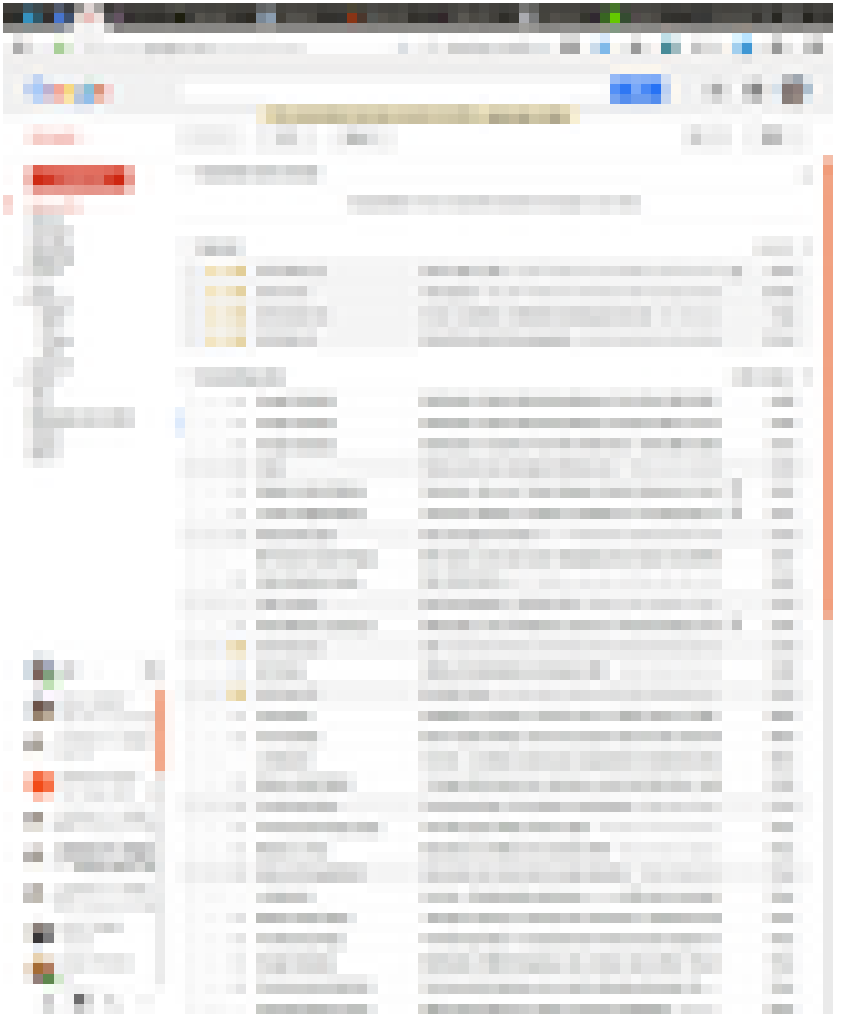

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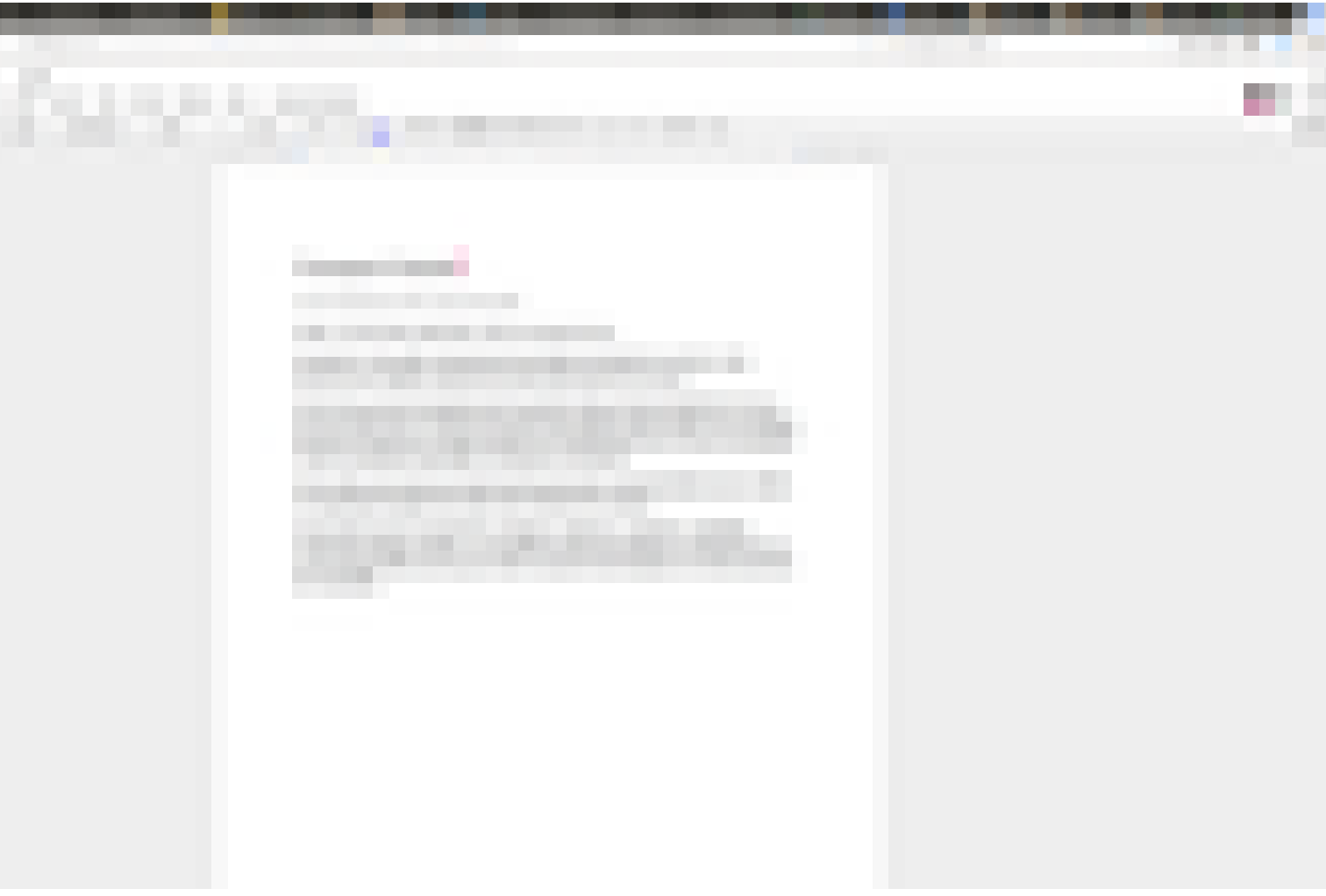

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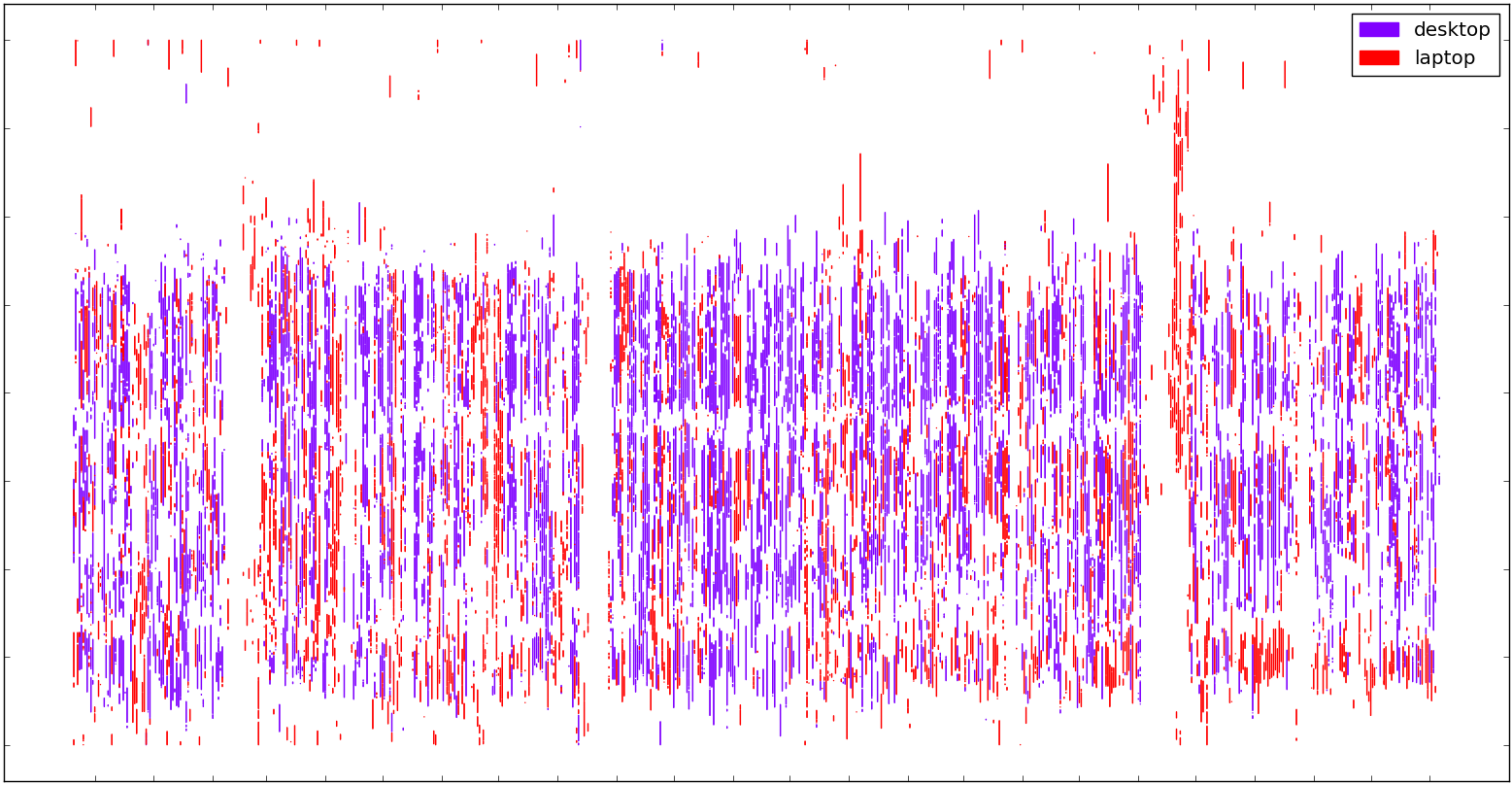

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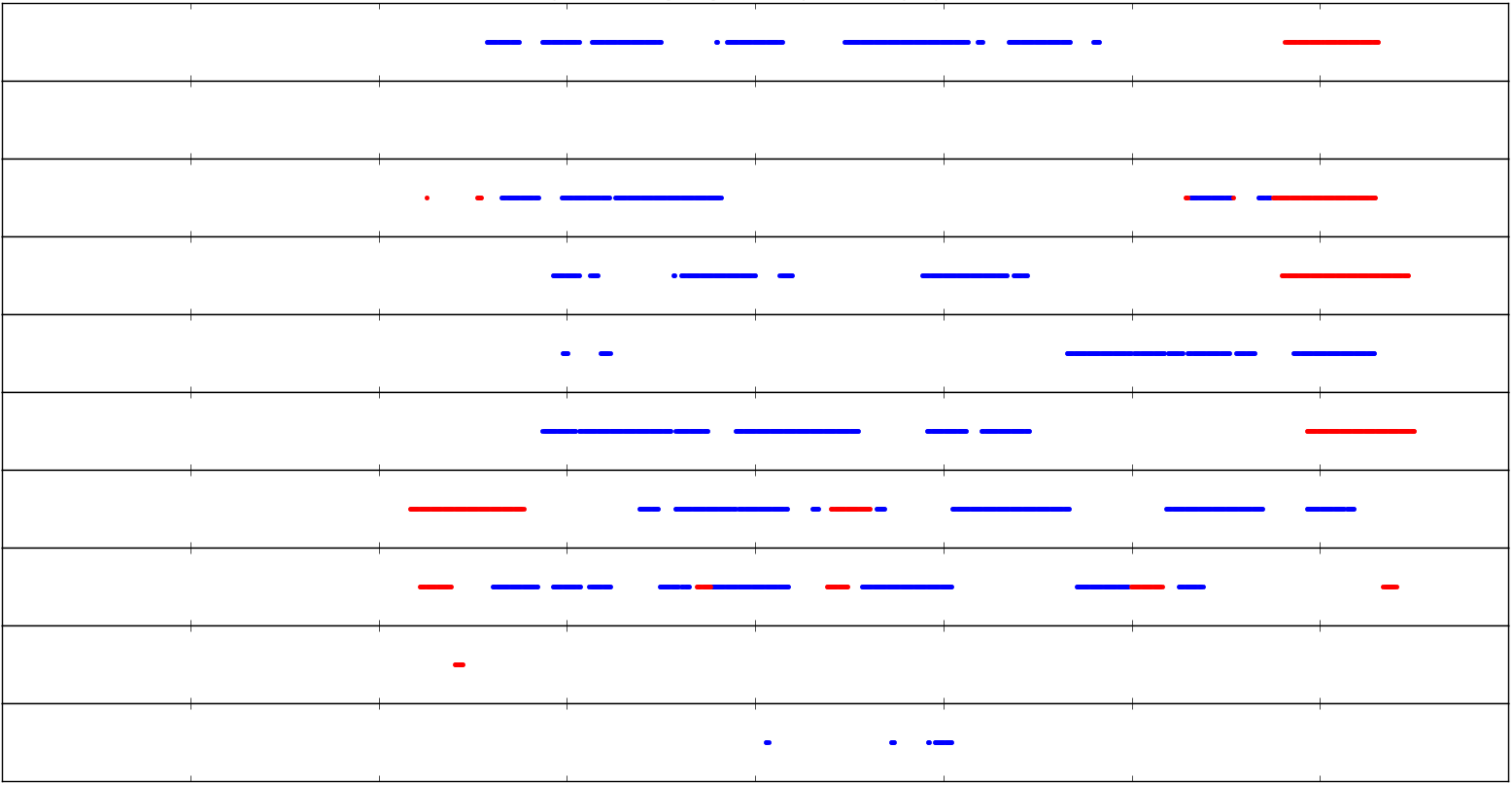
Computer Use by Day (desktop=blue, laptop=red)



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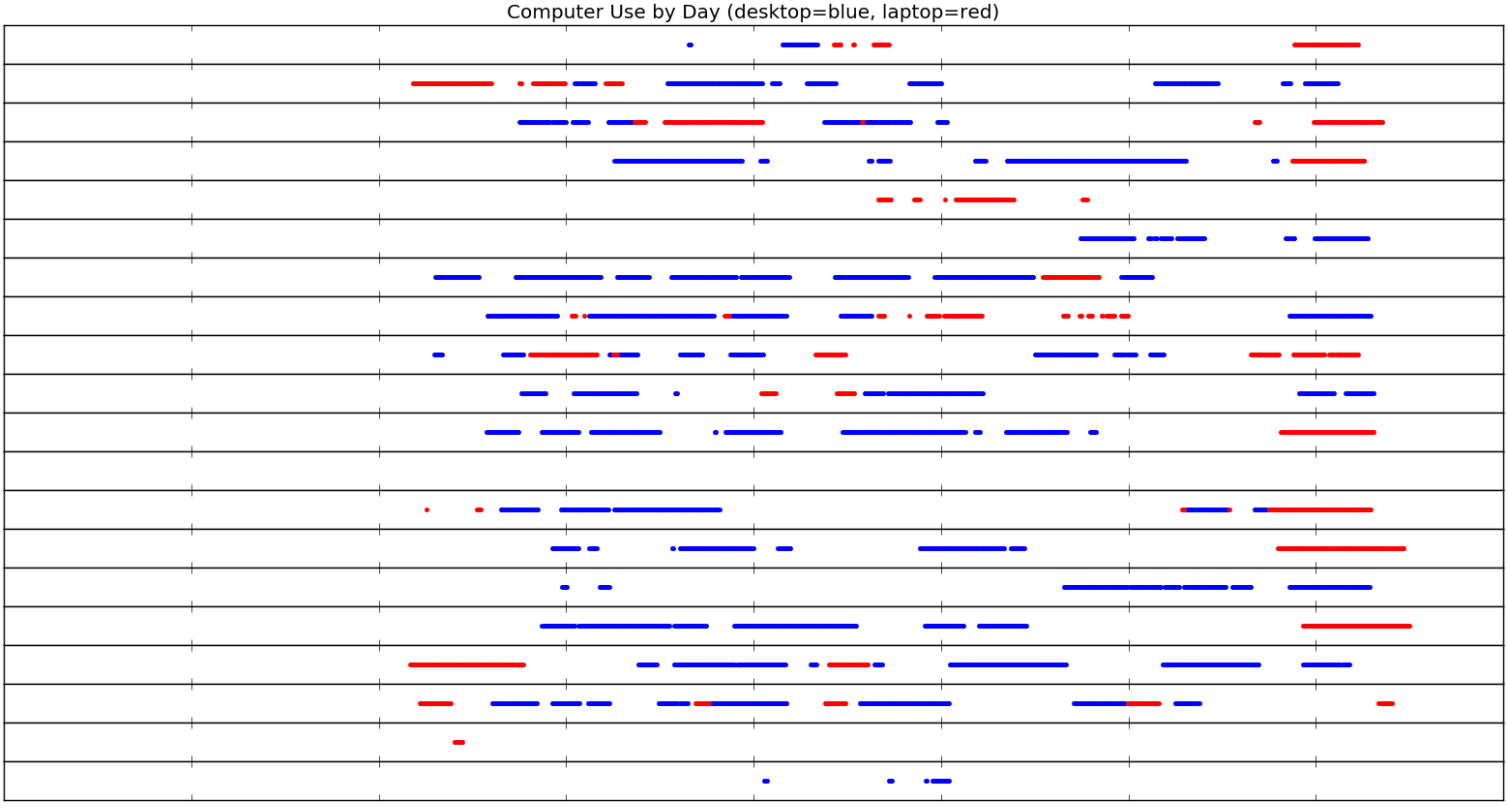

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supervisé

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model

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strategie générale : critères

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strategie générale : étiqueter

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strategie générale : auto-étiqueter

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strategie générale : séquences

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stratégie 1 : sac de mot

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stratégie 1 : tf-idf

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stratégie 2 : word2vec

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deux stratégies : trouver une séquence

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```
Le chat est orange.
Le chien court vite.
```

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```
6   1    7    2
Le chat est orange.
Le chien court vite.
6    3     4    5
```

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6 1 7 2

Le chat est orange.

Le chien court vite.

6 3 4 5

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Bag of Words

```
[[6, 1, 7, 2],

 [6, 3, 4, 5]]
```

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Bag of Words

```
[[6, 1, 7, 2]
 [1, 1, 0, 0, 0, 1, 1]
 [0, 0, 1, 1, 1, 1, 0]
 [6, 3, 4, 5]]
```

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Bag of Words

```
[1, 1, 0, 0, 0, 1, 1]
[0, 0, 1, 1, 1, 1, 0]
```

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```
Le chat est orange.
  [1, 1, 0, 0, 0, 1, 1]
  [0, 0, 1, 1, 1, 1, 0]
Le chien court vite.
```

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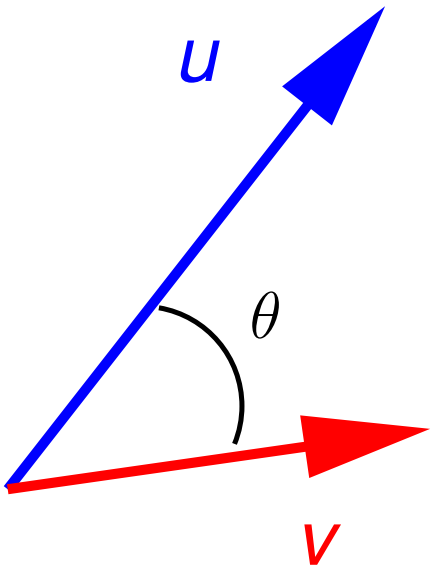
Cosine Similarity



$$\cos\theta = \frac{u \cdot v}{\| u \| \| v \|}$$

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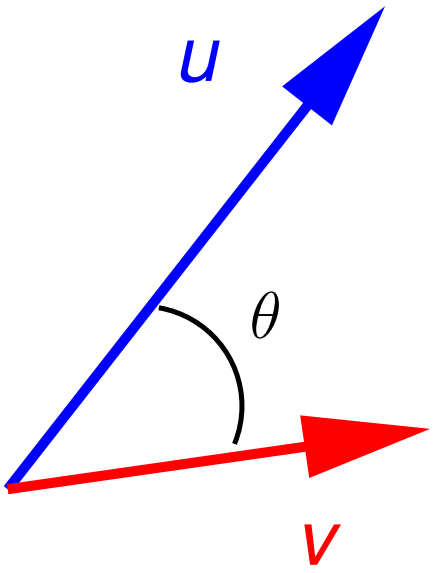

$$\cos\theta = u \cdot v$$

(if u and v have norm 1)

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Le chat est orange.

[1, 1, 0, 0, 0, 1, 1]

[0, 0, 1, 1, 1, 1, 0]

Le chien court vite.

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$u = [1,\ 1,\ 0,\ 0,\ 0,\ 1,\ 1]$

$v = [0,\ 0,\ 1,\ 1,\ 1,\ 1,\ 0]$

$u \cdot v = 0 + 0 + 0 + 0 + 0 + 1 + 0 = 1$

$$\cos\theta = \frac{u \cdot v}{\| u \| \| v \|} = \frac{1}{\sqrt{4} \cdot \sqrt{4}} = \frac{1}{4}$$

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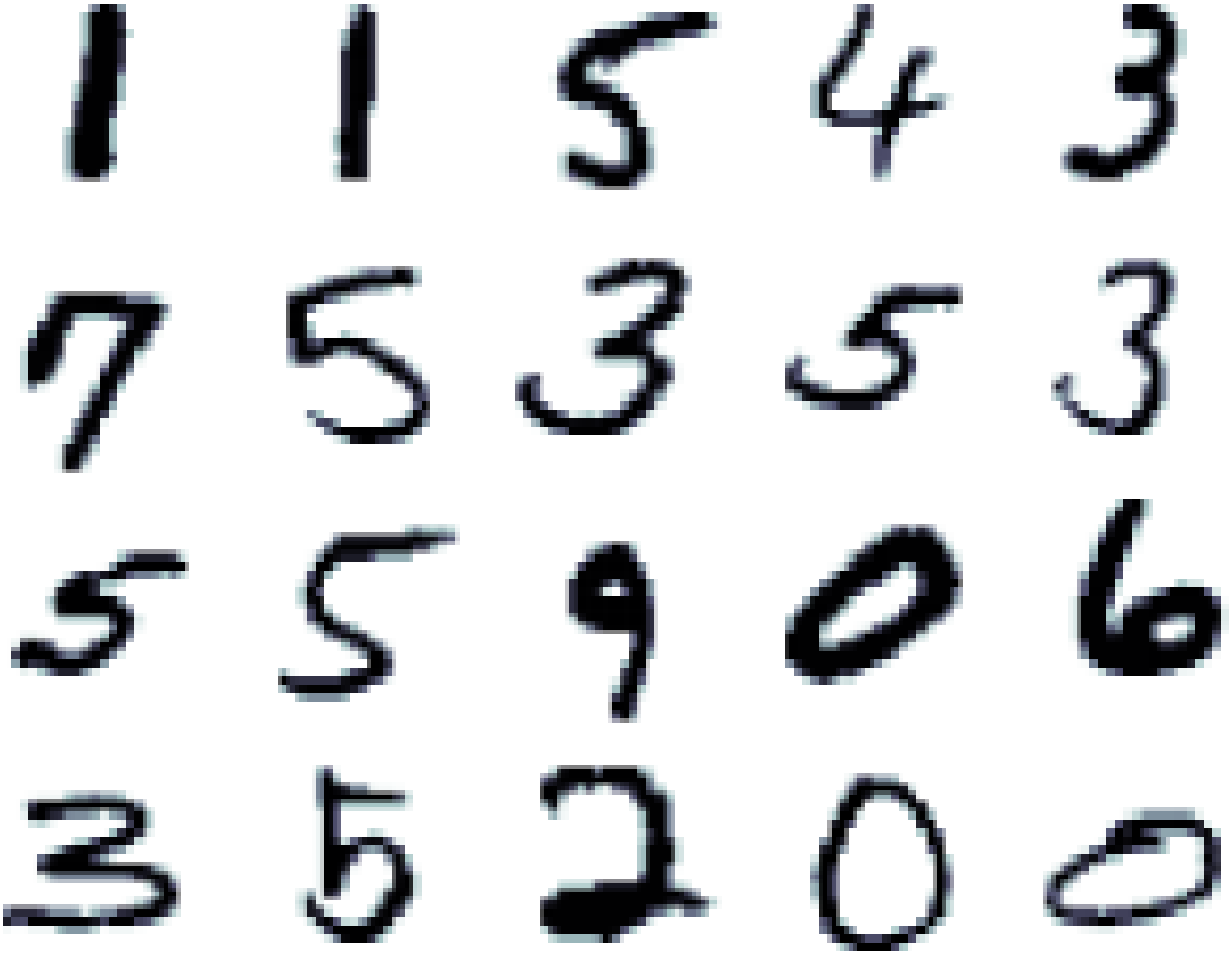

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Un exemple (trop) vite

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Linear neuron

$$y = b + \sum_i x_i w_i$$

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$$y = b + \sum_i x_i w_i$$

where

$$y = \text{output}$$
$$b = \text{bias}$$
$$x_i = i^{\text{th}} \text{ input}$$
$$w_i = \text{weight on } i^{\text{th}} \text{ input}$$

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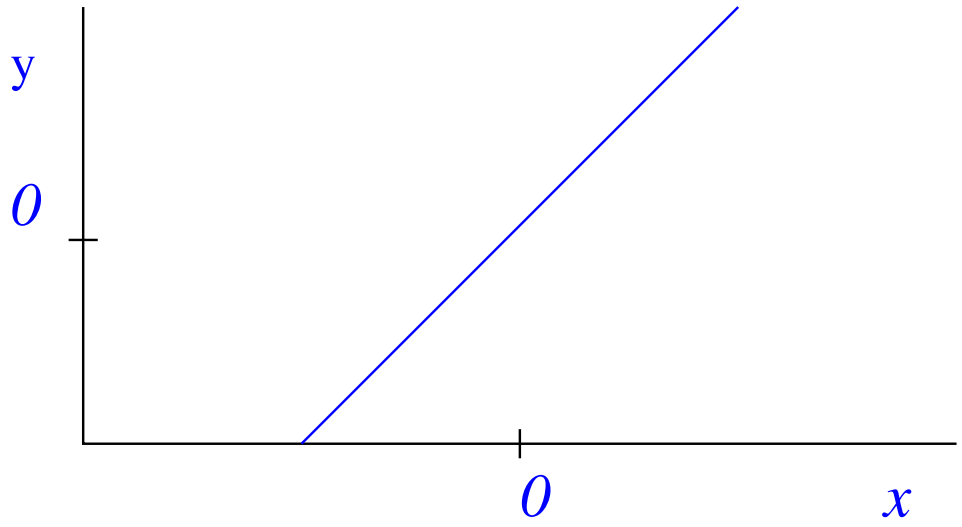
Linear neuron

$$y = b + \sum_i x_i w_i$$



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- Input neurons: pixels
- Output neurons: classes (digits)
- Connect them all! *(bipartite)*

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- Input neurons: pixels
- Output neurons: classes (digits)
- Connect them all! *(bipartite)*
- Initialize input weights to random

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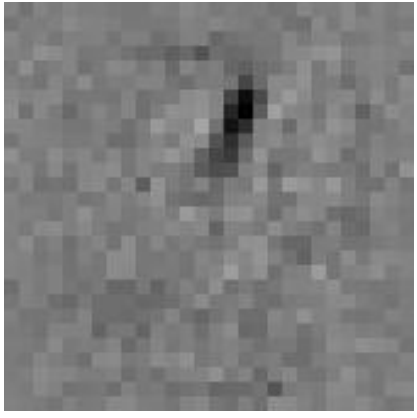
- Input neurons: pixels
- Output neurons: classes (digits)
- Connect them all! *(bipartite)*
- Initialize input weights to random



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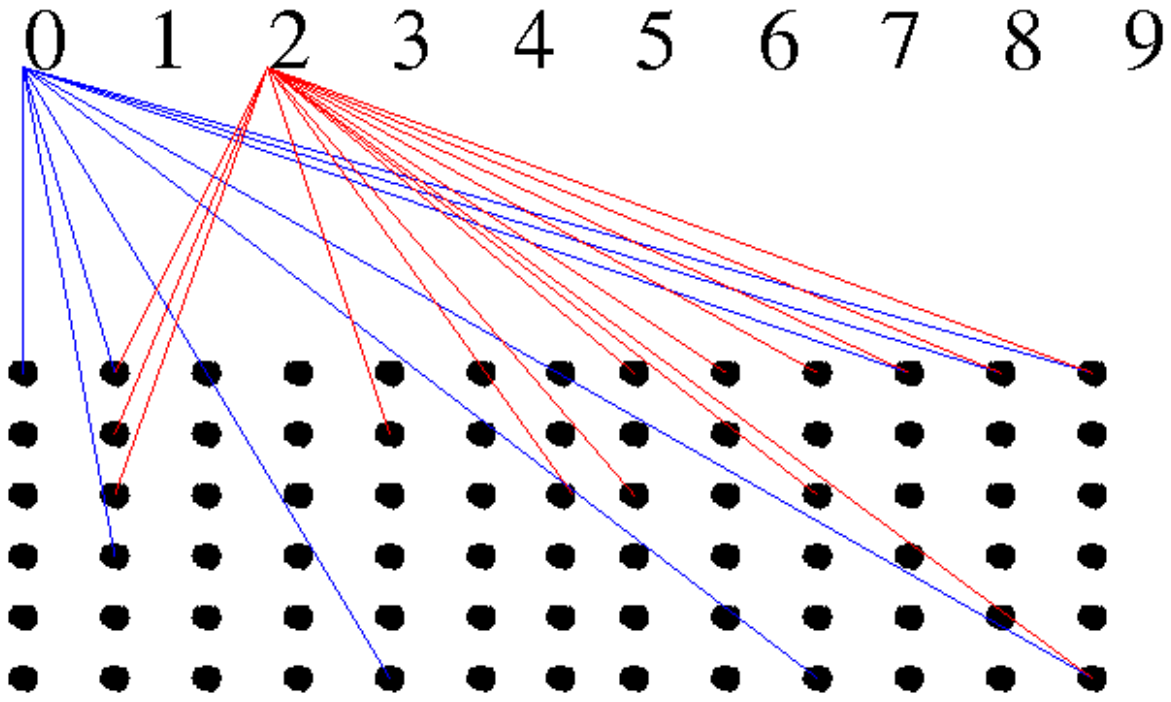
Example: handwriting recognition of digits



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To train this ANN:

- Increment weights from active pixels going to correct class
- Decrement weights from active pixels going to predicted class

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To train this ANN:

- Increment weights from active pixels going to correct class
- Decrement weights from active pixels going to predicted class

When it's right, nothing happens. This is good.

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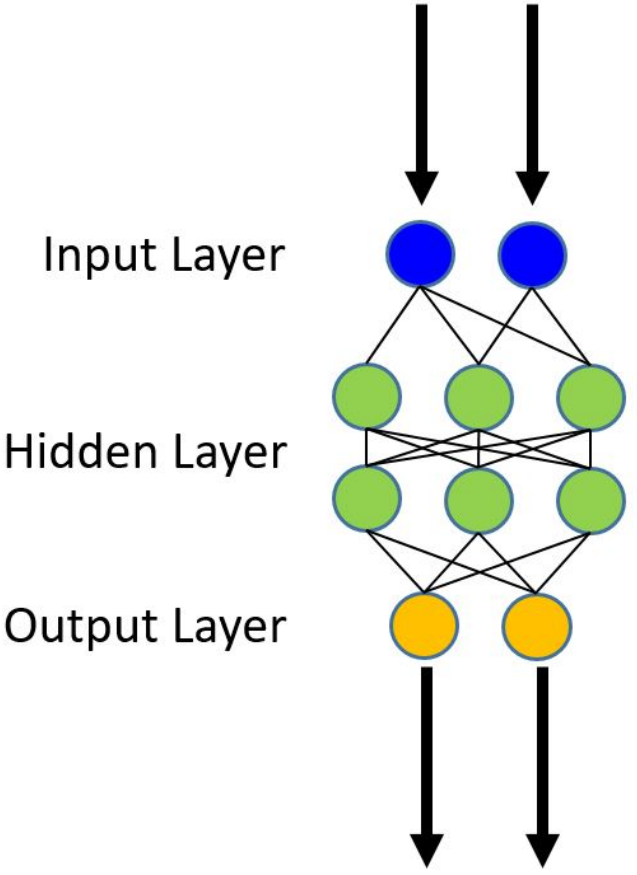

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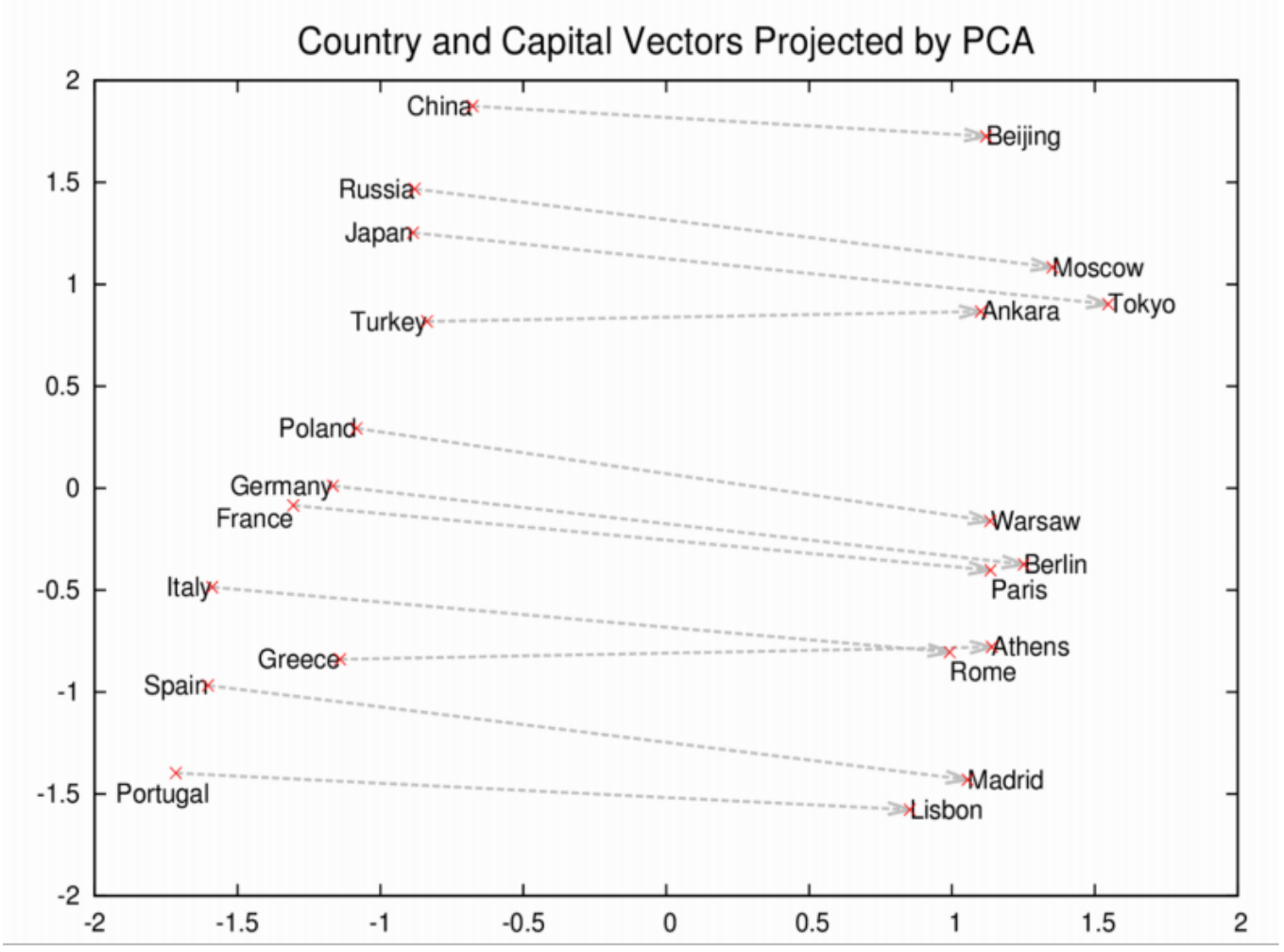

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	Term	Similarity
	"shift"	0.933104
	"gown"	0.887743
	"skirt"	0.881672
	"bandage"	0.880162
	"midi"	0.869786

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