

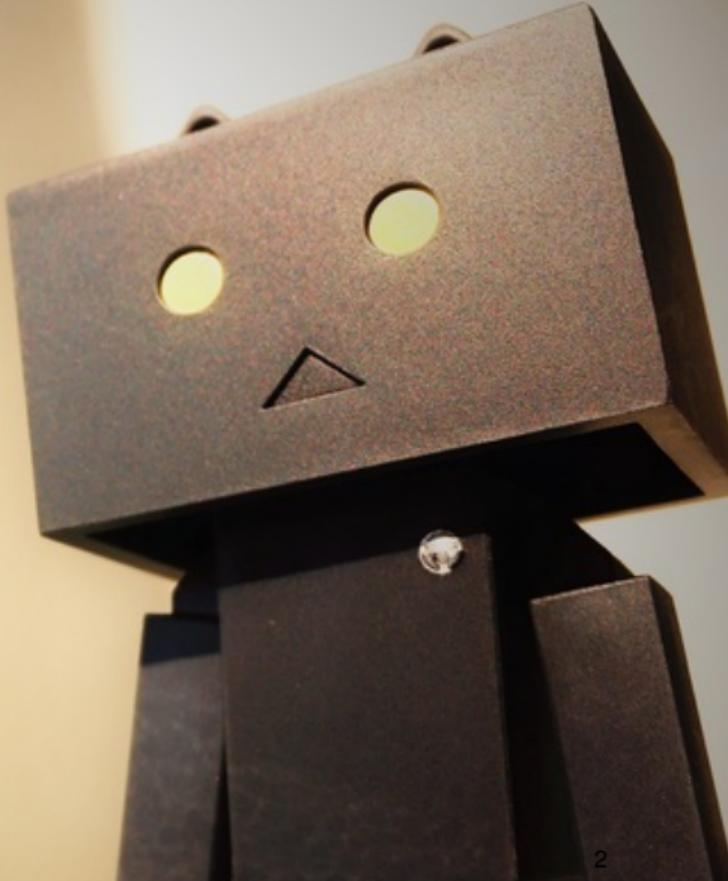
WTF am I Doing?

Jeff Abrahamson

7 May 2017

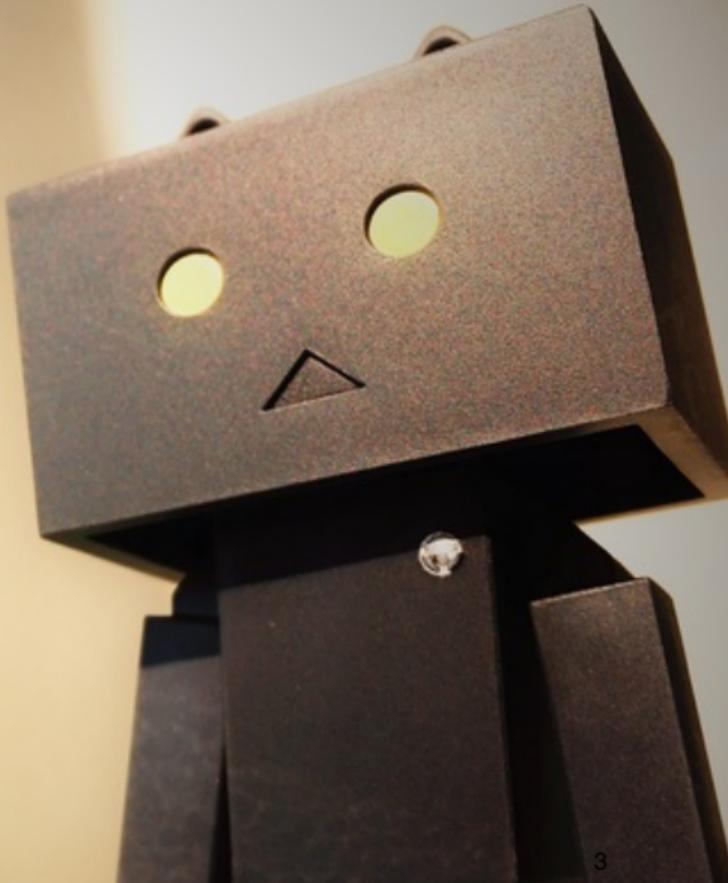
The problem

Understand my behaviour



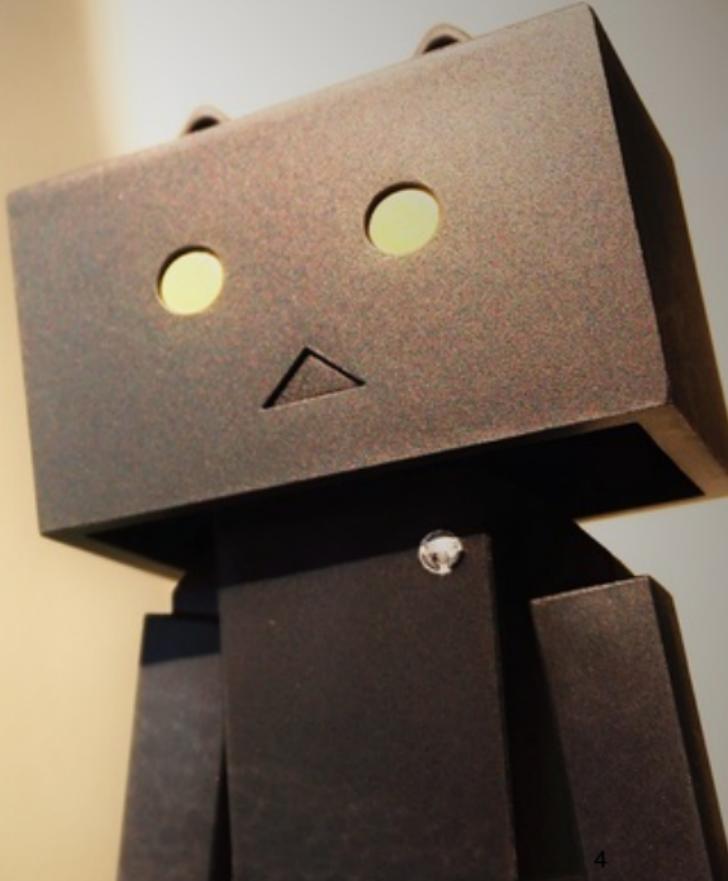
The problem

Predict



The problem

But it's a hobby...



Where's the data?

www.softpi.com

G%

My computer

Where's the data?

Window titles

Where's the data?



Window thumbnails

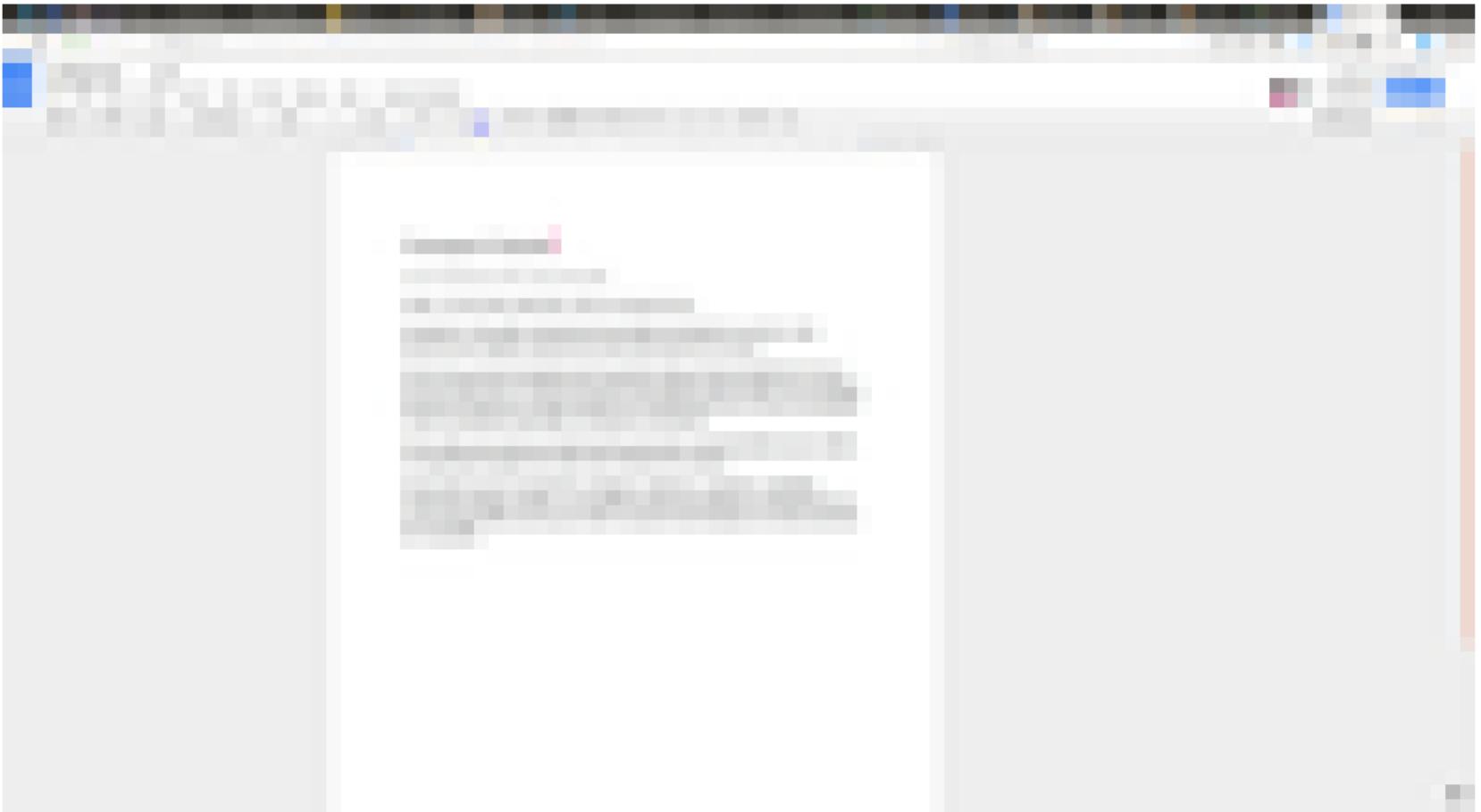
Where's the data?

1493904959 emacs@birdsong -
talk.tex :
/home/jeff/src/jma/talks/2017-05__PyDataLondon/talk.tex

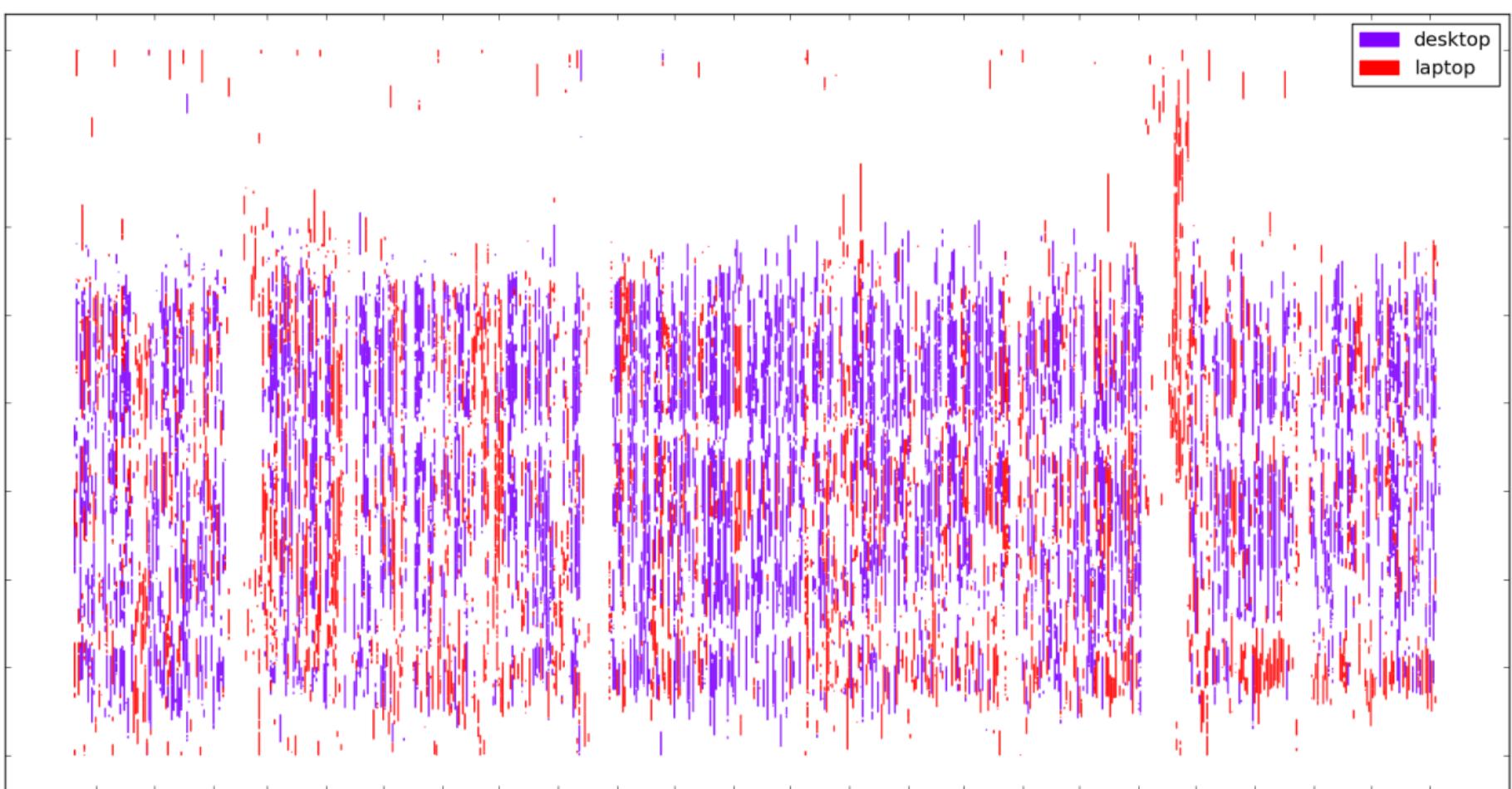




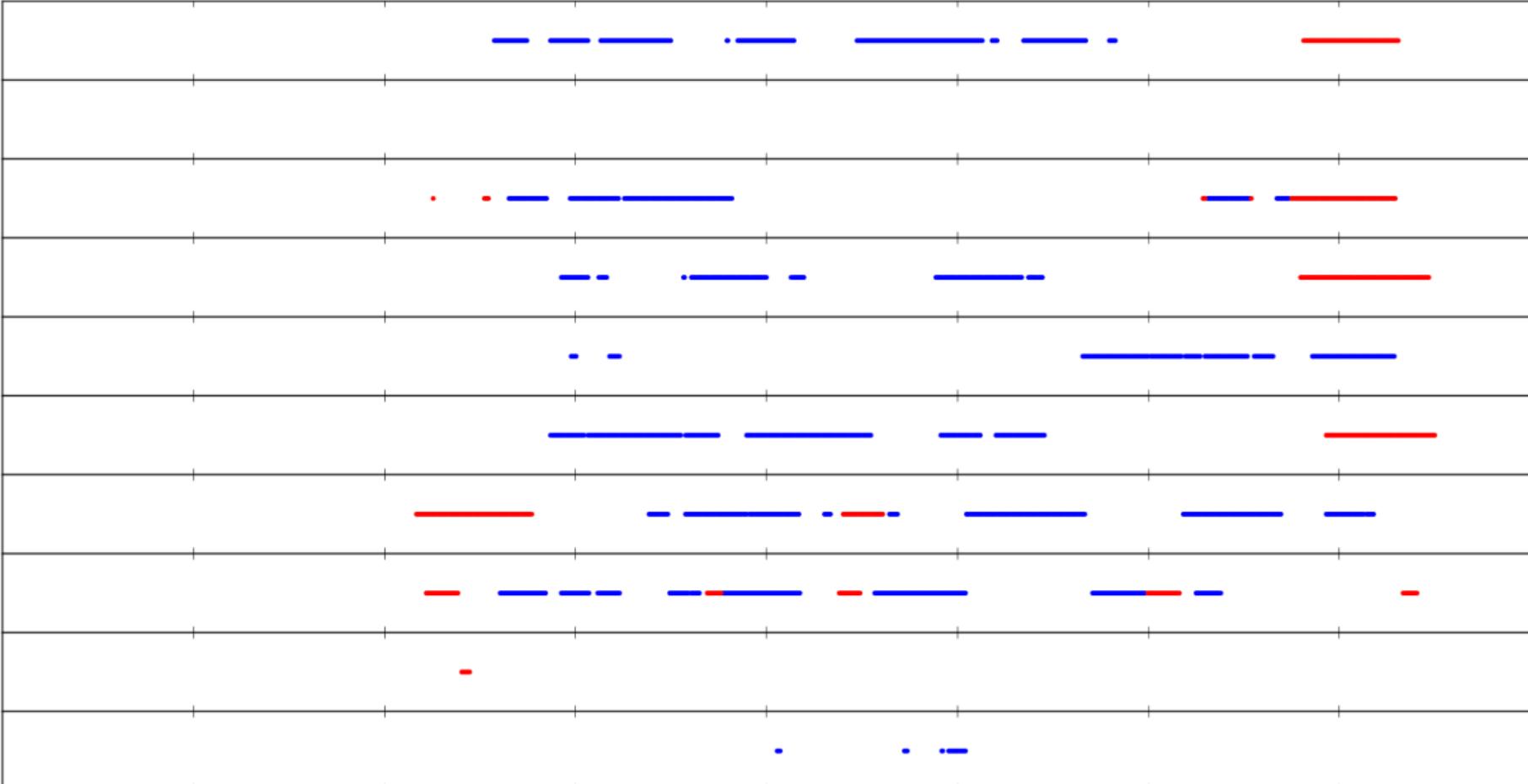




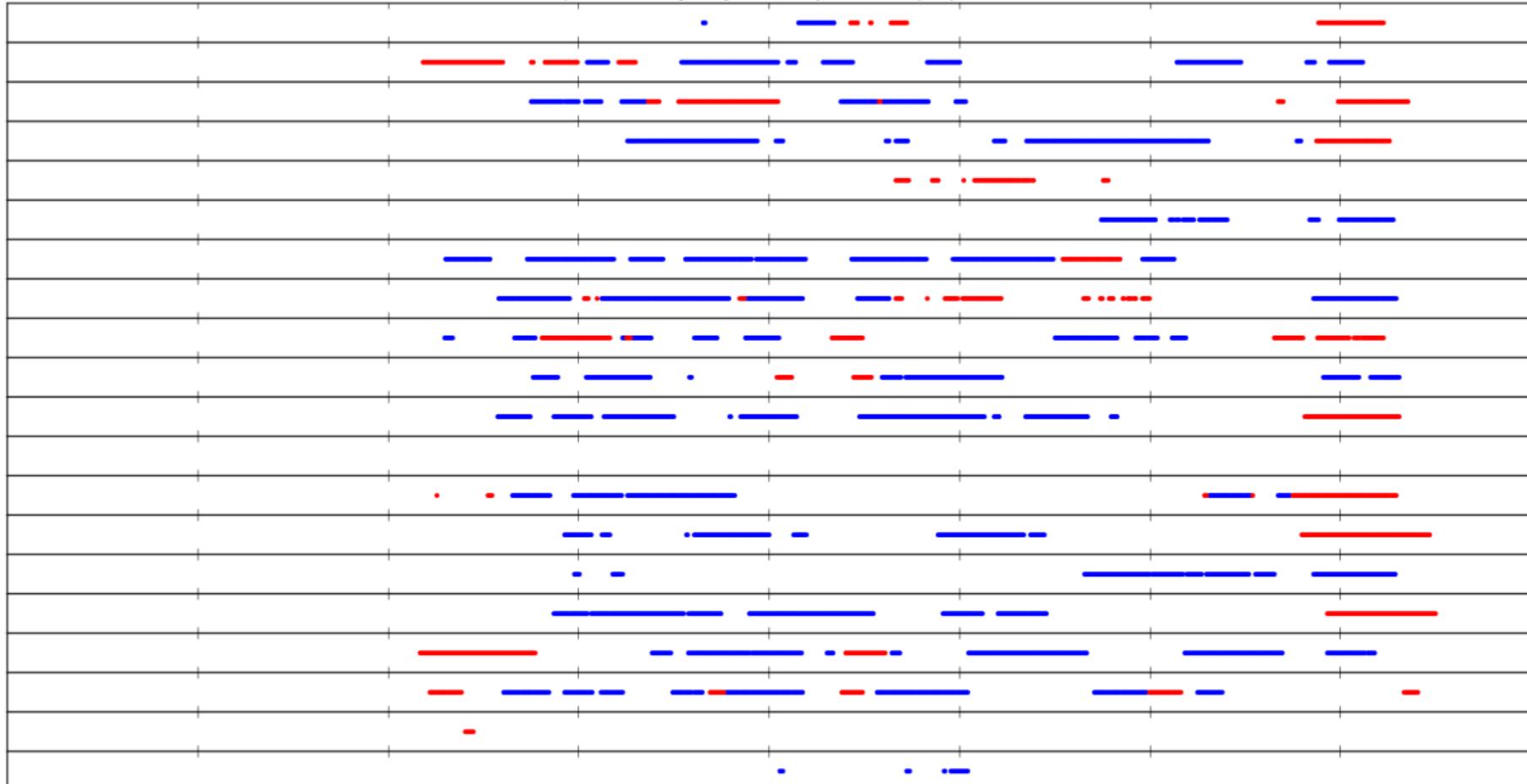




Computer Use by Day (desktop=blue, laptop=red)



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







model



y, \hat{y}



A photograph of a person with long brown hair tied back, wearing a green hoodie, sitting on a dark, mossy rock. They are holding a small, white and brown dog in their lap. They are looking out over a vast, misty landscape with mountains in the background under a blue sky with wispy clouds.

stratégie générale : critères

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strategie générale : étiquete

A photograph of a person with long brown hair, seen from behind, sitting on a dark, mossy rock. They are wearing a green hoodie and holding a small, brown and white dog in their lap. The person is looking out over a vast landscape of misty, mountainous terrain under a blue sky with wispy clouds.

stratégie générale : auto-étiquetage

A photograph of a person with long brown hair tied back, wearing a green hoodie, sitting on a dark, mossy rock. They are holding a small, white and brown dog in their lap. They are looking out over a vast, misty landscape of mountains under a blue sky with scattered clouds.

stratégie générale : séquen

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stratégie générale : prédire

A photograph of three small, light brown puppies standing on a gravel surface. They are looking towards the camera. The puppy on the left is standing, the middle one is sitting, and the right one is also sitting. The background is blurred.

stratégie 1 : sac de mot

stratégie 1 : tf-idf



stratégie 2 : word2vec



deux stratégies : trouver une séquence



Bag of Words

Le chat est orange.

Le chien court vite.

Bag of Words

6 1 7 2

Le chat est orange.

Le chien court vite.

6 3 4 5

Bag of Words

6 1 7 2

Le chat est orange.

Le chien court vite.

6 3 4 5

Bag of Words

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

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

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] ]
```

Bag of Words

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

Bag of Words

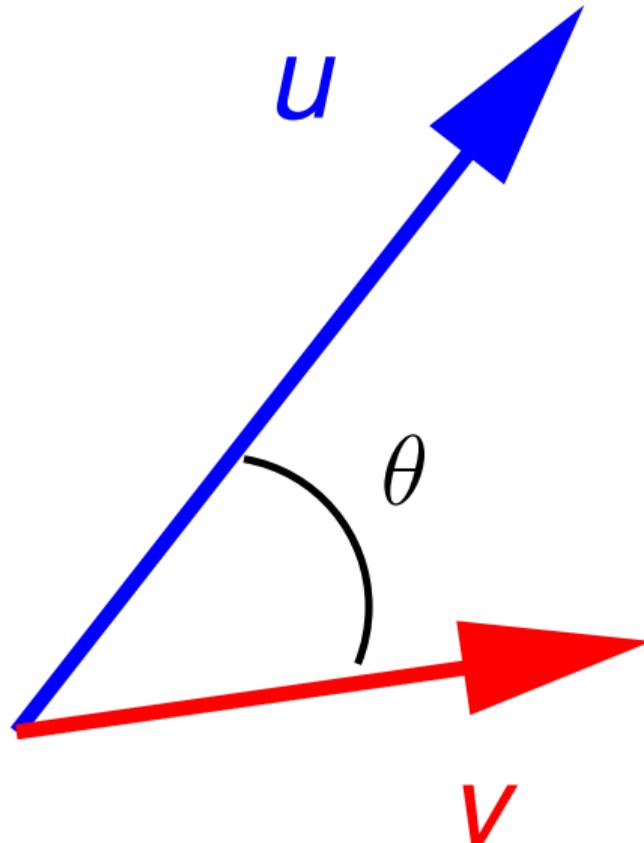
Le chat est orange.

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

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

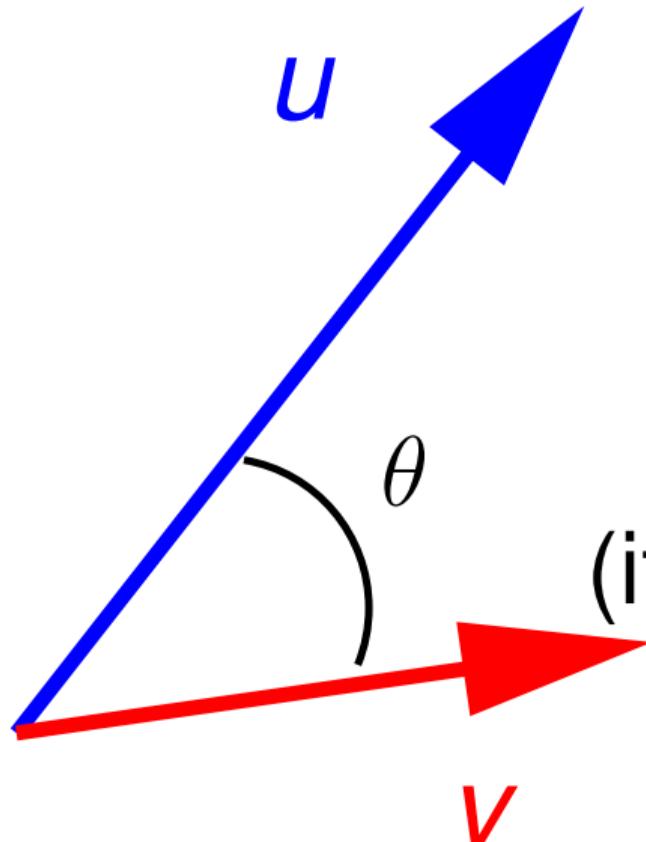
Le chien court vite.

Cosine Similarity



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

Cosine Similarity



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

(if u and v have norm 1)

Cosine Similarity

Le chat est orange.

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

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

Le chien court vite.

Cosine Similarity

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

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

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

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

1 1 5 4 3

7 5 3 5 3

6 5 9 0 6

2 6 2 0 2

Un exemple (trop) vite

Linear neuron

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

Linear neuron

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

where

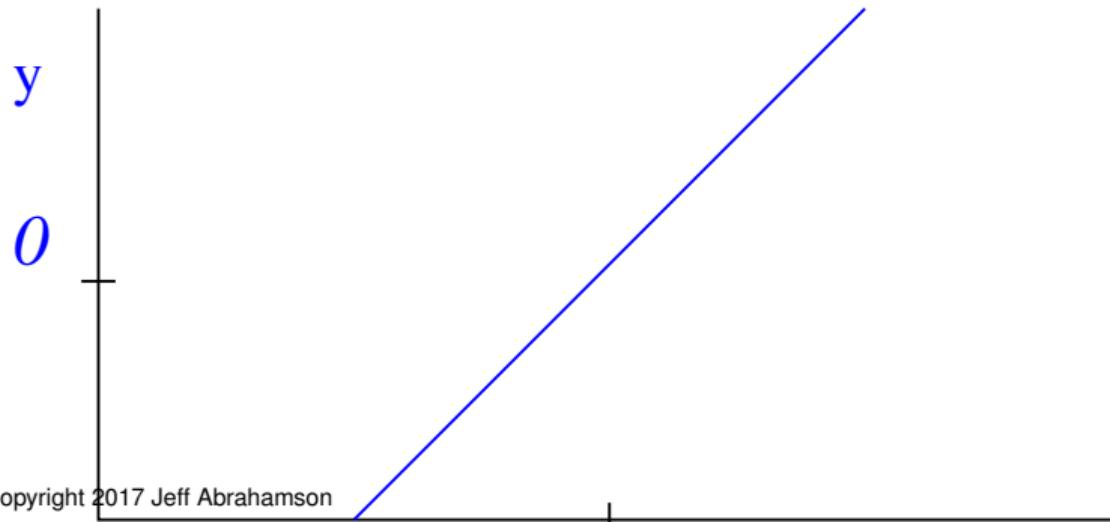
y = output

b = bias

x_i = i^{th} input

Linear neuron

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



Example: handwriting recognition of digits

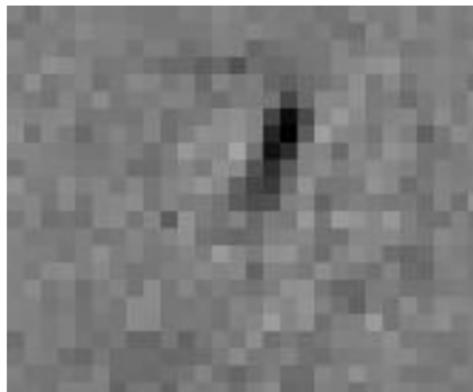
- Input neurons: pixels
- Output neurons: classes (digits)
- Connect them all! (*bipartite*)

Example: handwriting recognition of digits

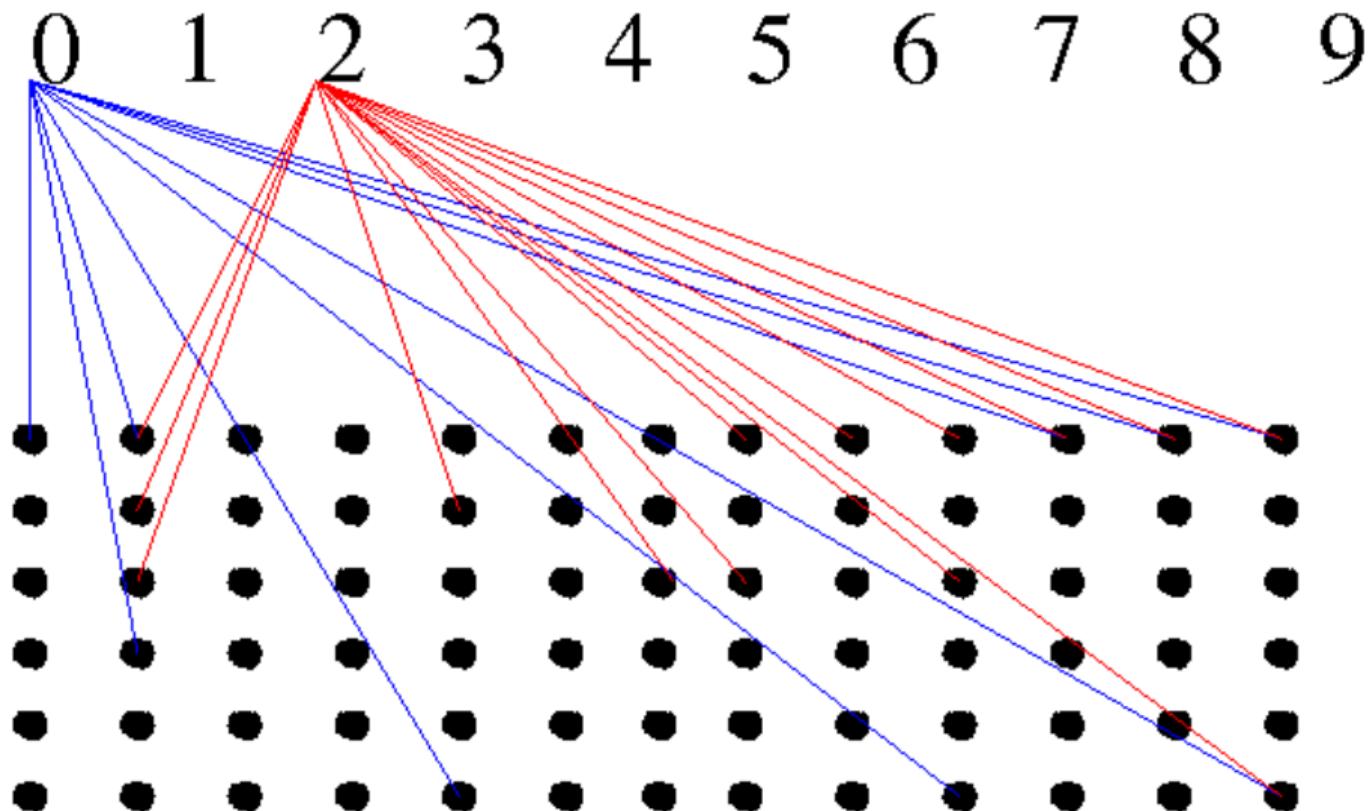
- Input neurons: pixels
- Output neurons: classes (digits)
- Connect them all! (*bipartite*)
- Initialize input weights to random

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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

Example: handwriting recognition of digits

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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stratégie 1 : sac de mot

stratégie 1 : tf-idf

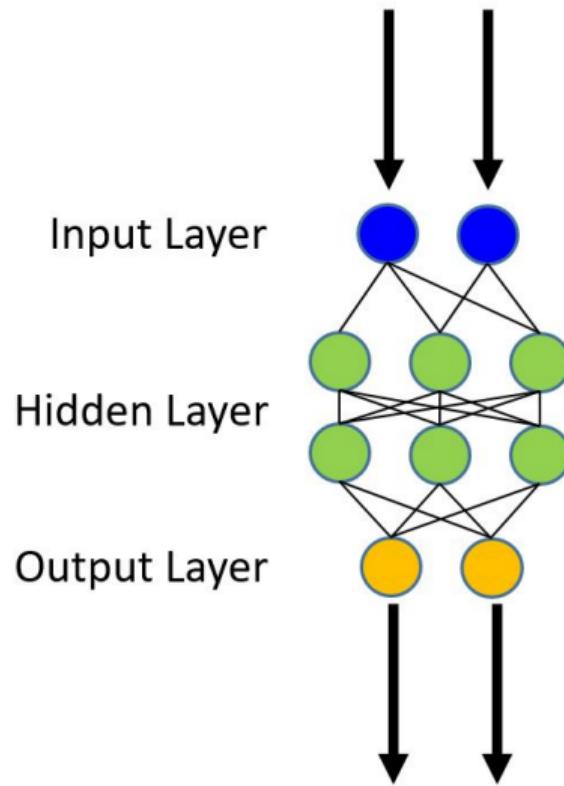


stratégie 2 : word2vec



deux stratégies : trouver une séquence





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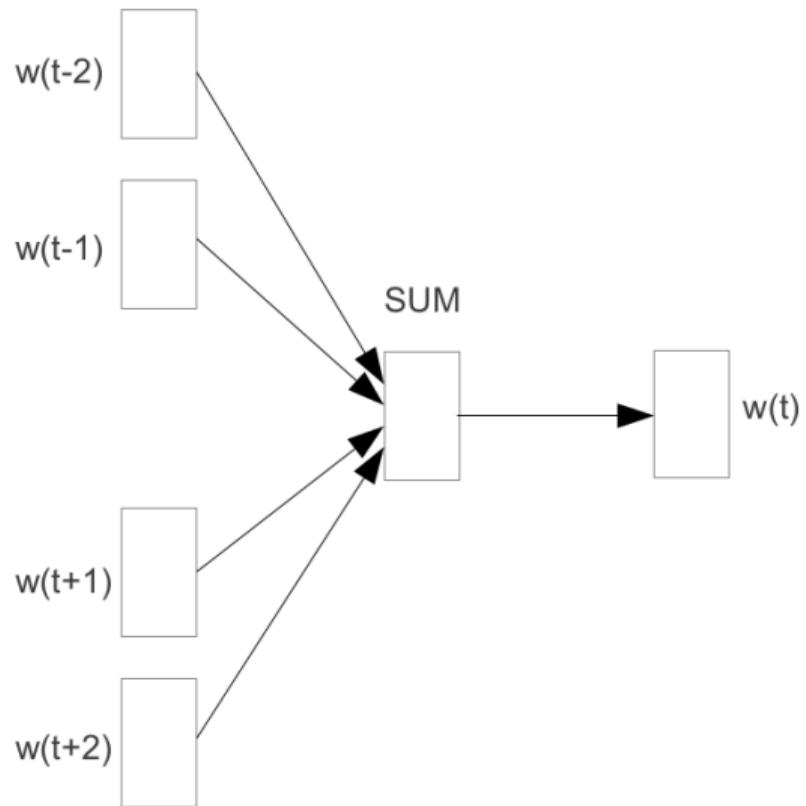
deux stratégies : trouver une séquence



INPUT

PROJECTION

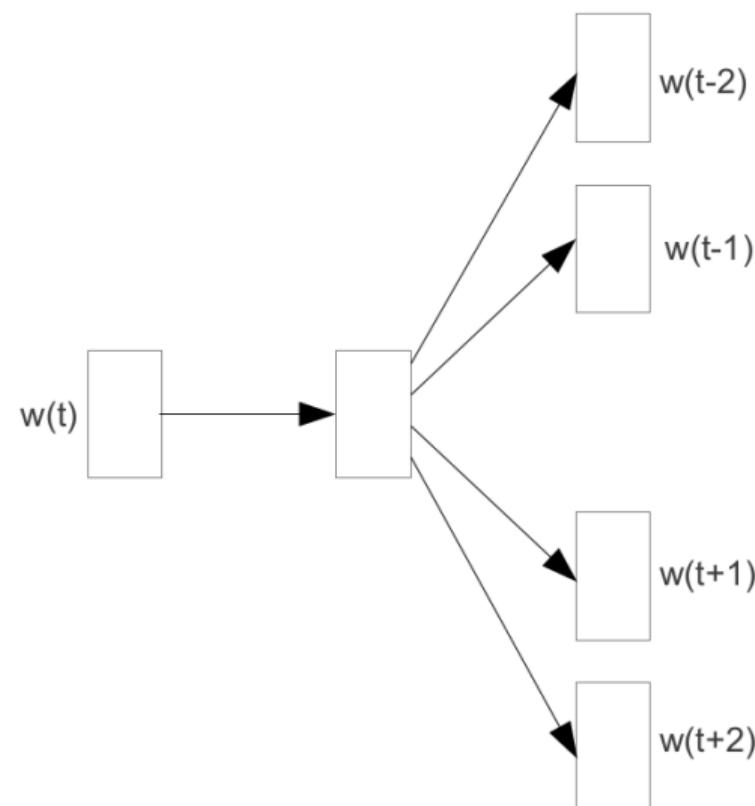
OUTPUT



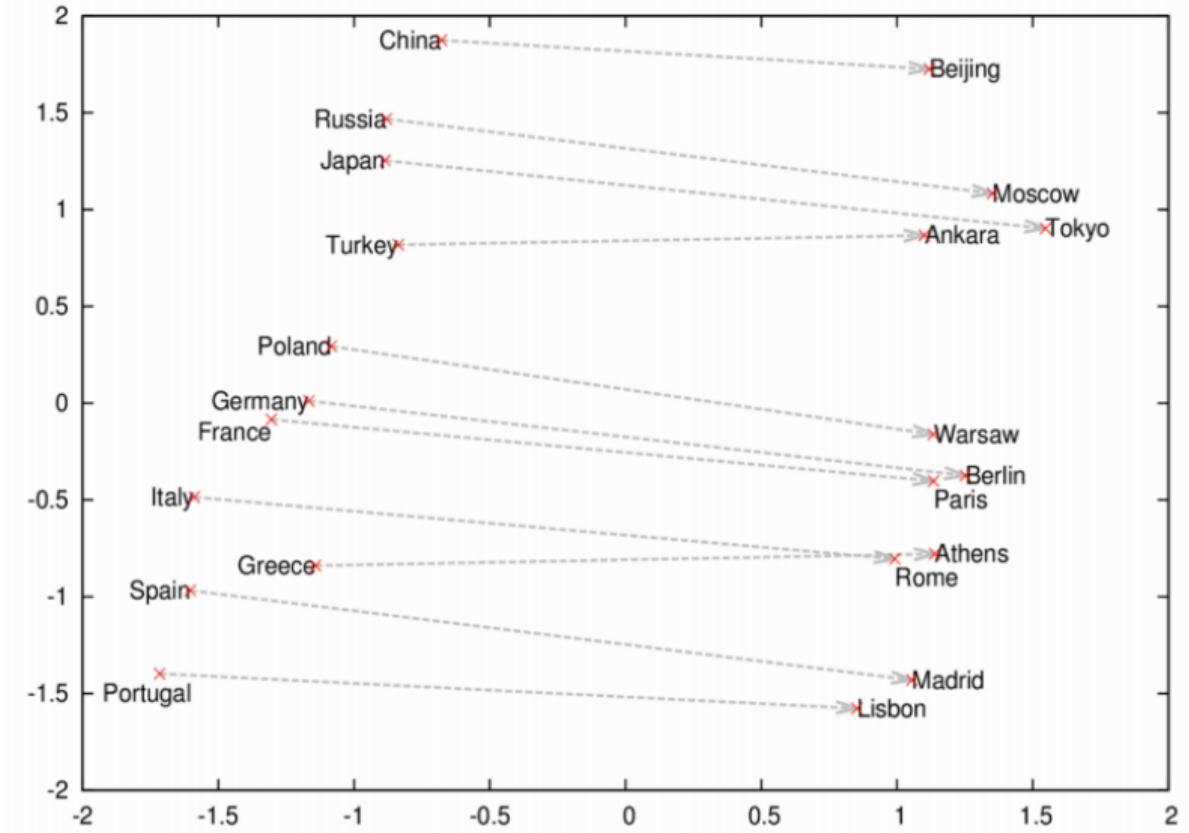
INPUT

PROJECTION

OUTPUT



Country and Capital Vectors Projected by PCA



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

Similar to 'dress'



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stratégie générale : auto-étiquetage

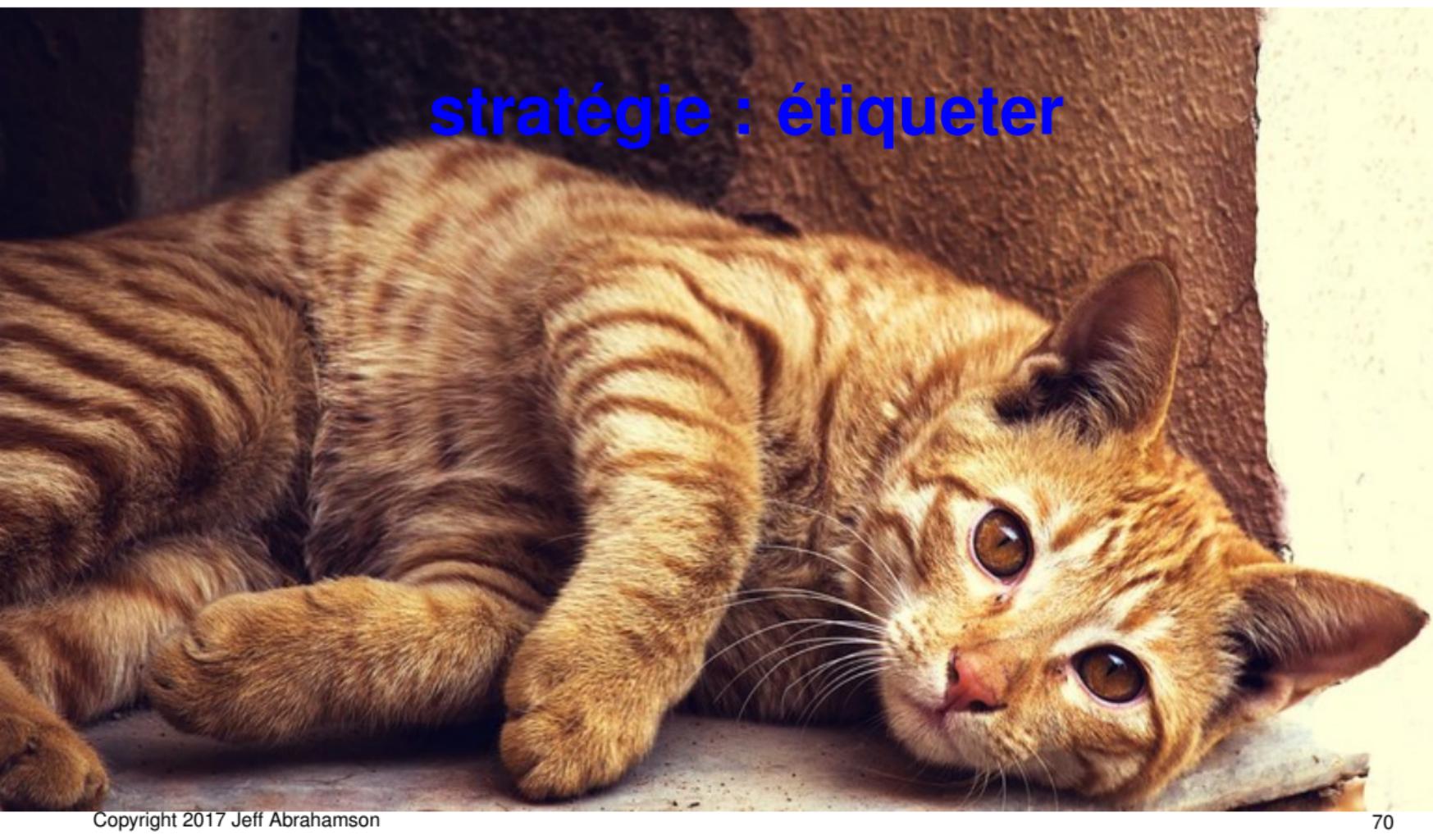
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stratégie générale : séquen

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stratégie générale : prédire

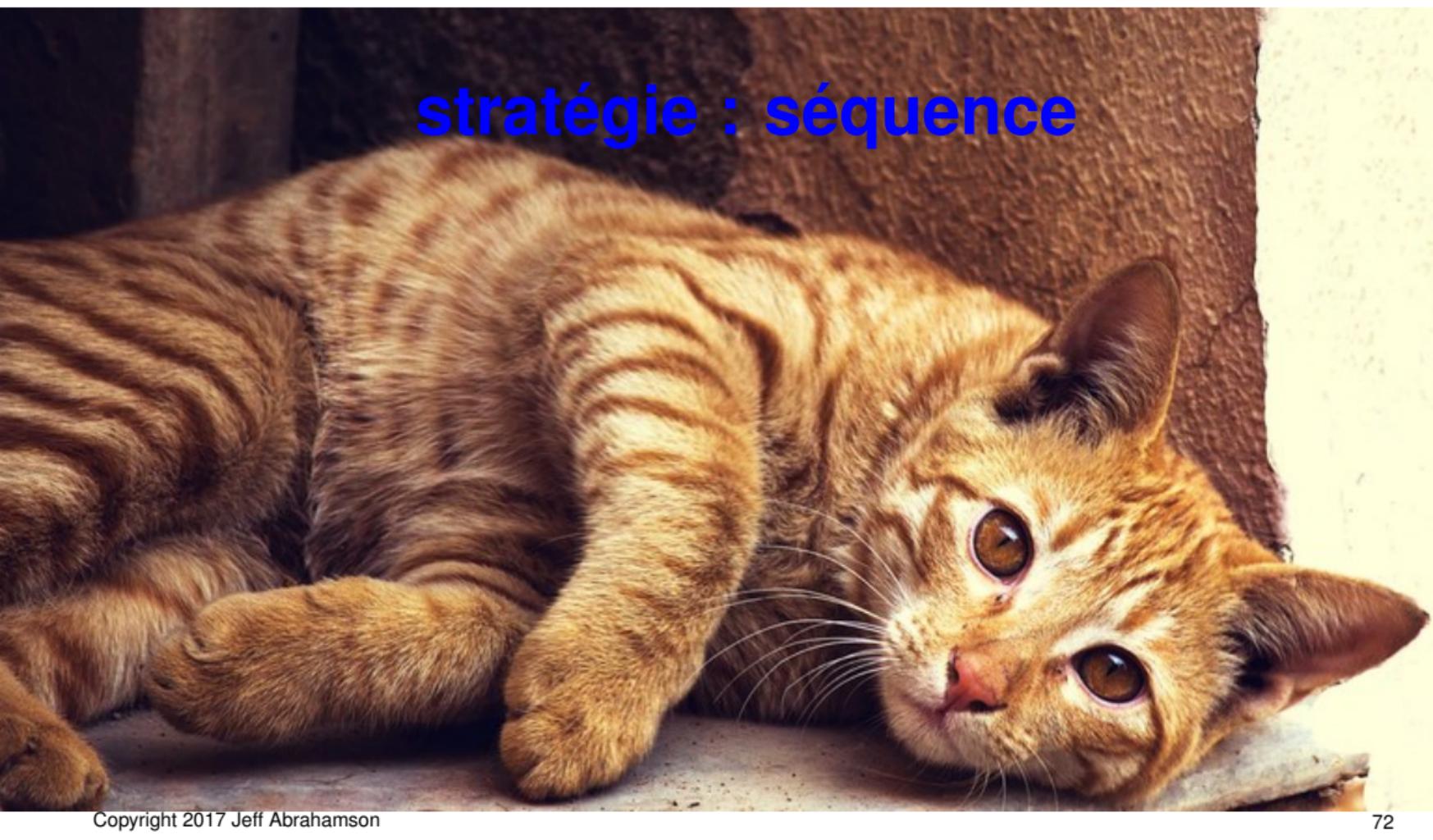
stratégie : étiqueter

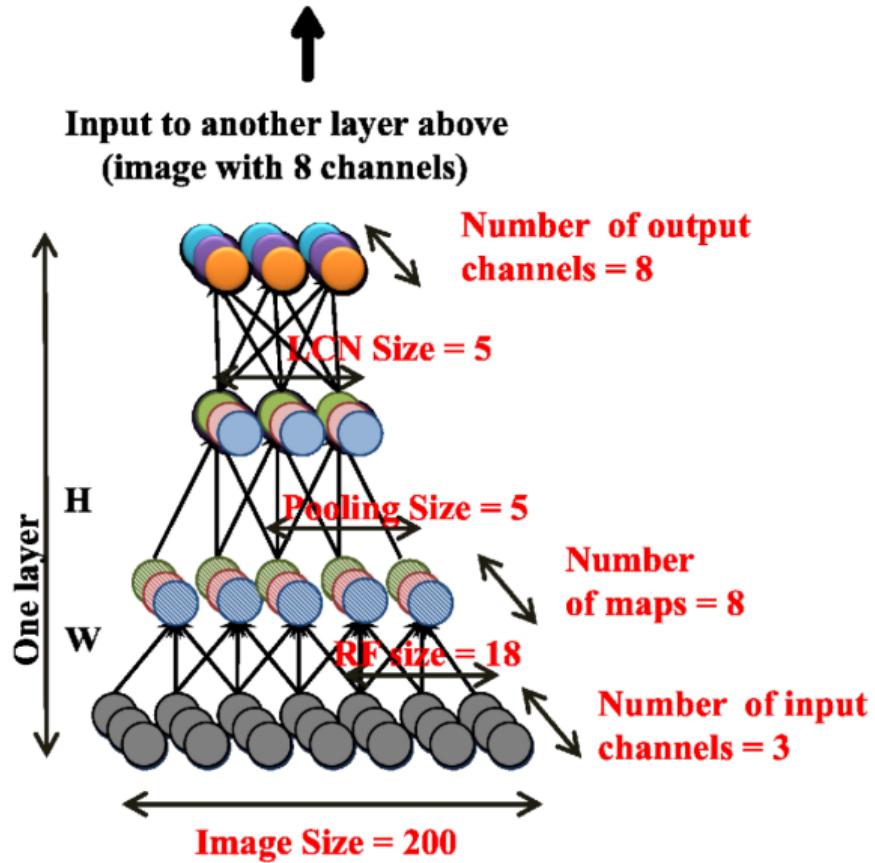


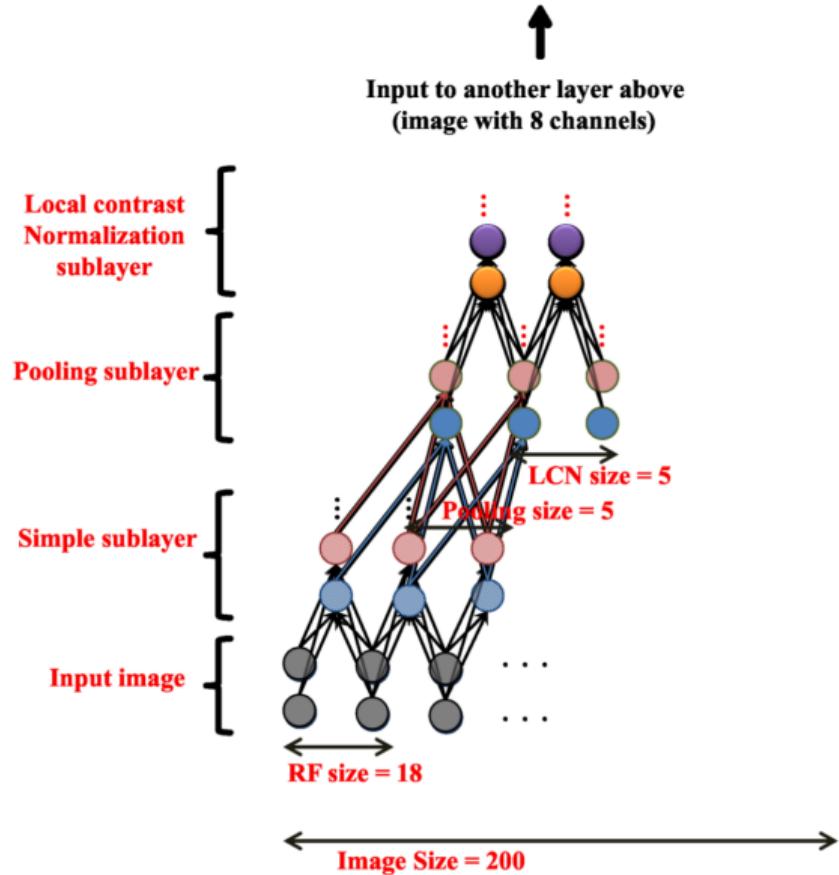
stratégie : auto-étiqueter

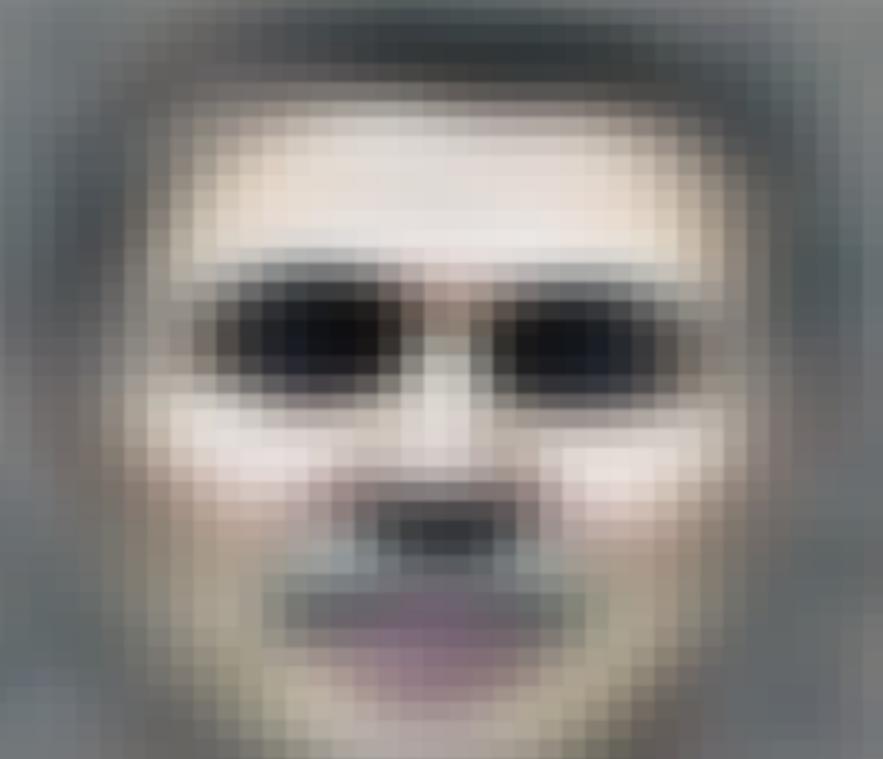


stratégie : séquence











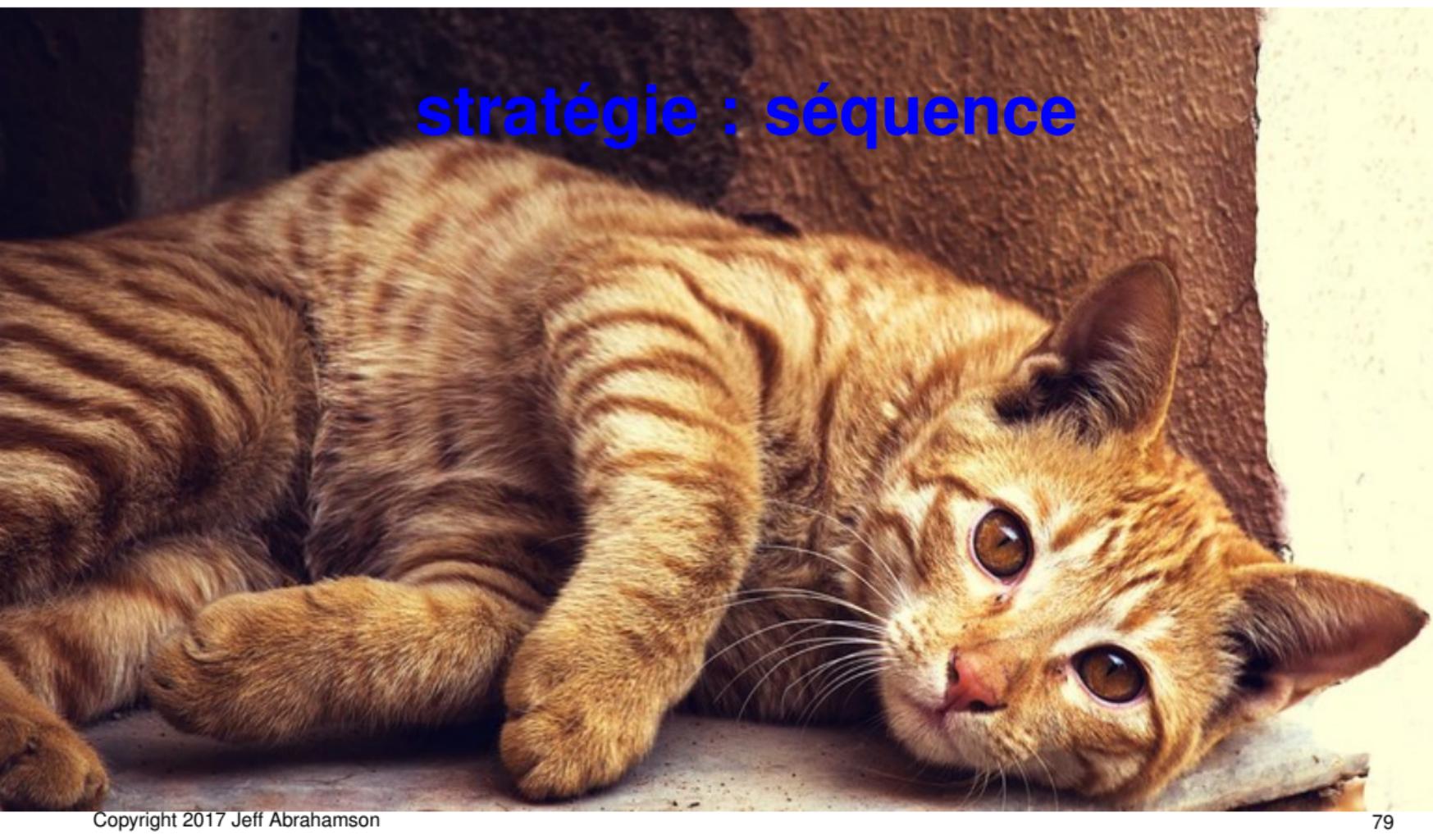
stratégie : ImageNet



stratégie : DGG-19, resnet



stratégie : séquence



$a_1, a_2, \dots, a_k \Rightarrow a_{k+1}$

Resources

Meetup Machine Learning Rennes

<https://www.meetup.com/Meetup-Machine-Learning-Rennes/>

Resources



<http://www.meetup.com/Nantes-Machine-Learning-Meetup/>

Resources



<http://www.ml-week.com/>



Questions?