CELEHS Data Science Summer

Lunch Chat

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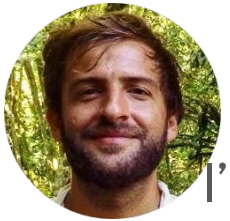
Hi!



I'm **Benjamín Sánchez-Lengeling**, originally from Guanajuato - Mexico, a research scientist at Google Research.

I work on the **Google Brain team,**

specifically on **machine learning for olfaction.**

Also!

Clubes de Ciencia México

clubesdeciencia.mx

Science Clubs International

scienceclubsint.org

RIIAA MEX

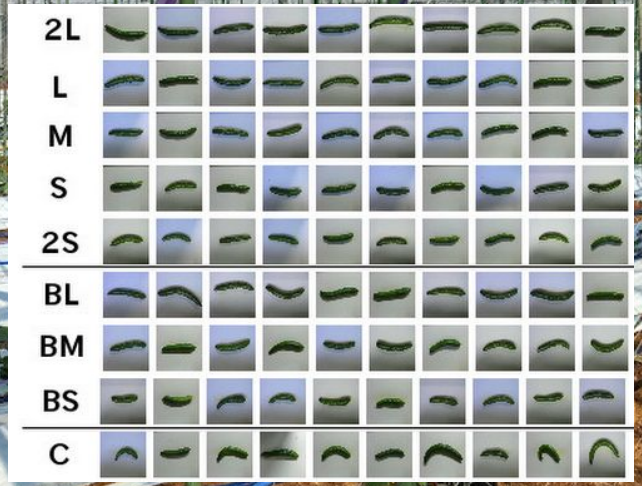
riiaa.org

Panorama

Google AI

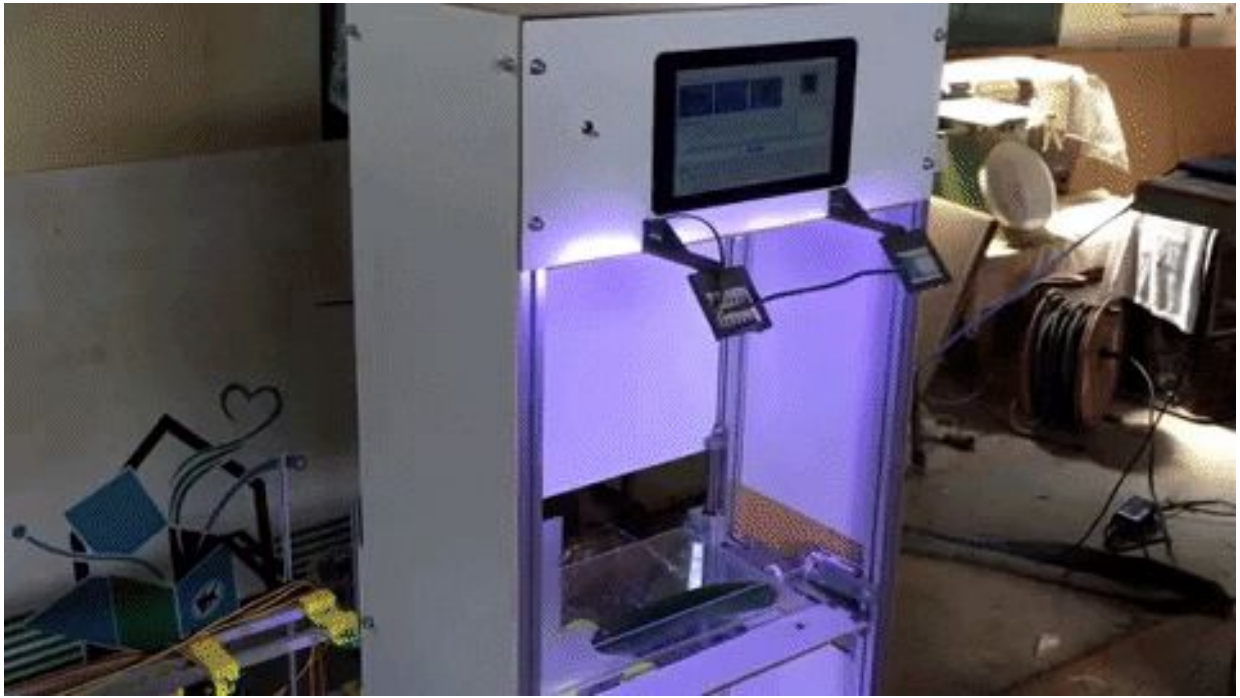
- Machine Learning, Deep Learning and Artificial Intelligence
  - Some intuition behind these concepts
  - What is a neural network
  - How does a neural network work?
  - One very concrete example
  - Smell

One example with a cucumber farm in Japan



Source: https://cloud.google.com/blog/products/gcp/how-a-japanese-cucumber-farmer-is-using-deep-learning-and-tensorflow

One example with a cucumber farm in Japan



Source: https://cloud.google.com/blog/products/gcp/how-a-japanese-cucumber-farmer-is-using-deep-learning-and-tensorflow

Another example

#Made *Translatable* With AI

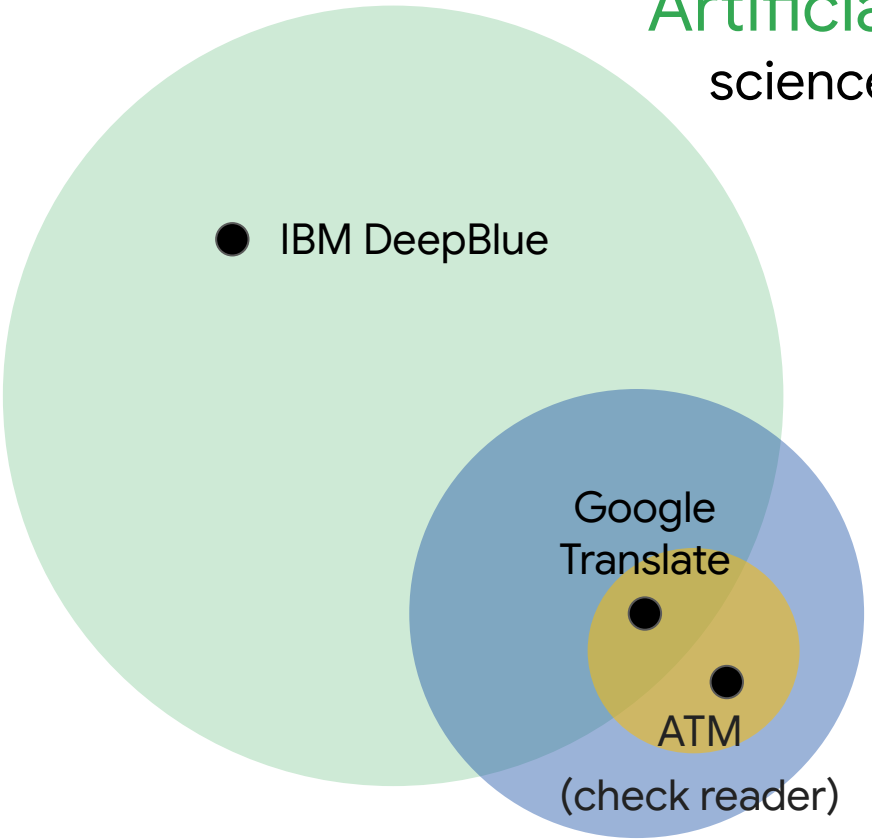
Google Translate

103

language pairs

Artificial intelligence

science of making things inteligent



Machine Learning

techniques to learn from data

Deep Learning

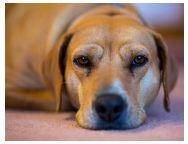
techniques to learn holistically

Machine Learning is teaching computers to learn without having to program them with rules.

A Neural Network

“cat”

“dog”

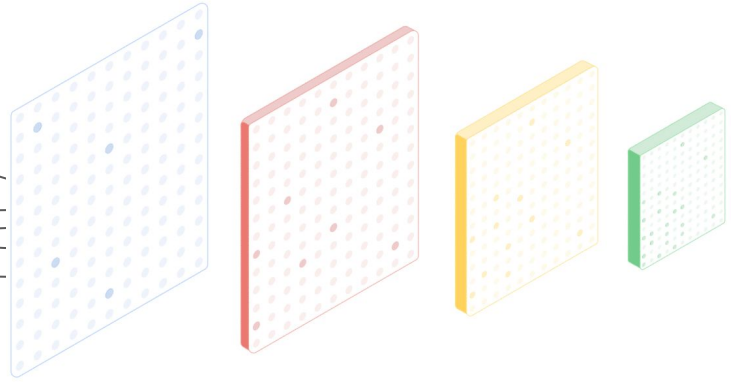


“car”

“apple”

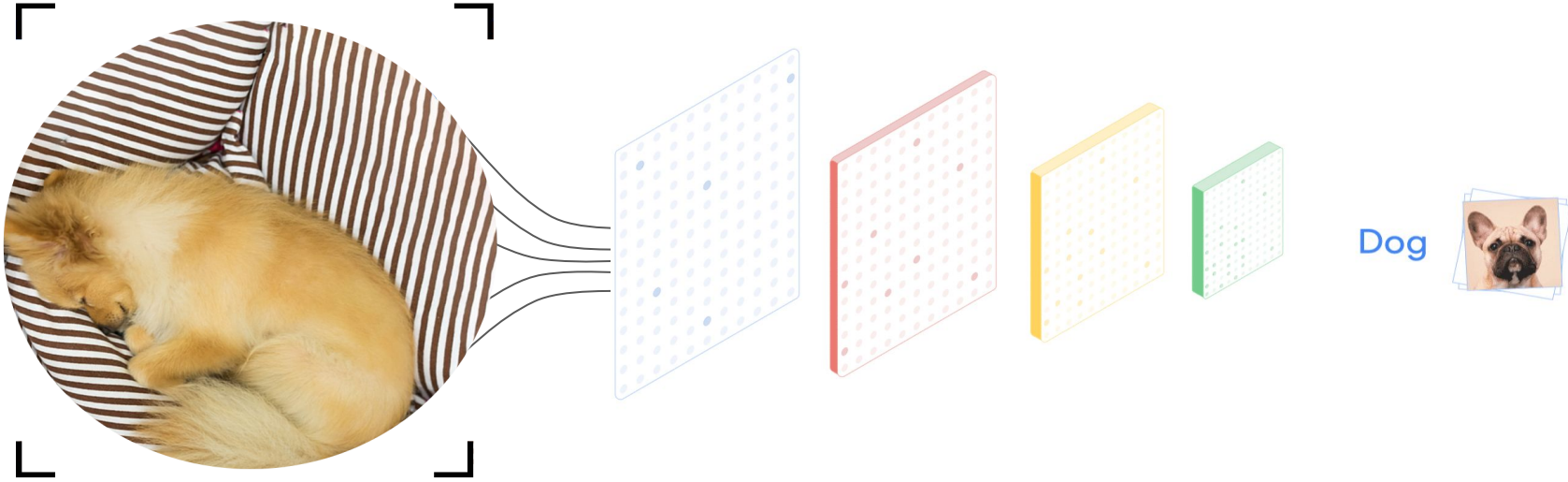
“flower”

Labeled Images



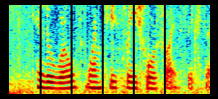
Cat

A neural network



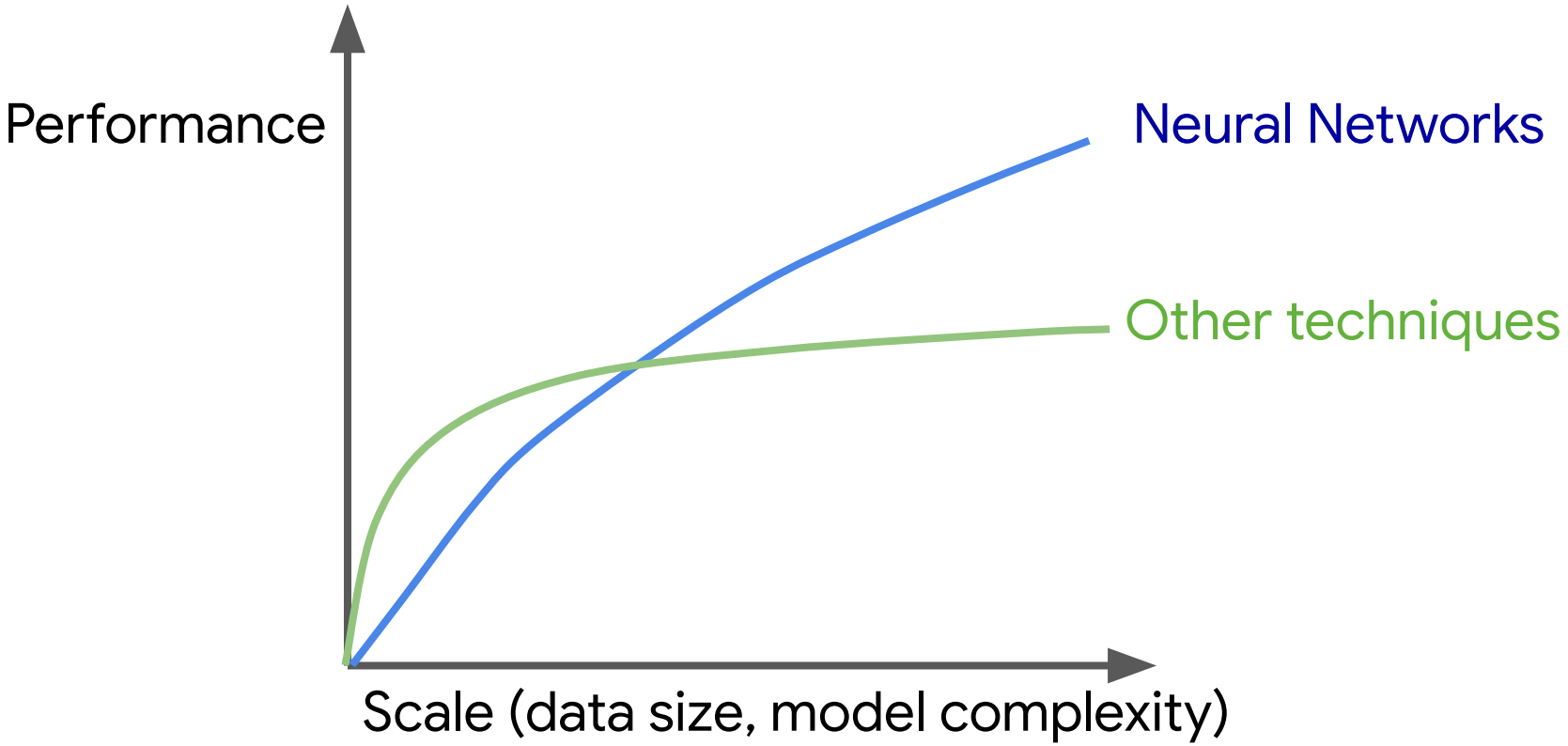
Unlabeled image

More than neurons (like the brain), think about learnable (**optimizable)** transformations of data

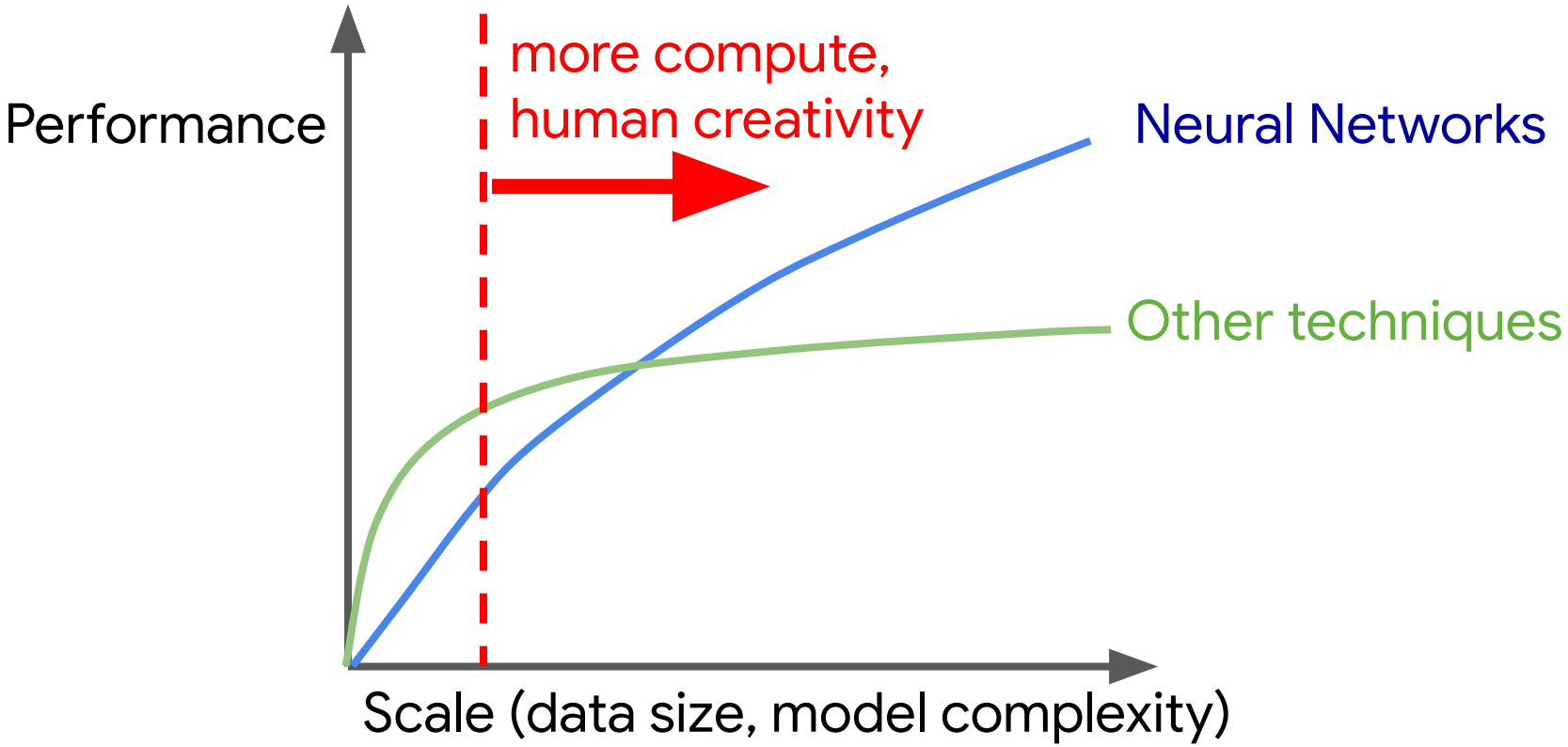
Input		Output
	PIXELS	“lion”
	AUDIO	“Is it cold outside?”
“How are you?”	TEXT	“你好，你好吗？”
	PIXELS	“A blue and yellow train moving on rails”

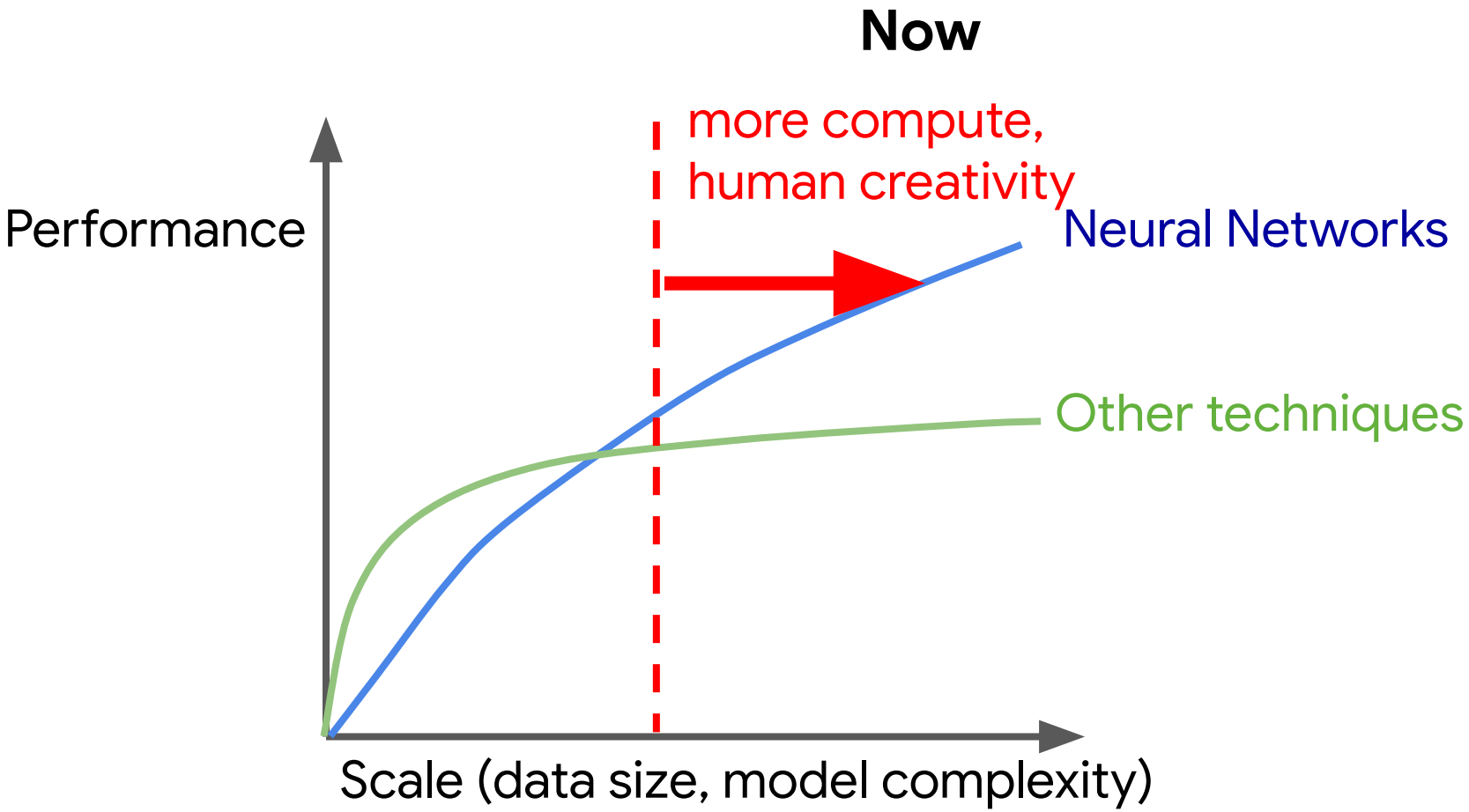
And why now?

1980s y 1990s



1980s y 1990s




Now
more compute,
human creativity
Performance
Neural Networks
Other techniques
Scale (data size, model complexity)

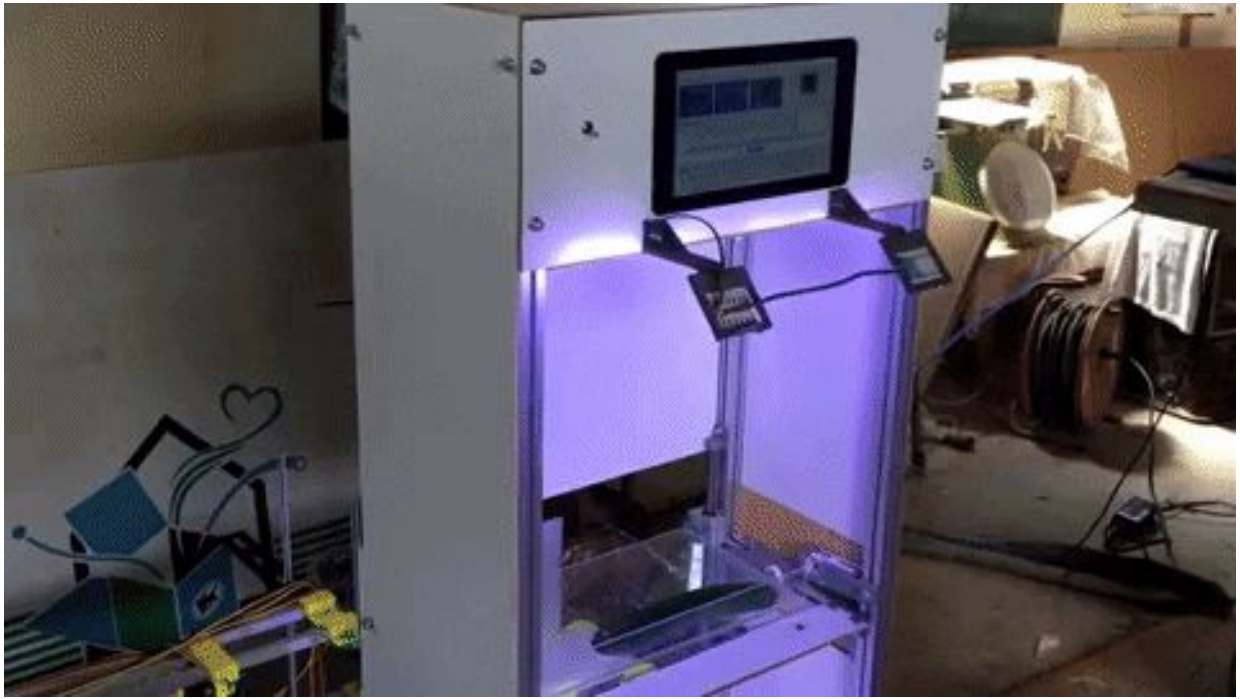
A very practical example

https://teachablemachine.withgoogle.com/

A very practical example

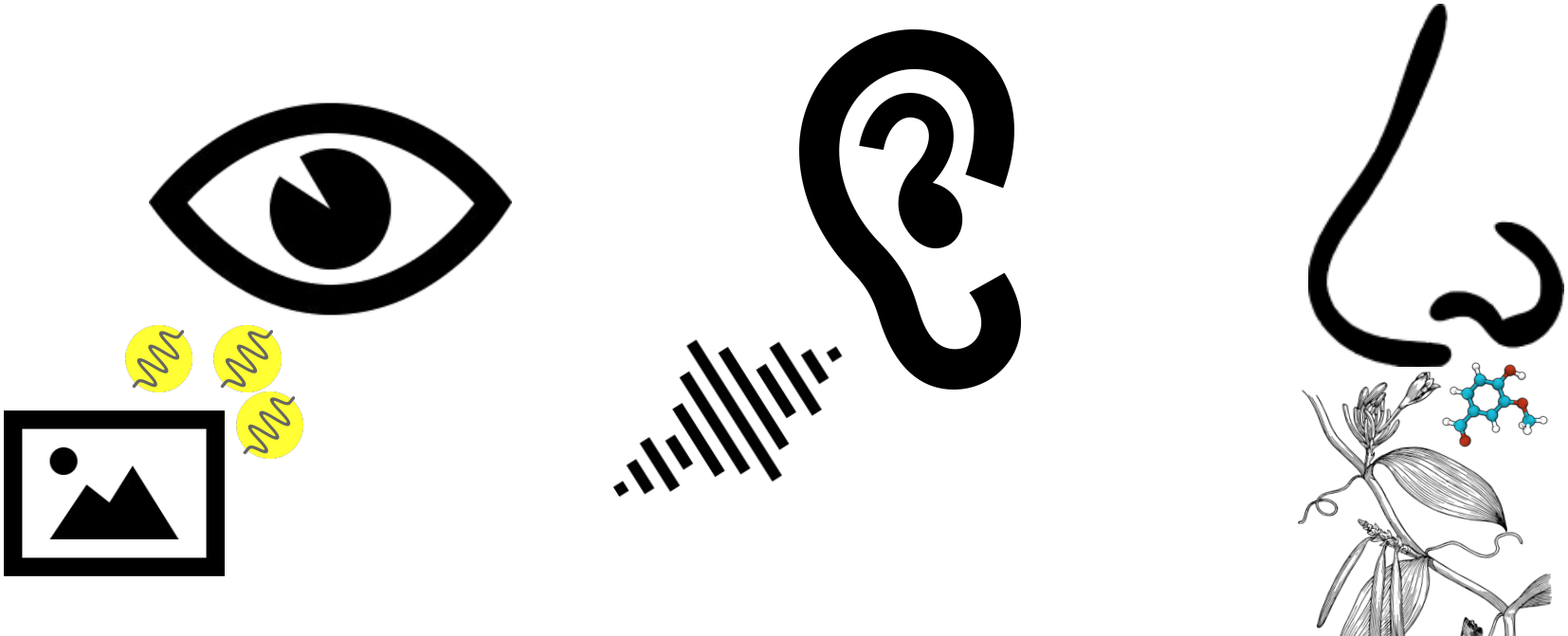
https://playground.tensorflow.org

Thinking about making more intelligent and useful machines for the world



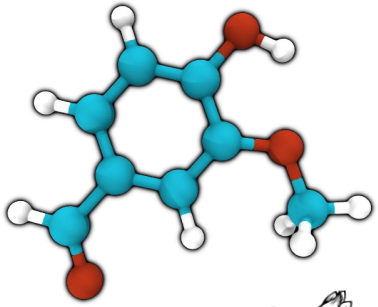
My current goal:

Do for olfaction what machine learning has already done for vision and hearing. In the long-term, **digitize the sense of smell**, and make the world's smells and flavors searchable.



We're starting at the very beginning, with the simplest problem.

"Smells sweet, with a hint of vanilla, some notes of creamy and back note of chocolate."



Predict

citrus **creamy**

sweet baked spicy

odorless **vanilla**

clean musky beefy

chocolate fruity

Odor descriptors