

Lean AI with Deep Learning and AutoML

Rui Quintino, Data Research @ DevScope

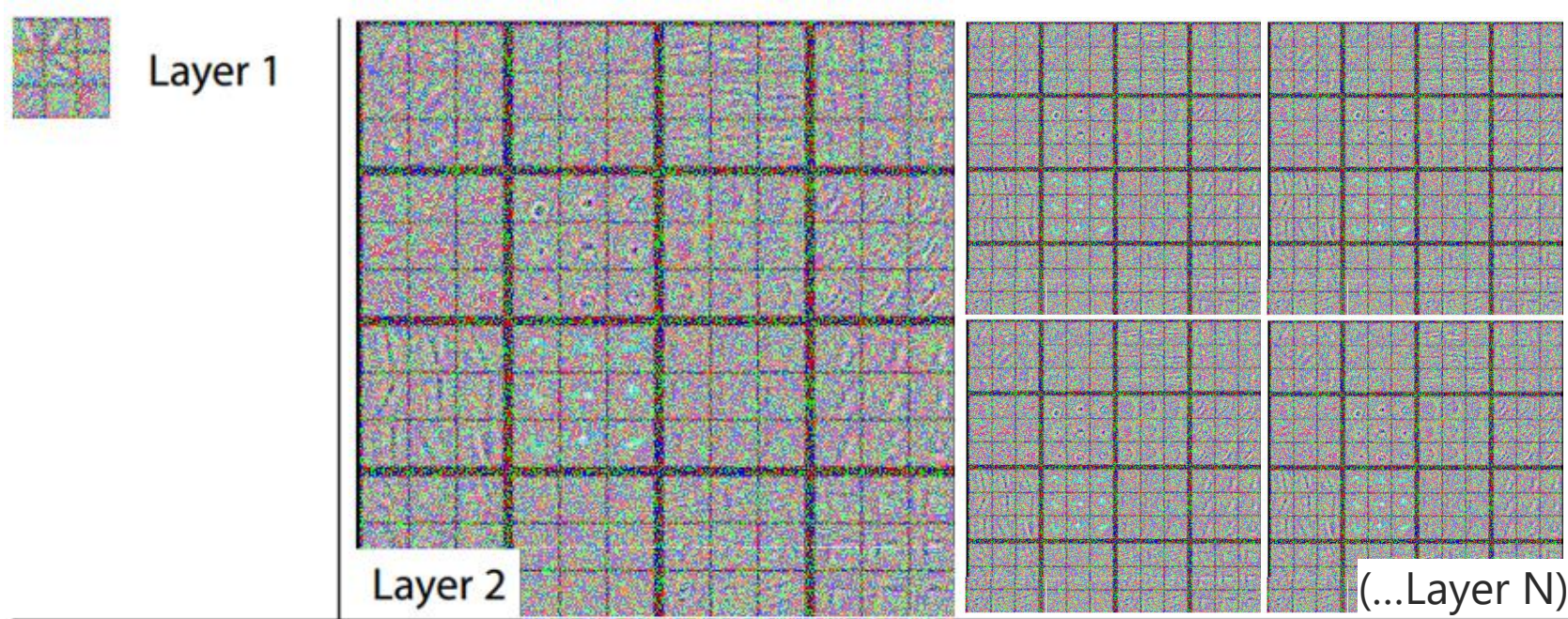
All Slides, Samples, References, Papers at
github.com/DevScope/ai-lab/

Machine Learning?

Using data to create programs
without manually building them!

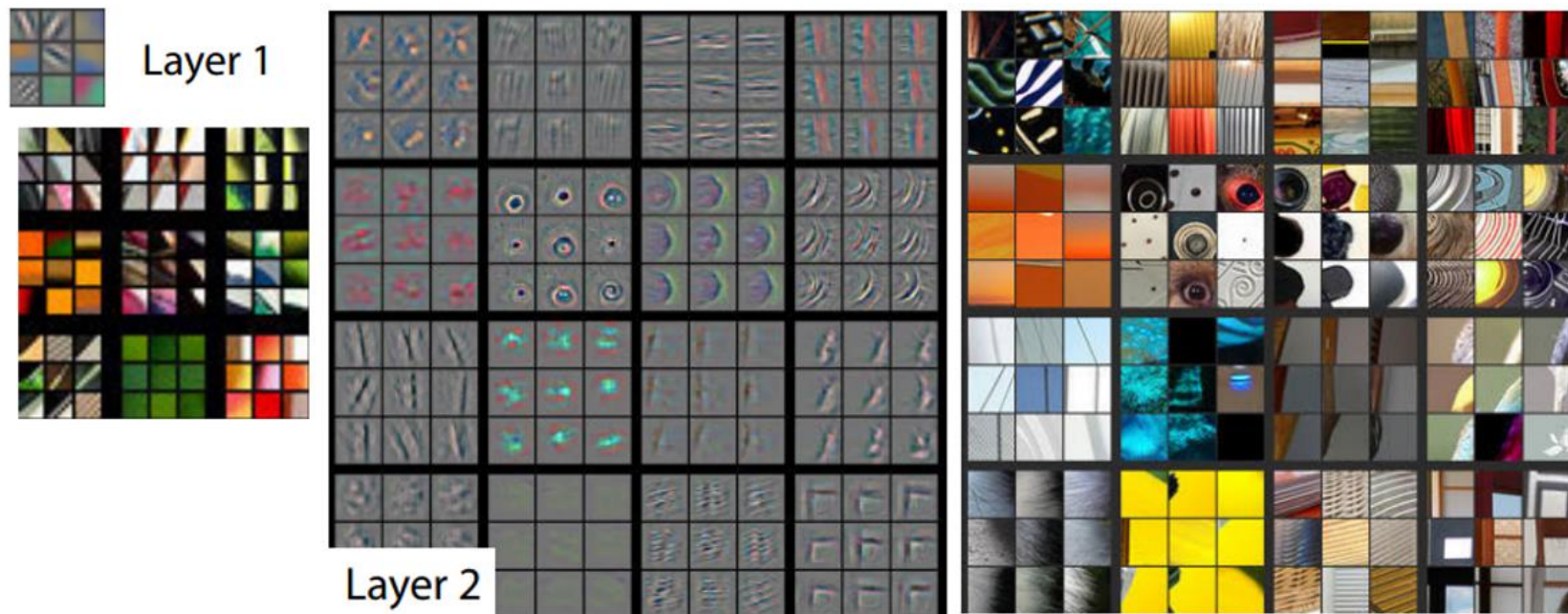
The Good News: Deep Learning

Deep Learning – Learning by *Layers*



****Adapted**** from *"Visualizing and Understanding Convolutional Networks"*
Matthew D Zeiler, Rob Fergus

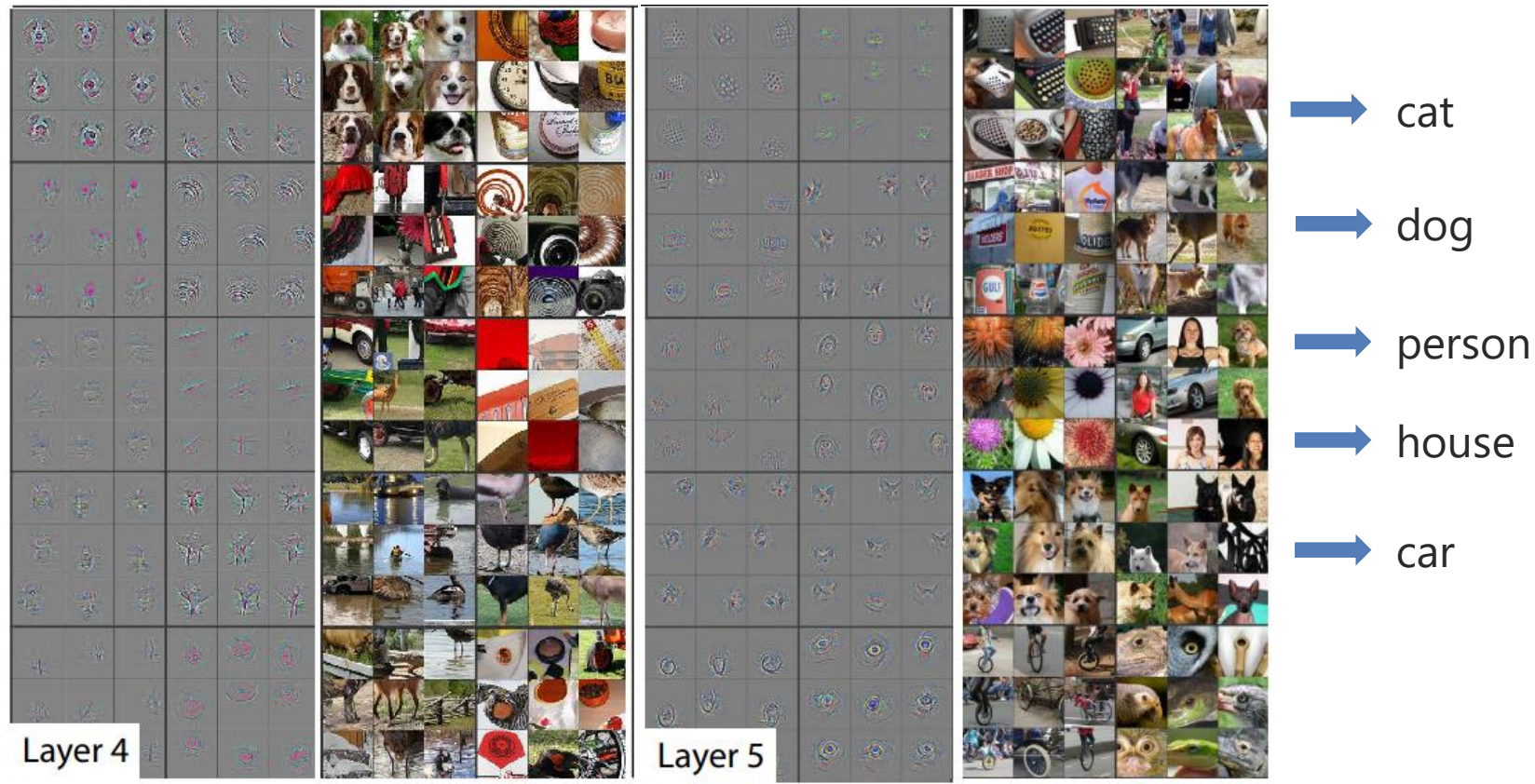
After Training (given Images + Labels)



"Visualizing and Understanding Convolutional Networks"

Matthew D Zeiler, Rob Fergus

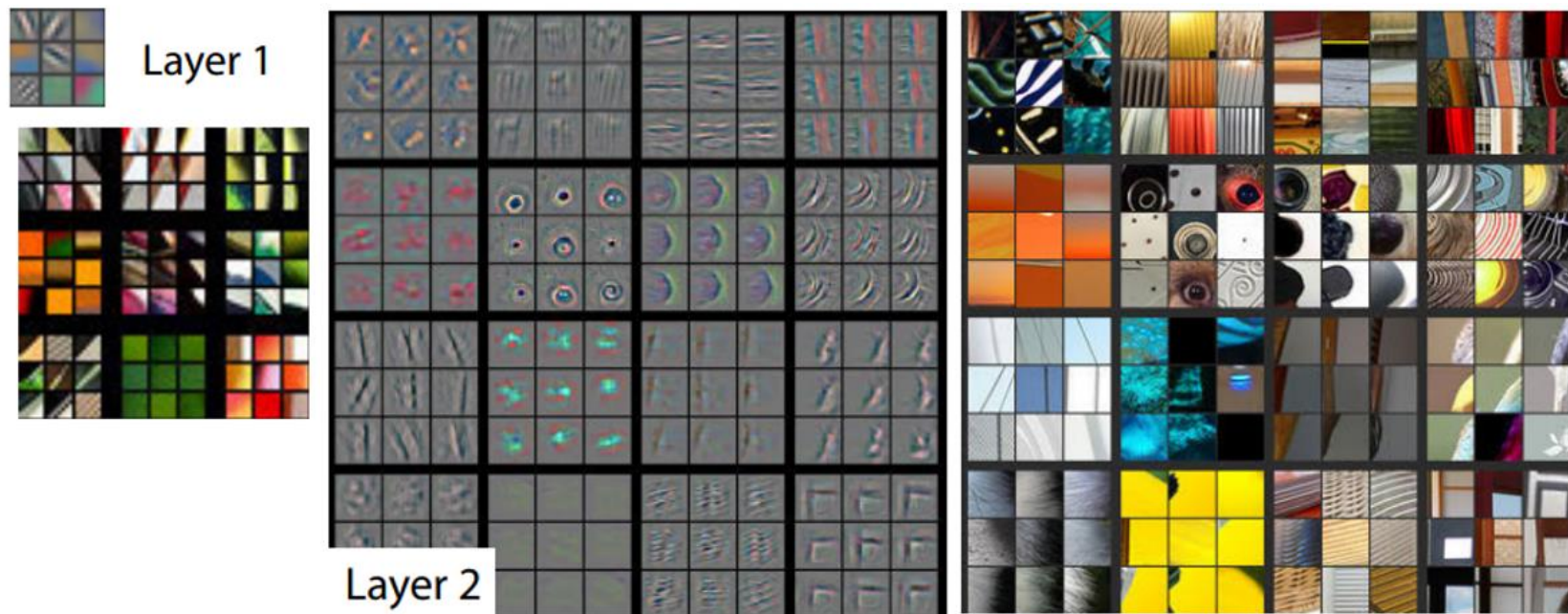
Final Layers – Higher Level Abstractions



Why so Powerful ?

- Boost Performance / State of Art
- Eliminated manual effort on filters/features
 - (kind of "AutoML")
- Enabled Reusability -> **Transfer Learning!**
 - the "NuGets" of AI/Machine Learning 😊

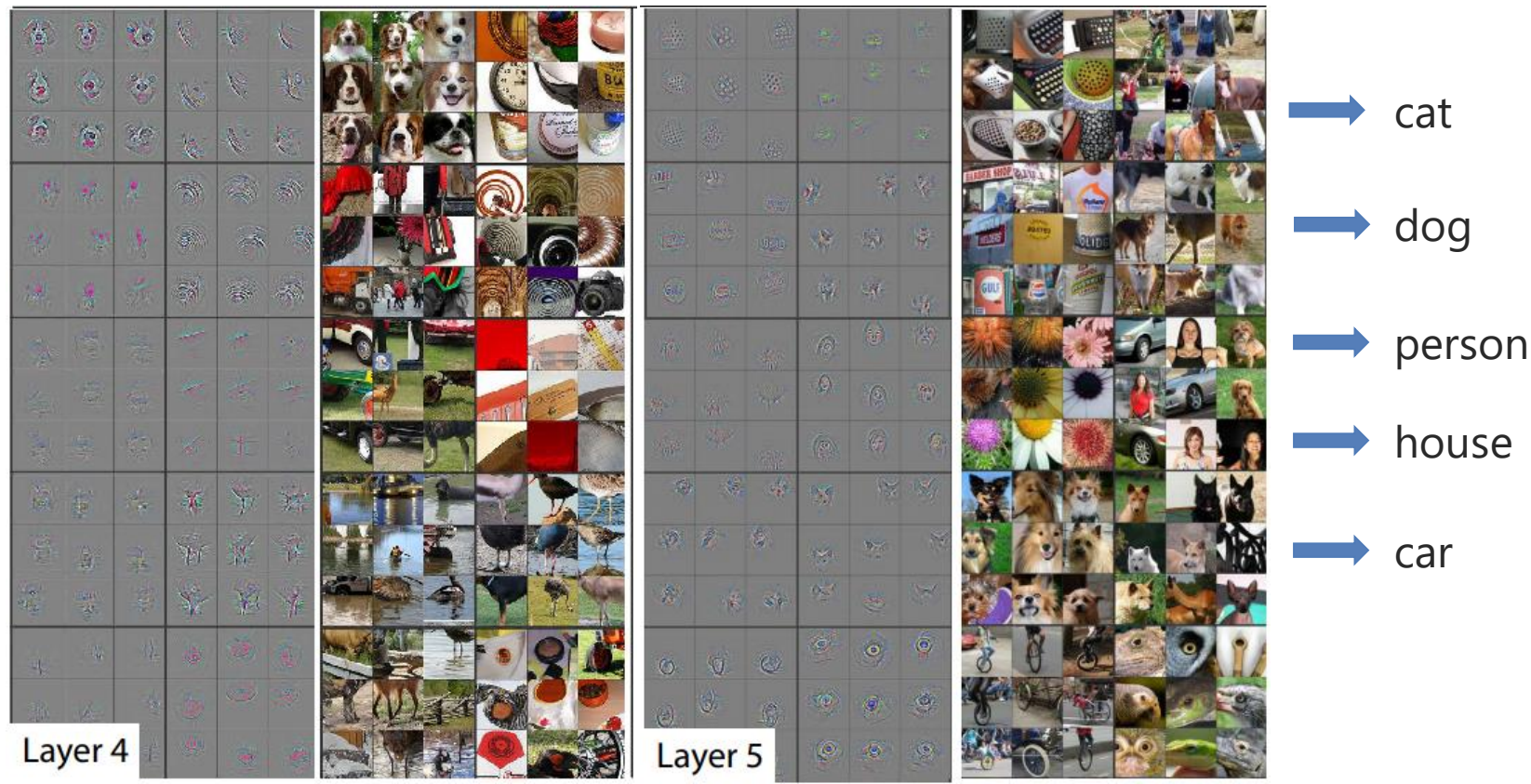
Transfer Learning – Reuse trained first layers



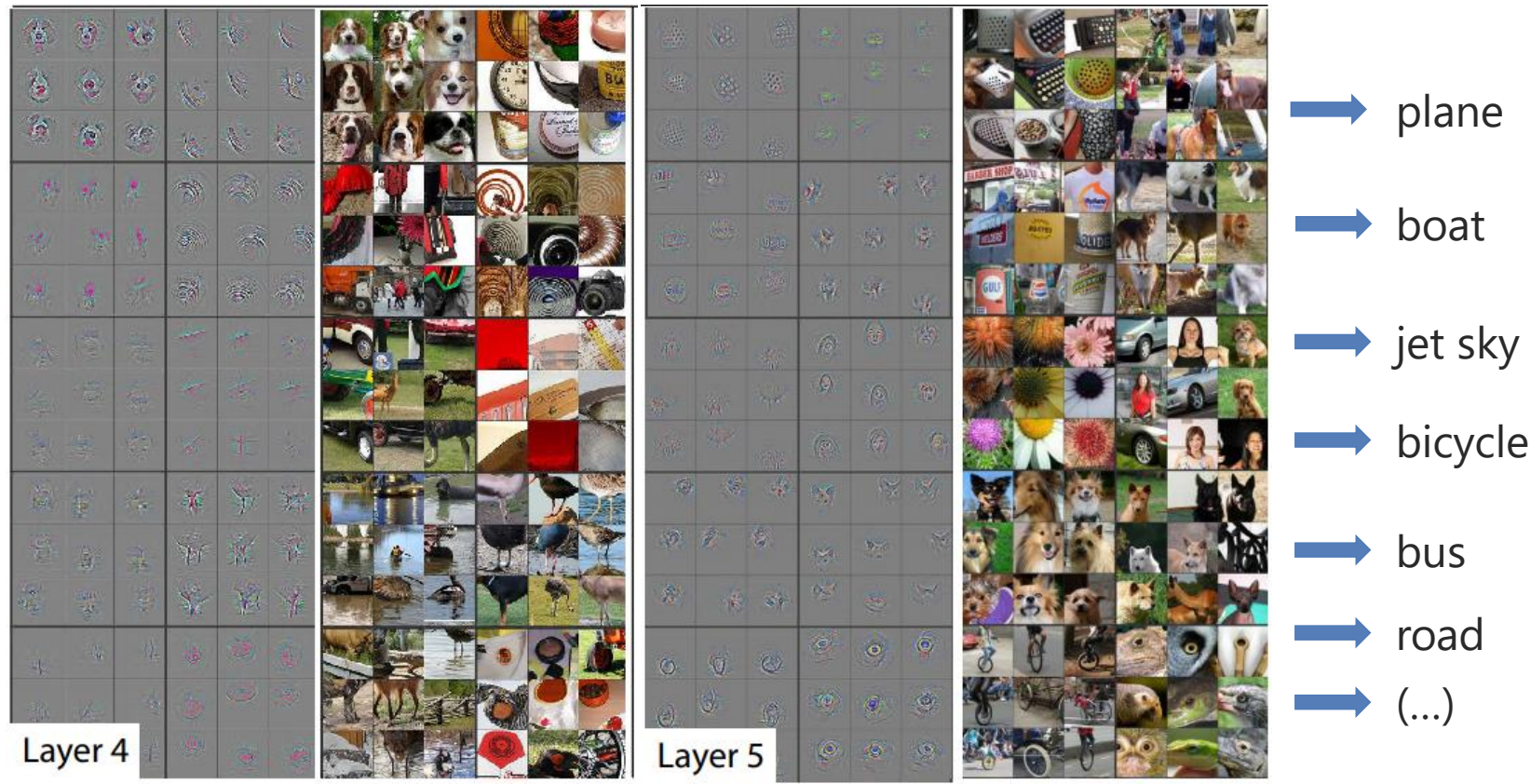
"Visualizing and Understanding Convolutional Networks"

Matthew D Zeiler, Rob Fergus

Retrain Final Layers for new Task outputs



Retrain Final Layers for new Task outputs



Let's dive in!

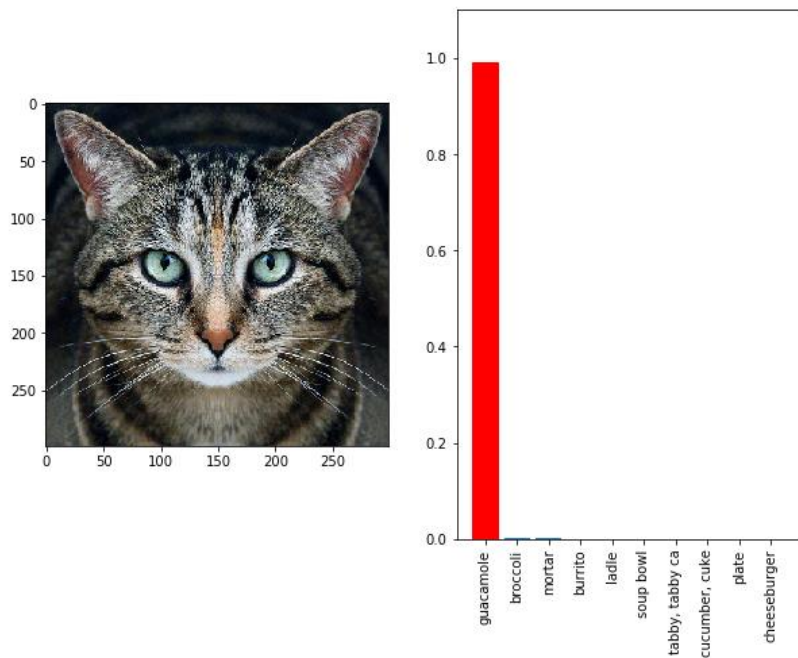
Not so fast... Machine Learning...

AI/ML/Deep Learning Safety issues

- We “assume” too much...
- Not error free (ever)
- Inherit/magnify/perpetuate our biases
- Ethical usage
- Can be fooled
- Unbalanced error behavior (sub-populations)
- Test set vs test dataset
- Lack of “common sense”
- Black box (mostly)
- Awesome results? You probably have an issue: find it!

source

<https://www.labsix.org/physical-objects-that-fool-neural-nets/>



Questions?

Thank you!