



Introduction

ADVANCED ARTIFICIAL INTELLIGENCE
JUCHEOL MOON

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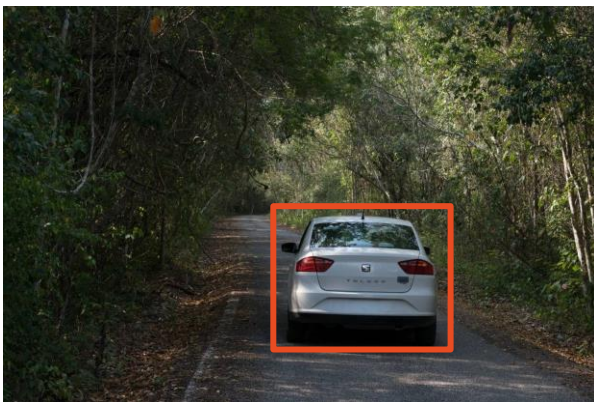
Learning

- Modern AI relies on supervised learning



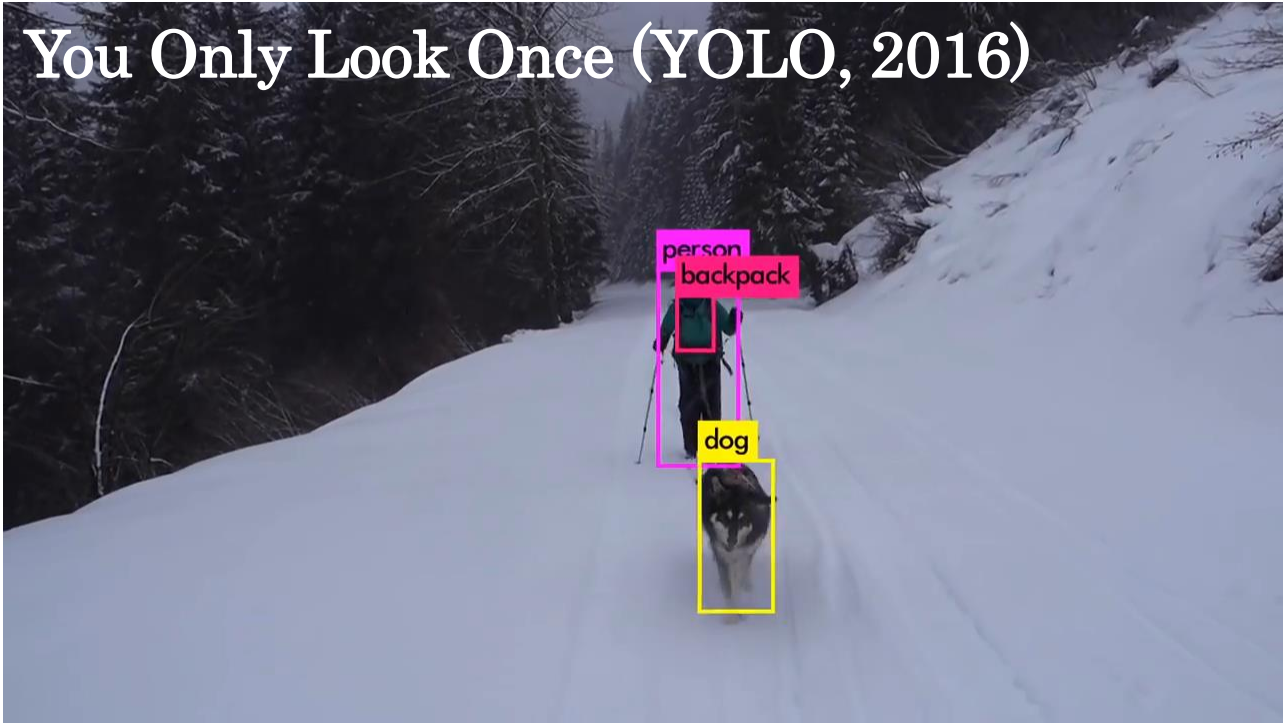
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Object Detection



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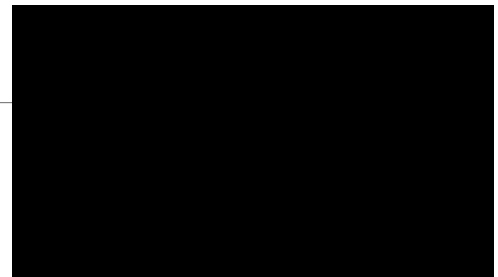
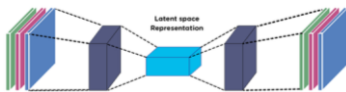
You Only Look Once (YOLO, 2016)



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Compressing Information

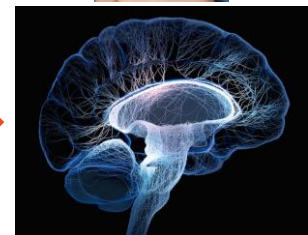
■ Nature vs. Learning



10^{15} bits



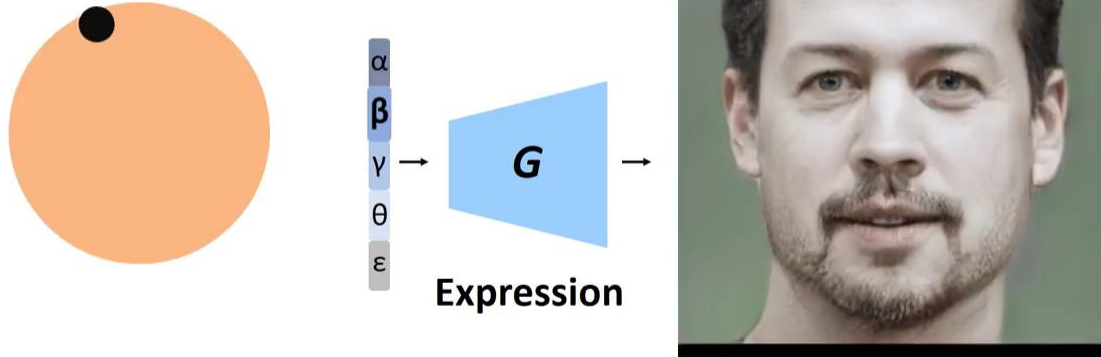
10^9 bits



10^{15} bits

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Disentanglement



Deng, Y., Yang, J., Chen, D., Wen, F., & Tong, X. (2020). Disentangled and Controllable Face Image Generation via 3D Imitative-Contrastive Learning. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*

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Generative Model



Menon, S., Damian, A., Hu, S., Ravi, N., & Rudin, C. (2020). PULSE: Self-Supervised Photo Upsampling via Latent Space Exploration of Generative Models. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*

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Training Bias



By ELAISHA STOKES CBS NEWS November 19, 2020, 7:00 AM

Wrongful arrest exposes racial bias in facial recognition technology

Share / Tweet / Reddit / Flipboard / Email



Microsoft 'deeply sorry' for racist and sexist tweets by AI chatbot

Company finally apologises after 'Tay' quickly learned to produce offensive posts, forcing the tech giant to shut it down after just 16 hours



Microsoft's artificial intelligence chatbot Tay didn't last long on Twitter. PH

Amazon scraps a secret A.I. recruiting tool that showed bias against women

PUBLISHED WED, OCT 10 2016-6:11 AM EDT / UPDATED THU, OCT 11 2016-3:25 PM EDT

KEY POINTS

- Amazon.com's machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.
- The team had been building computer programs since 2014 to review job applicants' resumes with the aim of mechanizing the search for top talent, five people familiar with the effort told Reuters.
- The company's experimental hiring tool used artificial intelligence to give job candidates scores ranging from one to five stars — much like shoppers rate products on Amazon, some of the people said.



An Amazon Prime package. PHOTODISC/REUTERS/CONTRAST



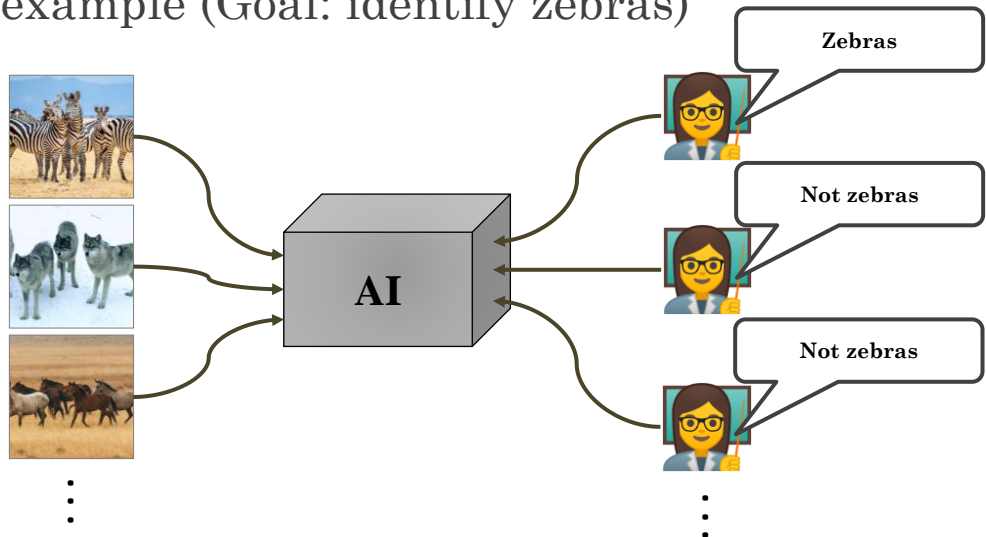
TRENDING NOW

House to impeach Trump for inciting Capitol attack as more Republicans get on board

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Beyond Recognition

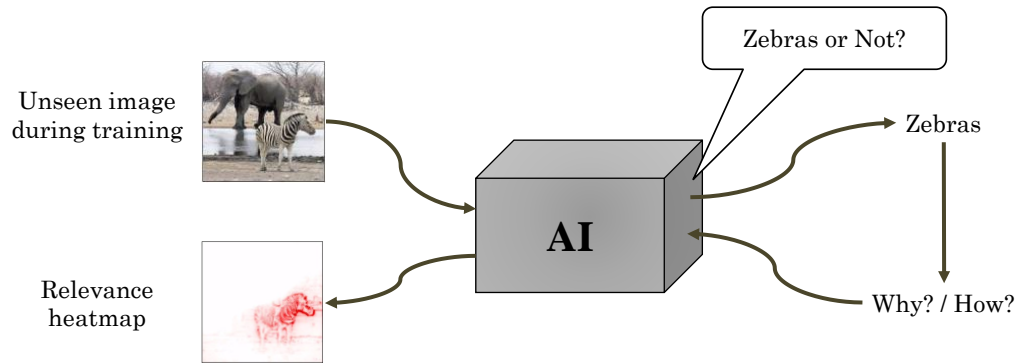
■ Training example (Goal: identify zebras)



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Explainable AI

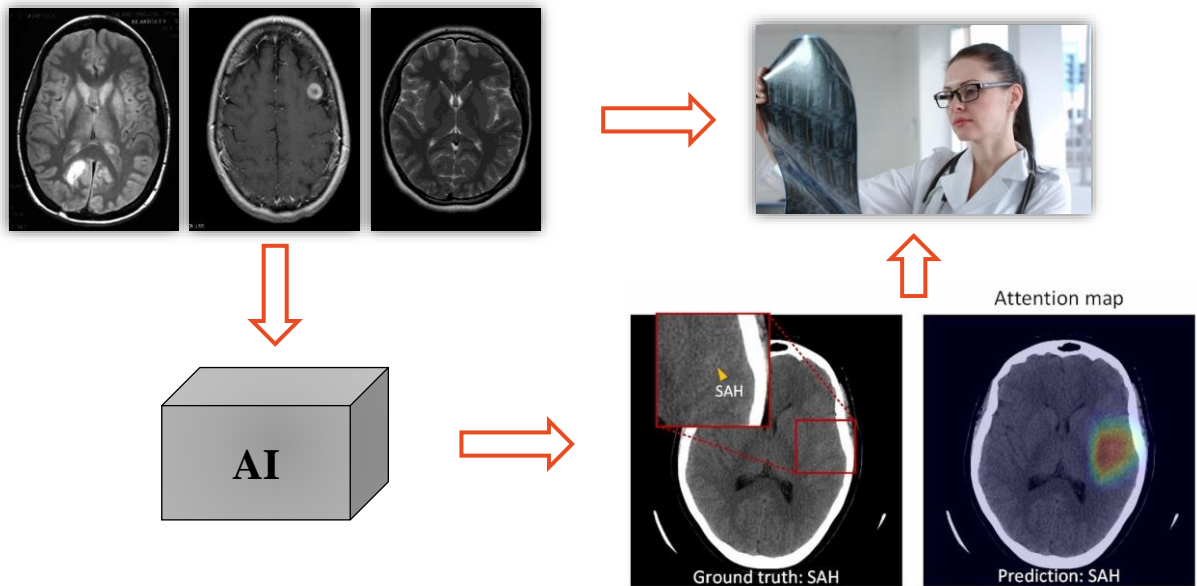
■ Testing example (Goal: identify zebras)



Bach, S., Binder, A., Montavon, G., Klauschen, F., Müller, K. R., & Samek, W. (2015).
On pixel-wise explanations for non-linear classifier decisions by layer-wise relevance propagation
PloS one

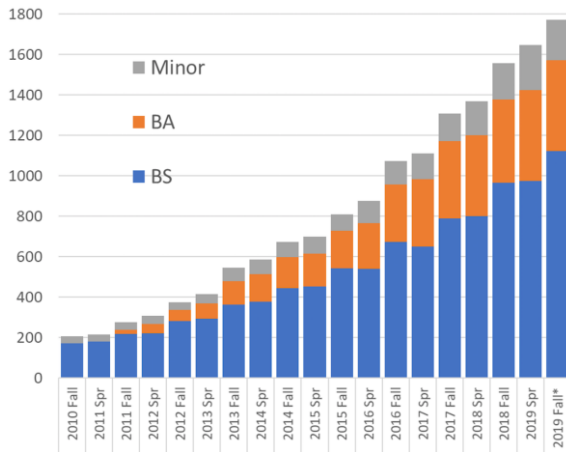
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Explainable AI

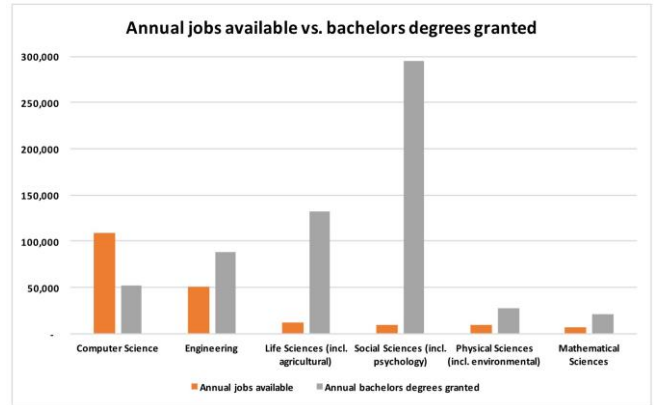


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Future in Computer Science



<https://cs.unc.edu/academics/undergraduate/enrollment-growth-and-access-to-the-major/>



<https://news.cs.washington.edu/2016/03/27/where-the-jobs-are-2016-edition/>

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Customer Support Representative

Sophie Bearman

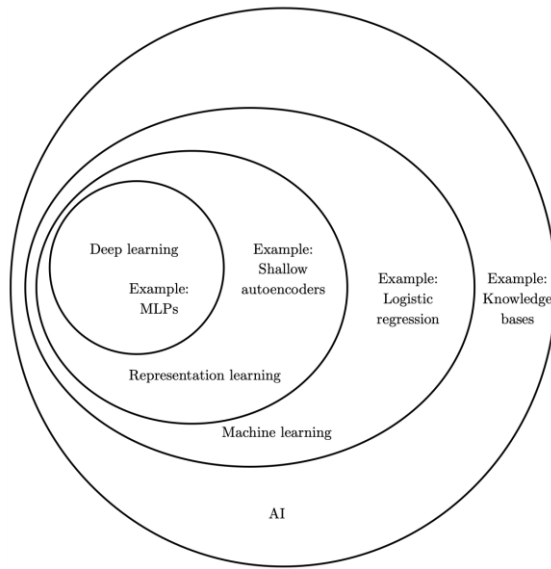
Hi my name is Gabriella, I'm hiring for Customer Support Representative at Eastmond Paper. Some of things we're passionate about and focused on are: Acting like an owner, being an industry leader, and customer obsession. Tell us some of the things you're passionate about and how you would be a great fit for this role.

Video Guide

Close

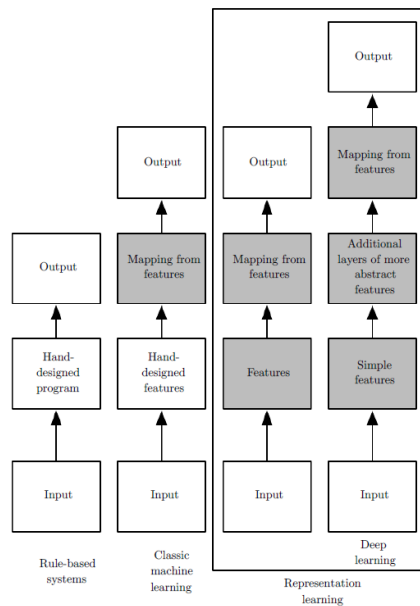
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Hierarchy



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AI disciplines

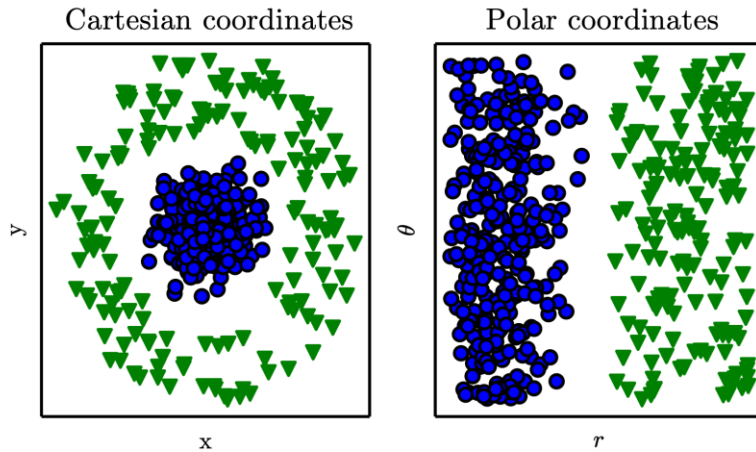


Shaded boxes indicate components that are able to learn from data.

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Machine Learning approach

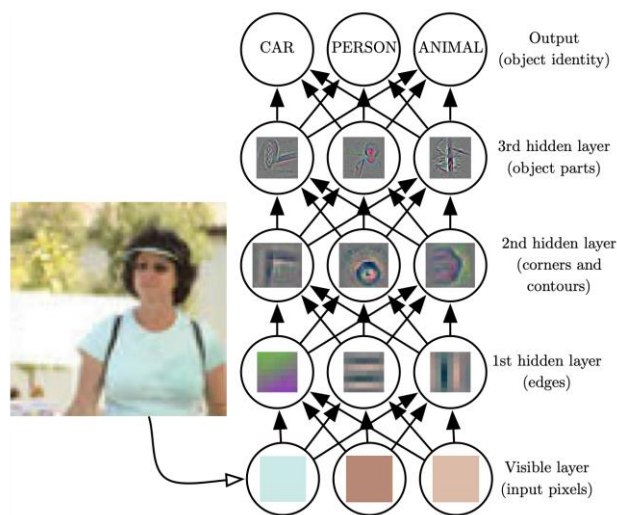
- Simple machine learning algorithms depends heavily on the representation of the data



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Deep Learning

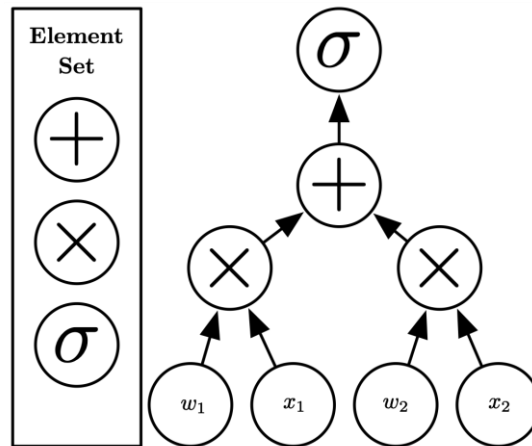
- Build complex concepts out of simpler concepts



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Multilayer Perceptron (MLP)

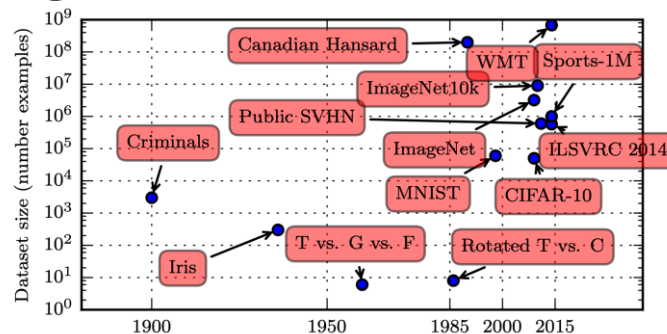
- A mathematical function mapping some set of input values to output values



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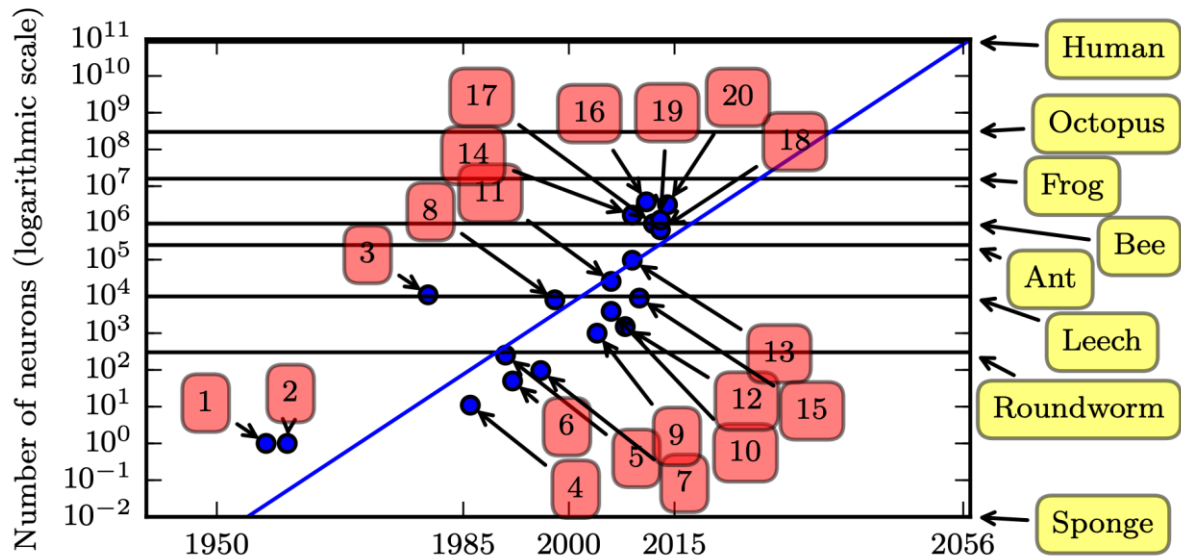
Growing Datasets

- The age of “Big Data” has made machine learning much easier because the key burden of statistical estimation—generalizing well to new data after observing only a small amount of data—has been considerably lightened



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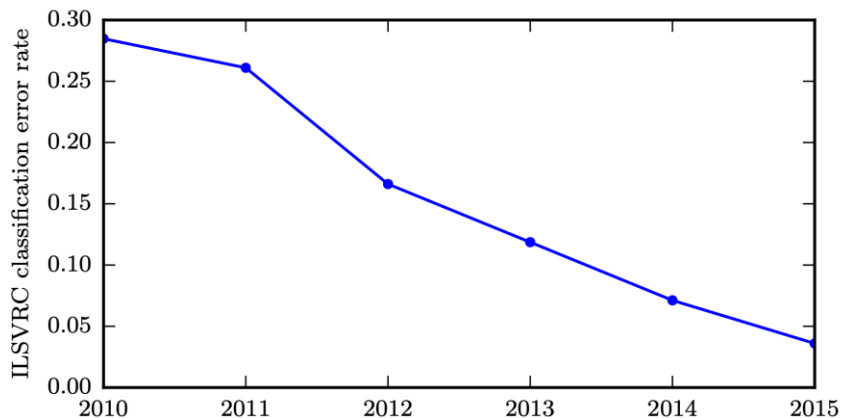
Increasing Model Sizes



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Object Recognition

- The largest contest in object recognition is the ImageNet Large Scale Visual Recognition Challenge (ILSVRC) held each year



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