

What is AI research?

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CS 197 Section 1

Recap: what is research?

An implicit assumption: industry and research thought about things one day

“No let’s do it this way instead:” Offering a new perspective

AI = Data + Algorithms

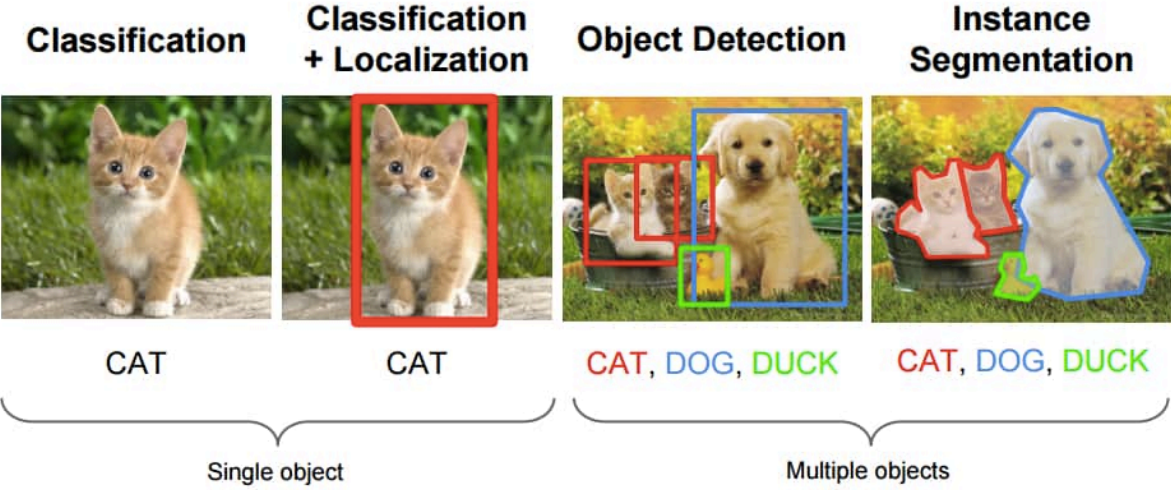
What is AI research?

- » AI research as **building tools**
 - » Can we use data and algorithms to build useful tools?
- » AI research as **phenomenology**
 - » How can we understand the tools we build?
- » AI research as “**philosophy**”
 - » What is the nature of intelligence? Can we create intelligent machines?



This view will be the focus of this section

AI tools: computer vision (CV)



What is in an image?

Generating and editing images

AI tools: natural language processing (NLP)

Normans

The Stanford Question Answering Dataset

The Normans (Norman: Nourmands; French: Normands; Latin: Normanni) were the people who in the 10th and 11th centuries gave their name to Normandy, a region in France. They were descended from Norse ("Norman" comes from "Norseman") raiders and pirates from Denmark, Iceland and Norway who, under their leader Rollo, agreed to swear fealty to King Charles III of West Francia. Through generations of assimilation and mixing with the native Frankish and Roman-Gaulish populations, their descendants would gradually merge with the Carolingian-based cultures of West Francia. The distinct cultural and ethnic identity of the Normans emerged initially in the first half of the 10th century, and it continued to evolve over the succeeding centuries.

In what country is Normandy located?

Ground Truth Answers: France France France France

Prediction: France

When were the Normans in Normandy?

Ground Truth Answers: 10th and 11th centuries in the 10th and 11th centuries 10th and 11th centuries 10th and 11th centuries

Prediction: 10th and 11th centuries

Question answering

Custom prompt

Natural language processing can leverage modern AI techniques for text generation

GENERATE ANOTHER

Completion

Natural language processing can leverage modern AI techniques for text generation – such as deep learning. In this approach, a human is brought in to help with the learning process.

"It's a very flexible approach," said Ralf BÜchmann, director general of the Swiss National Library of Science in Zürich (SNLZ). "For the past ten years, many have been seeking to implement deep learning in text generation and have struggled. But after these studies, I believe we have reached a milestone that should help us advance this field of research."

Text generation

AI tools: reinforcement learning (RL)

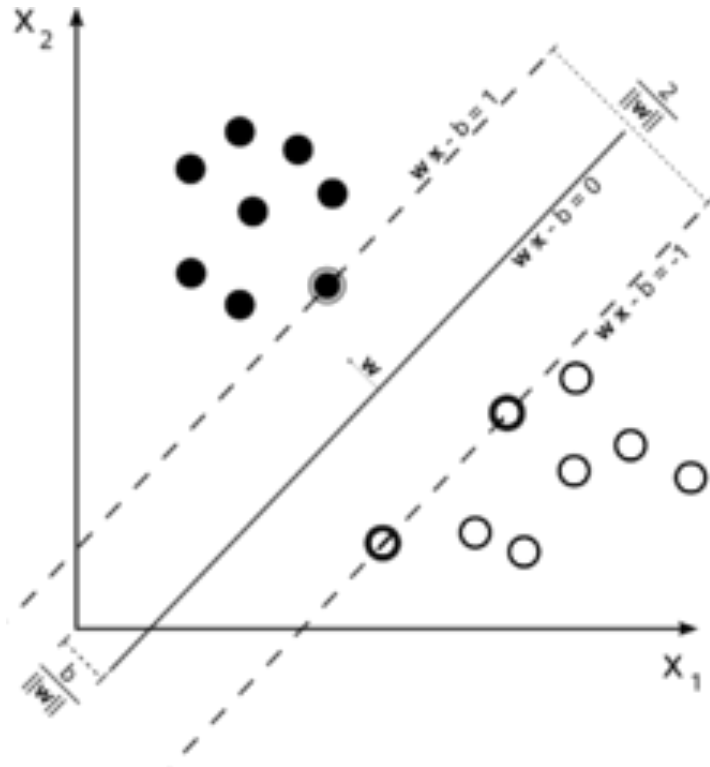


Game playing



Robotics

Aside: traditional machine learning



“Traditional ML” build statistical models for prediction

Example: ImageNet



Stanford + others collected
and labeled 14 million images

What **tools** would 14M labeled
images enable?

How important is data?

Do computers need many
examples to recognize images?

Example: AlphaGo



Prevailing “wisdom:” games require search, Go is too complex

AlphaGo: Deep networks can learn to predict over complex state spaces and self-play