Q: Let's look at current state of the art for AI. What types of problems is AI currently good at today, and why? (with real world examples)
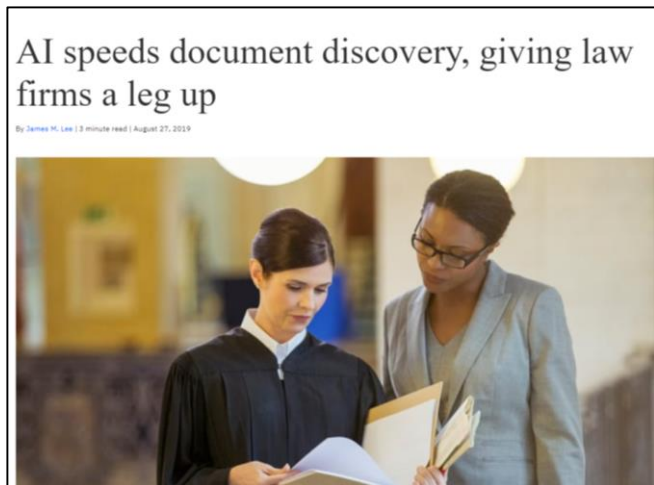
Nisar Ahmed
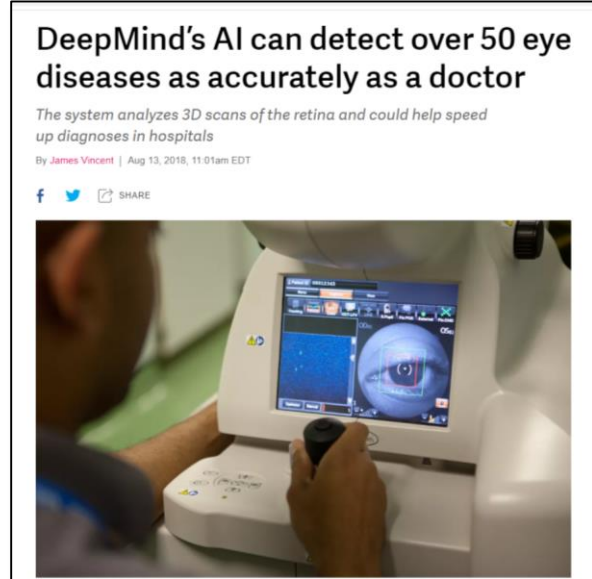
Smead Aerospace Engineering Sciences

University of Colorado Boulder

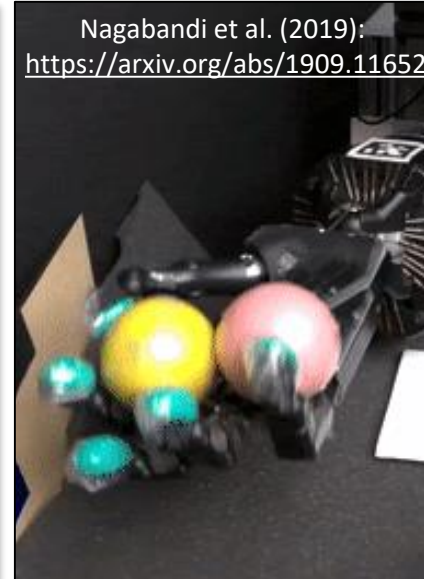# "Machine Learning (ML)": a special domain of AI

- use data to "find algorithm" to turn given list of #'s x → desired list of #'s y
- ML methods today: **#'s in x and y could represent practically anything…**

AI speeds document discovery, giving law firms a leg up

By James M. Lee | 3 minute read | August 27, 2019

DeepMind's AI can detect over 50 eye diseases as accurately as a doctor

The system analyzes 3D scans of the retina and could help speed up diagnoses in hospitals

By James Vincent | Aug 13, 2018, 11:01am EDT

Nagabandi et al. (2019): https://arxiv.org/abs/1909.11652

Multi-modal control

x: gobs of documents
y: discovery drafts

x: 3D retinal scan data
y: disease diagnosis

x: color images
y: joint movements

x: vehicle sensor data
y: steering + brake commands

How to "find algorithm" from data?

- algorithm = "best fit" often the answer to **some optimization problem**
  - usually: "get predicted y to match desired y (given any x)"
- finding "best fit" for "big problems": lots of data, computer horsepower
  - Today: storage, CPUs, and GPUs are everywhere & **cheap**!
- closed-worlds, fixed rules, high-fidelity simulations → **ripe for shortcuts!**
  - **Machines "training" against themselves or each other**