# Intelligent Minds and Machines

PSYC 3043

Week 2: Cognition and intelligence

# Talk alert: Belief as emotion? [Oct 14]

- Professor of Philosophy at University of Richmond
- Philosophy & Psych department co-hosted
- October 14
- 5 pm, Searles 315

# today's agenda

+ more definitions and terminology
+ discussing human (and AI) limitations

# a quiz!

+ test your awareness of “AI” in daily life

# terminology

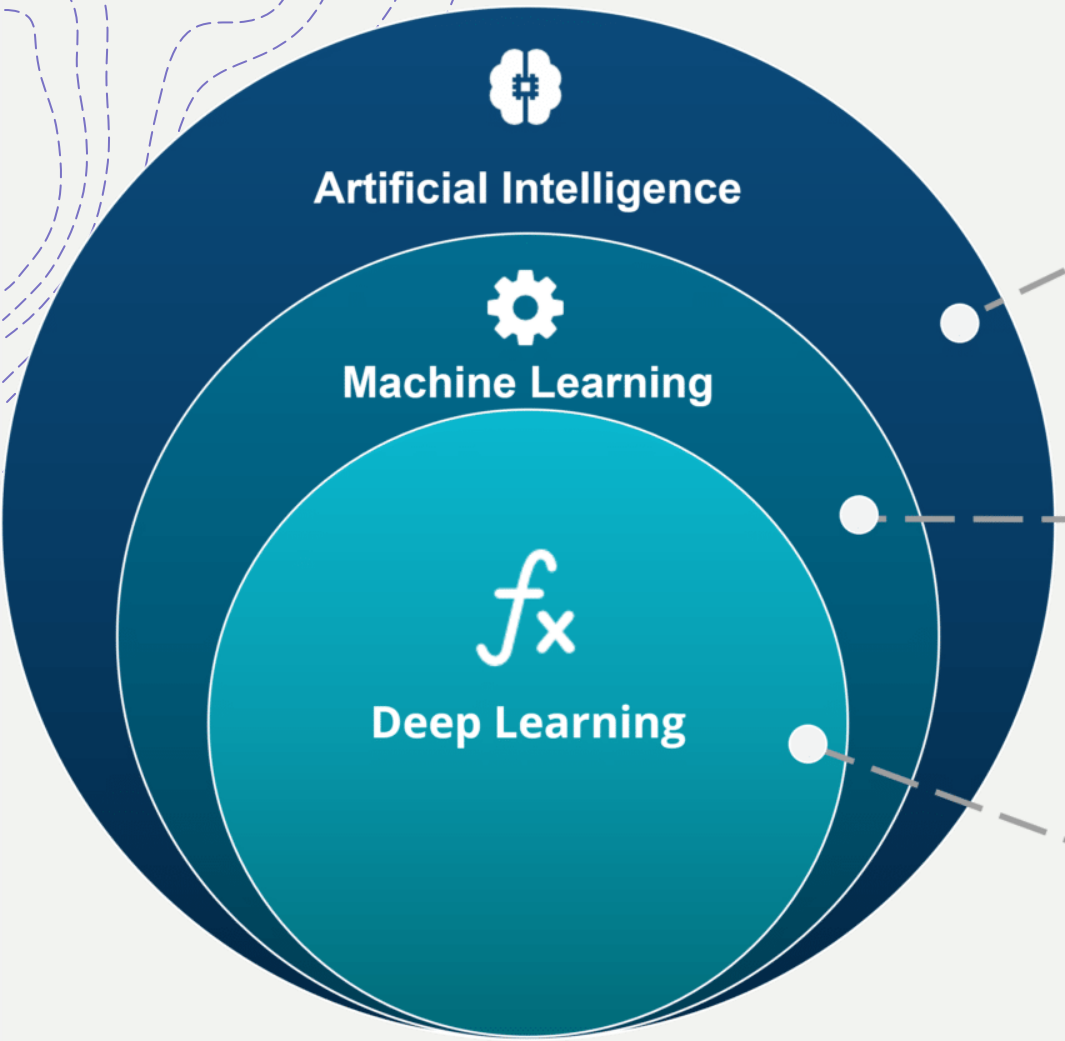
- discuss what you know about these terms
  - machine
  - machine learning
  - artificial intelligence
  - deep learning

# origins: “AI”

The first use of the term ‘artificial intelligence’ appears in a funding proposal for a workshop at Dartmouth College, in Hanover, New Hampshire, United States. In the proposal for the Dartmouth Summer Research Project on Artificial Intelligence, we find the following wildly ambitious proposal:

> *We propose that a 2-month, 10-man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.*

source: aimyths.org




## ARTIFICIAL INTELLIGENCE

A technique which enables machines to mimic human behaviour

## MACHINE LEARNING

Subset of AI technique which use statistical methods to enable machines to improve with experience

## DEEP LEARNING

Subset of ML which make the computation of multi-layer neural network feasible

source

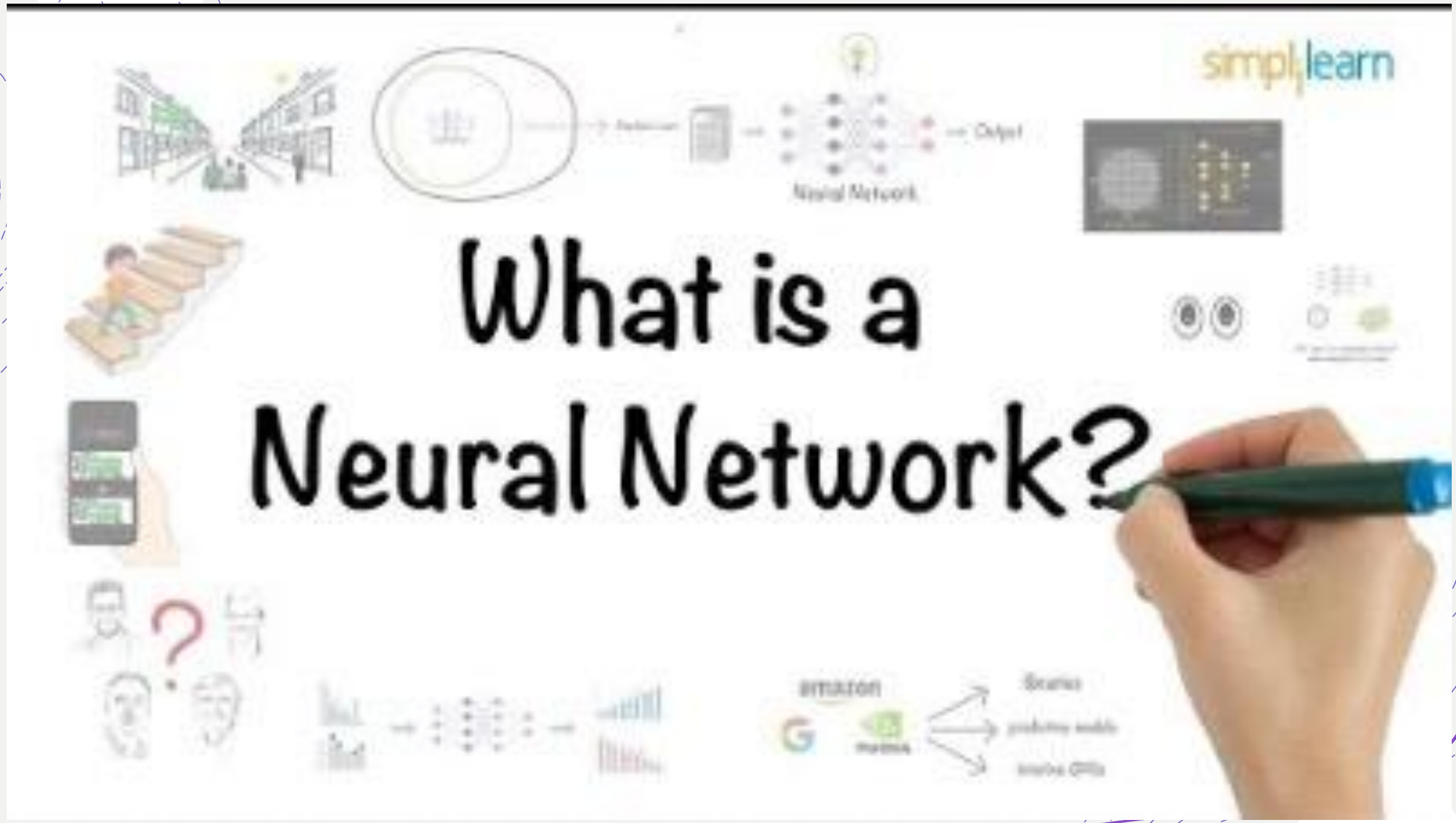
# types of AI

- artificial narrow intelligence (ANI)
  - specific tasks (e.g., chess, chatbots, etc.)
- artificial general intelligence (AGI)
  - complex human behaviors (emotion, perspective taking, etc.)
  - perform at the same level as human
- artificial super intelligence (ASI)
  - exceed human performance

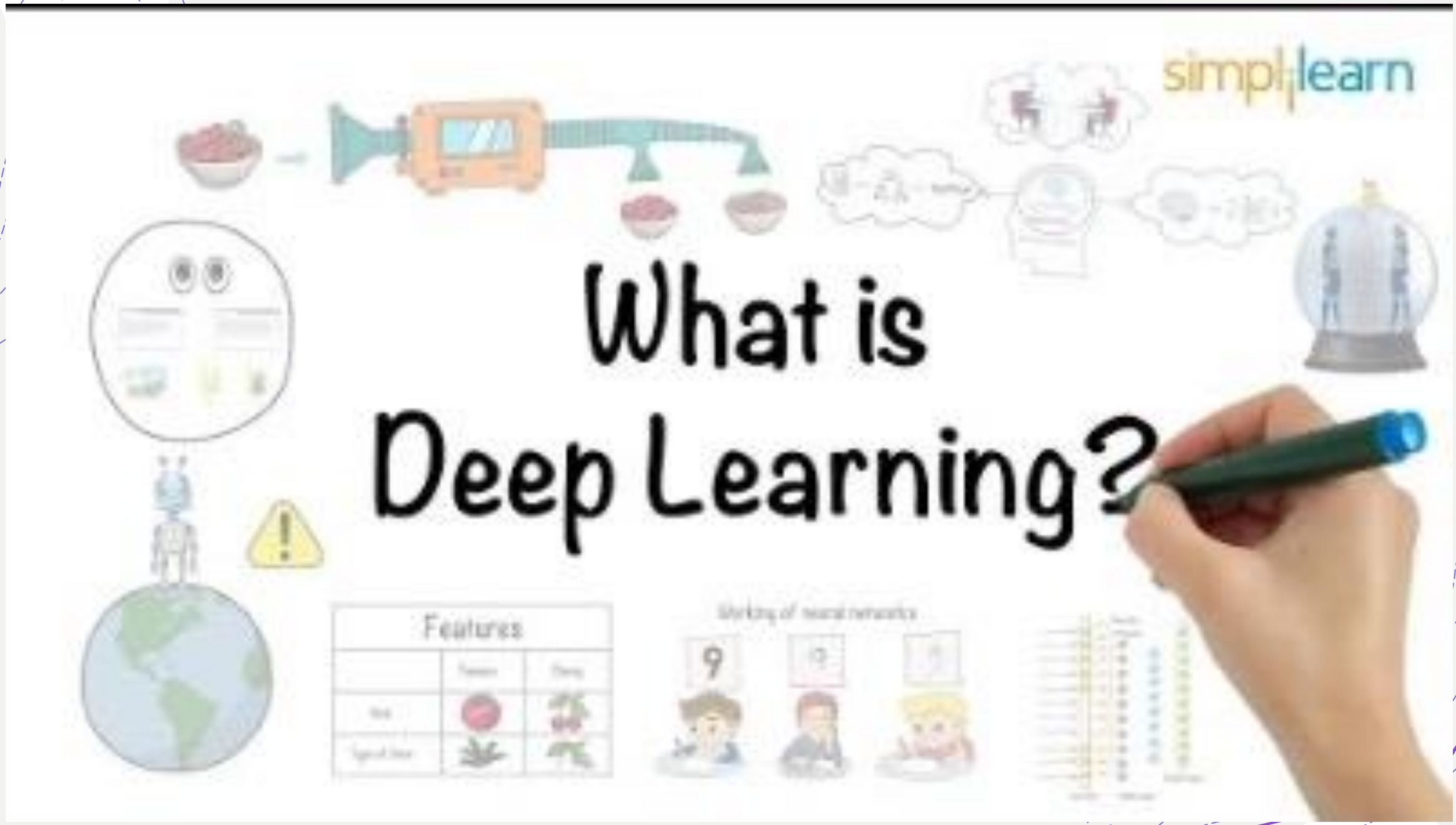
source: IBM

# machine learning

- improve predictions through learning
- “nondeep” machine learning: requires human intervention for learning effectively
  - e.g., identifying features, labeled datasets
  - “supervised learning” vs. “unsupervised learning”
- “deep learning”: often uses unstructured data to automatically determine features (with a goal in mind)
  - minimizes human labeling, large datasets
- reinforcement learning: learning through reward & punishment




https://www.youtube.com/watch?feature=oembed&v=bfmFfD2RIcg




https://www.youtube.com/watch?v=6M5VXKLf4D4

# discuss

# quiz discussion

**Thinking about customer service, which of the following uses artificial intelligence (AI)?**

- A detailed Frequently Asked Questions webpage
- An online survey sent to customers that allows them to provide feedback
- A contact page with a form available to customers to provide feedback
- A chatbot that immediately answers customer questions
- Not sure

**When playing music, which of the following uses artificial intelligence (AI)?**

- Using Bluetooth to connect to wireless speakers
- A playlist recommendation
- A wireless internet connection to stream the music
- Shuffle play from a chosen playlist
- Not sure

**When using email, which of the following uses artificial intelligence (AI)?**

- The email service marking an email as read after the user opens it
- The email service allowing the user to schedule an email to send at a specific time in the future
- The email service categorizing an email as spam
- The email service sorting emails by time and date
- Not sure

**Thinking about health products, which of the following uses artificial intelligence (AI)?**

- Wearable fitness trackers that analyze exercise and sleeping patterns
- Thermometers that are placed under someone's tongue to detect a fever
- At-home COVID-19 tests
- Pulse oximeters that measure a person's oxygen level of the blood
- Not sure

**Thinking about online shopping, which of the following uses artificial intelligence (AI)?**

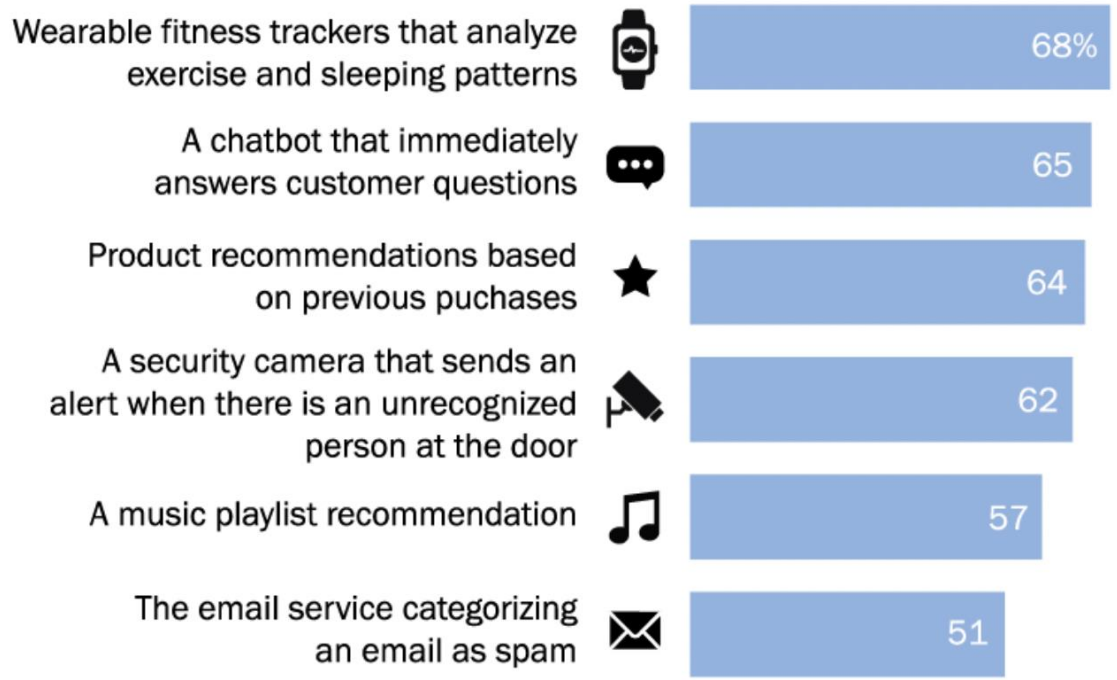
- Storage of account information, such as shipping addresses
- Records of previous purchases
- Product recommendations based on previous purchases
- Product reviews from other customers
- Not sure

**Thinking about devices in the home, which of the following uses artificial intelligence (AI)?**

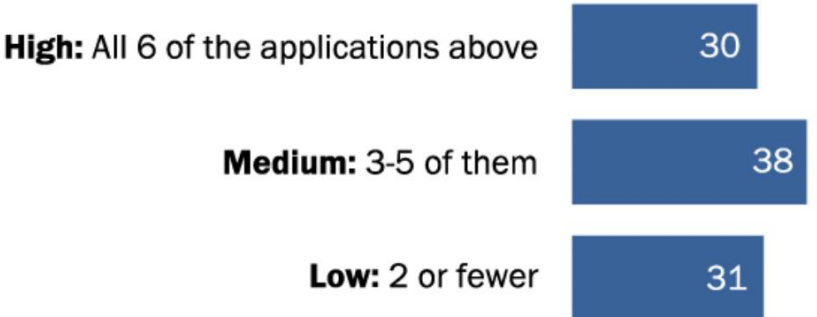
- Programming a home thermostat to change temperatures at certain times
- A security camera that sends an alert when there is an unrecognized person at the door
- Programming a timer to control when lights in a home turn on and off
- An indicator light that turns red when a water filter needs to be replaced
- Not sure

# Half of Americans or more aware of common uses of AI, but fewer can identify AI's role in all six examples

*% of U.S. adults who identify that the following use artificial intelligence in multiple choice questions*




*% of U.S. adults who correctly identify ___ as using AI*



# AI myths

+https://www.aimyths.org/

# Griffiths article

+ three key “limitations”
+ limited time
+ limited computation
+ limited communication

# limited time

- survival
- explore/exploit trade-offs
- human lifespan
- solution:
  - inductive biases / Bayesian inference
  - theory of mind (week 9)

# example

“blue”

# limited computation

- brains have limited power
- solution:
  - divide, reuse, and recycle!
  - forming subgoals, planning, “meta-reasoning” (week 12)

# limited communication

- information sharing is not seamless
- solution:
  - language (week 5)
  - cumulative cultural evolution (week 14)

# coming up + annotation feedback

+ moving away from what separates individuals to what separates species
+ intelligence as a complex behavior

# coming up

Sunday, September 15, 2024, 2024: Week 2 Assignments

- Submit Project Milestone #1 (Questions of Interest)
- Submit Week 2's Meme

## Week 3: Statistical Learning

Tuesday, September 17, 2024: Learning patterns from data

- Saffran, J. R., Aslin, R. N., & Newport, E. L. (1996). Statistical learning by 8-month-old infants. *Science, 274*(5294), 1926-1928. [ANNOTATE]
- Saffran, J. R., & Kirkham, N. Z. (2018). Infant statistical learning. *Annual Review of Psychology, 69*, 181-203.[ANNOTATE]