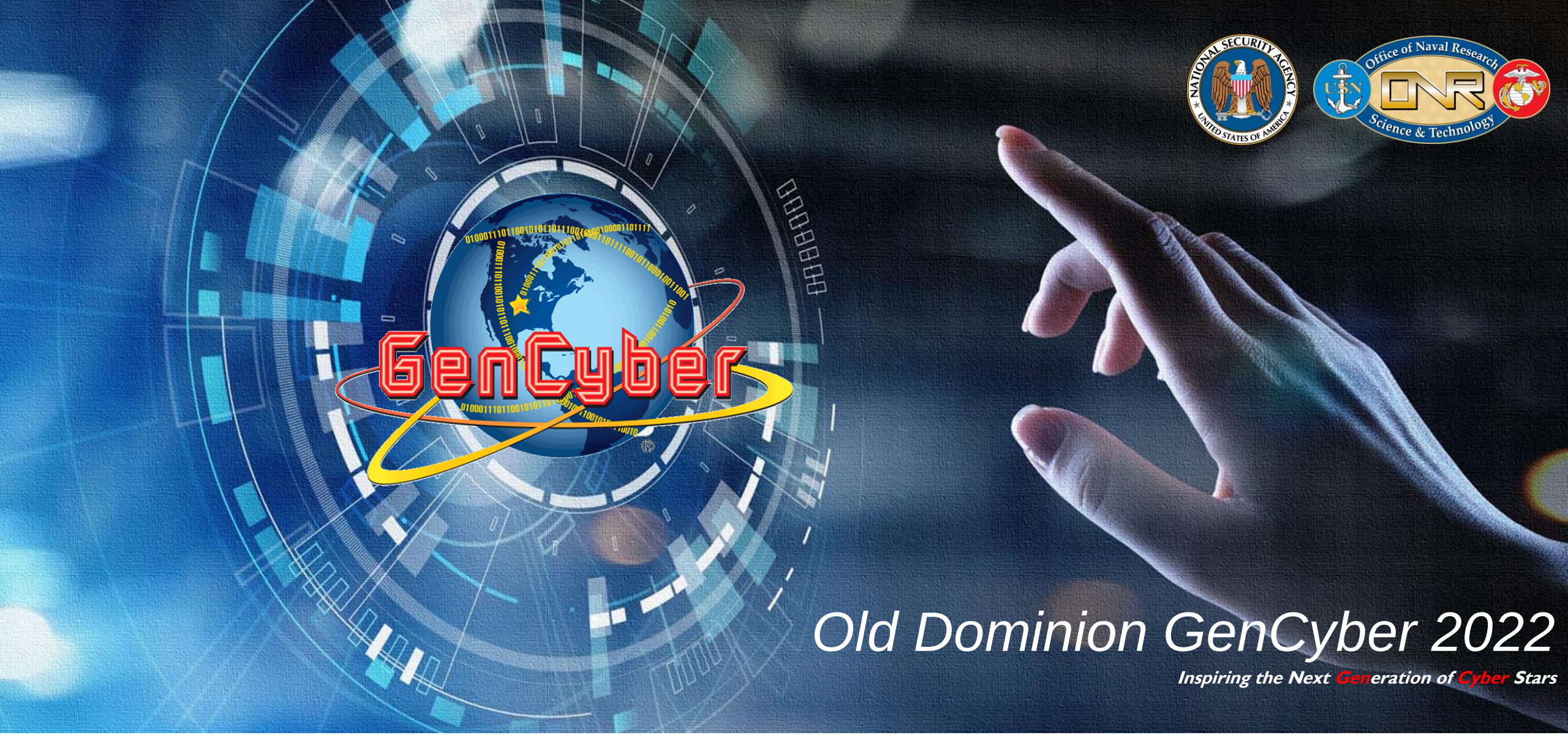


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# Tutorial: Introduction to AI

*Uddom Lee*

# A LITTLE BIT ABOUT ME

- Masters student in Cybersecurity
  - Plan to Graduate in Spring 2023
- Hobbies: Reading, video games, trading card games
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# OBJECTIVE

You will be able to:

- Define "Artificial Intelligence" (AI),
  - "Machine Learning" (ML), and "Deep Learning" (DL)
- Explain how DL helps solve classical ML limitations.
- Relate sample applications of AI.

# AI Breakthroughs

## Image Classification

As of 2015, computers can be trained to perform better on this task than humans.

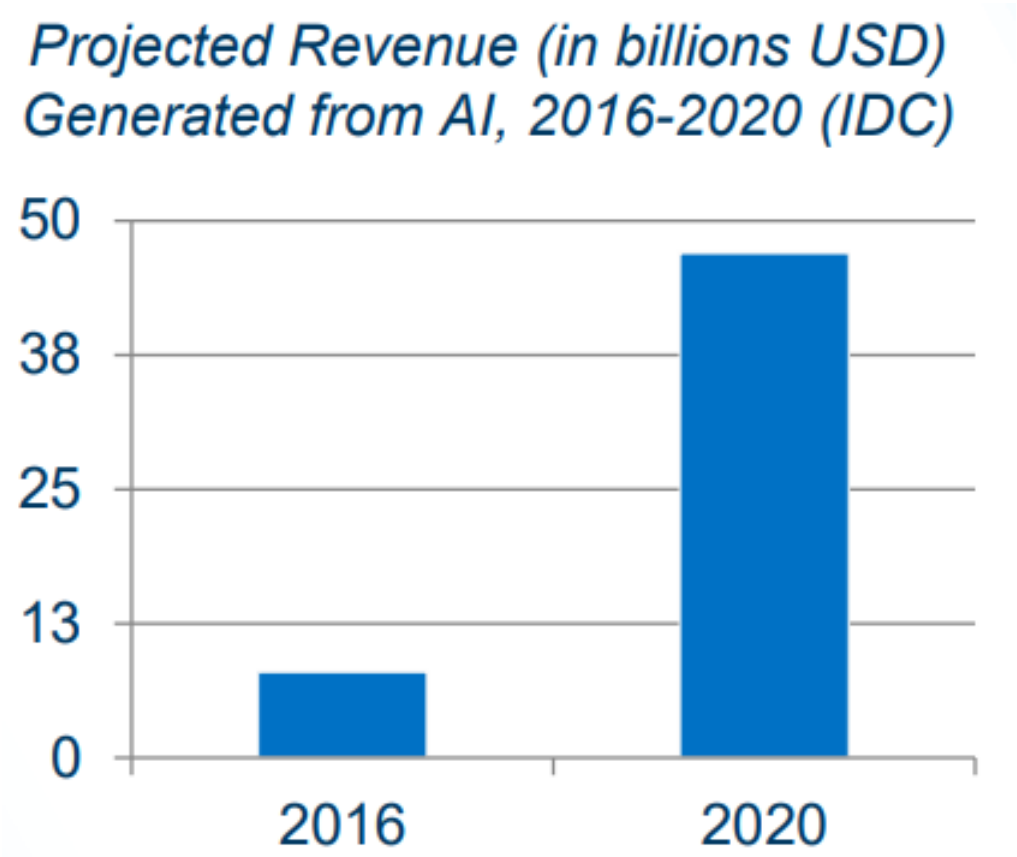

## Machine Translation

As of 2016, we have achieved near-human performance using the latest AI techniques.

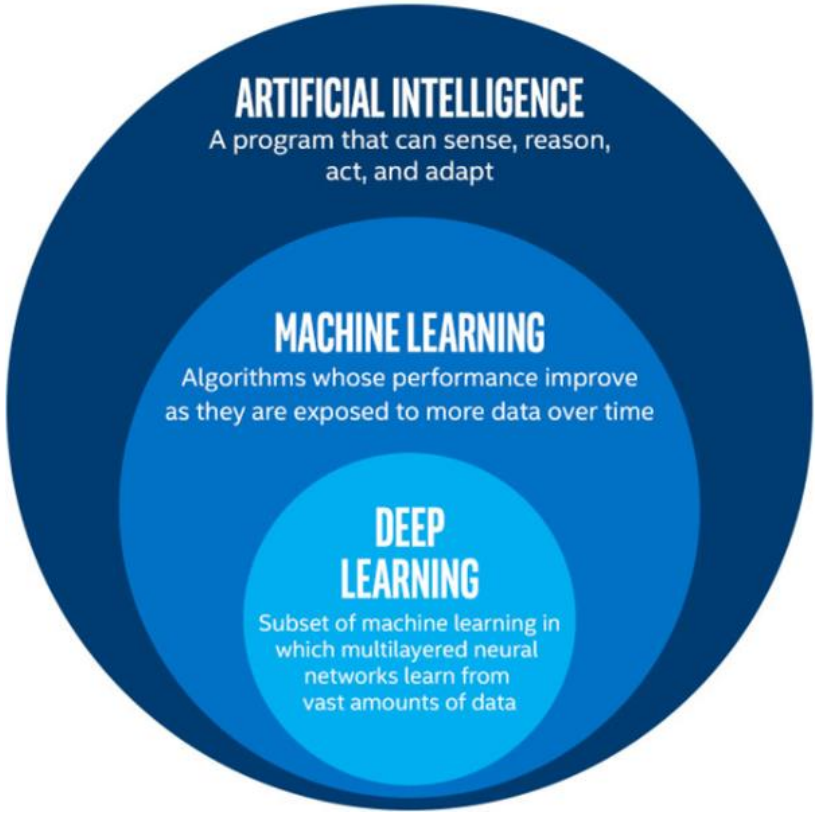
# AI Is The New Electricity

"About 100 years ago, electricity transformed every major industry. AI has advanced to the point where it has the power to transform…every major sector in coming years"

-Andrew Ng, Stanford University



# Definitions



# Artificial Intelligence

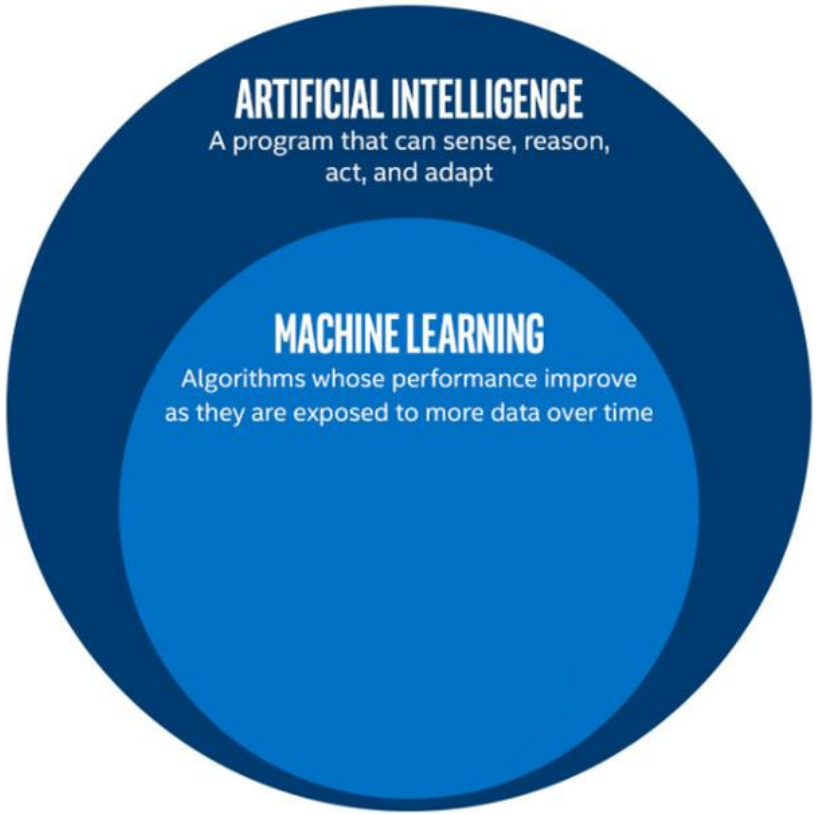
"A branch of computer science dealing with the simulation of intelligent behavior in computers." (Merriam-Webster)

"A program that can sense, reason, act, and adapt." (Intel)

"At its simplest form, artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving" (IBM)

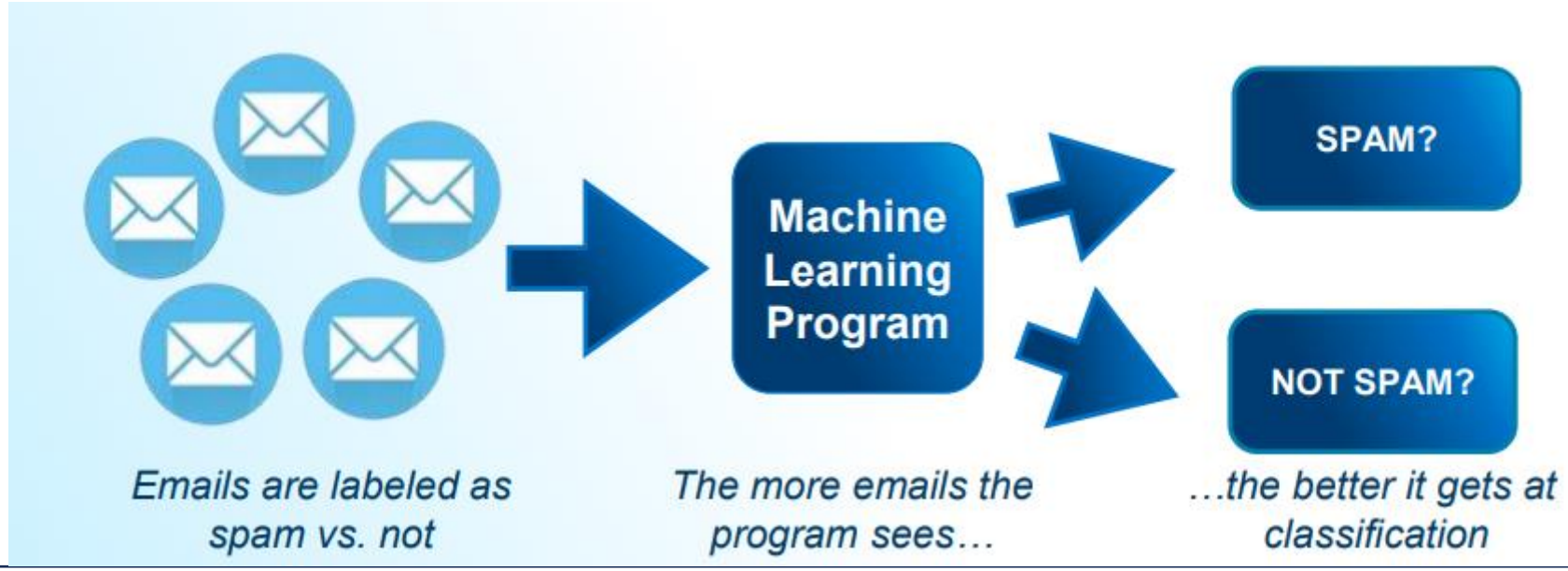
# Machine Learning

"The study and construction of programs that are not explicitly programmed, but learn patterns as they are exposed to more data over time." (Intel)



# Machine Learning

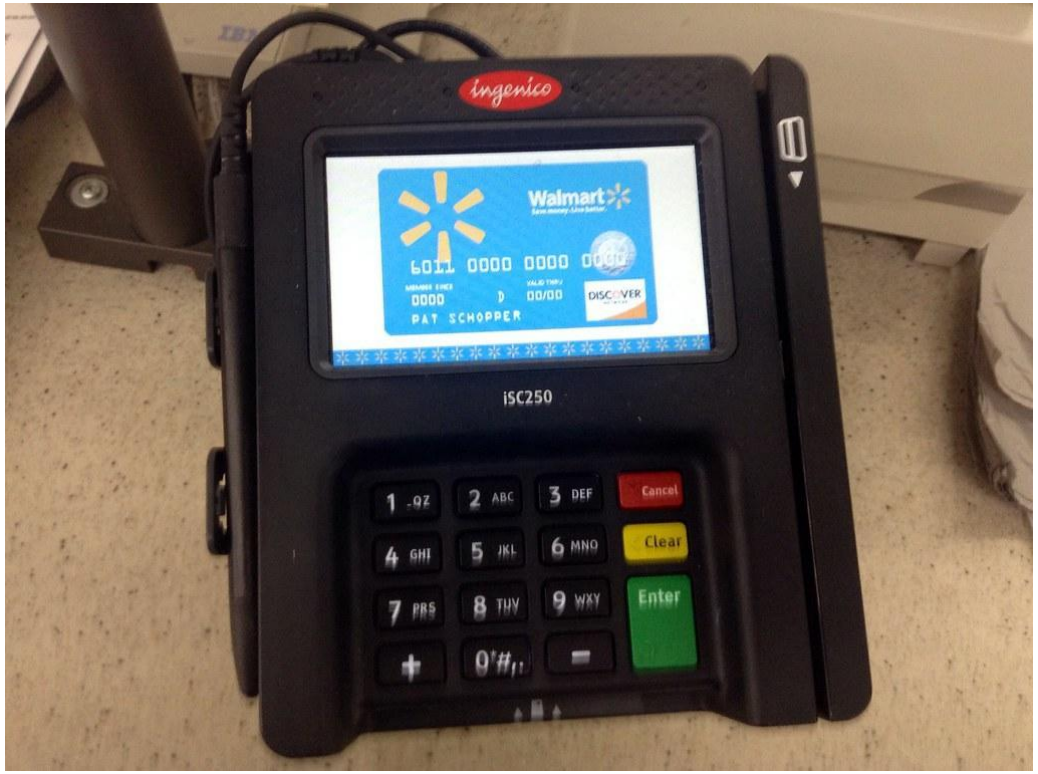
These programs learn from repeatedly seeing data, rather than being explicitly programmed by humans.



# Machine Learning Example

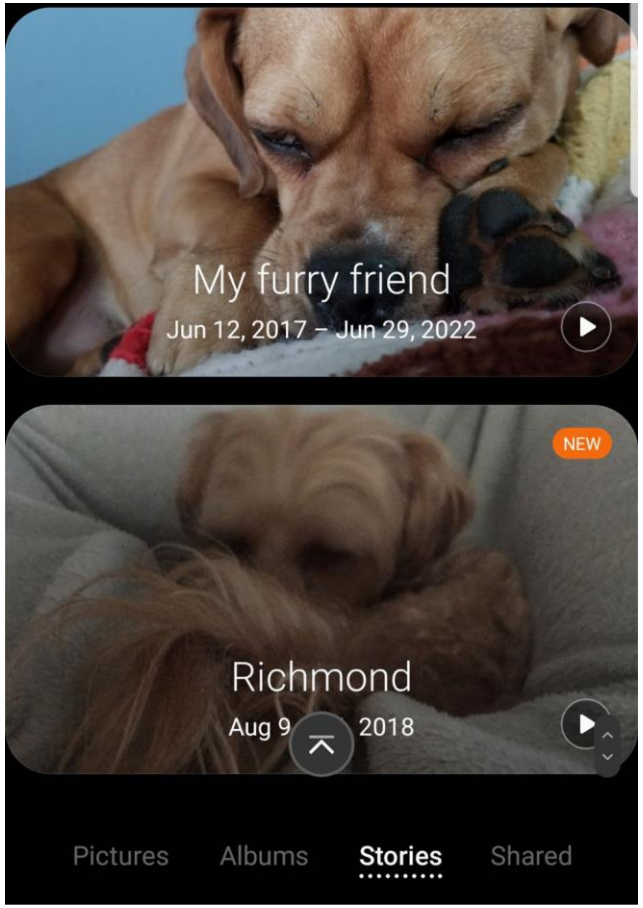
Suppose you wanted to identify fraudulent credit card transactions.

- You could define features to be:
  - Transaction time
  - Transaction amount
  - Transaction location
  - Category of purchase
- The algorithm could learn what feature combinations suggest unusual activity



# Take out your phone!

- Usually within a “stories” tab.
- AI used the features and meta data of the photos to create these stories.



# Machine Learning Limitations

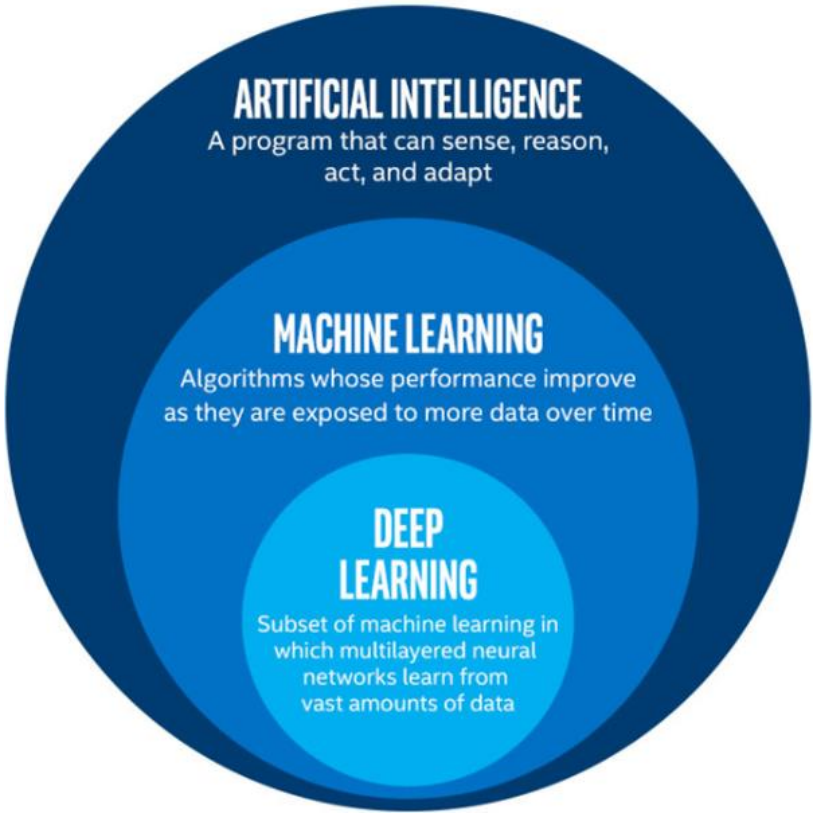
- Suppose you wanted to determine if an image is of a cat or a dog.
- What features would you use?
- This is where **Deep Learning** can come in.

# Deep Learning

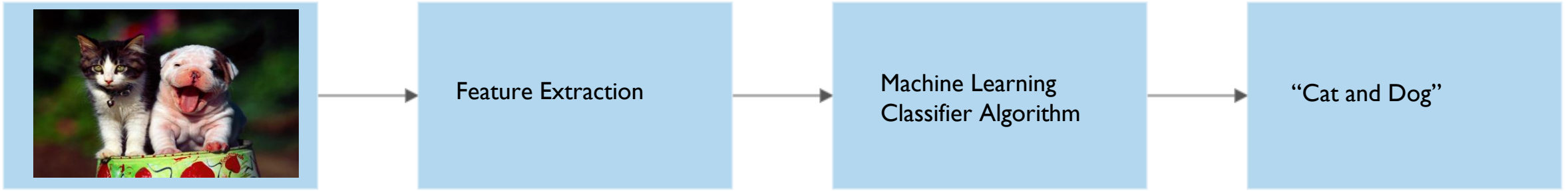
"Subset of Machine learning that involves using very complicated models called "deep neural networks"." (Intel)

*Models* determine best representation of original data; in classic machine learning, humans must do this.

Requires a much larger dataset than machine learning.



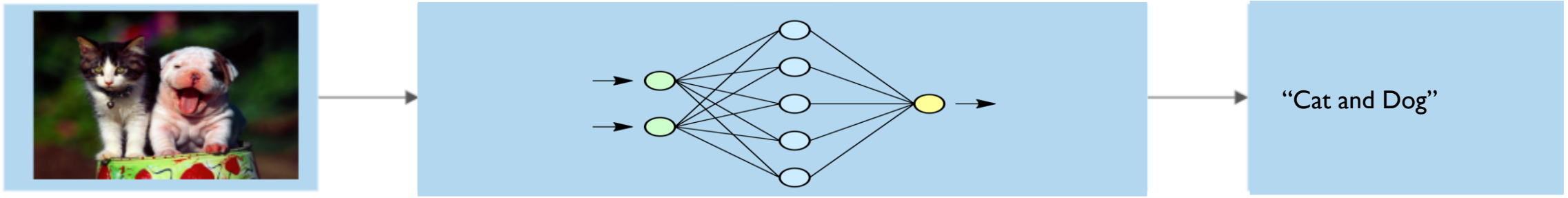
# Deep Learning Example




Classic Machine learning:

1. Determine features
2. Feed them through the model.

# Deep Learning Example



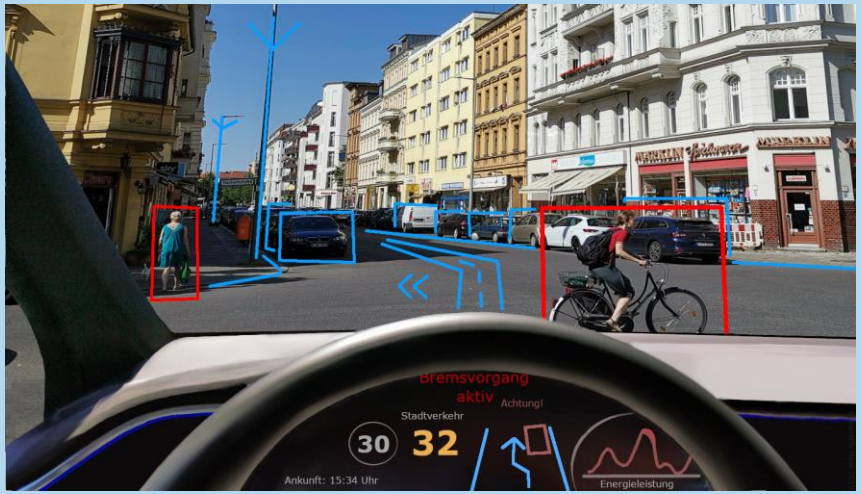

Deep Learning:

Steps 1 and 2 are combined into 1 step known as the neural network.

But needs lots of data.

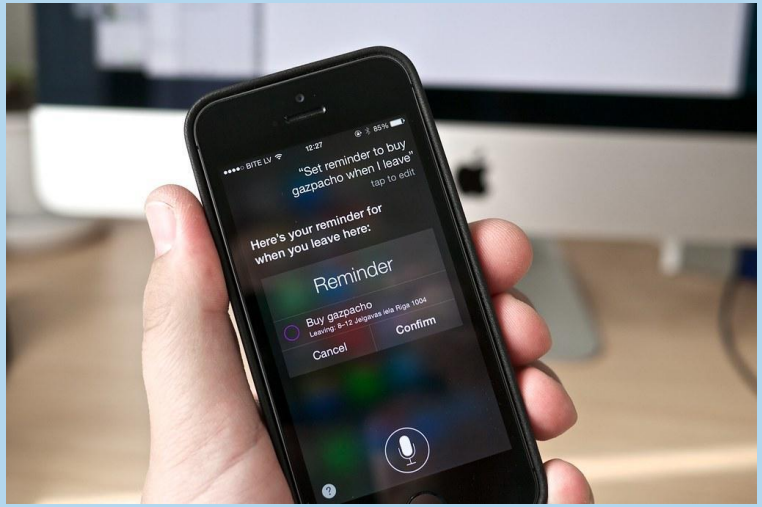
# Application of AI

## Automatic Driving




We carry around powerful natural language processing algorithms in our phones/computers.

## Natural Language




We carry around powerful natural language processing algorithms in our phones/computers.

# Application Example: Abandoned Baggage

- AI can automatically detect when baggage has been left unattended.
- This system relies on object detection
  - Detecting a person near a luggage
  - Detecting the luggage
  - Detecting a luggage without someone near it
- Someone forgot? Or Malicious intent?

Abandoned baggage

# Time to Code!

- Using Google Colab
  - Google Cloud service
- Language used this camp is Python
- Goals of coding:
  - Try to print some text
  - Create some sample functions