

What is (tiny) Machine Learning?

What is Machine Learning?

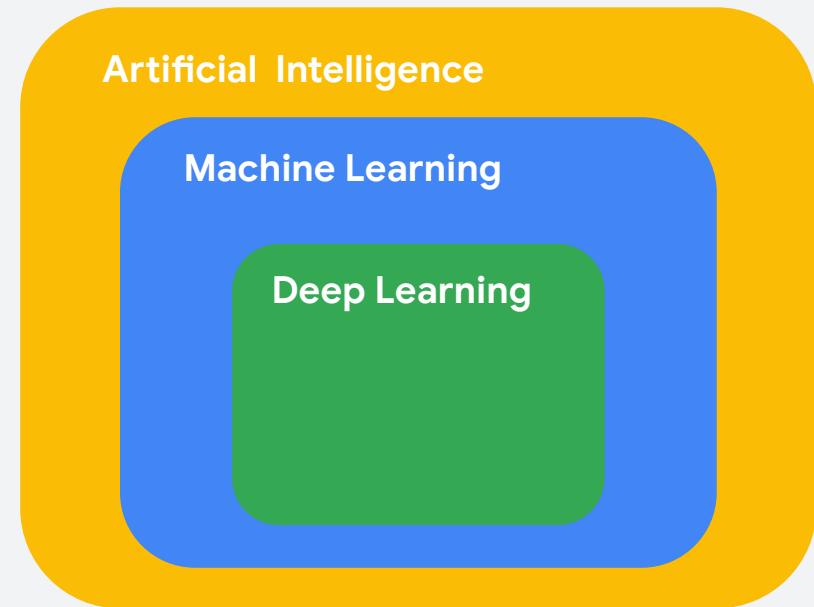
1. **Machine Learning** is a subfield of **Artificial Intelligence** focused on developing algorithms that learn to **solve problems by analyzing data for patterns**

Artificial Intelligence

Machine Learning

What is (Deep) Machine Learning?

1. Machine Learning is a subfield of Artificial Intelligence focused on developing algorithms that learn to solve problems by analyzing data for patterns
2. **Deep Learning** is a type of Machine Learning that leverages **Neural Networks** and **Big Data**



Applications of Machine Learning

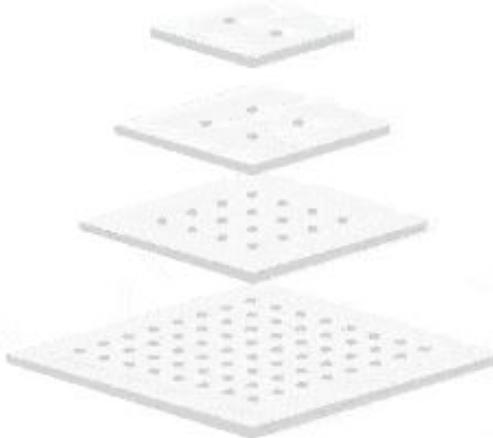


Image Classification

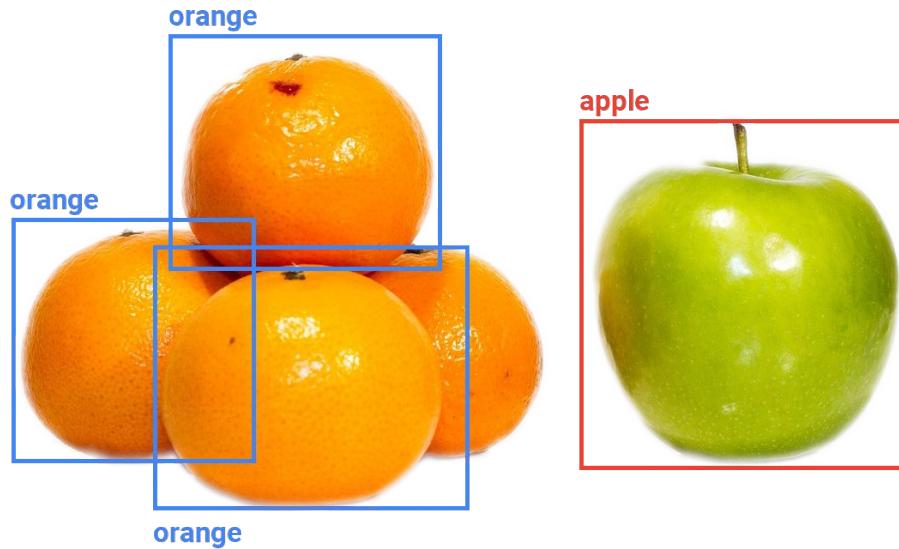


CAT

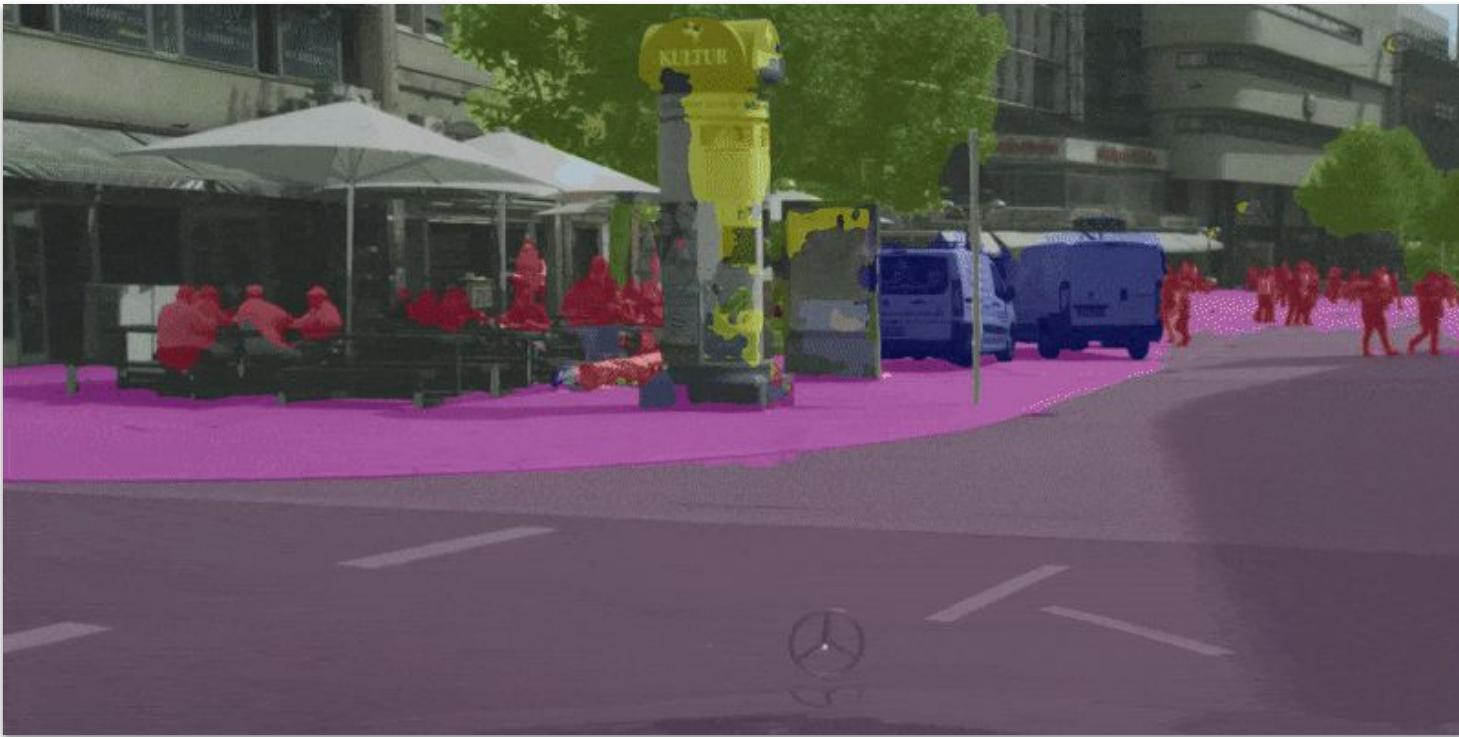
DOG



Object Detection



Segmentation



Machine Translation

- 1 Upload translated language pairs



- 2 Train your model

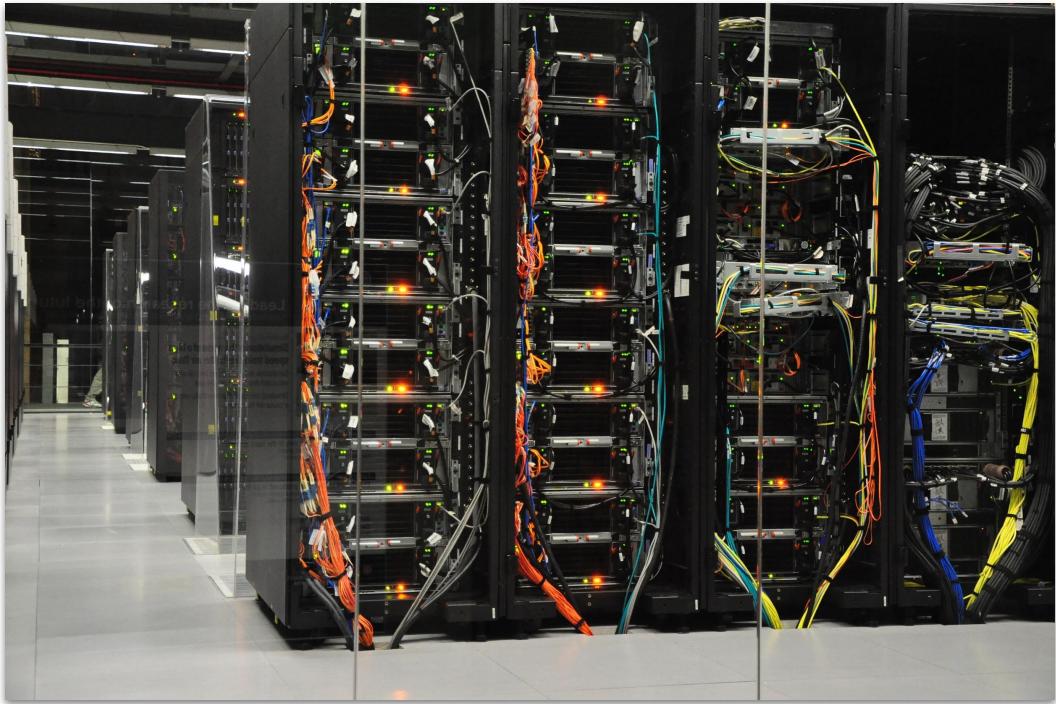
文→A
AutoML Translation

- 3 Evaluate

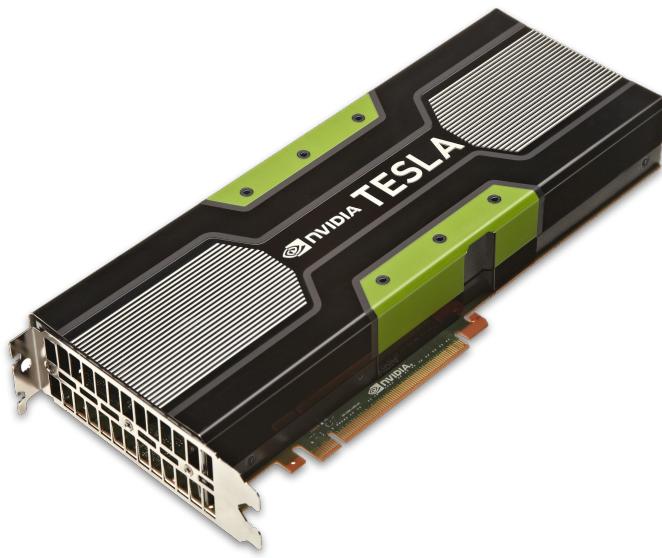
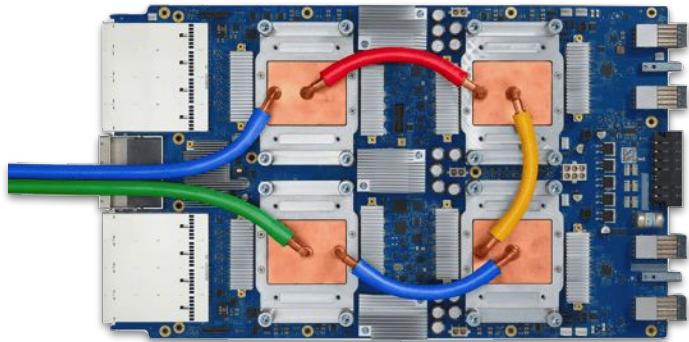


Recommendations

Datacenter

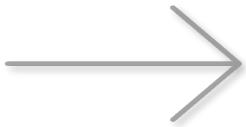
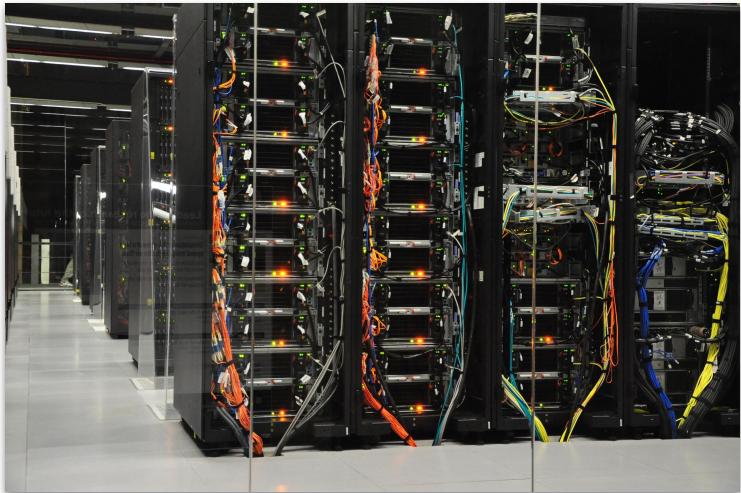


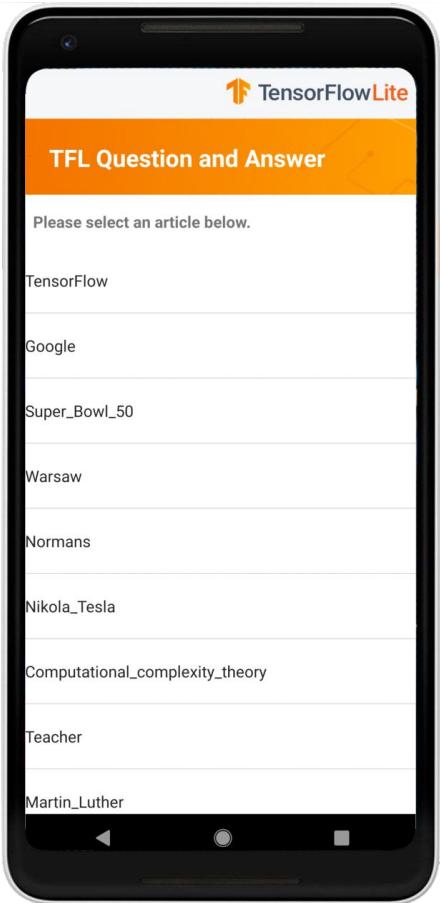
TPUs/GPUs

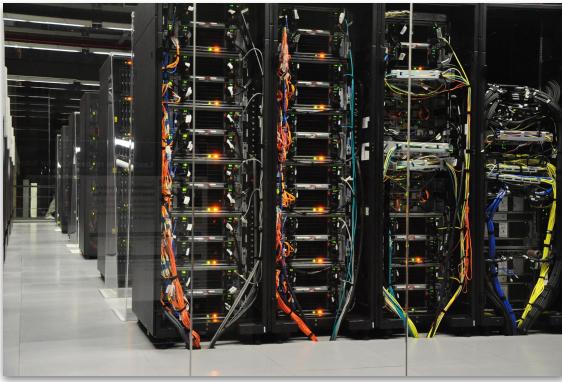




Bigger Is Not
Always Better.





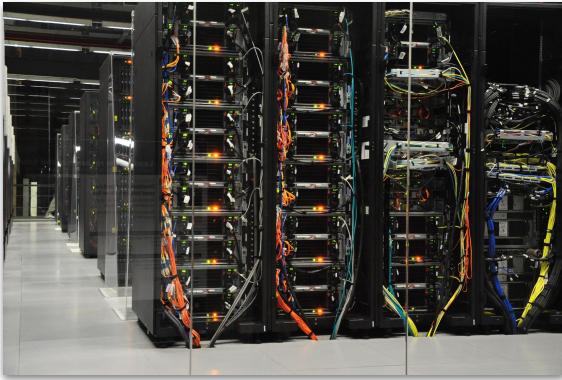


Why?

High power



Low power

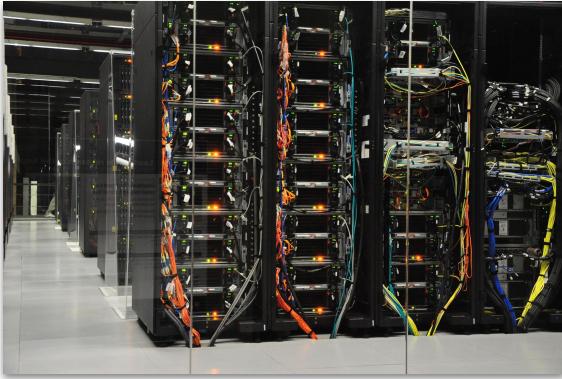


Why?

High power
High bandwidth



Low power
Low bandwidth

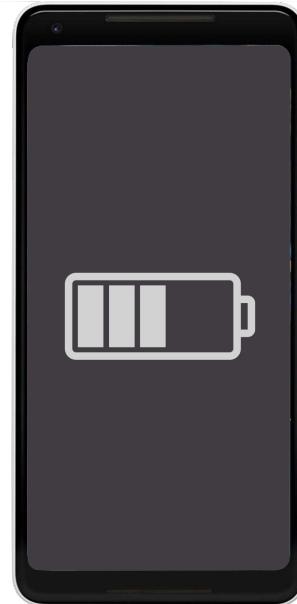
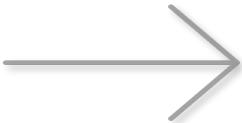


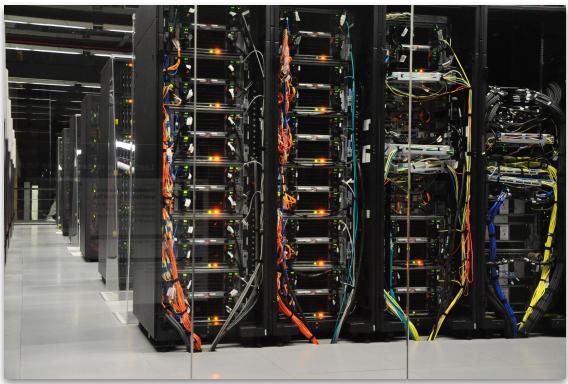
Why?

High power
High bandwidth
High latency



Low power
Low bandwidth
Low latency





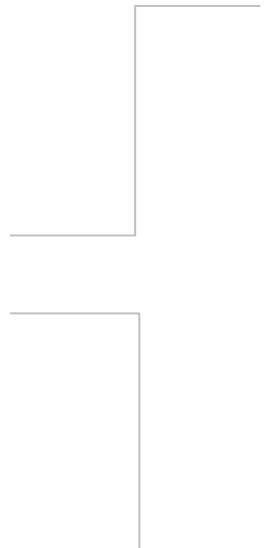
Google Assistant



Endpoint Devices



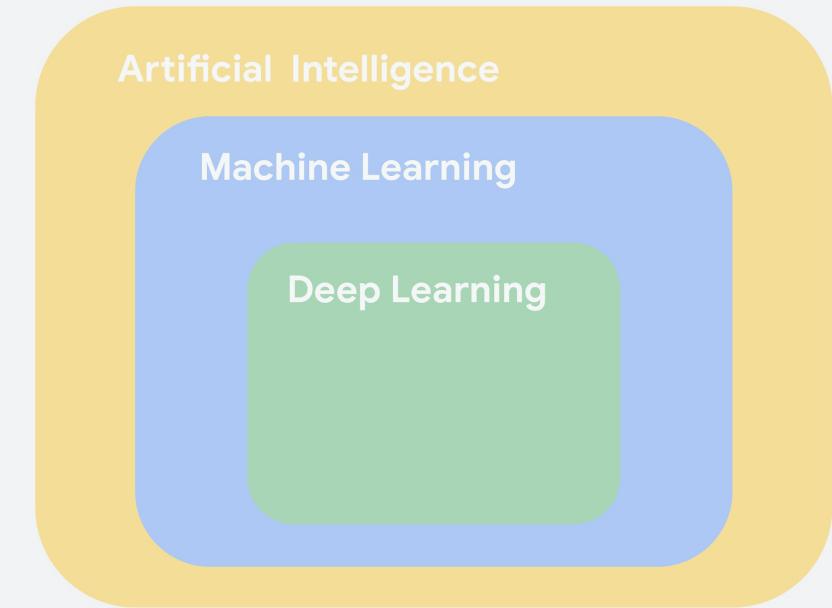
Google Assistant



What is (Deep) Machine Learning?

1. Machine Learning is a subfield of Artificial Intelligence focused on developing algorithms that learn to solve problems by analyzing data for patterns
2. Deep Learning is a type of Machine Learning that leverages Neural Networks and

Big Data



No Good Data Left Behind

5 Quintillion
bytes of data produced
every day by IoT

<1%
of unstructured data is
analyzed or used at all

Summary

- ML has several diverse applications in the real-world
- ML is increasingly moving from the cloud to endpoint devices
- Endpoint devices are everywhere around us