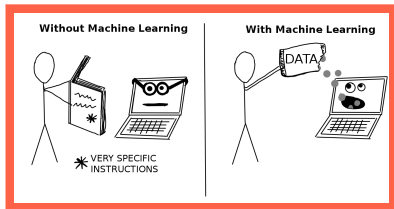
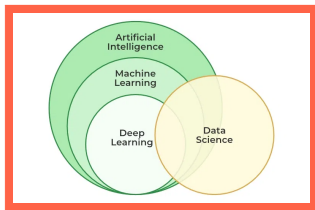


What is...machine learning in mathematics - part 1?

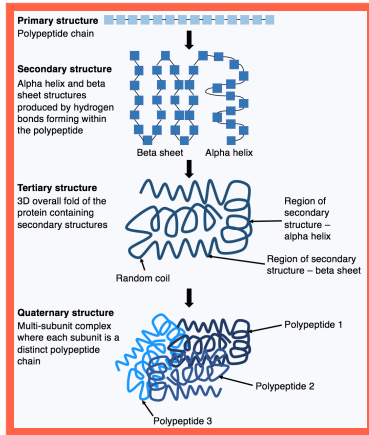
Or: Introduction

What is machine learning (ML)?



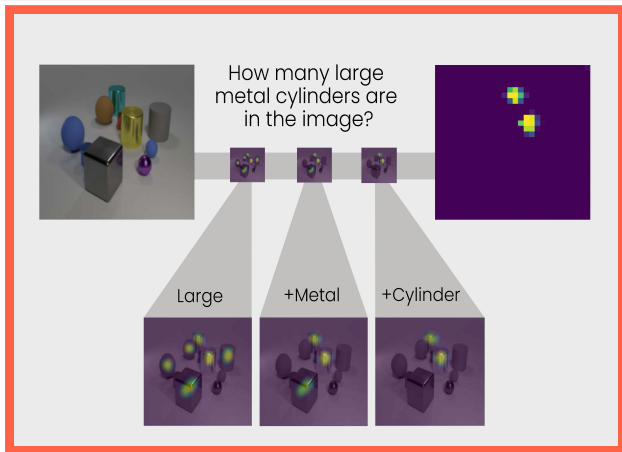
- ▶ ML tries to answer questions letting a computer detect patterns in data
- ▶ Crucial In ML the computer performs tasks without explicit instructions
- ▶ I will be brutal and identify all the above

A story of remarkable success



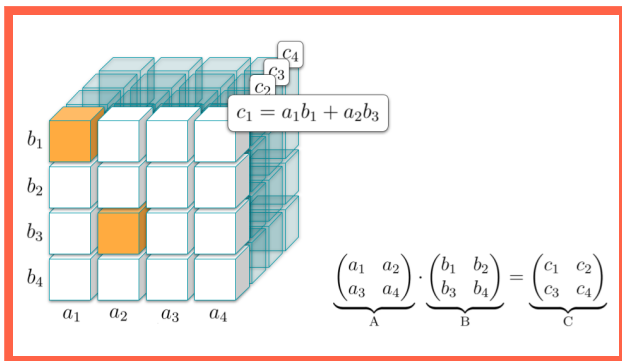
- ▶ AlphaFold = AI model predicting protein folding
- ▶ It has transformed structural biology with accurate protein structure predictions
- ▶ This is one example of many ML breakthroughs in science, from drug discovery to climate models

But what about mathematics?



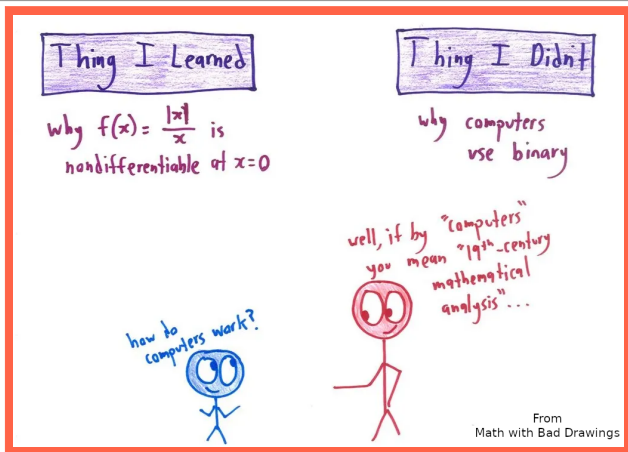
- ▶ Simulating reasoning is still one of the main open problems in ML
- ▶ Mathematics = the art of reasoning
- ▶ Problem That doesn't seem to fit together

What it can do for you



- ▶ **AlphaTensor** = specialized type of neural network that applies deep learning to algorithmic problem-solving
- ▶ It has found **new algorithms** to speed-up matrix multiplication (improved upon known methods)
- ▶ **Fun** A main issue in ML is to have efficient matrix multiplication, so this is self-improving

What it can't do for you



- ▶ Actually in early 2025, ML in math is growing but not yet popular
- ▶ There are many reasons for that (some will be addressed in later videos)
- ▶ One is that mathematicians are not trained to work in ML

Thank you for your attention!

I hope that was of some help.