

Introduction to ML

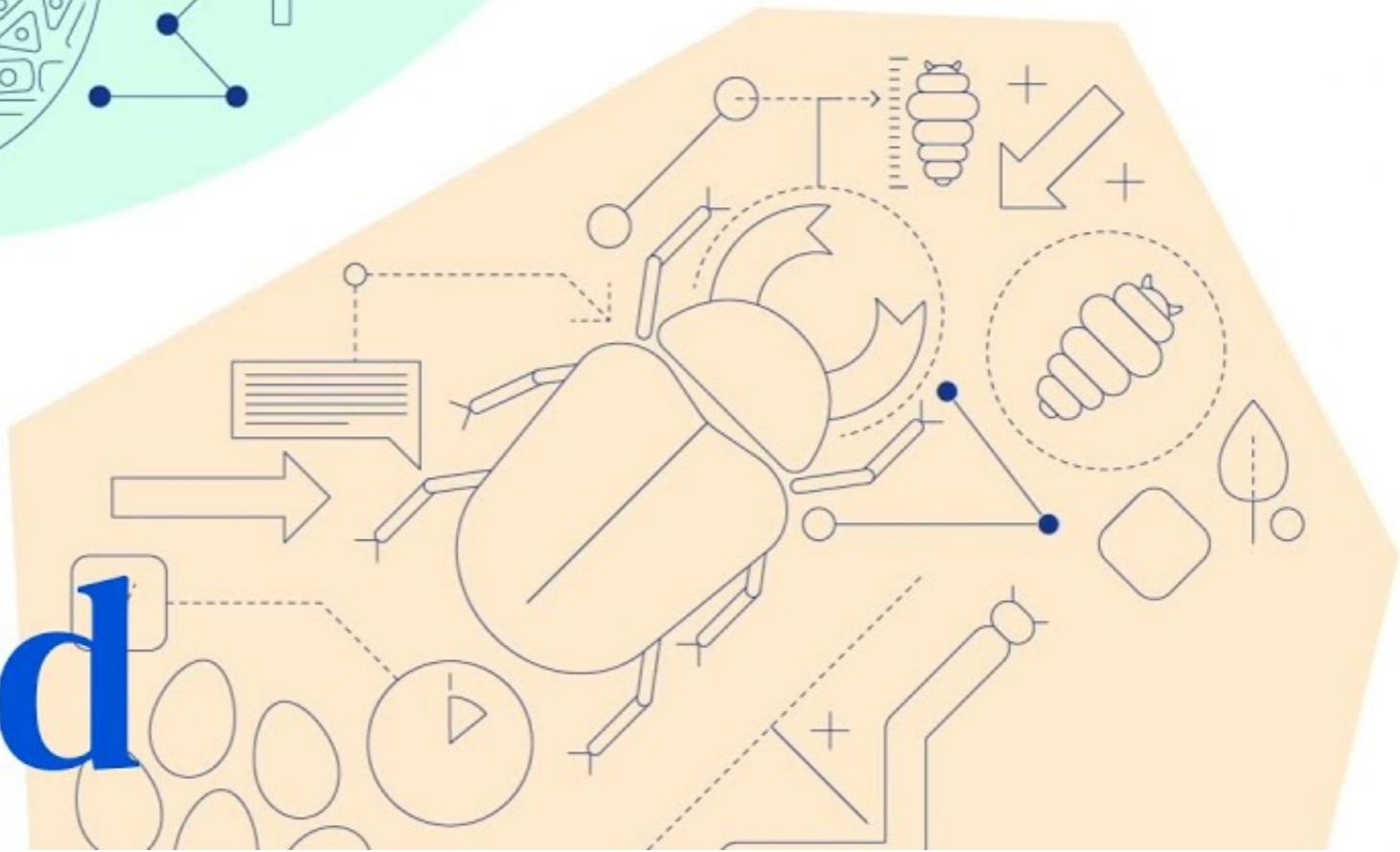
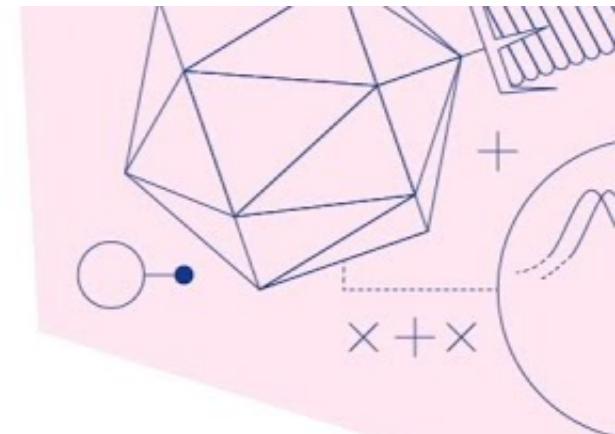
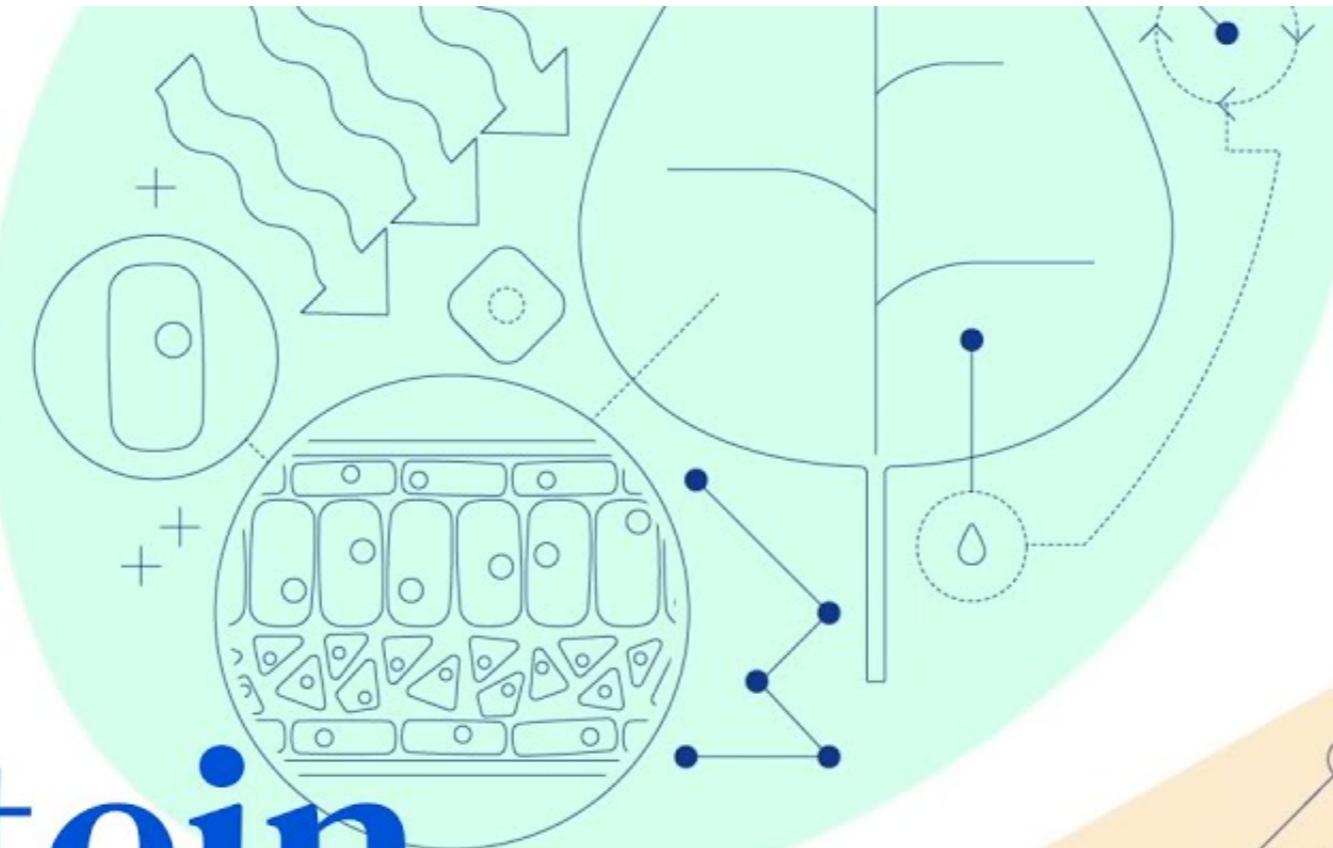
Nipun Batra

Machine Learning Applications

Protein folding explained: <https://www.youtube.com/watch?v=KpedmJdrTpY>



Protein folding explained

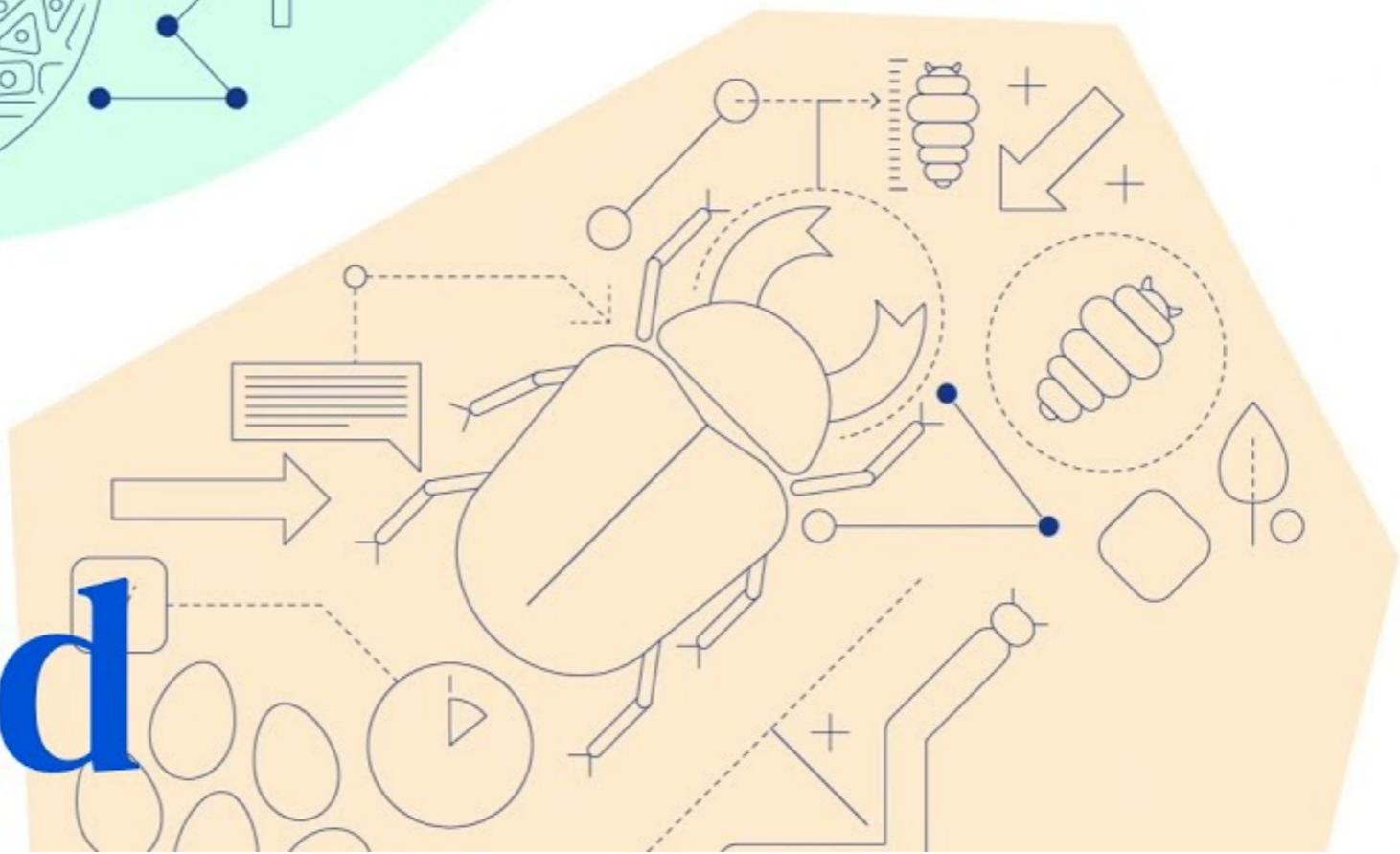
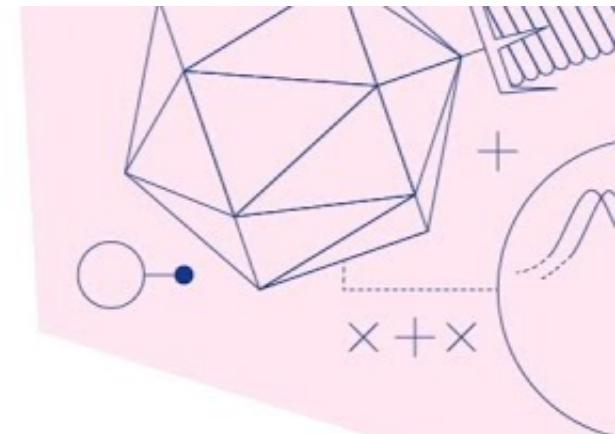
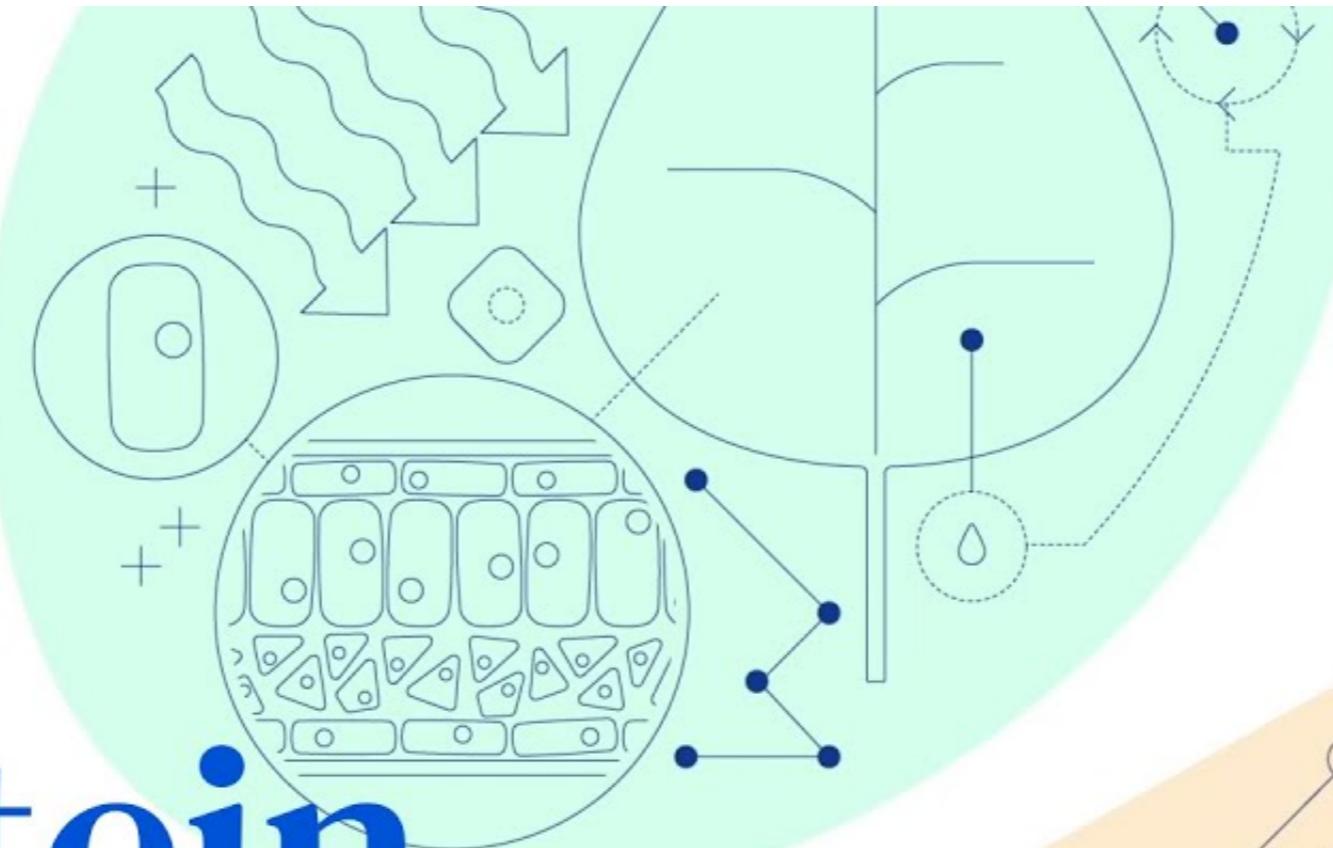


Machine Learning Applications

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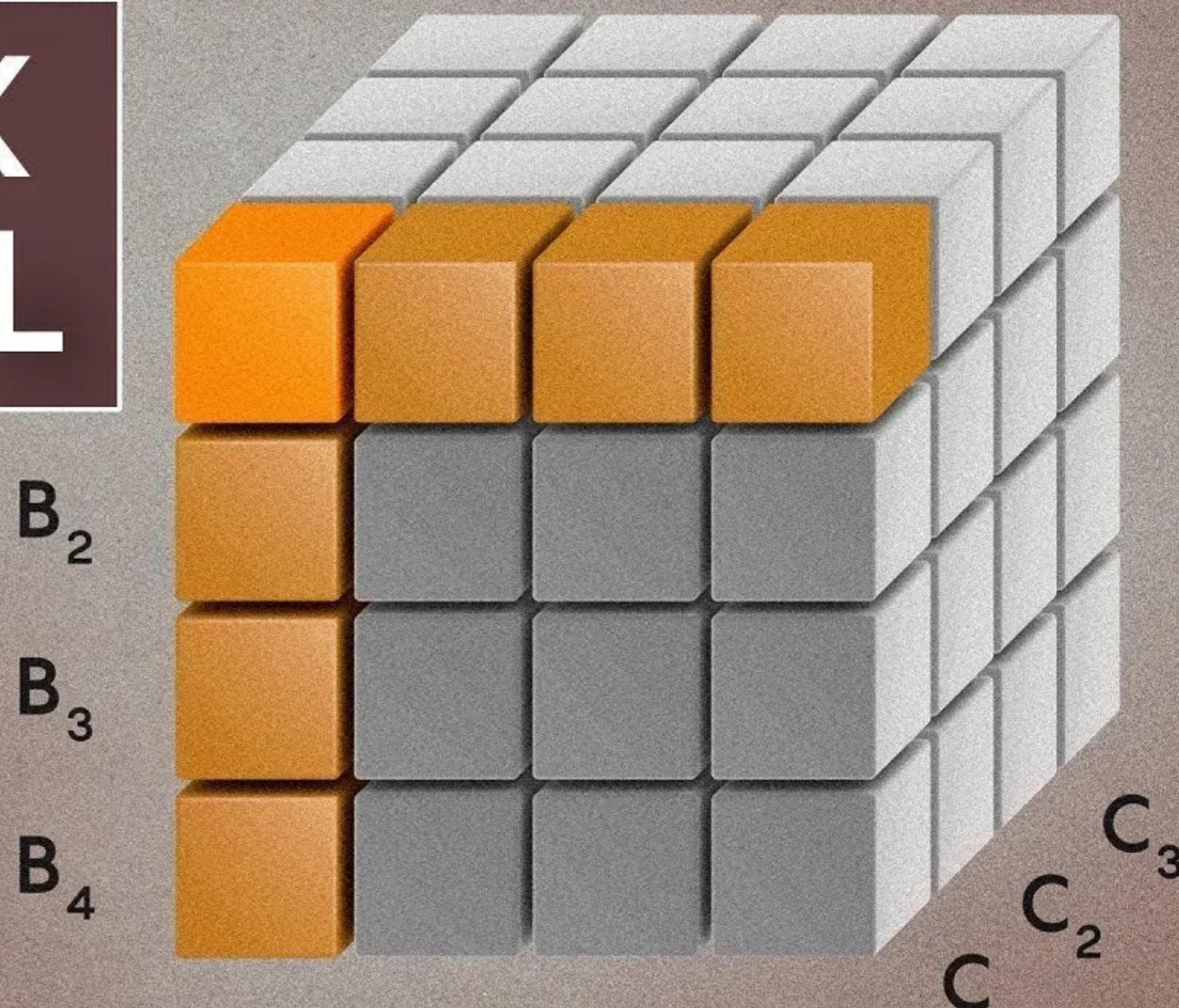


Protein folding explained



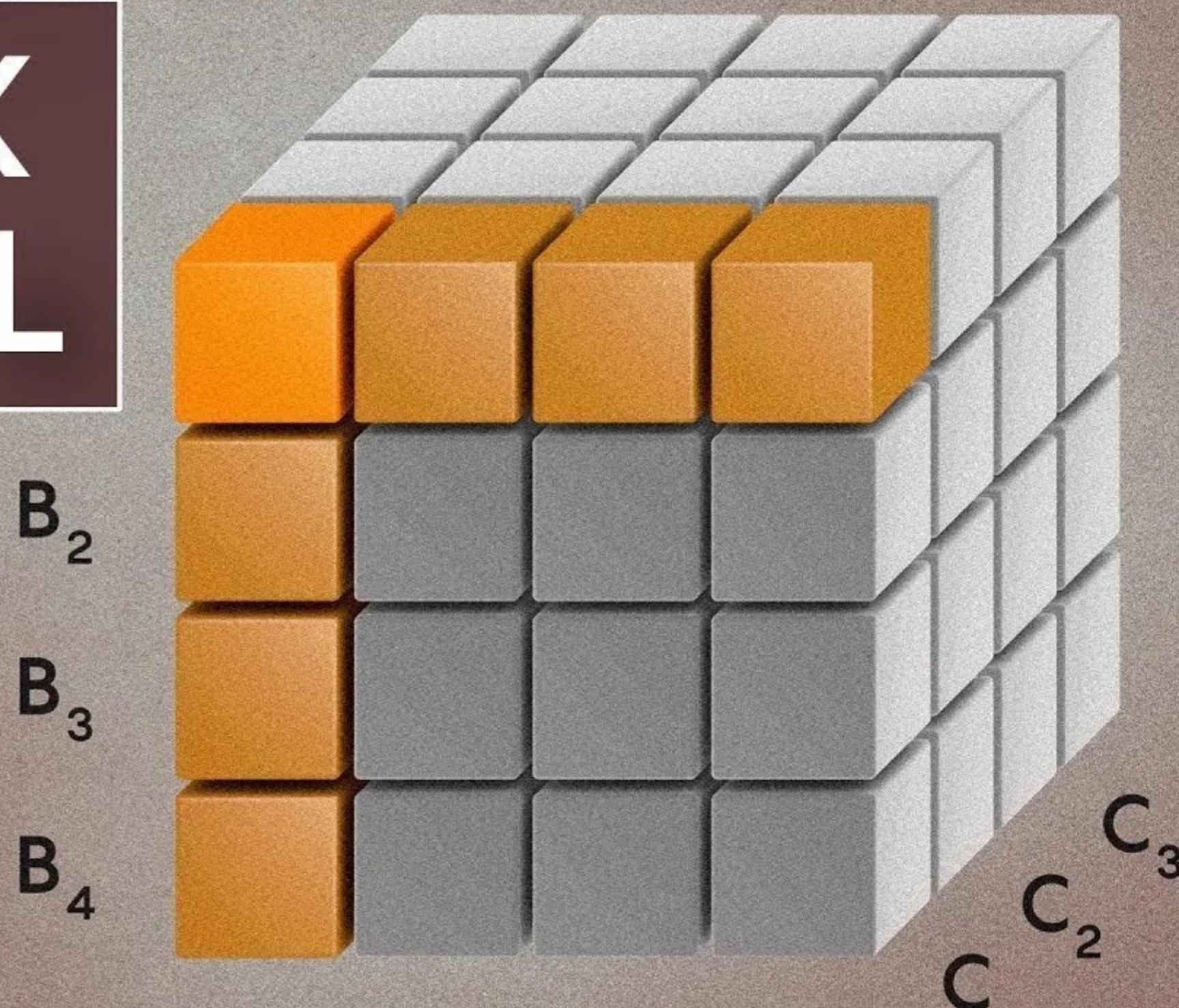
Machine Learning Applications

How AI Discovered a Faster Matrix Multiplication Algorithm <https://www.youtube.com/watch?v=fDAPJ7rvcUw>



Machine Learning Applications

How AI Discovered a Faster Matrix Multiplication Algorithm <https://www.youtube.com/watch?v=fDAPJ7rvcUw>



Machine Learning Applications

(Already outdated: Devin) <https://www.youtube.com/watch?v=fjHtjT7GO1c>

A medium shot of Scott Wu, CEO of Cognition AI, sitting cross-legged on a light blue couch. He is wearing a light blue button-down shirt and glasses. He is smiling and looking slightly to his right. The background consists of wooden bleachers.

Scott Wu, CEO / Cognition AI

Human Software Engineer

Machine Learning Applications

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Scott Wu, CEO / Cognition AI

Human Software Engineer

Machine Learning Applications

6 weeks of Claude Code:<https://news.ycombinator.com/item?id=44746621>

▲ lukaslalinsky 3 days ago | next [-]

I have about two weeks of using Claude Code and to be honest, as a vibe coding skeptic, I was amazed. It has a learning curve. You need to learn how to give it proper context, how to chunk up the work, etc. And you need to know how to program, obviously. Asking it to do something you don't know how to do, that's just asking for a disaster. I have more than 25 years of experience, so I'm confident with anything Claude Code will try to do and can review it, or stop and redirect it. About 10-15 years ago, I was dreaming about some kind of neural interface, where I could program without writing any code. And I realized that with Claude Code, it's kind of here.

A couple of times I hit the daily limits and decided to try Gemini CLI with the 2.5 pro model as a replacement. That's not even comparable to Claude Code. The frustration with Gemini is just not worth it.

I couldn't imagine paying >100\$/month for a dev tool in the past, but I'm seriously considering upgrading to the Max plans.

[reply](#)

▲ giancarlostoro 3 days ago | parent | next [-]

If you are a Senior Developer, who is comfortable giving a Junior tips, and then guiding them to fixing them (or just stepping in for a brief moment and writing where they missed something) this is for you. I'm hearing from Senior devs all over thought, that Junior developers are just garbage at it. They product slow, insecure, or just outright awful code with it, and then they PR the code they don't even understand.

For me the sweet spot is for boilerplate (give me a blueprint of a class based on a description), translate a JSON for me into a class, or into some other format. Also "what's wrong with this code? How would a Staff Level Engineer white it?" those questions are also useful. I've found bugs before hitting debug by asking what's wrong with the code I just pounded on my keyboard by hand.

[reply](#)

▲ channel_t 3 days ago | root | parent | next [-]

Yes, can confirm that as a senior developer who has needed to spend huge amounts of time reviewing junior code from off-shore contractors with very detailed and explicit instructions, dabbling in agentic LLM coding tools like Claude Code has felt like like a gift from heaven.

I also have concerns about said junior developers wielding such tools, because yes, without being able to supply the right kind of context and being able to understand the difference between a good solution and a bad solution, they will produce tons of awful, but technically working code.

[reply](#)

▲ willsmith72 3 days ago | root | parent | next [-]

Totally agree with the off-shore component of this. I'm already going to have to break a task down into clear detail and resolve any anticipated blocker myself upfront to avoid multi-timezone multi-day back and forth.

Now that I'm practiced at that, the off-shored part is no longer valuable

[reply](#)

▲ sitkack 3 days ago | root | parent | next [-]

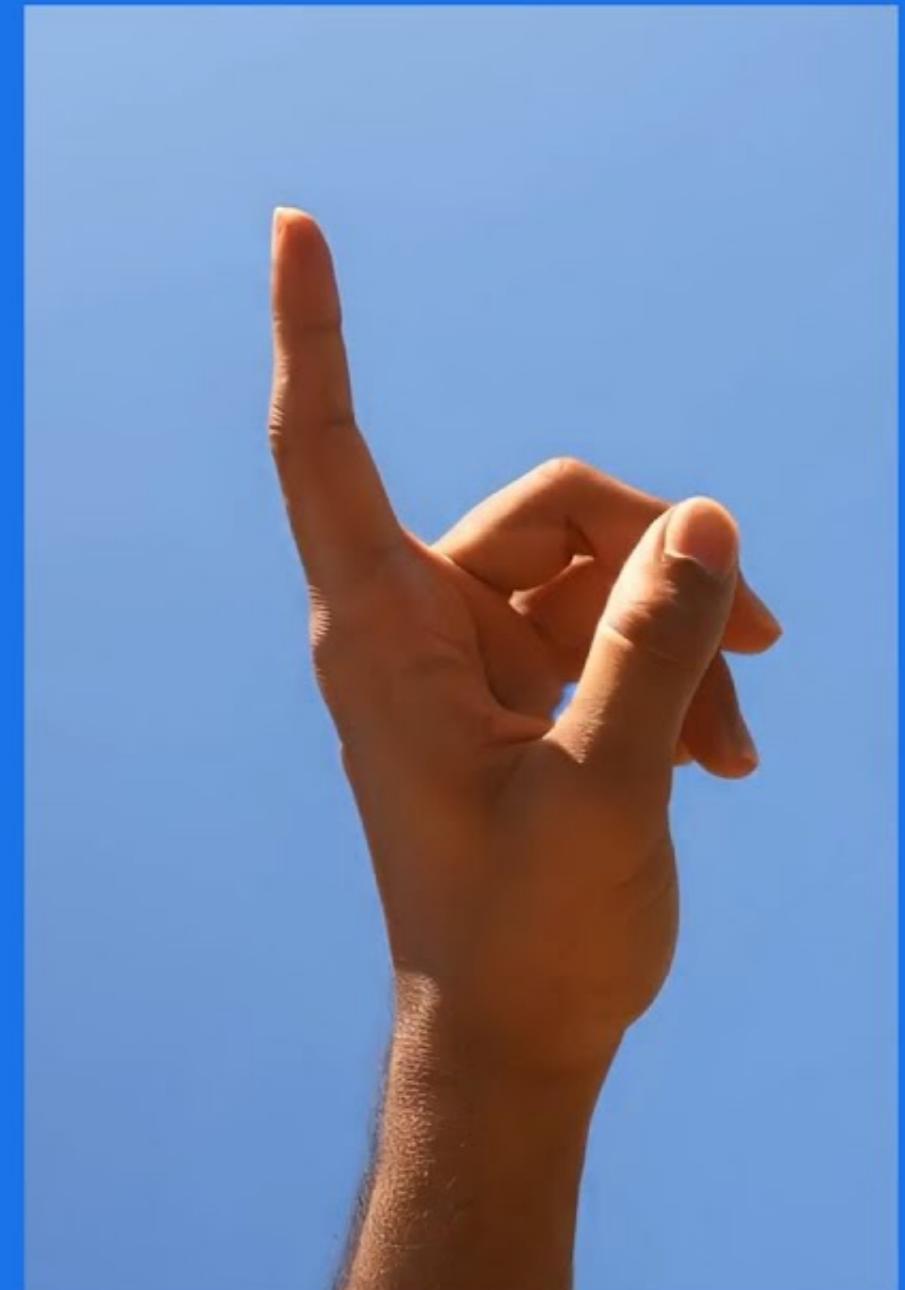
The unemployment in India is going to be catastrophic. Geopolitical.

[reply](#)

Machine Learning Applications

(AI for weather) <https://www.youtube.com/watch?v=-KFO0pES-zQ>

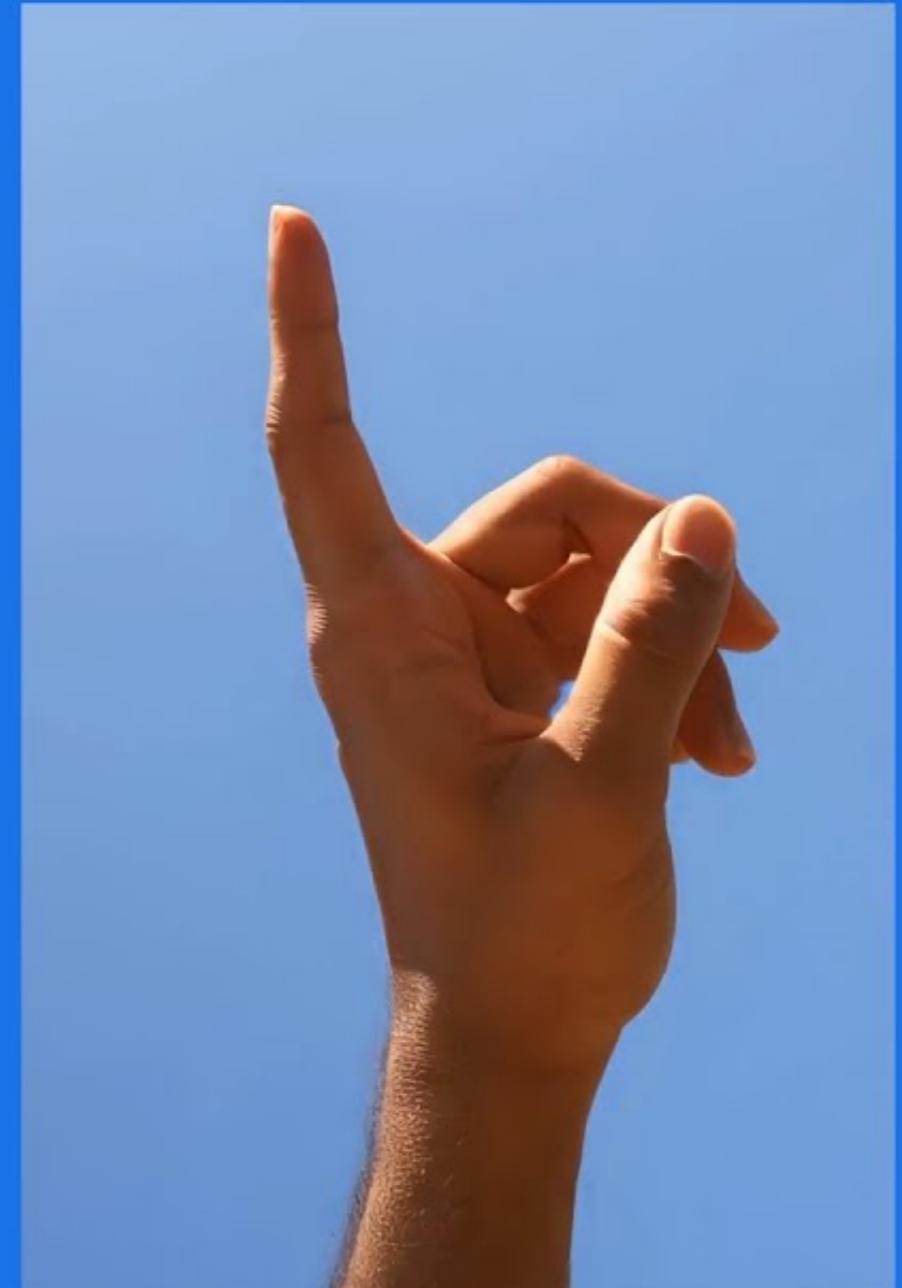
AI is Transforming
Weather Forecasting



Machine Learning Applications

(AI for weather) <https://www.youtube.com/watch?v=-KFO0pES-zQ>

AI is Transforming
Weather Forecasting



Machine Learning Applications

(AI for Disaster) <https://www.youtube.com/watch?v=ET04pDj-RvM>



Machine Learning Applications

(AI for Disaster) <https://www.youtube.com/watch?v=ET04pDj-RvM>



help save lives
and improve resilience worldwide



Saving The Planet - One Watt A time

Bidgeley: <https://www.youtube.com/@bidgely1905>

Saving The Planet - One Watt A time

Bidgeley: <https://www.youtube.com/@bidgely1905>

ML for Farm

Farmbeat: <https://www.youtube.com/watch?v=pDgjOHY7sMI>



ML for Farm

Farmbeat: <https://www.youtube.com/watch?v=pDgjOHY7sMI>



ML for Health



ML for Health



ML for Education

https://www.youtube.com/watch?v=lvXZCocyU_M



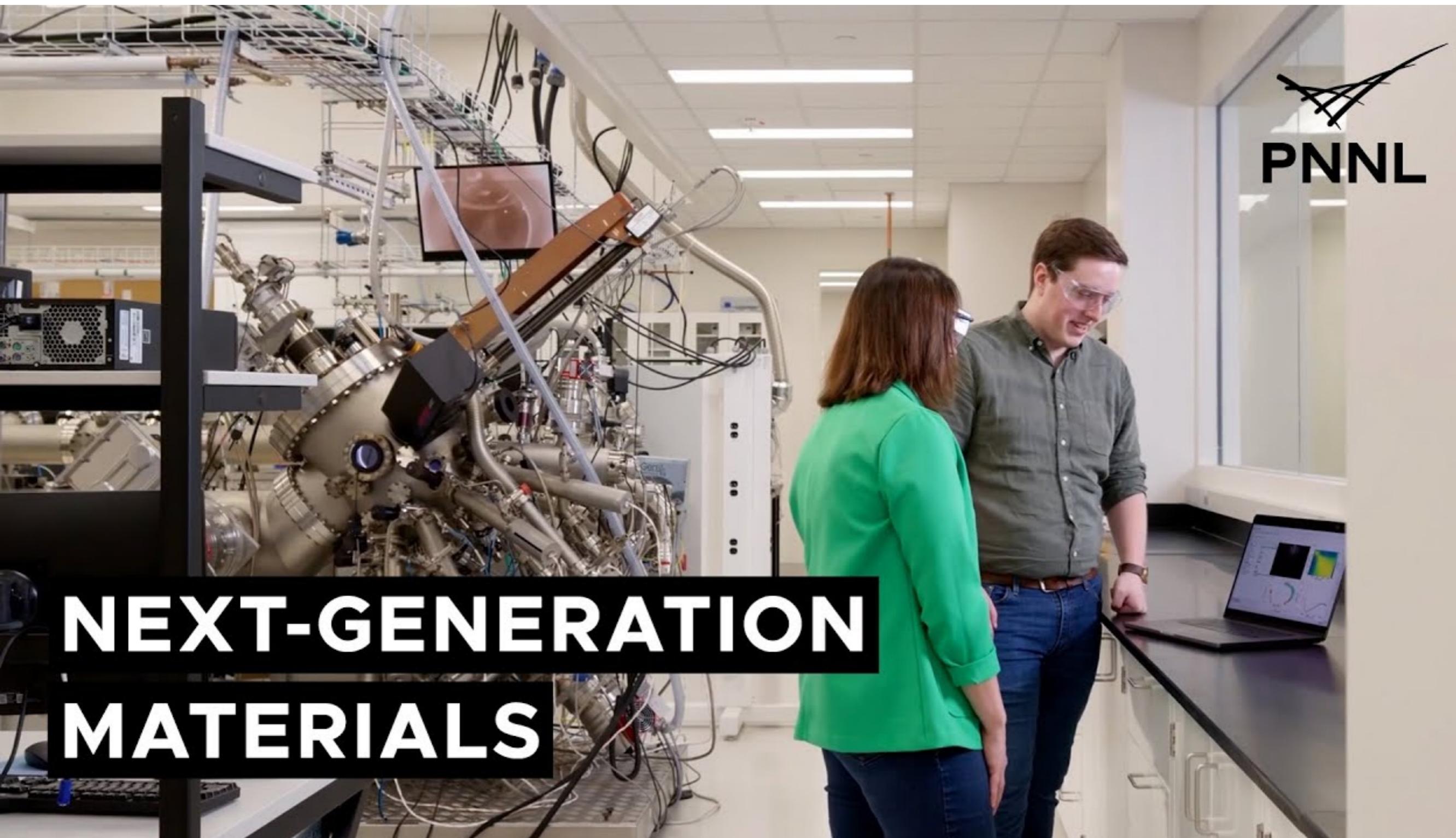
ML for Education

https://www.youtube.com/watch?v=lvXZCocyU_M



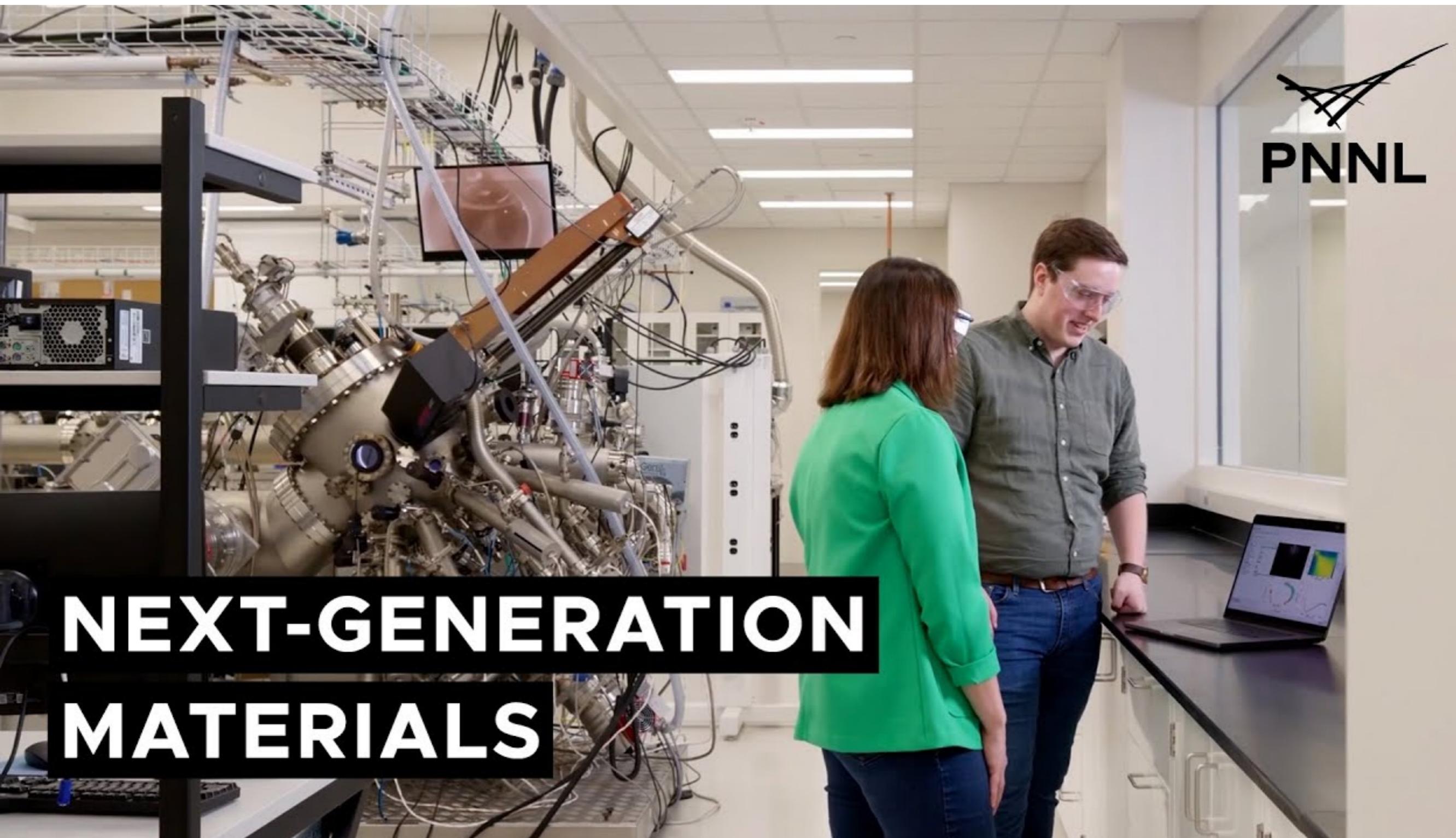
ML for Materials

<https://www.youtube.com/watch?v=yRVyehD5lhM>

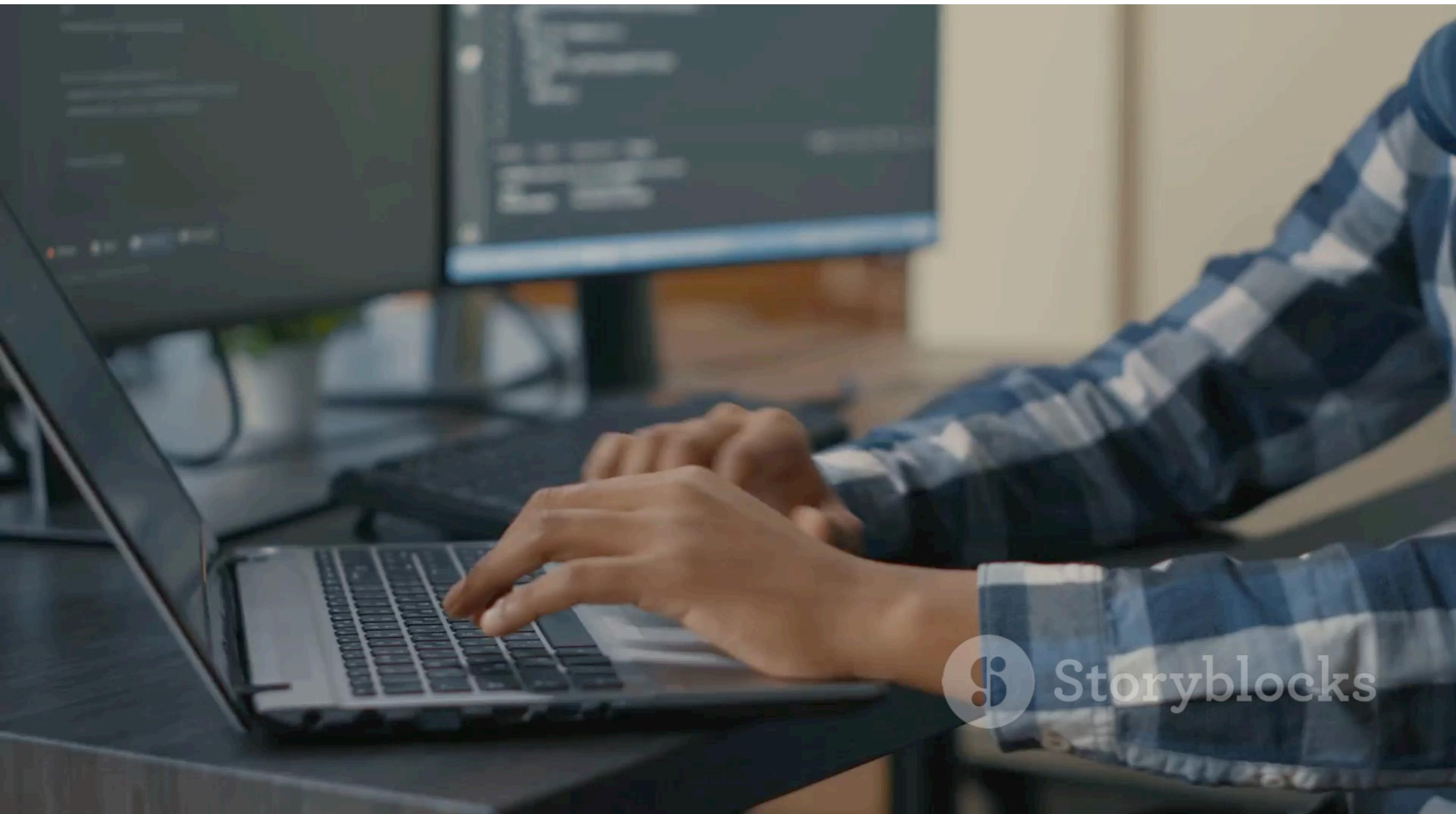


ML for Materials

<https://www.youtube.com/watch?v=yRVyehD5lhM>

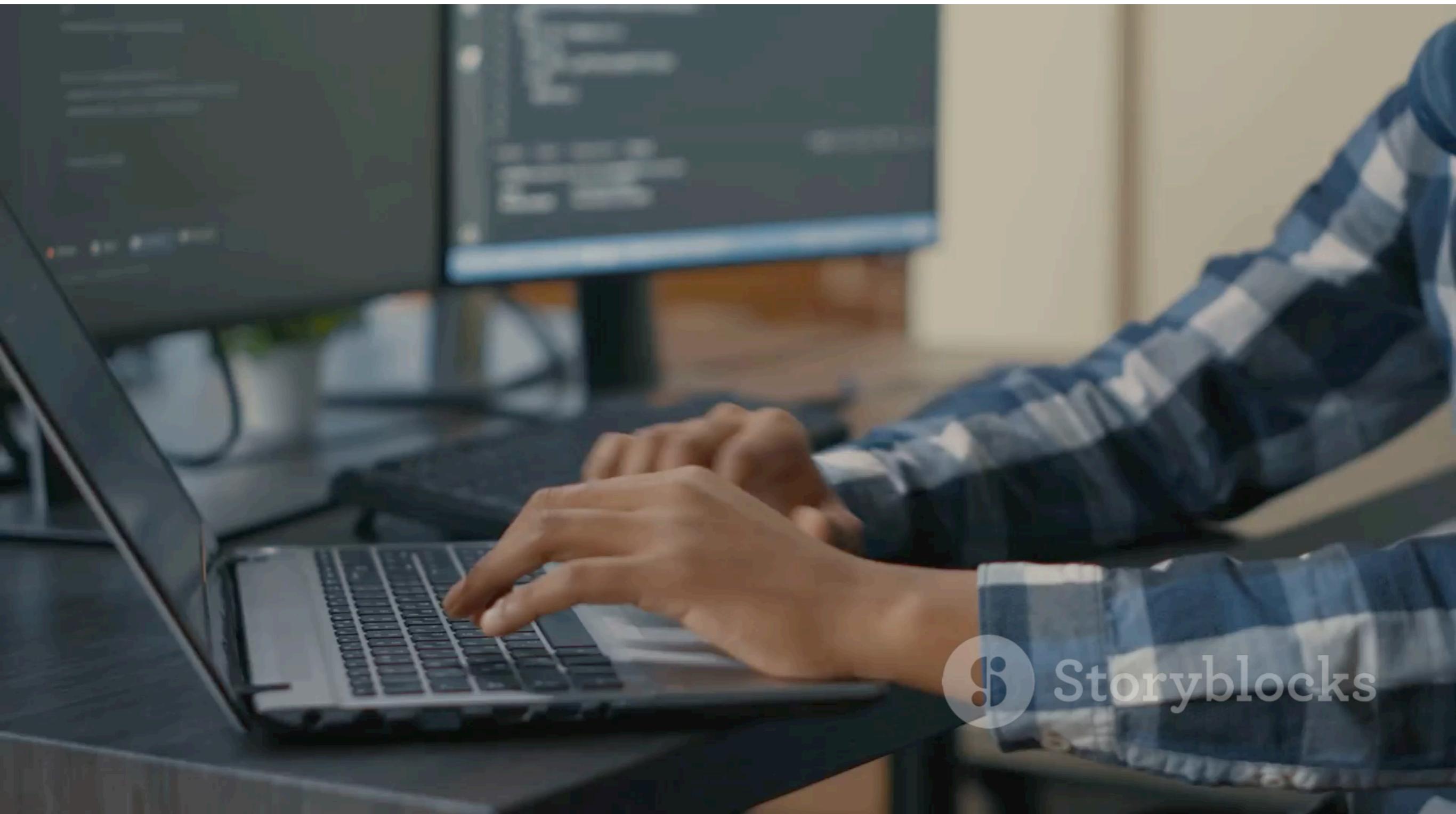


ML for Creativity



Storyblocks

ML for Creativity



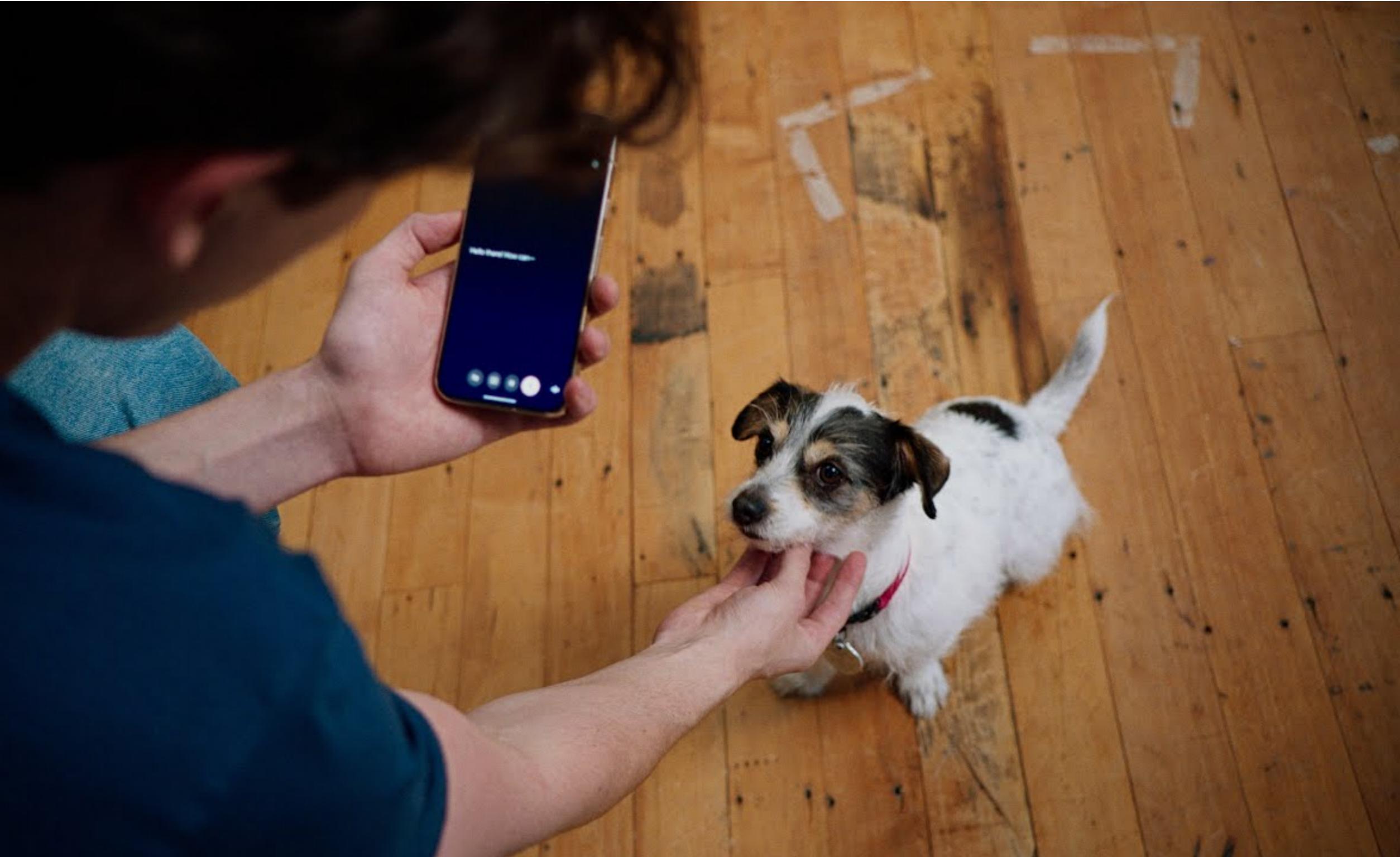
Storyblocks

Machine Learning Applications

Demo: https://nipunbatra.github.io/ml-teaching/notebooks/text_to_image.html

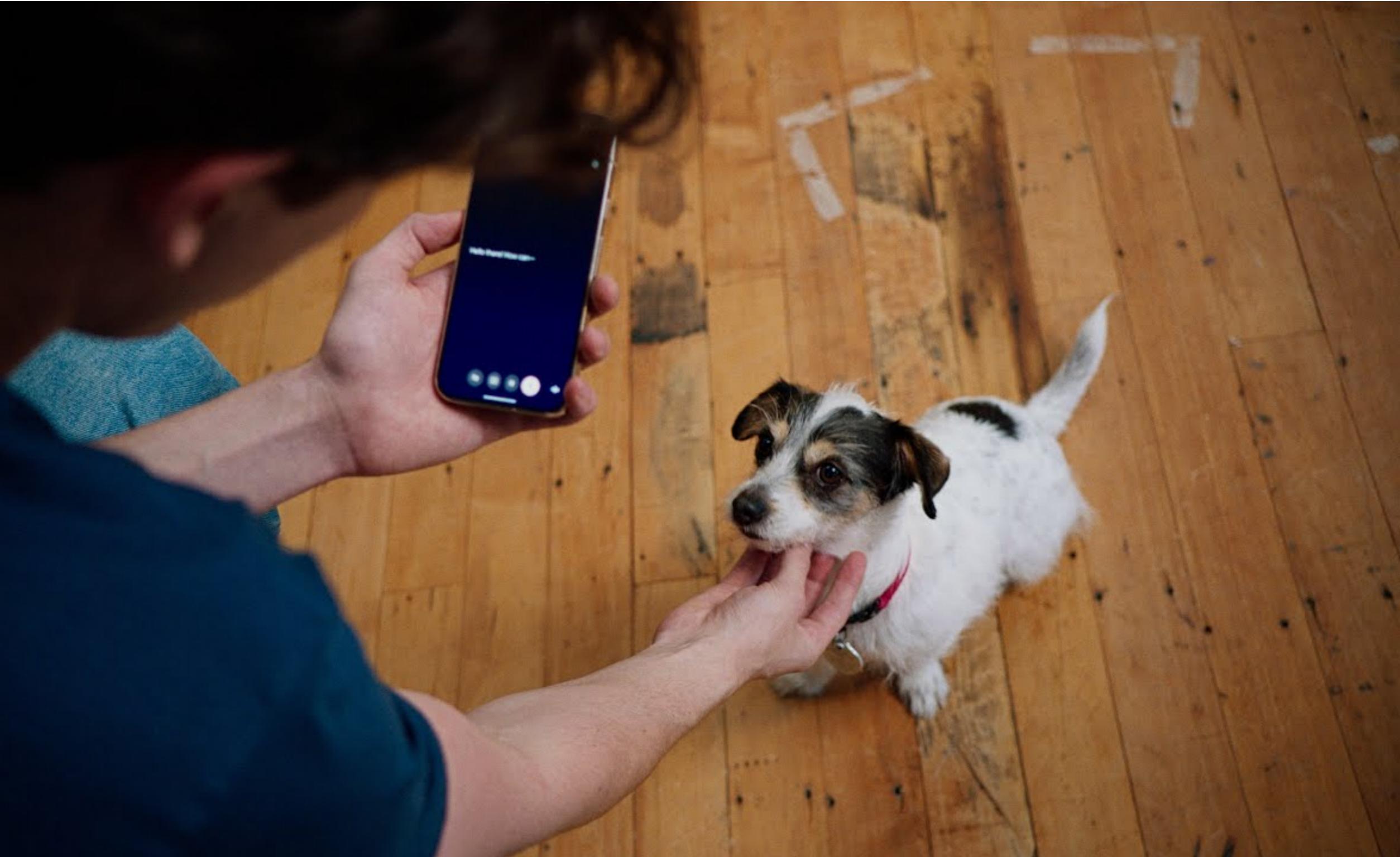
Machine Learning Applications

Universal AI Assistant: <https://www.youtube.com/watch?v=JcDBFAm9PPI>



Machine Learning Applications

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Machine Learning Applications

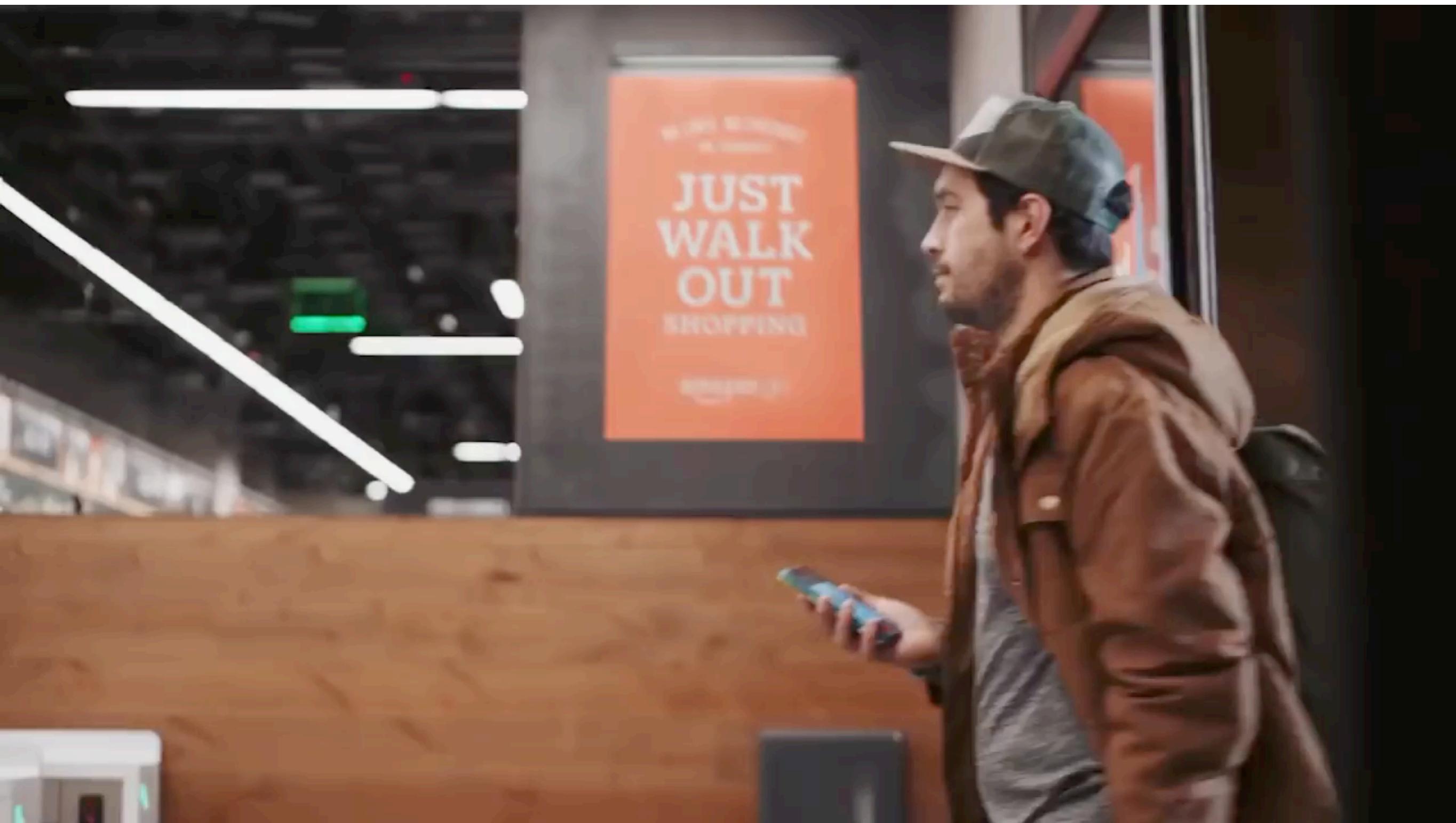
Demo: <https://nipunbatra.github.io/ml-teaching/notebooks/transcript.html>

The Long Wait ...



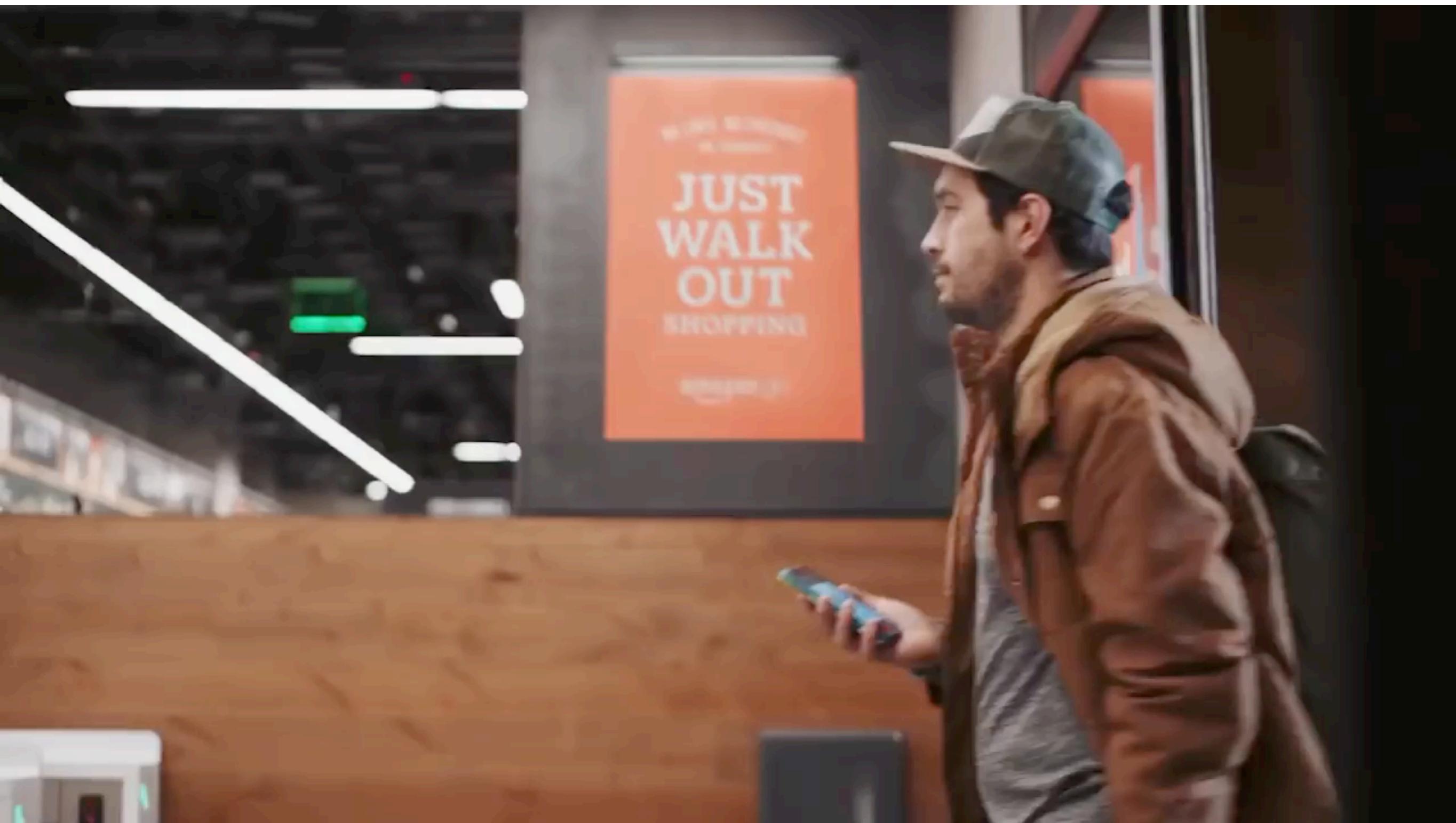
Machine Learning Applications

<https://www.youtube.com/watch?v=NrmMk1Myrxc>

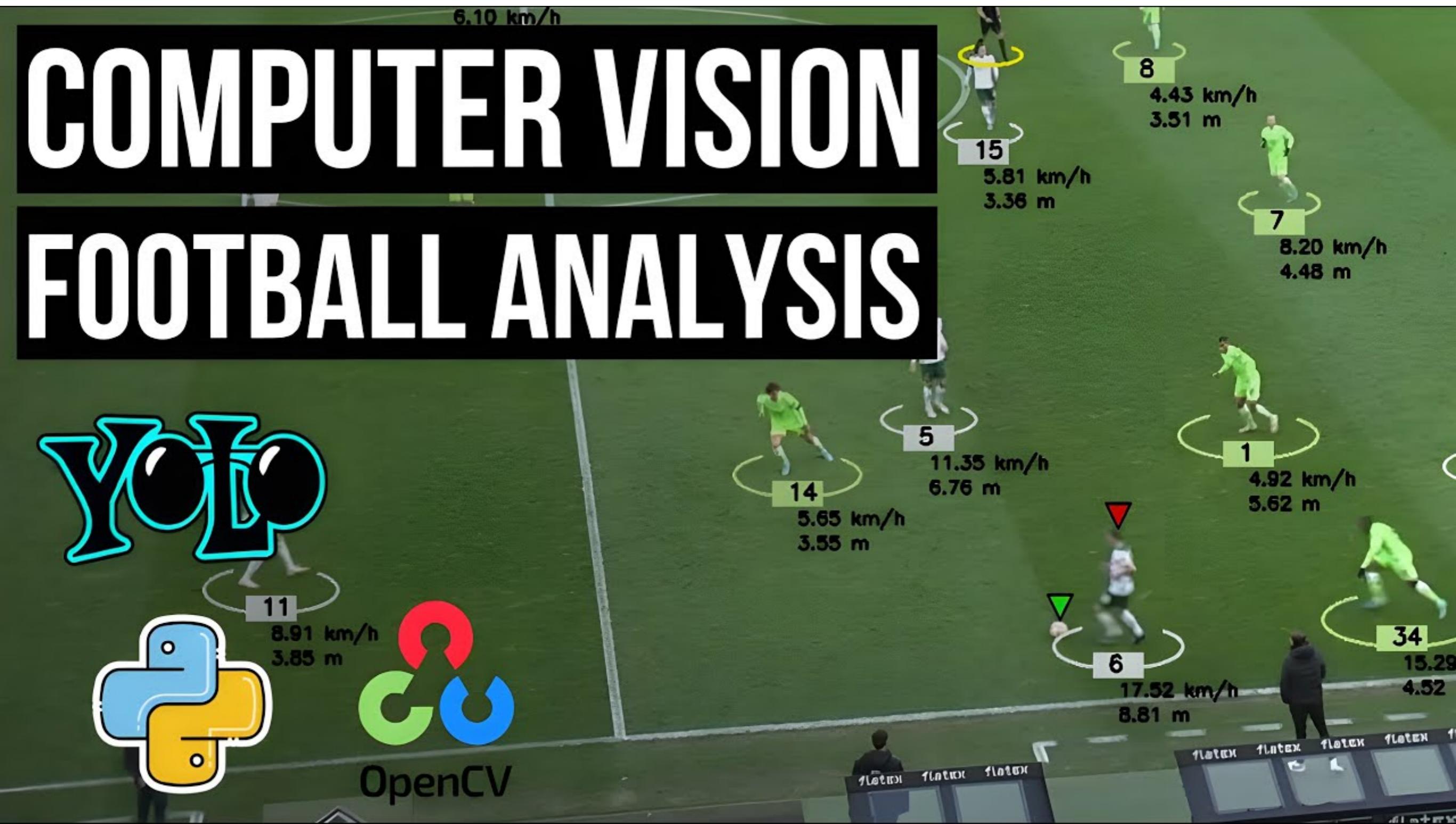


Machine Learning Applications

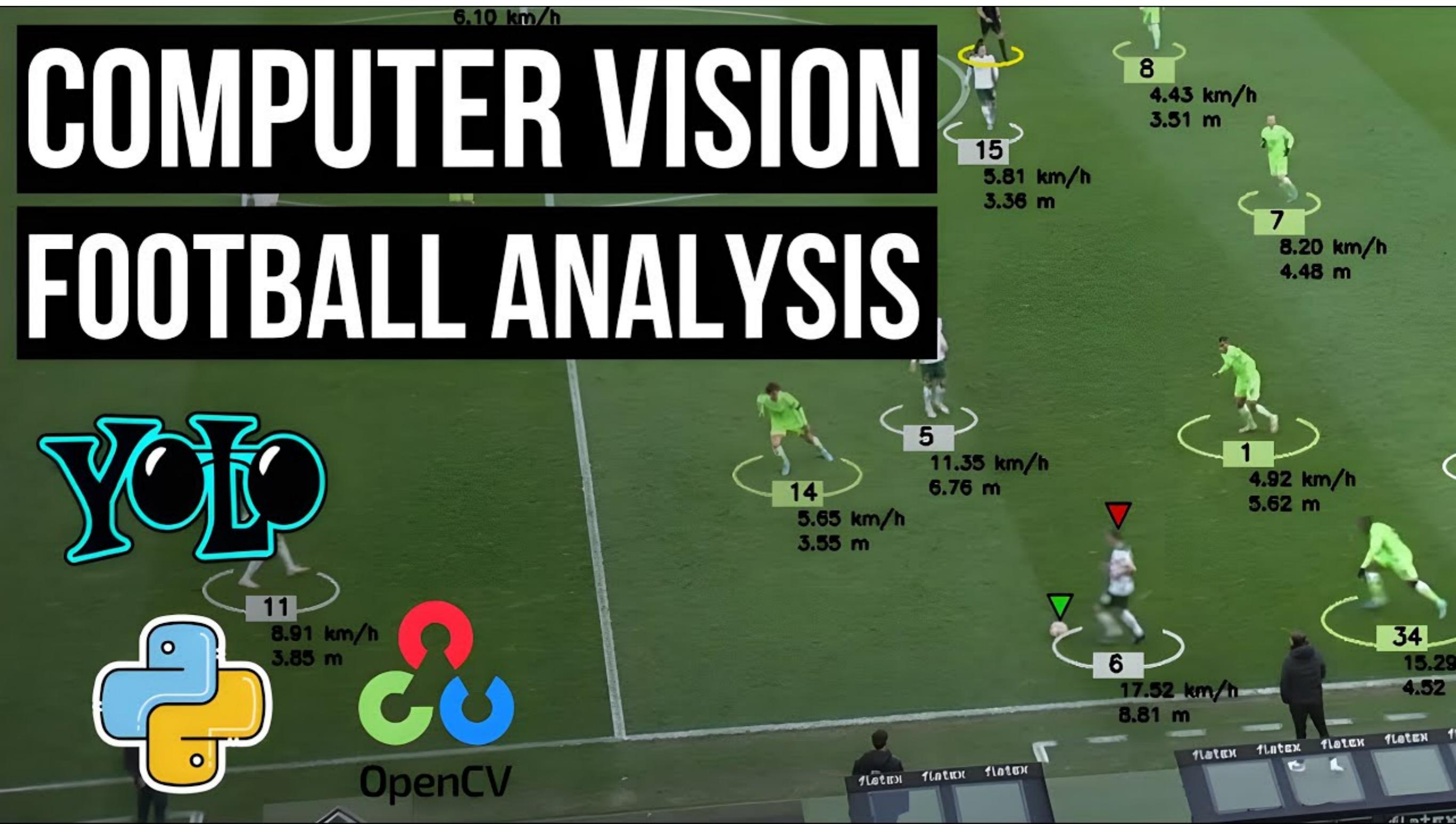
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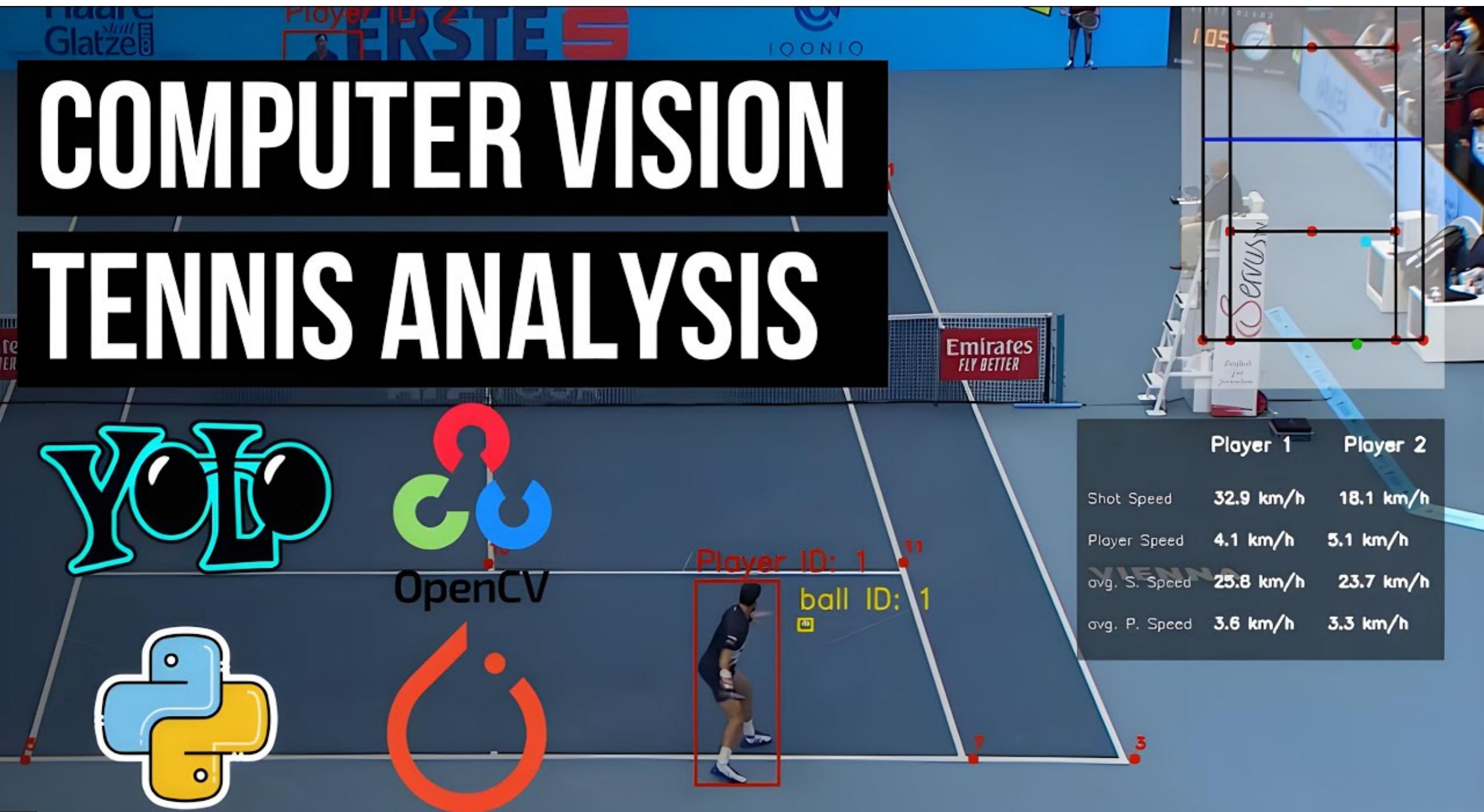
Machine Learning Applications



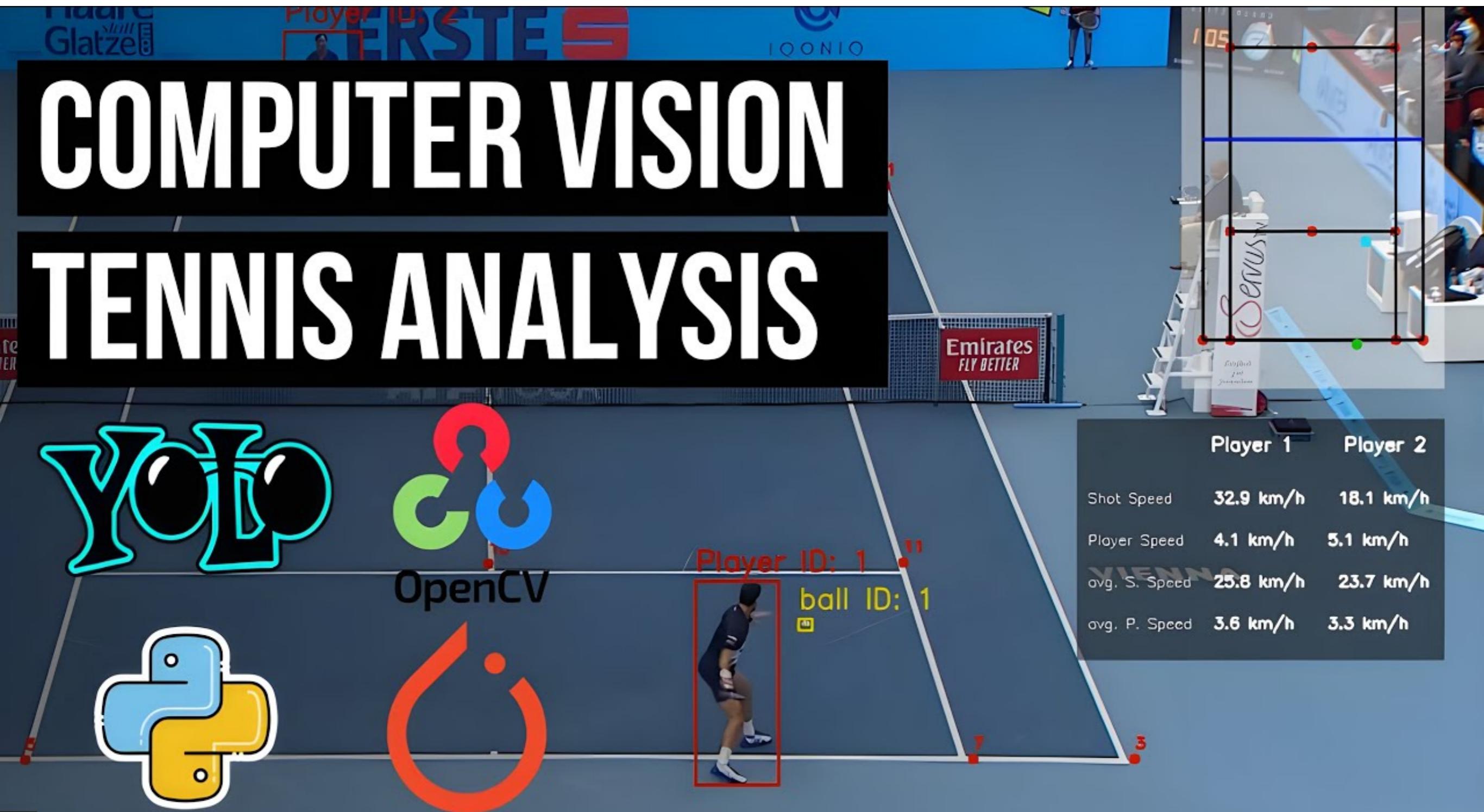
Machine Learning Applications



Machine Learning Applications



Machine Learning Applications

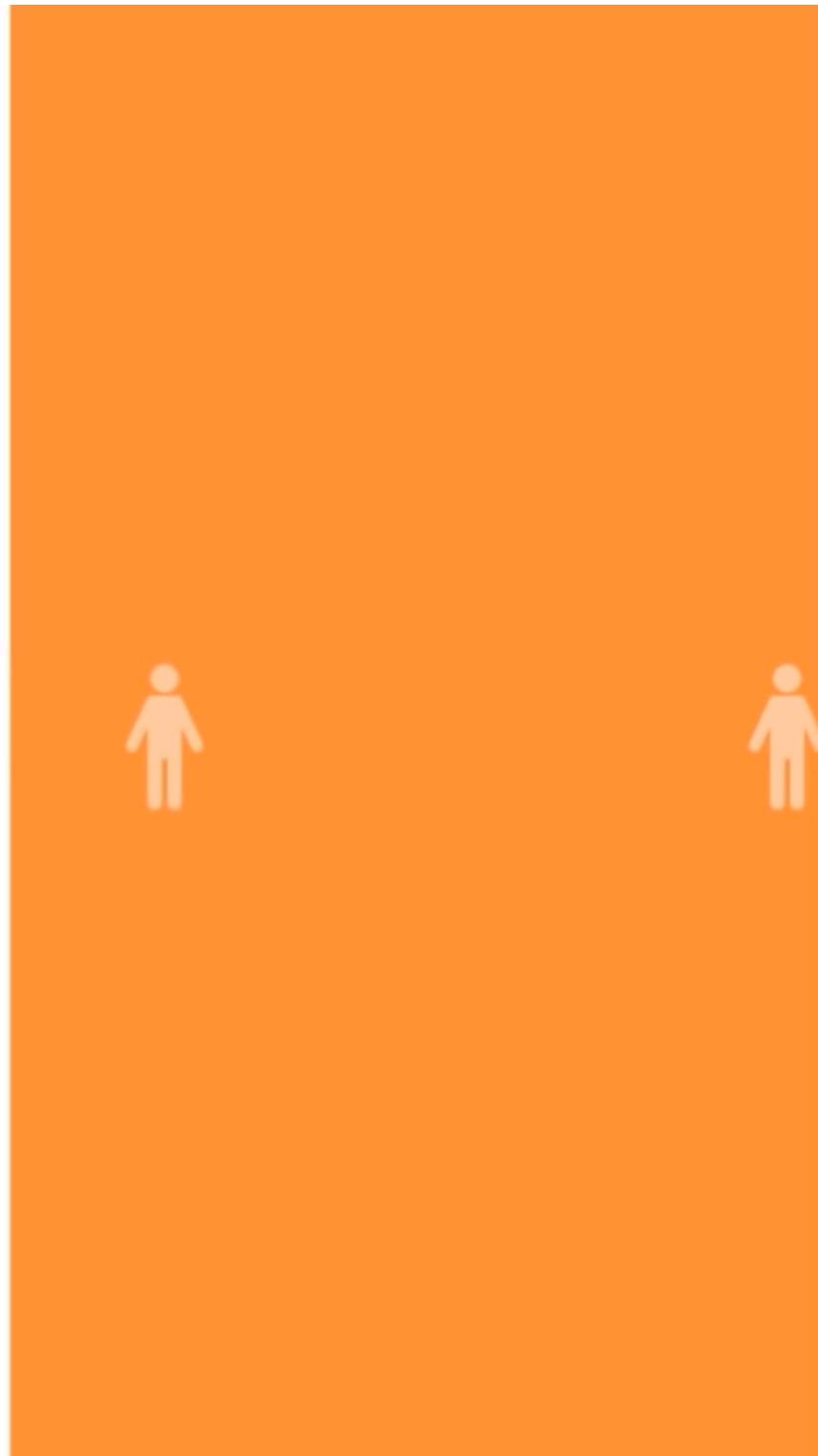


Machine Learning Applications

Demo: <https://hipunbatra.github.io/ml-teaching/notebooks/object-detection-segmentation.html>

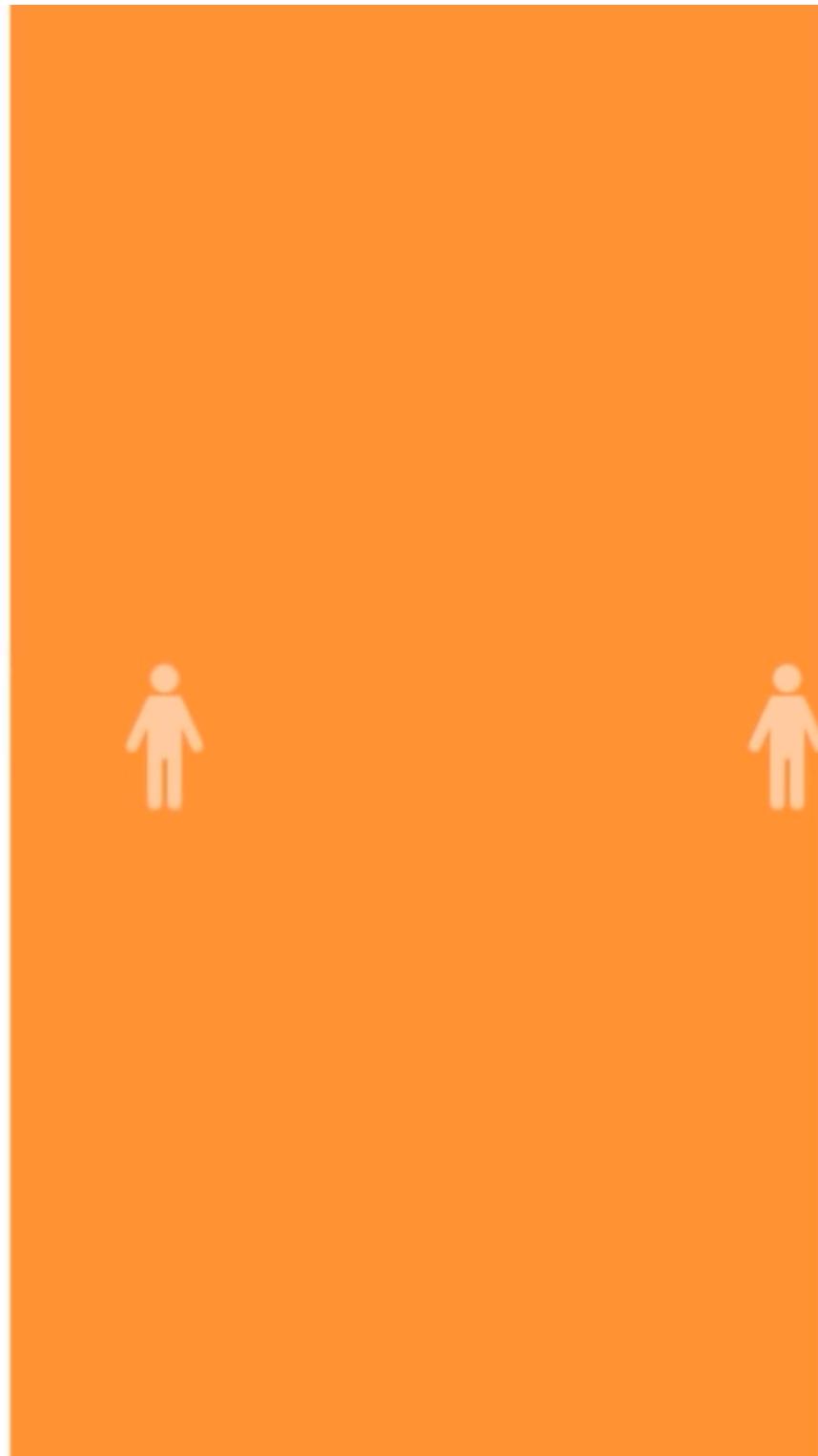
Machine Learning Applications

Poverty detection using satellite images: <https://www.youtube.com/watch?v=DafZSeIGLNE>



Machine Learning Applications

Poverty detection using satellite images: <https://www.youtube.com/watch?v=DafZSeIGLNE>



Self Driving Car

Waymo self-driving car: <https://www.youtube.com/@Waymo>



Self Driving Car

Waymo self-driving car: <https://www.youtube.com/@Waymo>



Self Driving Car

Swaayat Robotics: <https://www.youtube.com/watch?v=0rFuFVHOwG8>



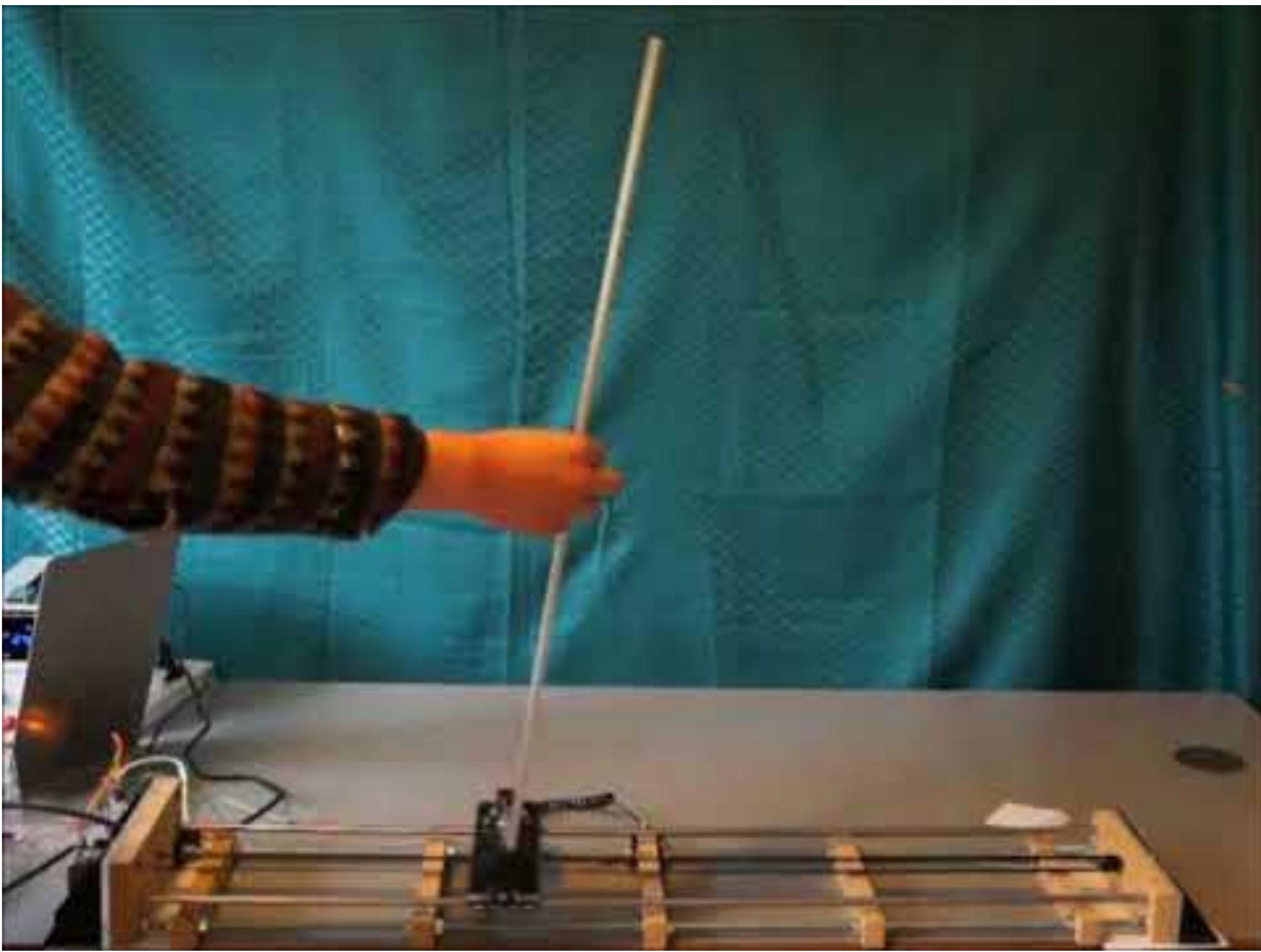
Self Driving Car

Swaayat Robotics: <https://www.youtube.com/watch?v=0rFuFVHOwG8>



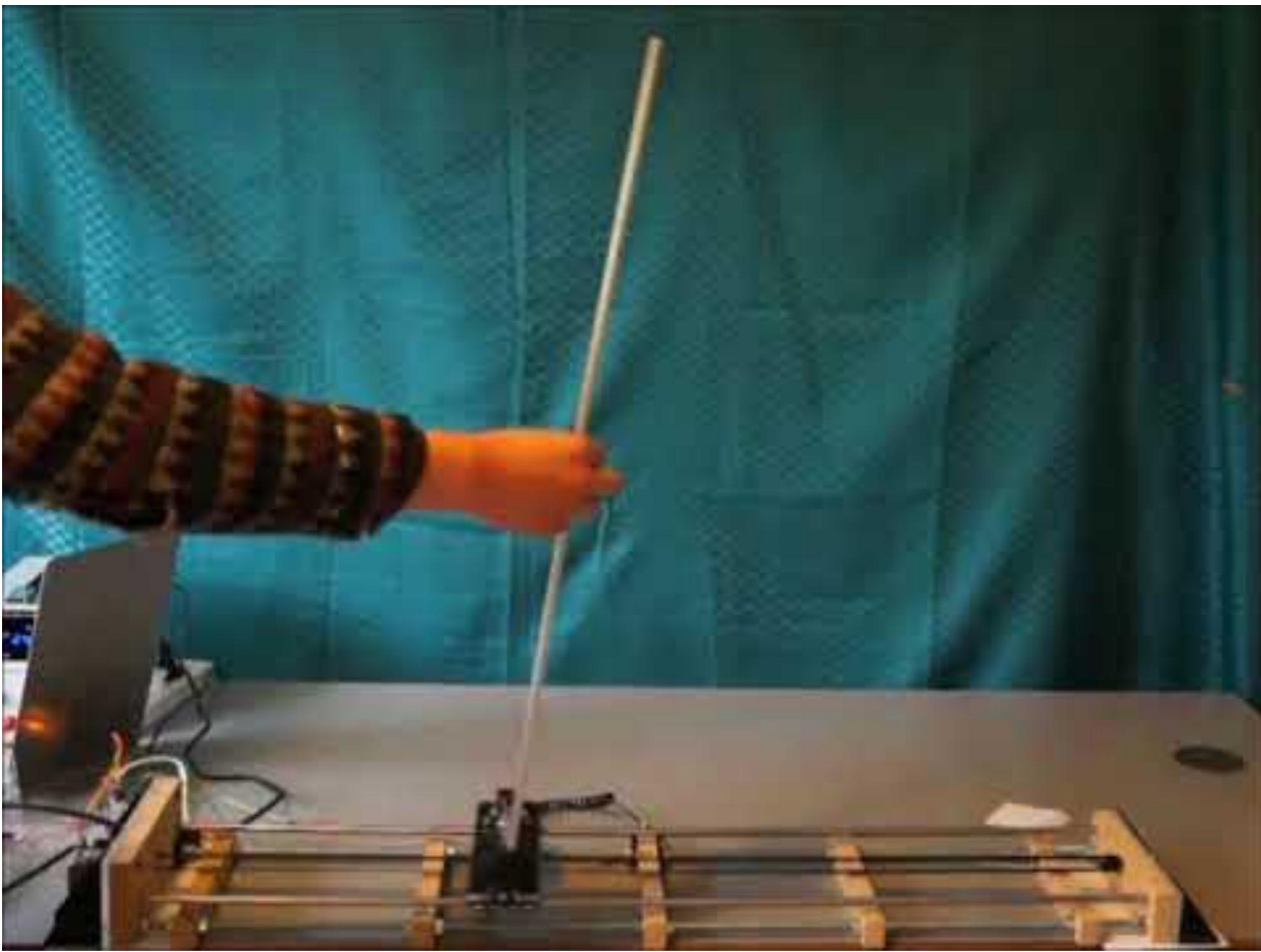
Self Driving Car

Cart Pole RL: <https://youtube.com/watch?v=5Q14EjnOJZc>

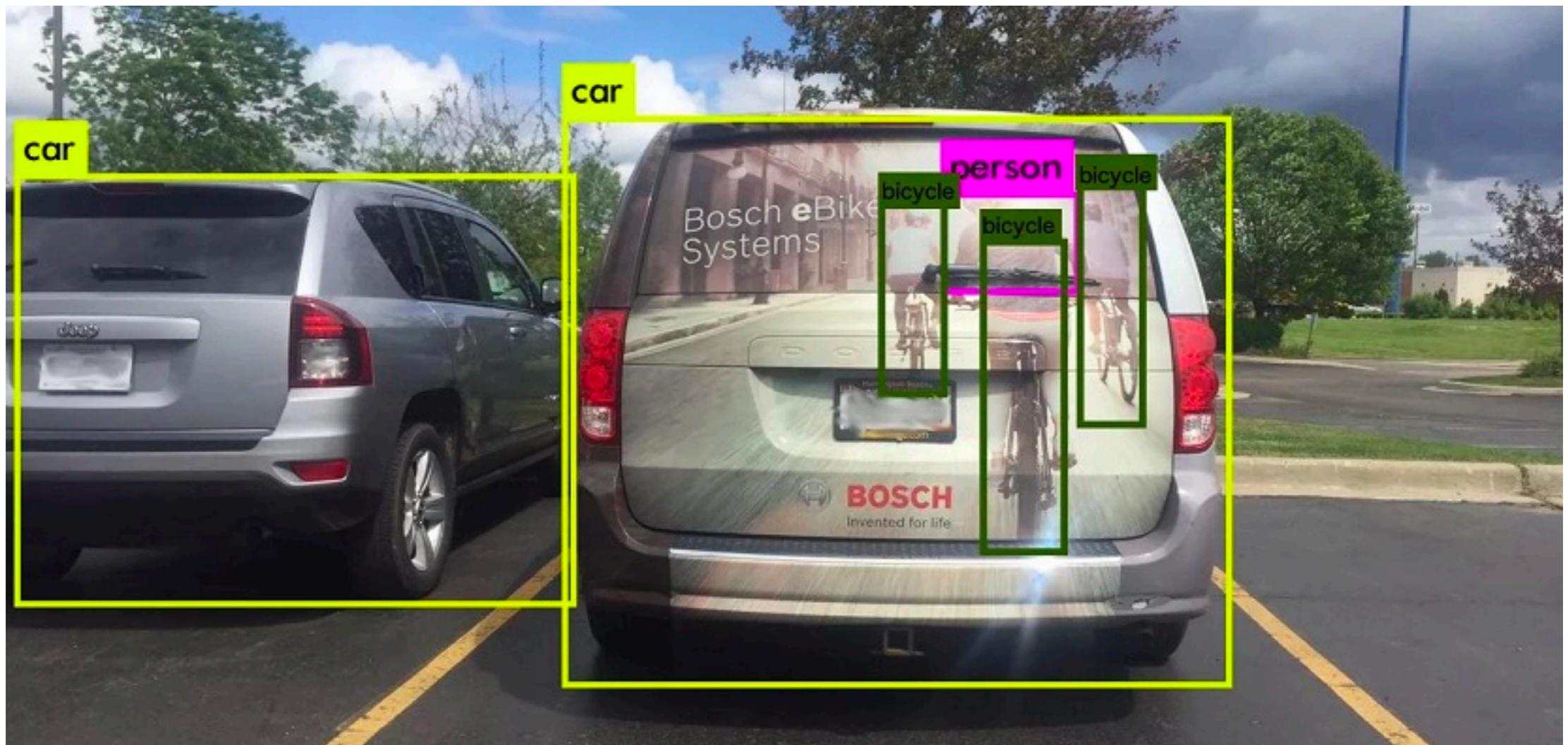


Self Driving Car

Cart Pole RL: <https://youtube.com/watch?v=5Q14EjnOJZc>



Self Driving Car



Courtesy: Cognata

Machine Learning Applications

<https://www.youtube.com/watch?v=PDKhUknuQDg>



Machine Learning Applications

<https://www.youtube.com/watch?v=PDKhUknuQDg>



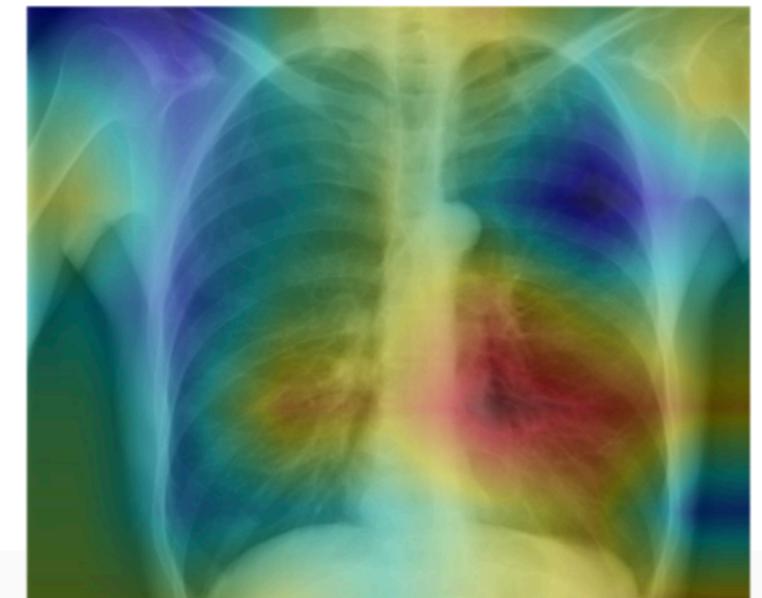
Machine Learning Applications



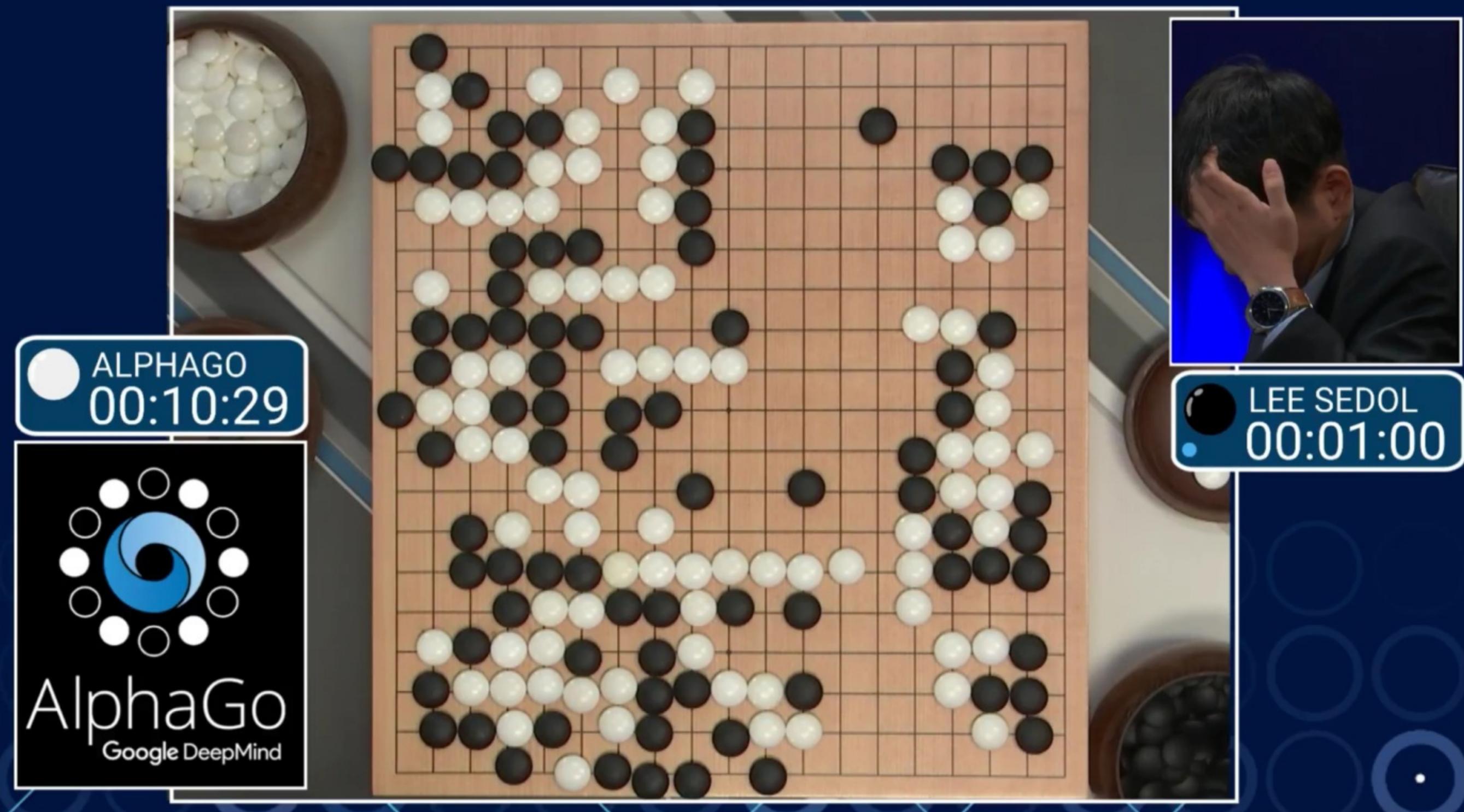
Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Machine Learning Applications



Machine Learning Gone Wrong

THE VERGE

TECH

SCIENCE

CULTURE

CARS

REVIEWS

LONGFORM

VIDEO

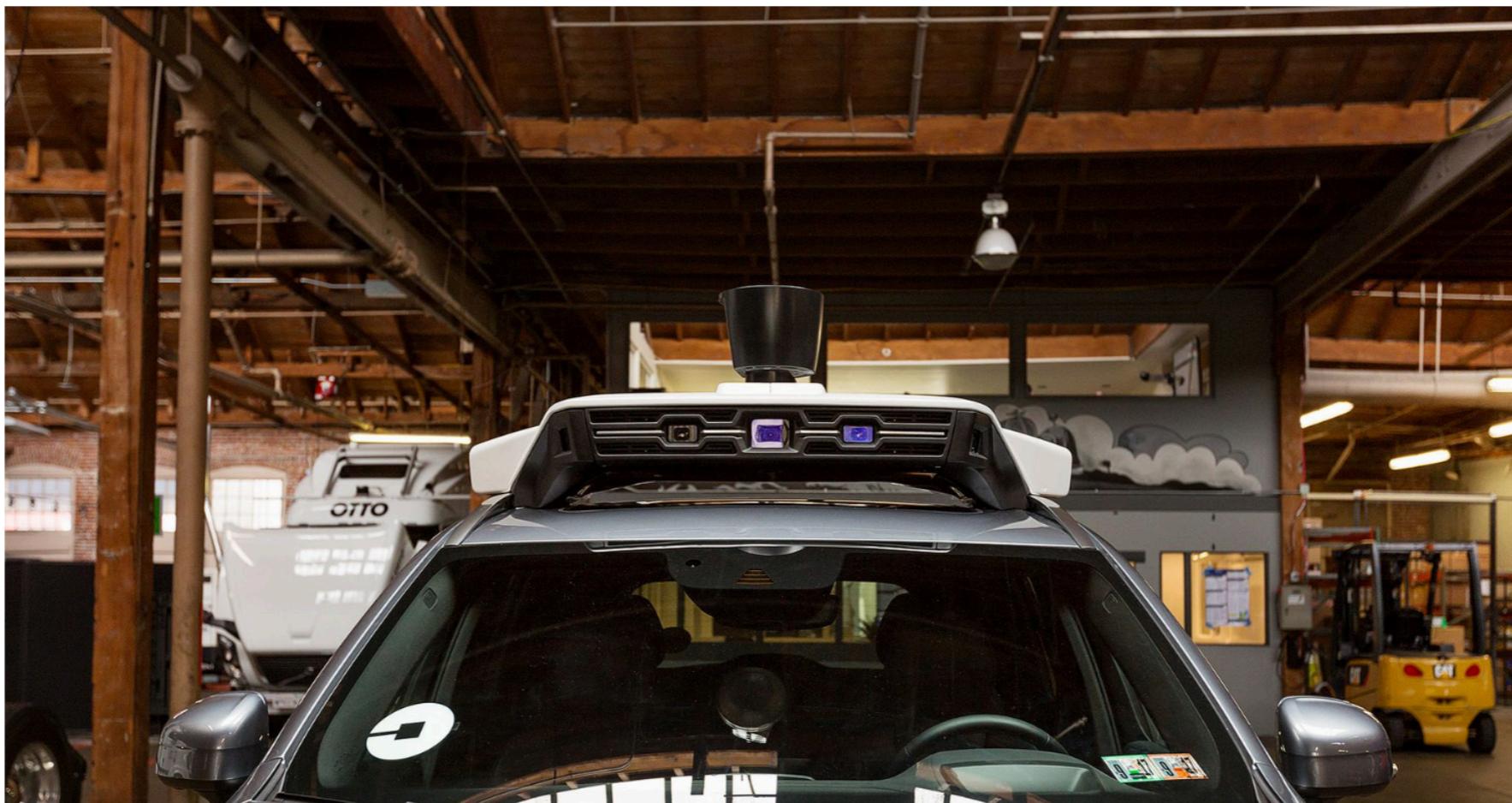
MORE

STORYSTREAM

TRANSPORTATION

UBER

RIDE-SHARING



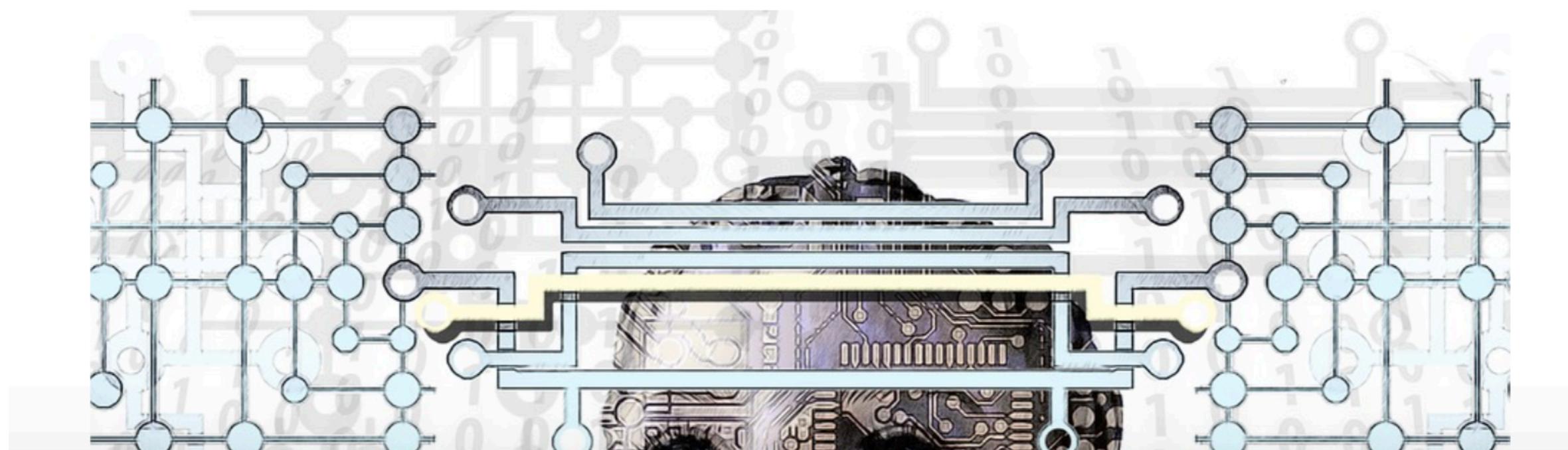
Uber's fatal self-driving crash: all the news and updates

Machine Learning Gone Wrong

[Home](#) › [Cool Science](#) › After Uber, Tesla Incidents, Can Artificial Intelligence Be Trusted?

After Uber, Tesla Incidents, Can Artificial Intelligence Be Trusted?

April 13, 2018



“Bias” in Machine Learning

The screenshot shows two examples of Google Translate's handling of gendered sentences.

Example 1: English input: "He is a babysitter
She is a doctor". Translation: "O bir bebek bakıcısı
O bir doktor".

Example 2: English input: "O bir bebek bakıcısı
O bir doktor". Translation: "She's a babysitter
He is a doctor".

Both examples demonstrate a clear bias in favor of male gender roles, as the machine learning model consistently translates "he" to "she" and "she" to "he".

ANITA BORG

PAGE 9 | GRACE HOPPER CELEBRATION FOR WOMEN IN COMPUTING 2017
PRESENTED BY THE ANITA BORG INSTITUTE AND THE ASSOCIATION FOR COMPUTING MACHINERY

#GHC17

“Bias” addressed

The screenshot shows a translation interface with the following settings:

- Source language: TURKISH - DETECTED
- Target language: ENGLISH
- Other available languages: SPANISH, FRENCH, TURKISH, ARABIC
- Bottom navigation: Text (selected), Documents

The input text is "o bir doktor". The output provides two gender-specific translations:

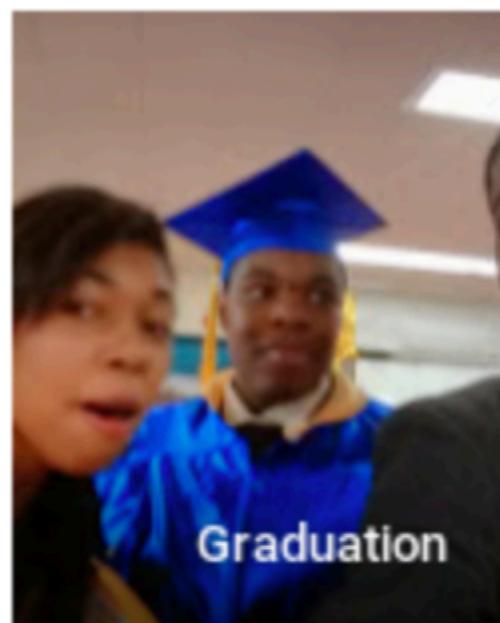
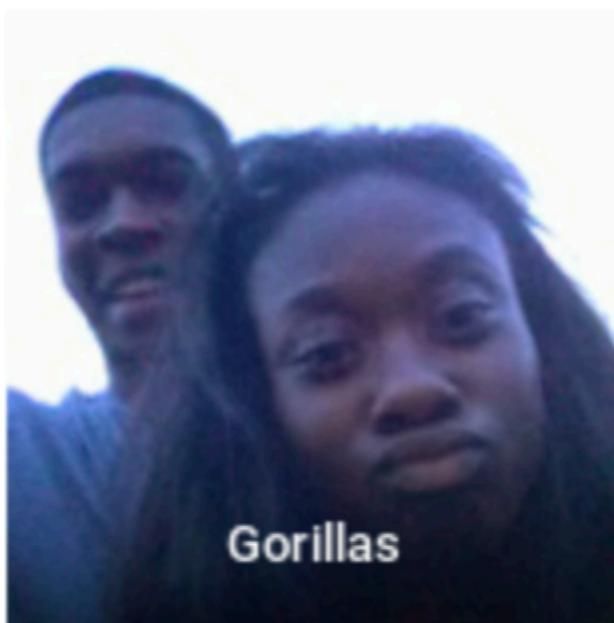
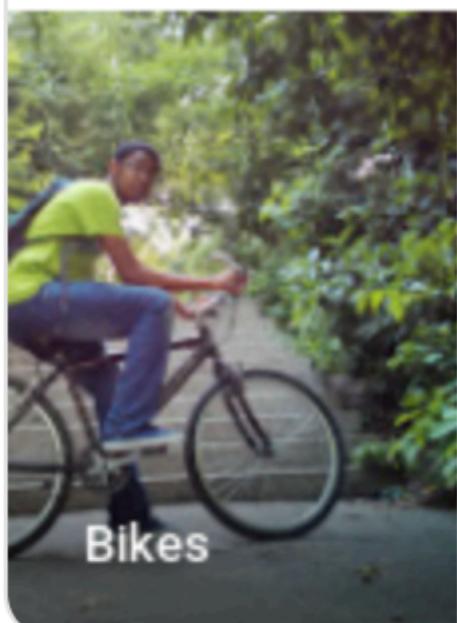
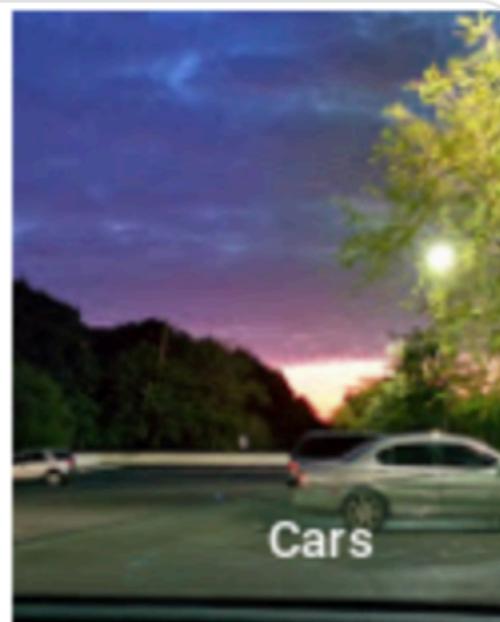
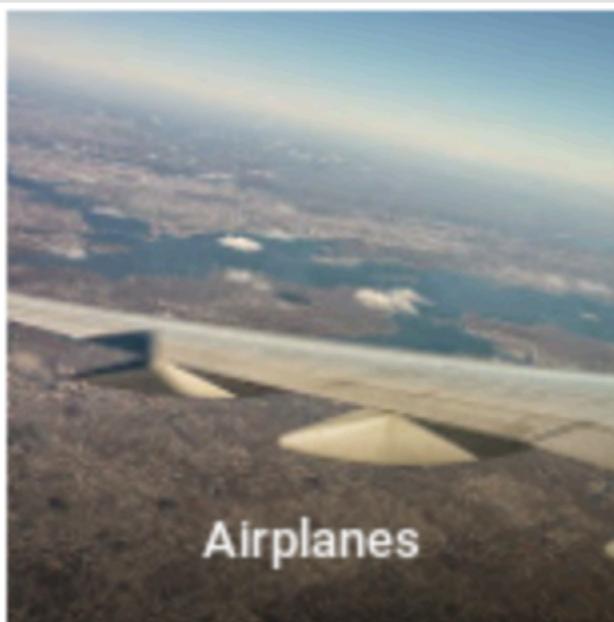
- she is a doctor** (*feminine*)
- he is a doctor** (*masculine*)

Annotations include:

- A note: "Translations are gender-specific. [LEARN MORE](#)"
- Speaker icons and copy/paste buttons for each translation result.
- Microphone and speaker icons at the bottom left.
- A character count: 12/5000.

“Racist” Machine Learning?

not a gorilla.



Where is the bride?



“Bias” addressed

Machine learning and bias: <https://www.youtube.com/watch?v=59bMh59JQDo>

“Bias” addressed

Machine learning and bias: <https://www.youtube.com/watch?v=59bMh59JQDo>

A “reality” check

<https://www.youtube.com/watch?v=UCwbJxW-ZRg>



A “reality” check

<https://www.youtube.com/watch?v=UCwbJxW-ZRg>

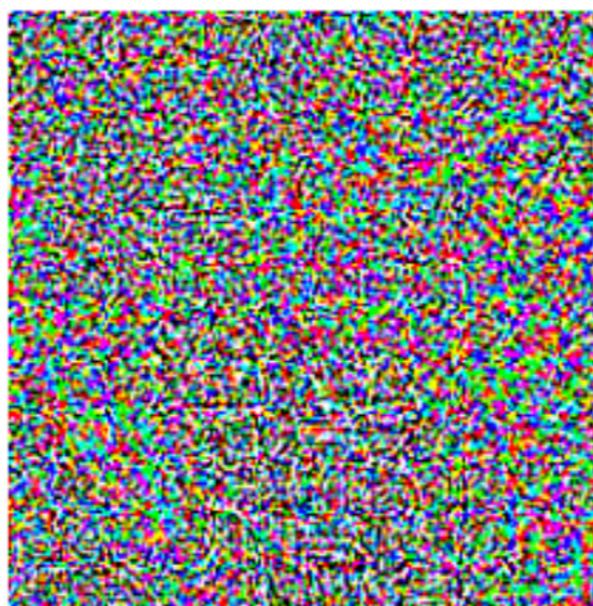


Adversaries!



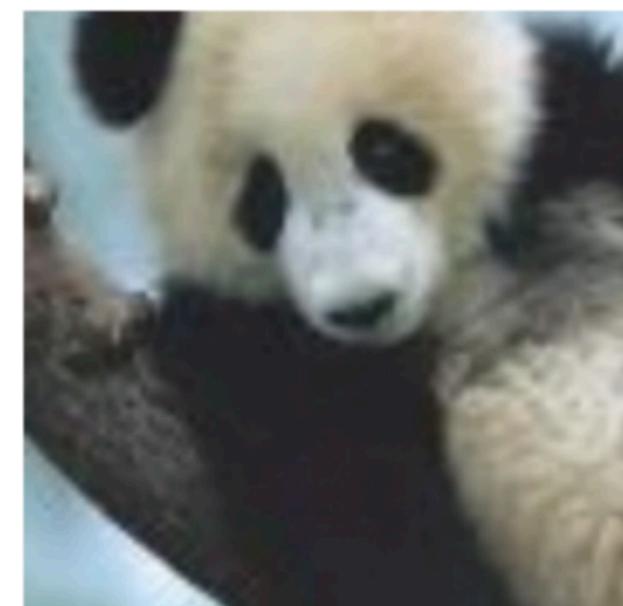
\mathbf{x}
“panda”
57.7% confidence

+ .007 ×



sign($\nabla_{\mathbf{x}} J(\theta, \mathbf{x}, y)$)
“nematode”
8.2% confidence

=



$\mathbf{x} +$
 $\epsilon \text{sign}(\nabla_{\mathbf{x}} J(\theta, \mathbf{x}, y))$
“gibbon”
99.3 % confidence

What is Machine Learning?

What is Machine Learning?

- “Field of study that give computers the ability to learn without being explicitly programmed” - Arthur Samuel [1959]

What is Machine Learning?

What is Machine Learning?

- “A computer program is said to **learn** from **experience E** with respect to some class of **tasks T** and **performance measure P** if its performance at tasks in T, as measured by P, improves with experience E.” - Tom Mitchell

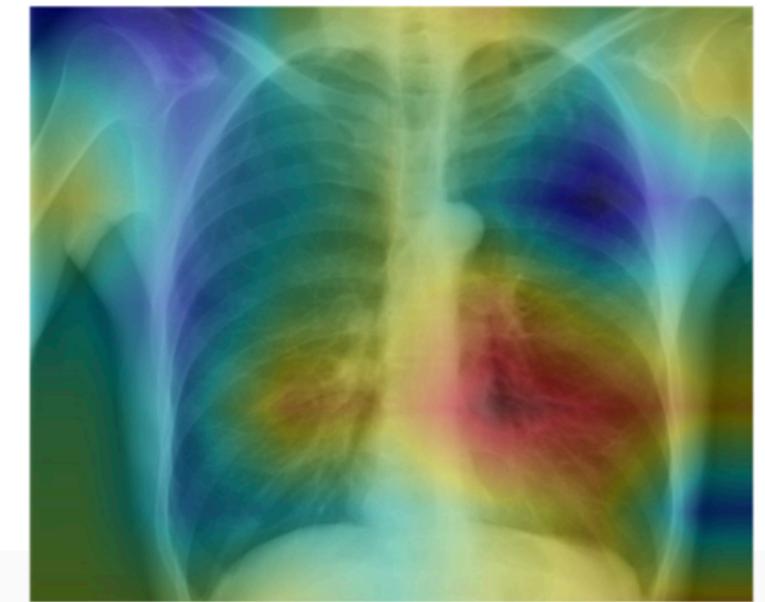
What is Machine Learning?



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

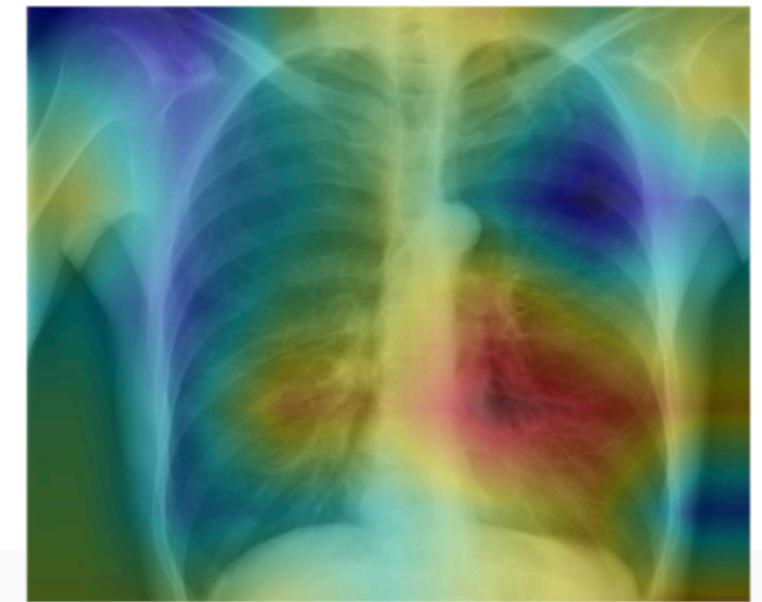
What is Machine Learning?



Input
Chest X-Ray Image

Task
CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)

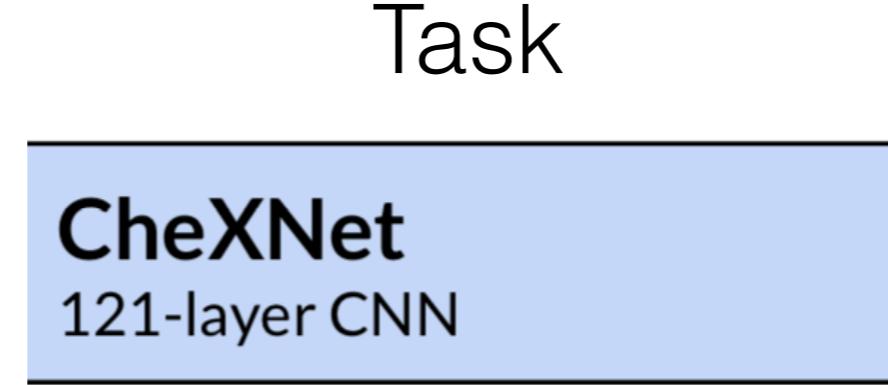


Q: Identify task, performance measure, and experience

What is Machine Learning?



Input
Chest X-Ray Image



Performance
measure

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?

Experience
1000s of <image, disease> pairs



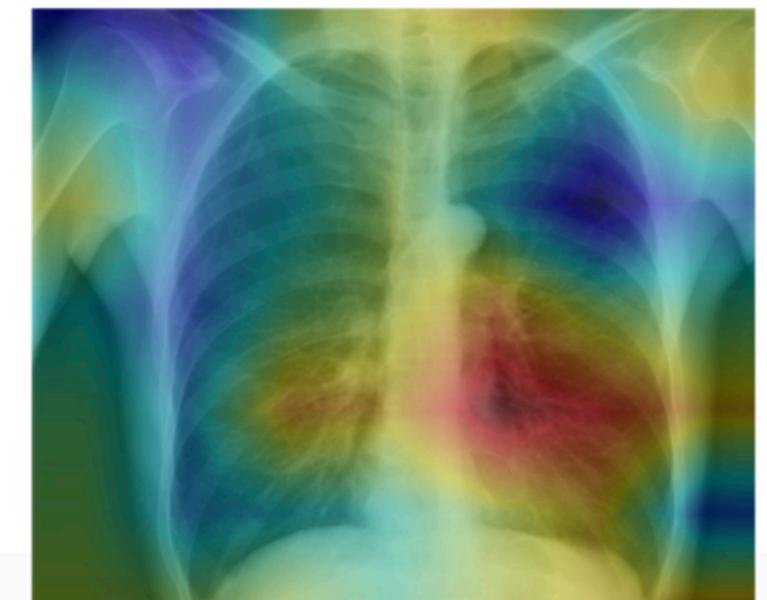
Input
Chest X-Ray Image

Task

CheXNet
121-layer CNN

Performance
measure

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?

Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

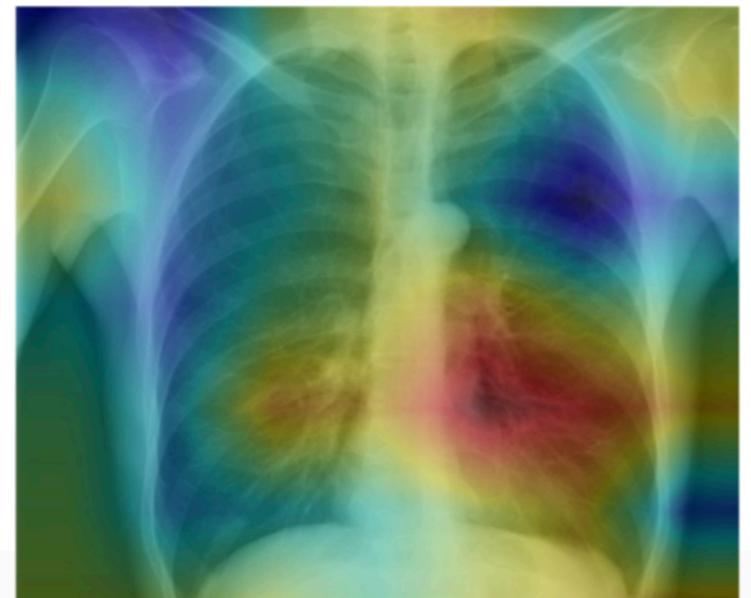
Task

CheXNet
121-layer CNN

Performance
measure

Output

Pneumonia Positive (85%)



What is Machine Learning?

Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

Task

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



What is Machine Learning?

Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



What is Machine Learning?

Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



What is Machine Learning?

Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

Supervised Learning
Output
Pneumonia Positive (85%)



CheXNet
121-layer CNN