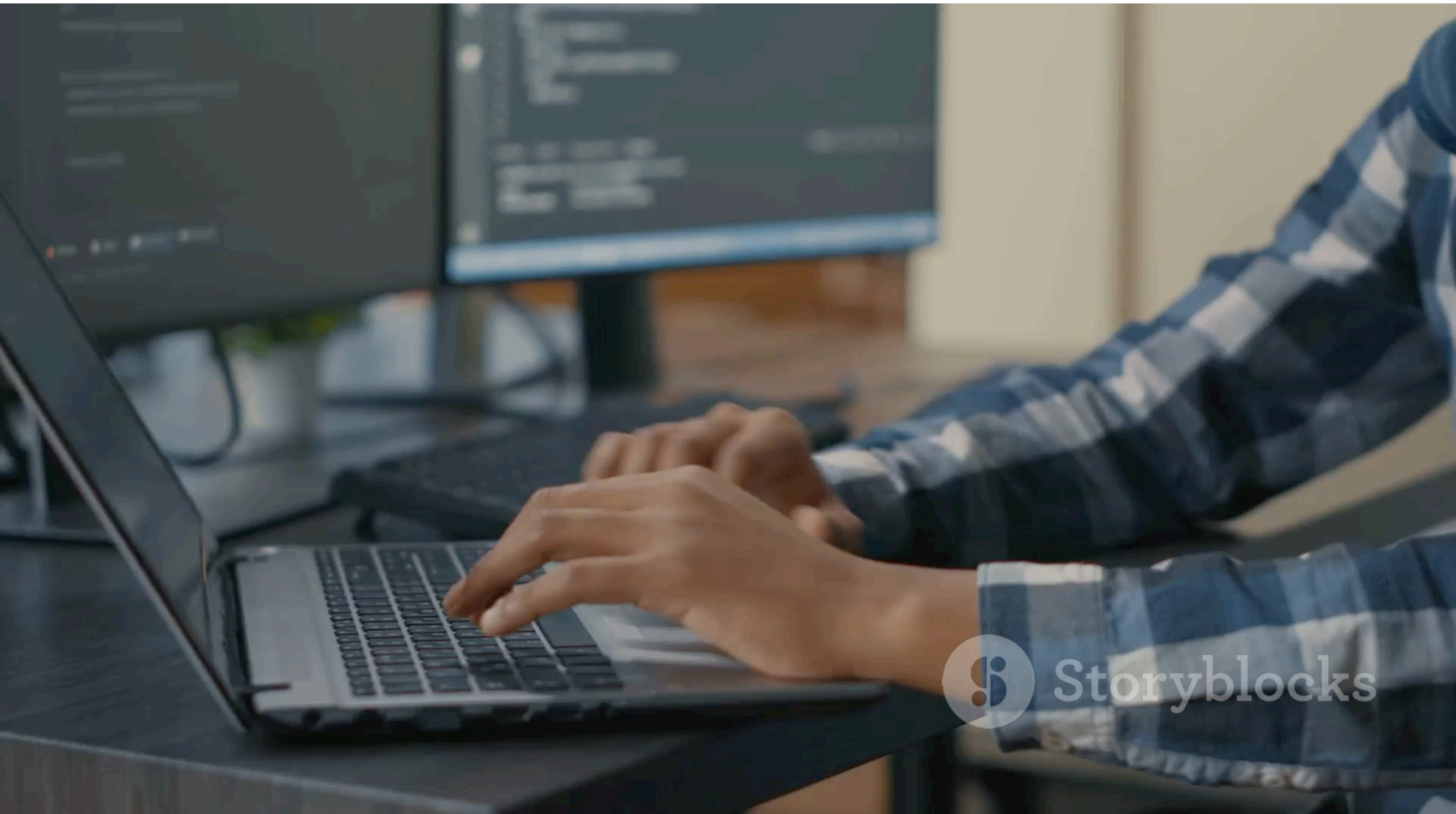
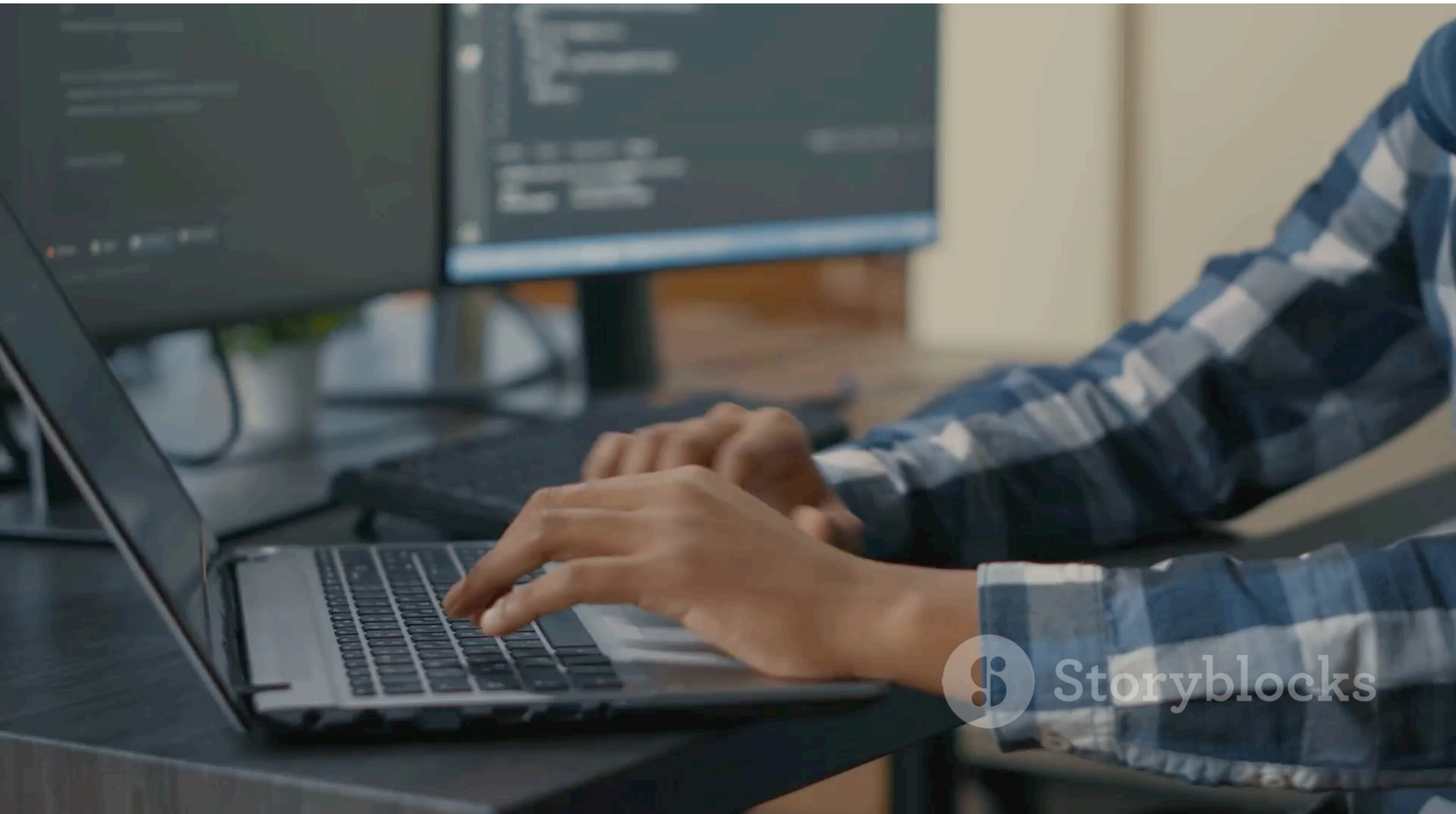
Introduction to ML

Nipun Batra

Machine Learning Applications

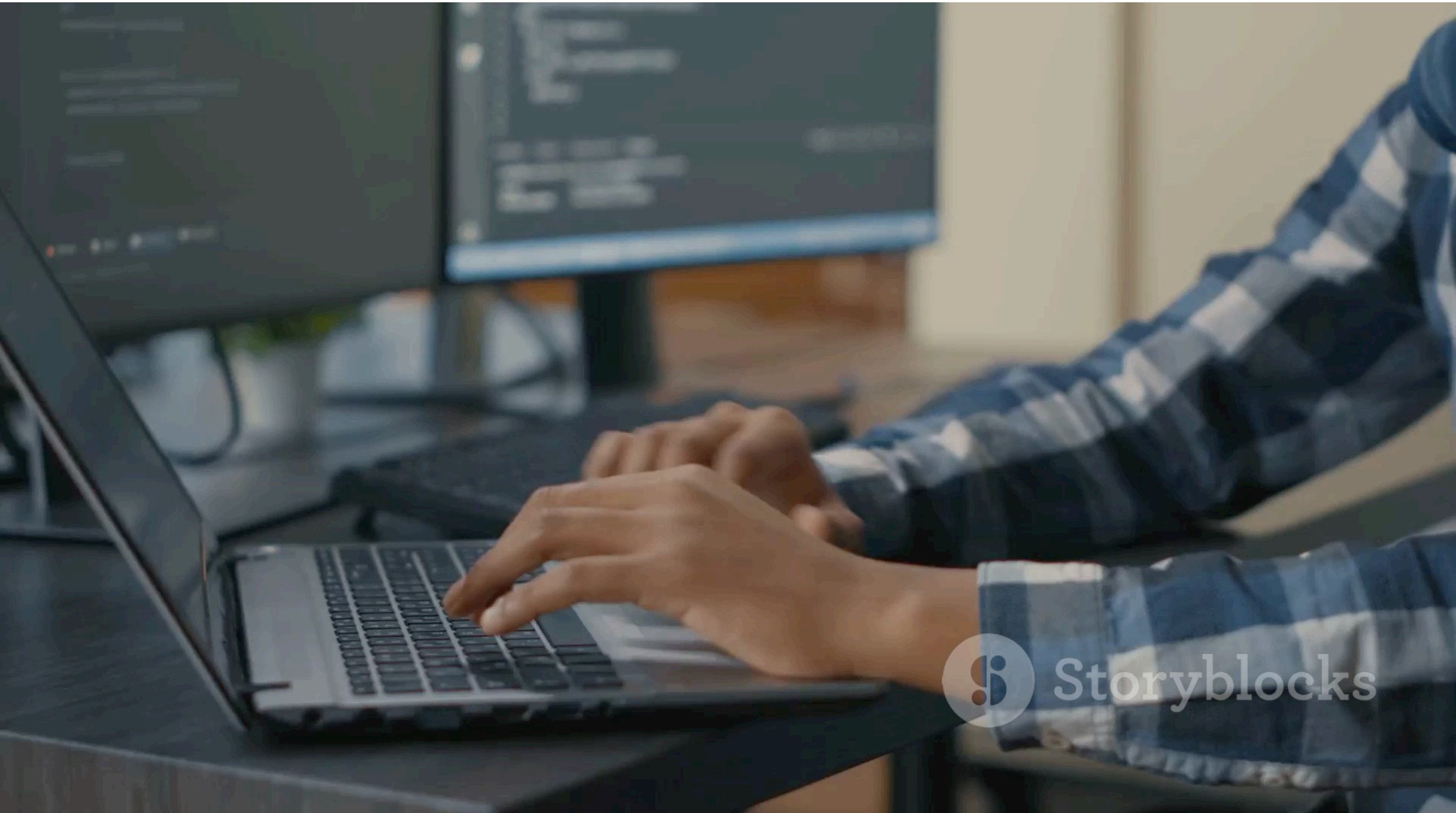


Machine Learning Applications



Machine Learning Applications

The video was created in 5 mins using invideo



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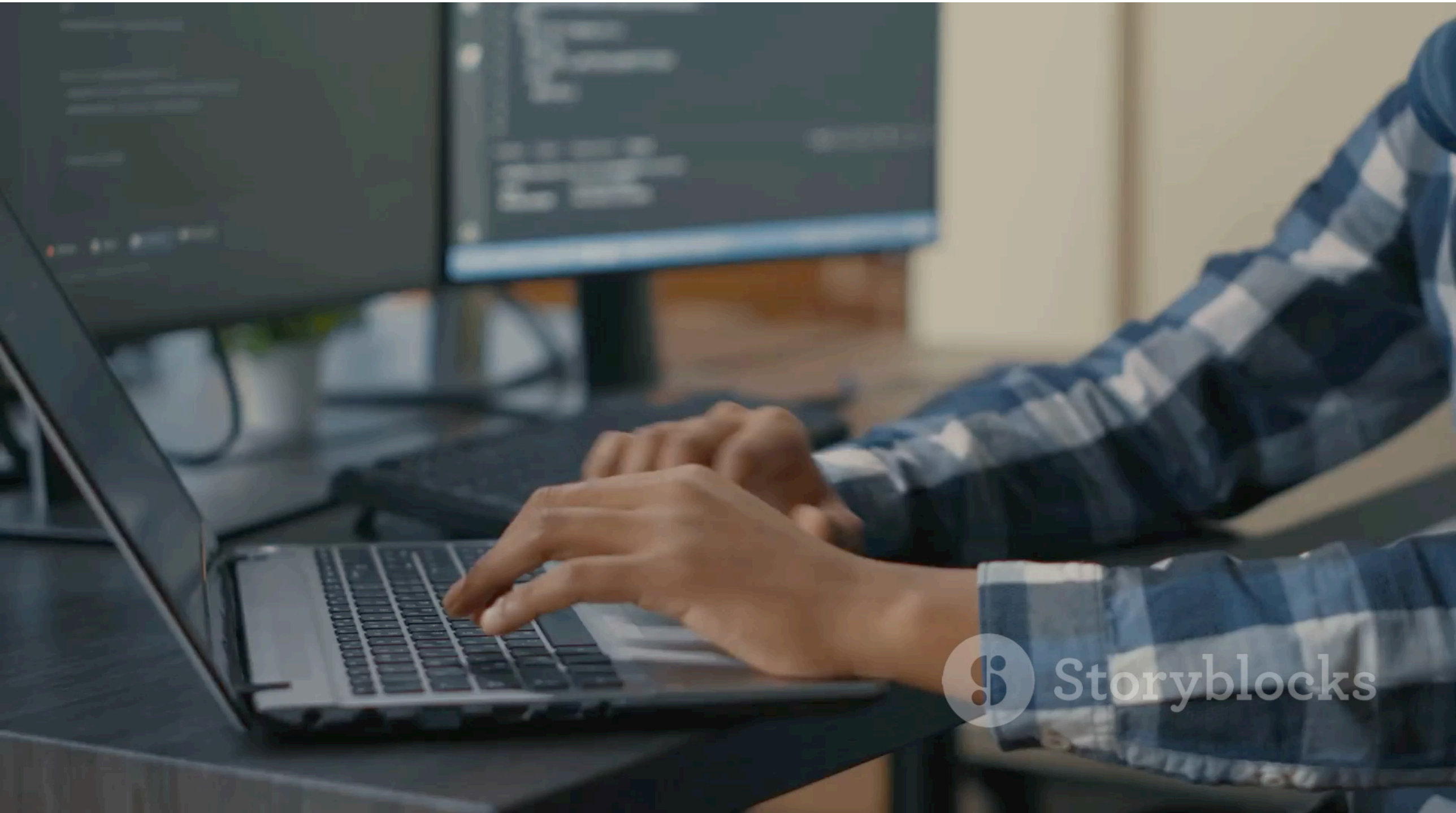


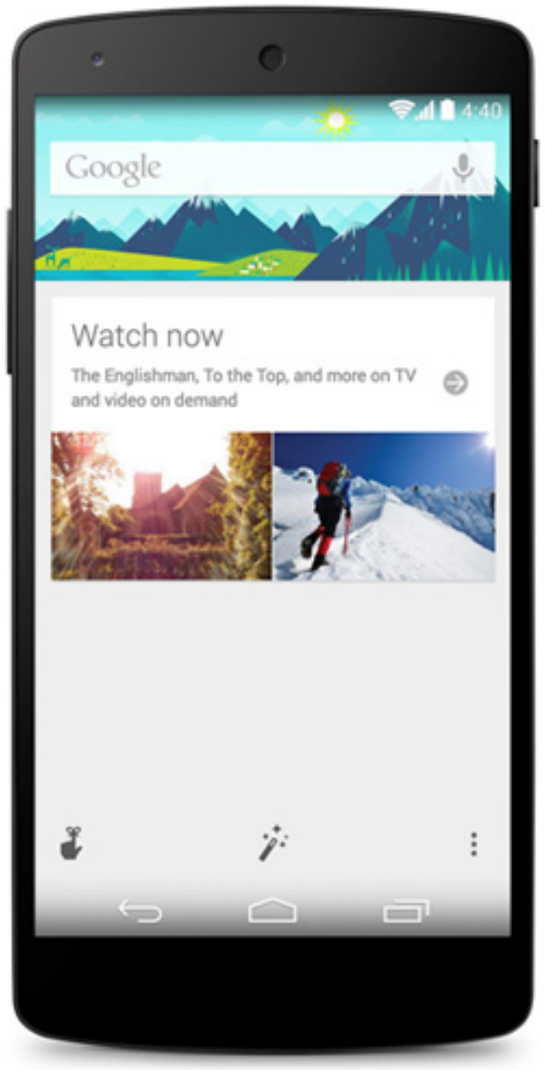
Machine Learning Applications

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

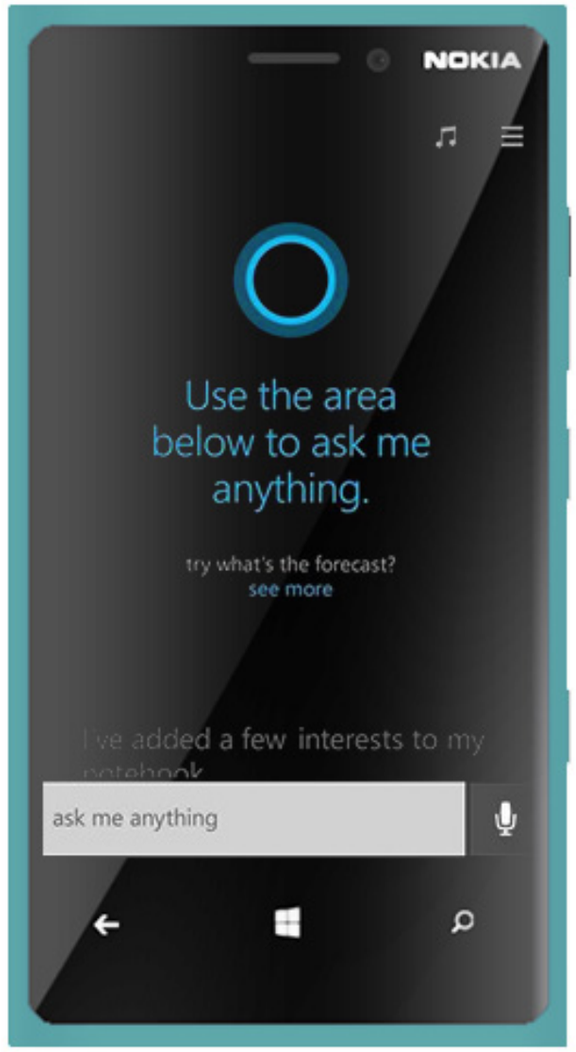
Machine Learning Applications

Apple Siri

Google Now



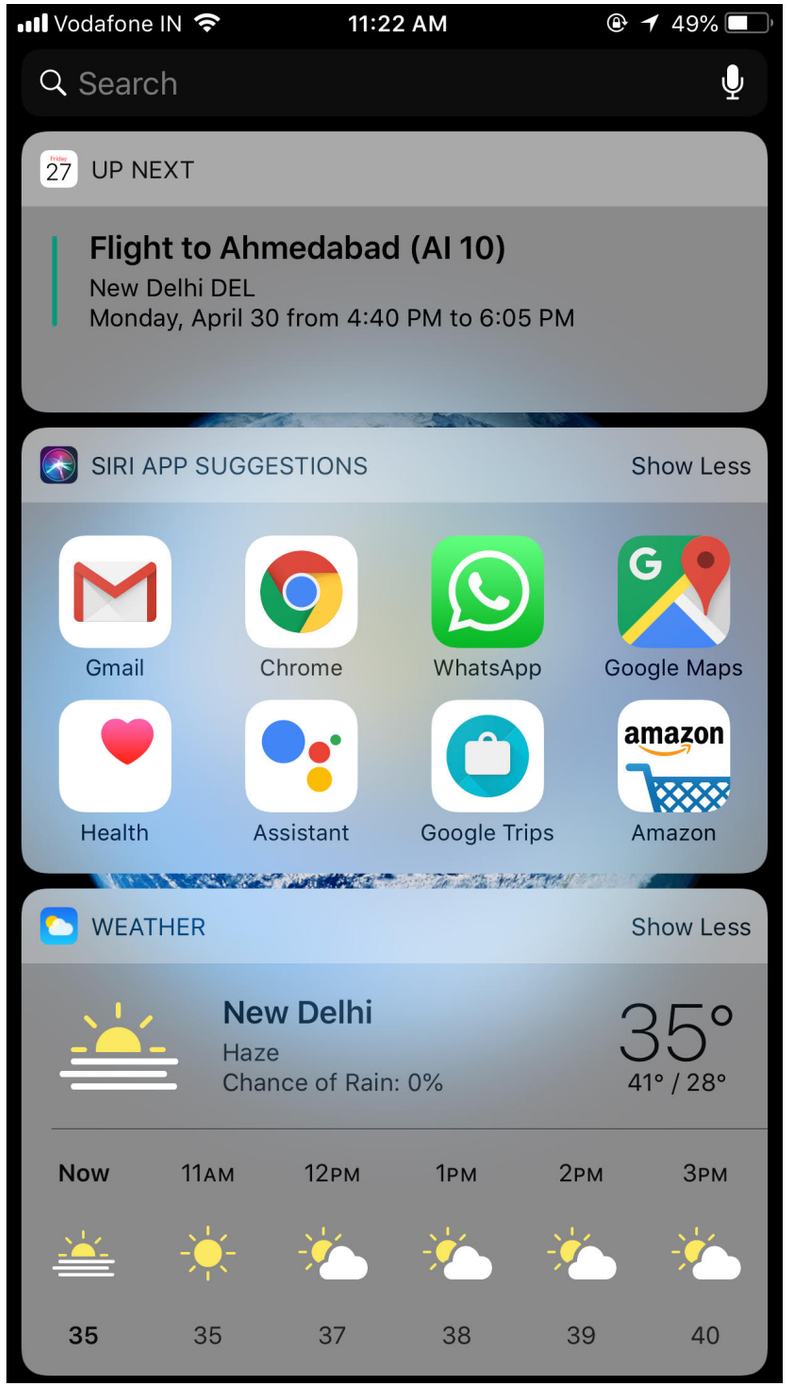
Windows Cortana



Machine Learning Applications

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

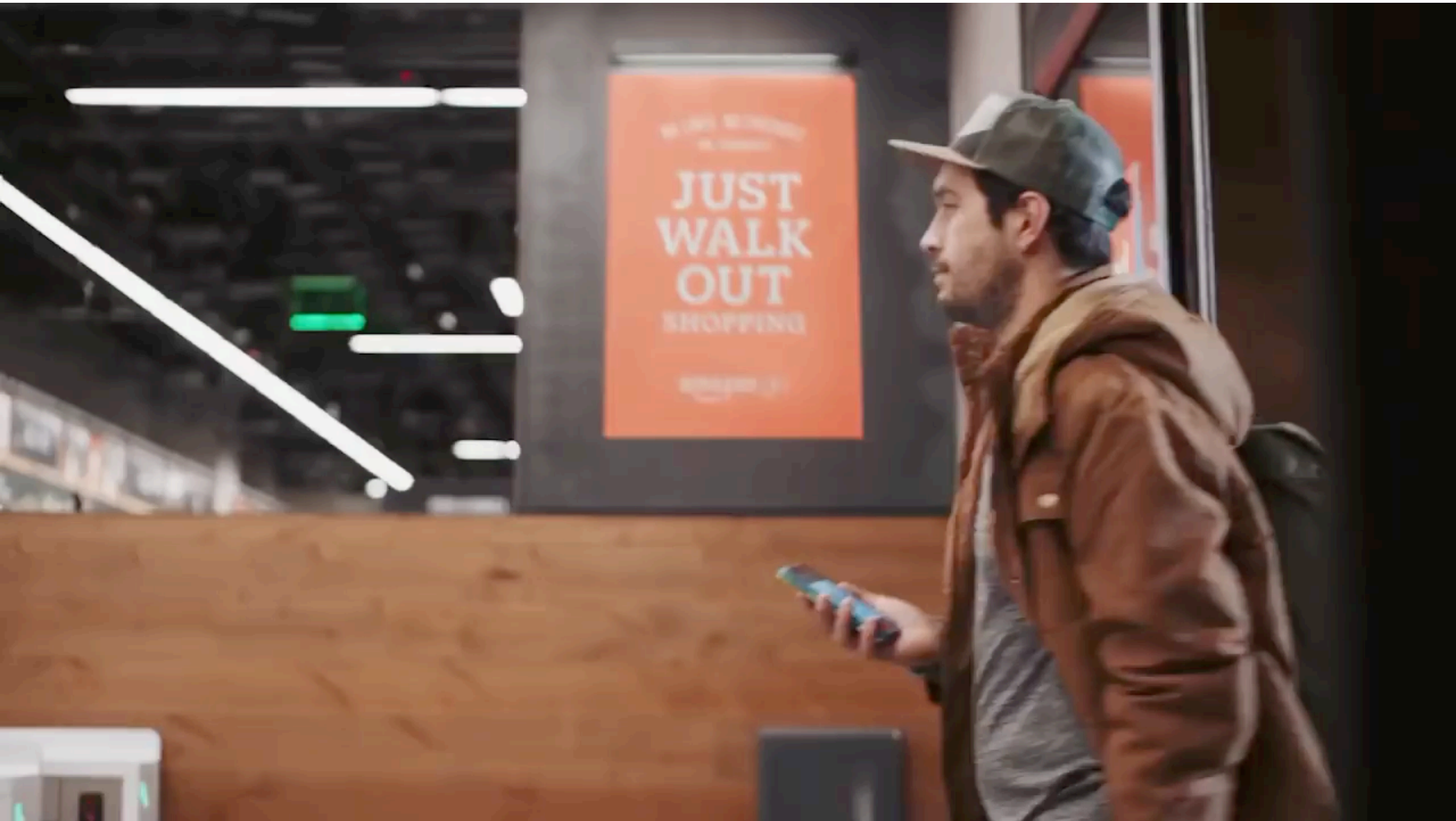
Machine Learning Applications



The Long Wait …

Machine Learning Applications

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



Machine Learning Applications

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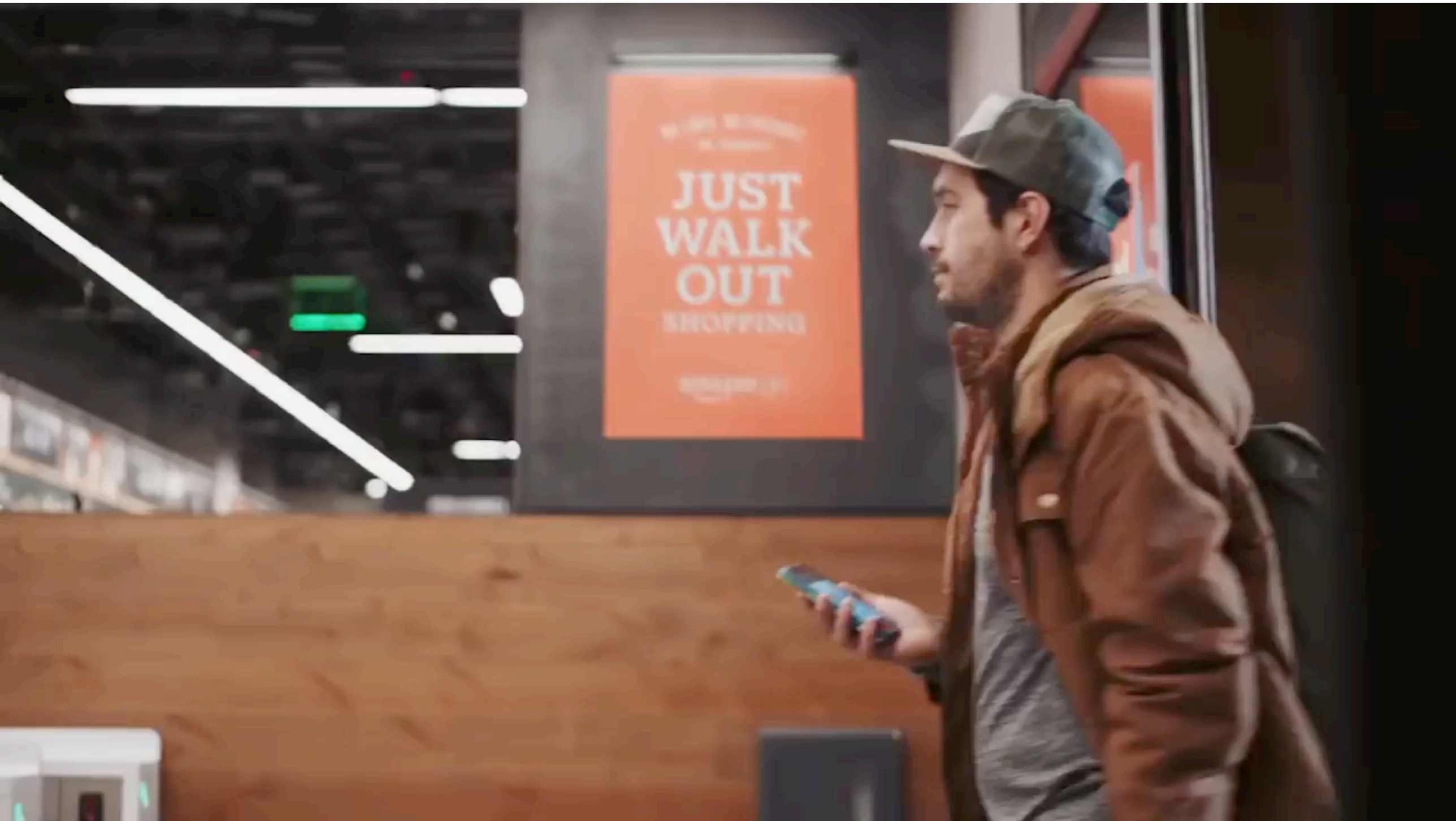

Machine Learning Applications

Demo: https://nipunbatra.github.io/ml-teaching/notebooks/object-detection-segmentation.html

Machine Learning Applications

Our in-house developed JoulesEye

Machine Learning Applications

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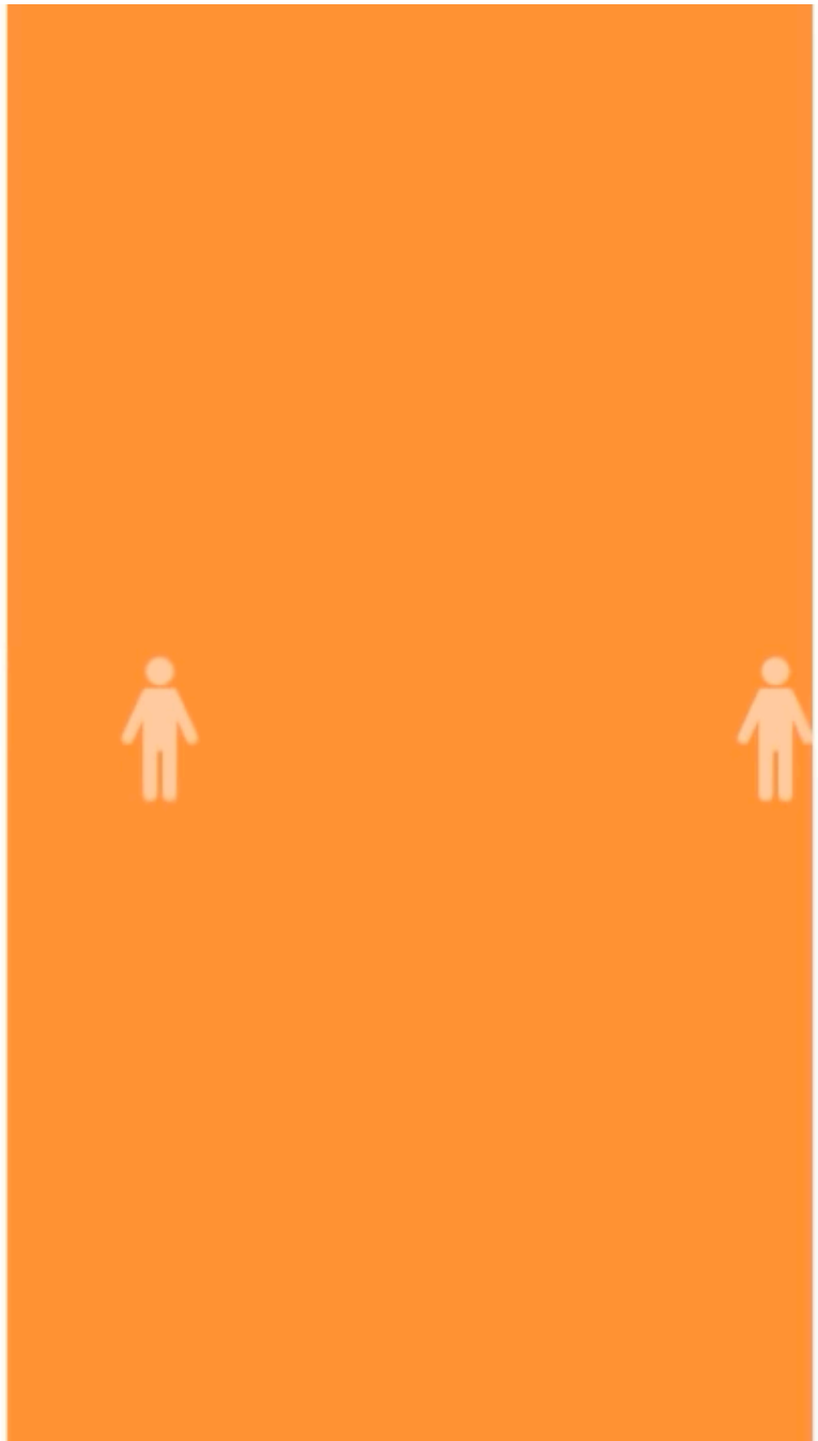
Machine Learning Applications

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



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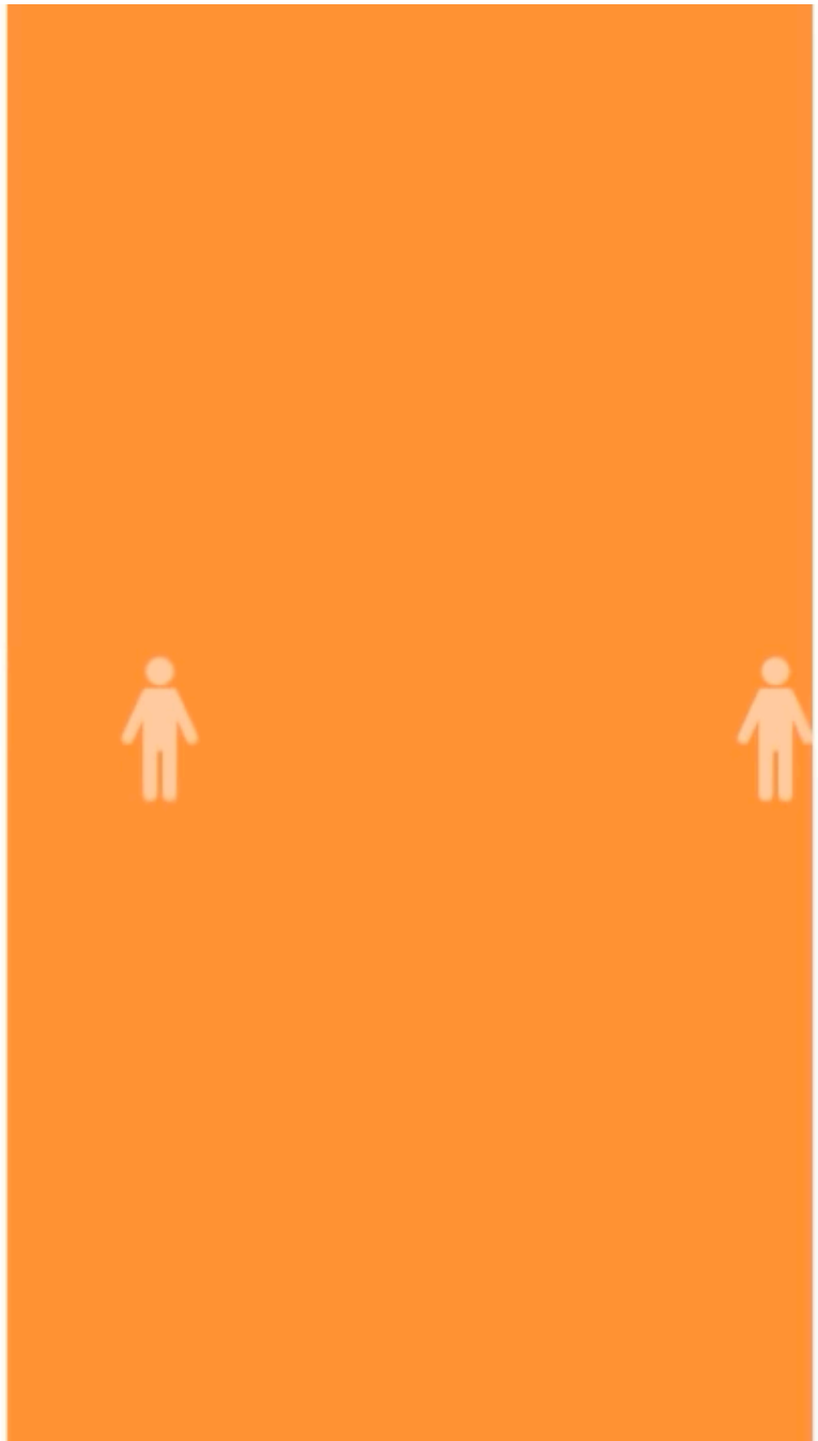
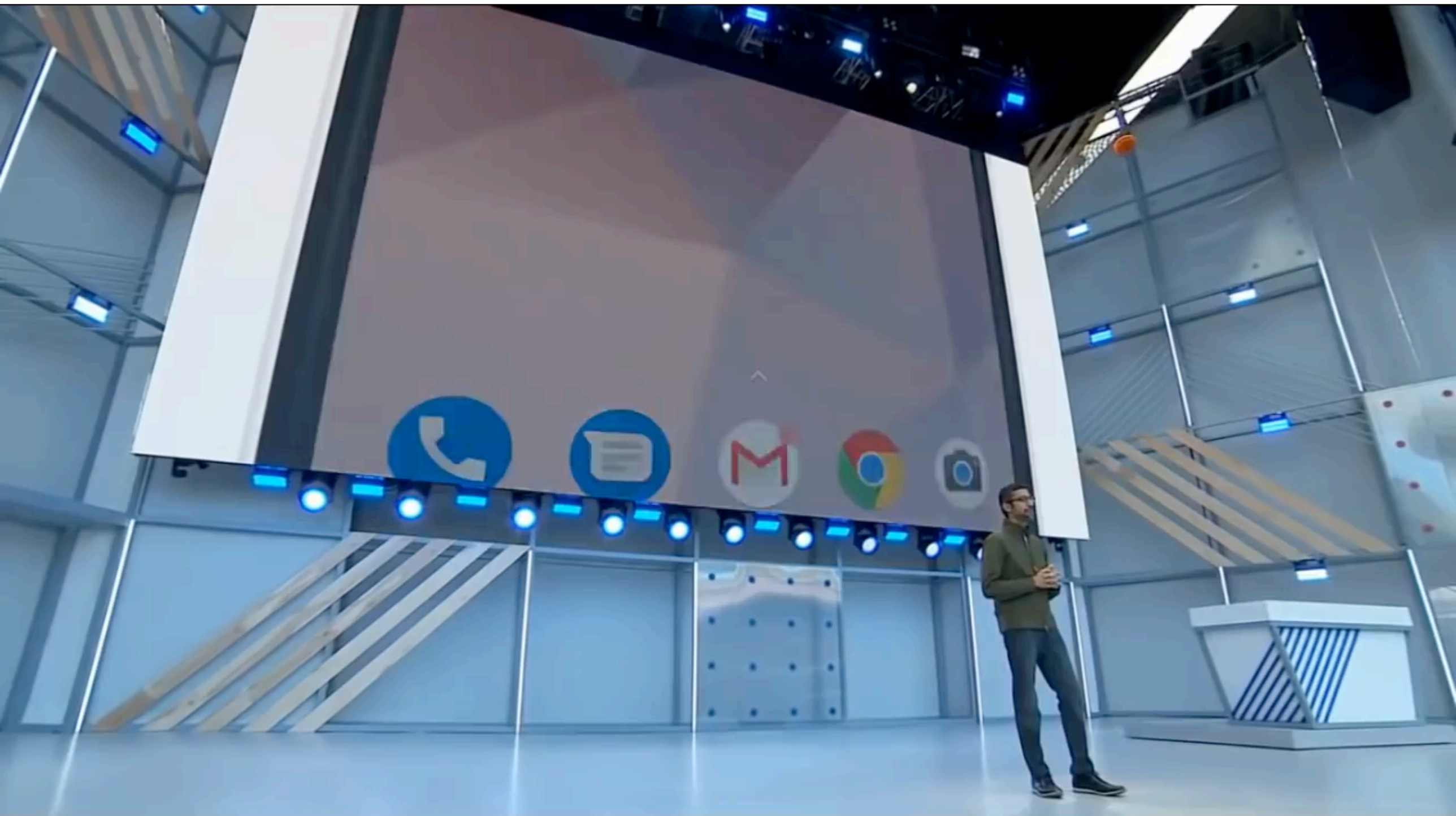


Never Liked To Call People!

Google Duplex!

https://www.youtube.com/watch?v=D5VN56jQMWM



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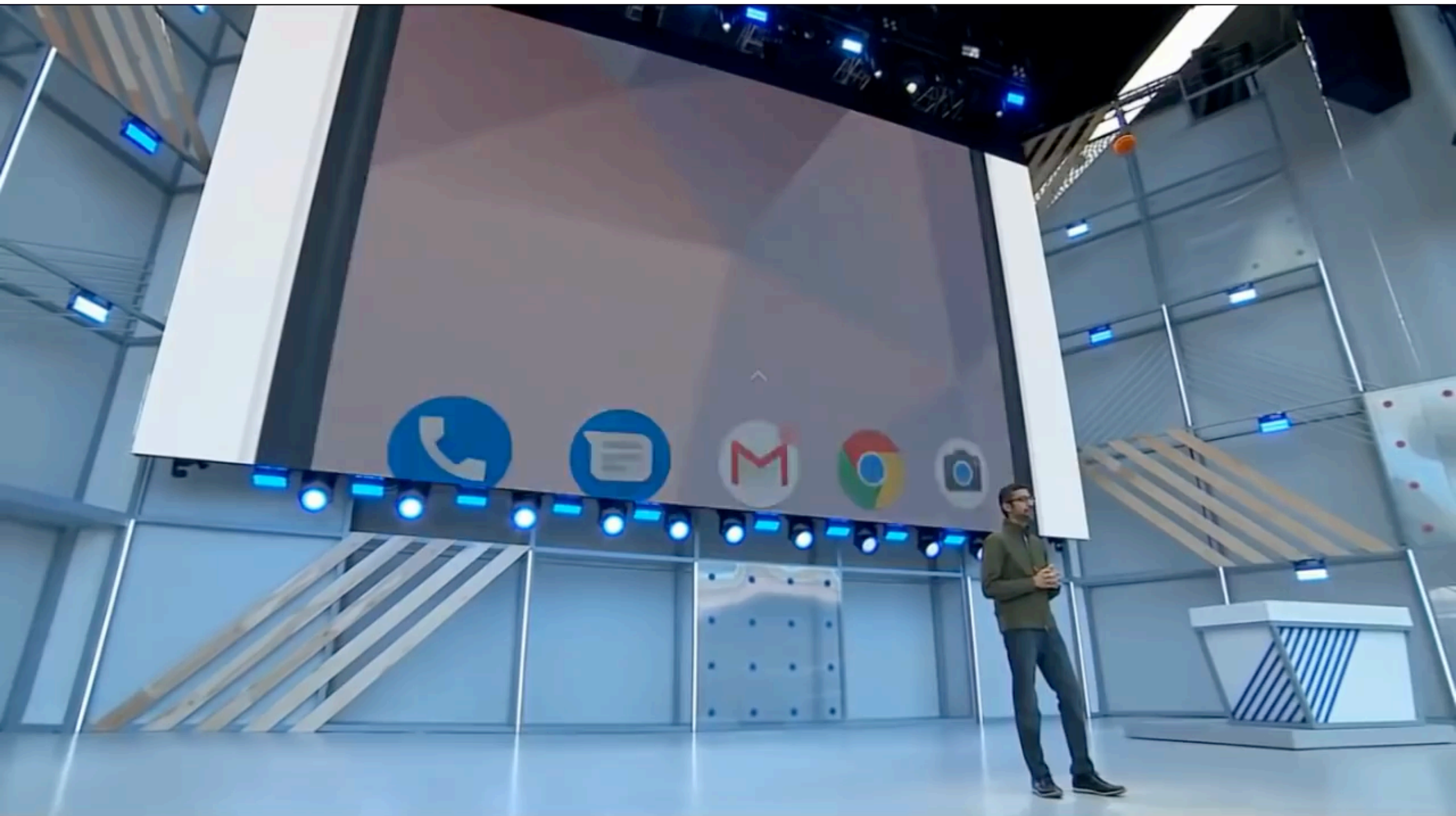

Saving The Planet - One Watt A time

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

Saving The Planet - One Watt A time

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Self Driving Car

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

Self Driving Car

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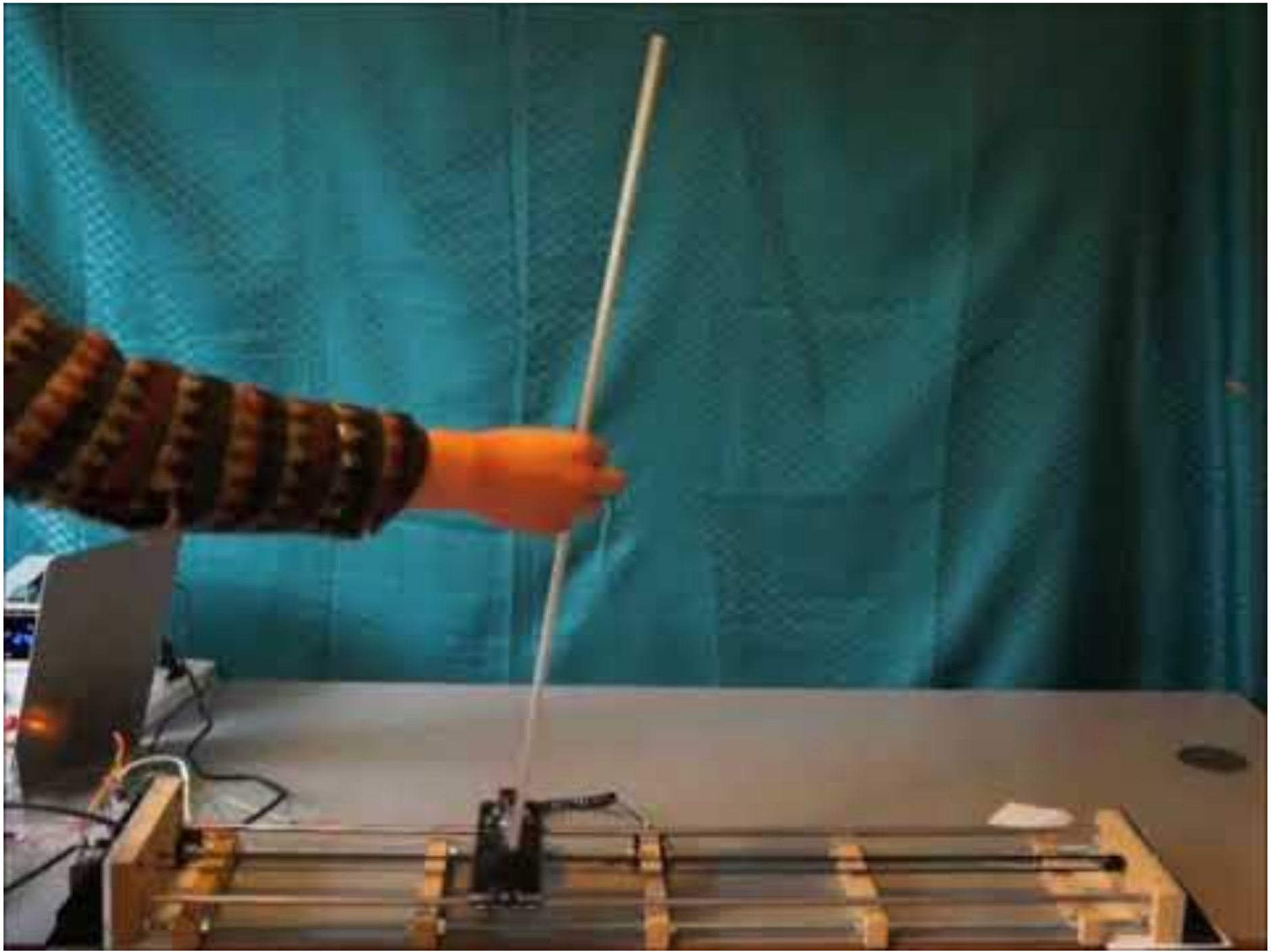
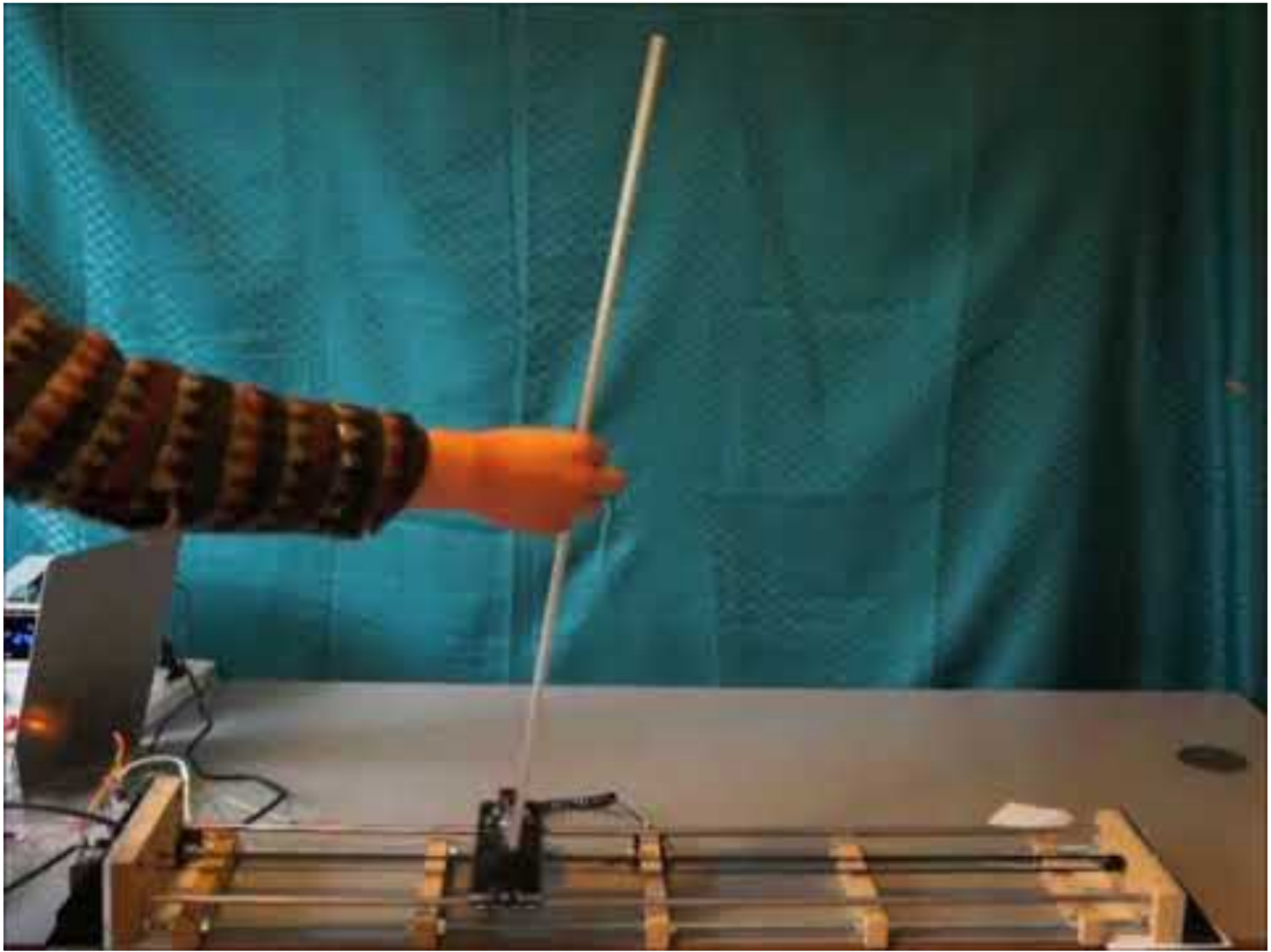
Self Driving Car

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

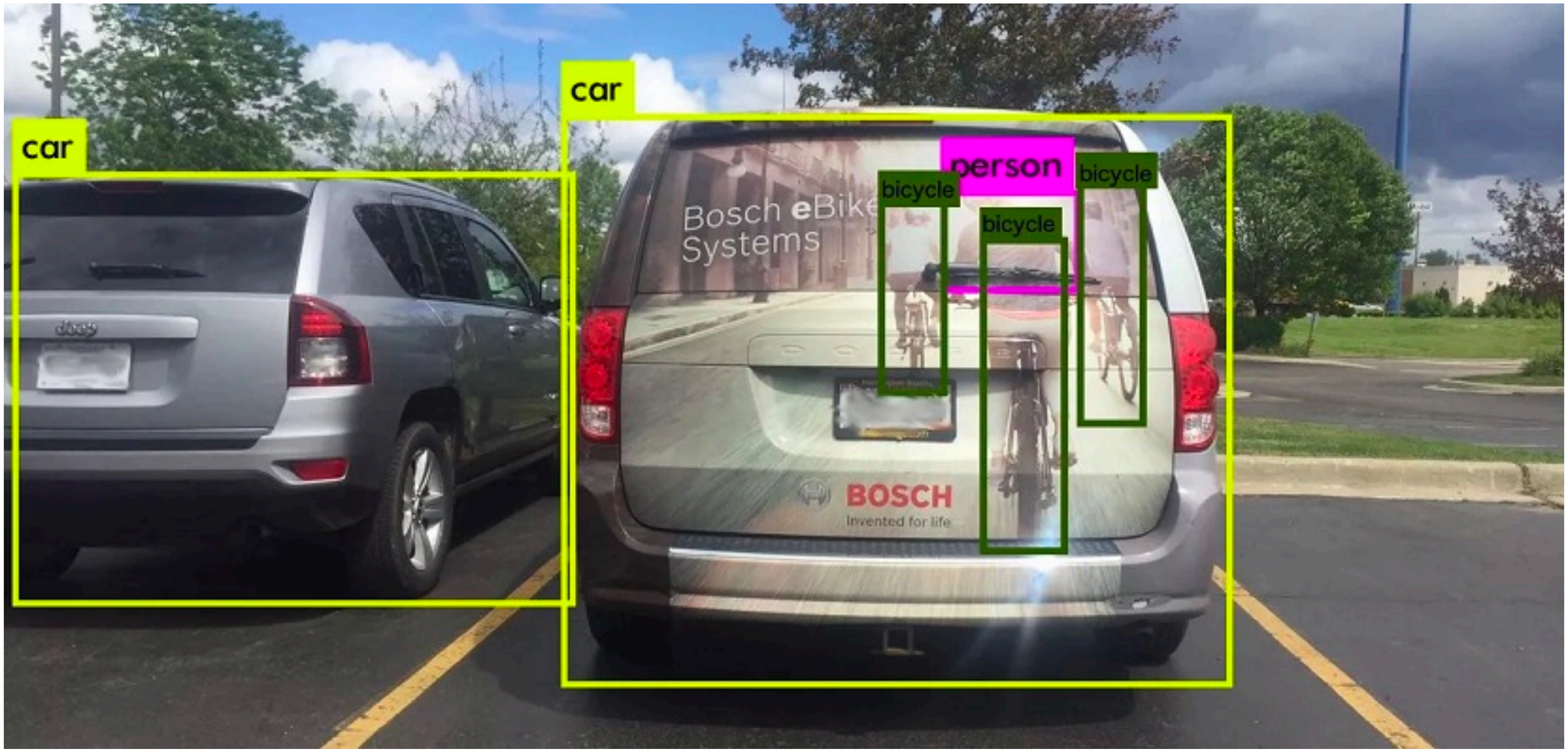


Self Driving Car

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



Self Driving Car



Courtesy: Cognata

ML for Farm

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

ML for Farm

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

ML for Healthcare

Dina Katabi: https://www.youtube.com/watch?v=CzAWndQh6xE

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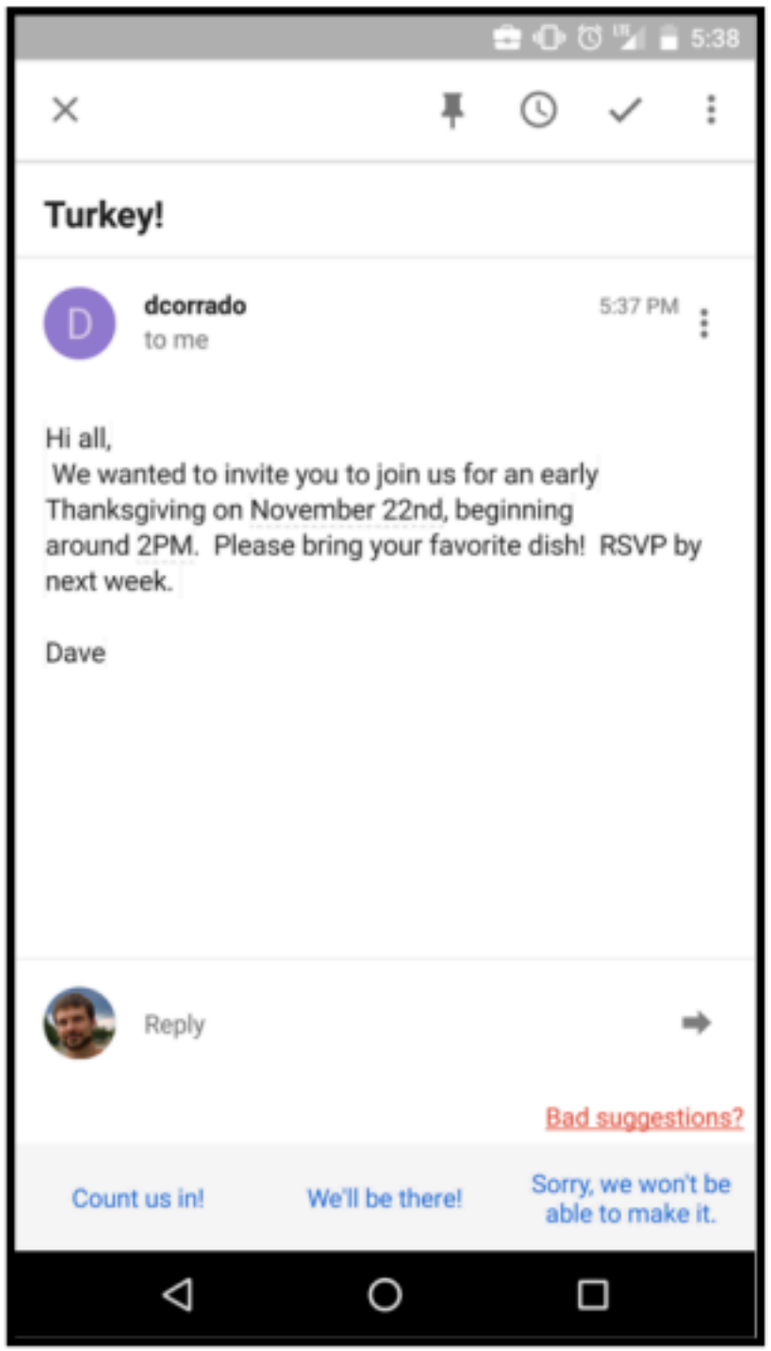
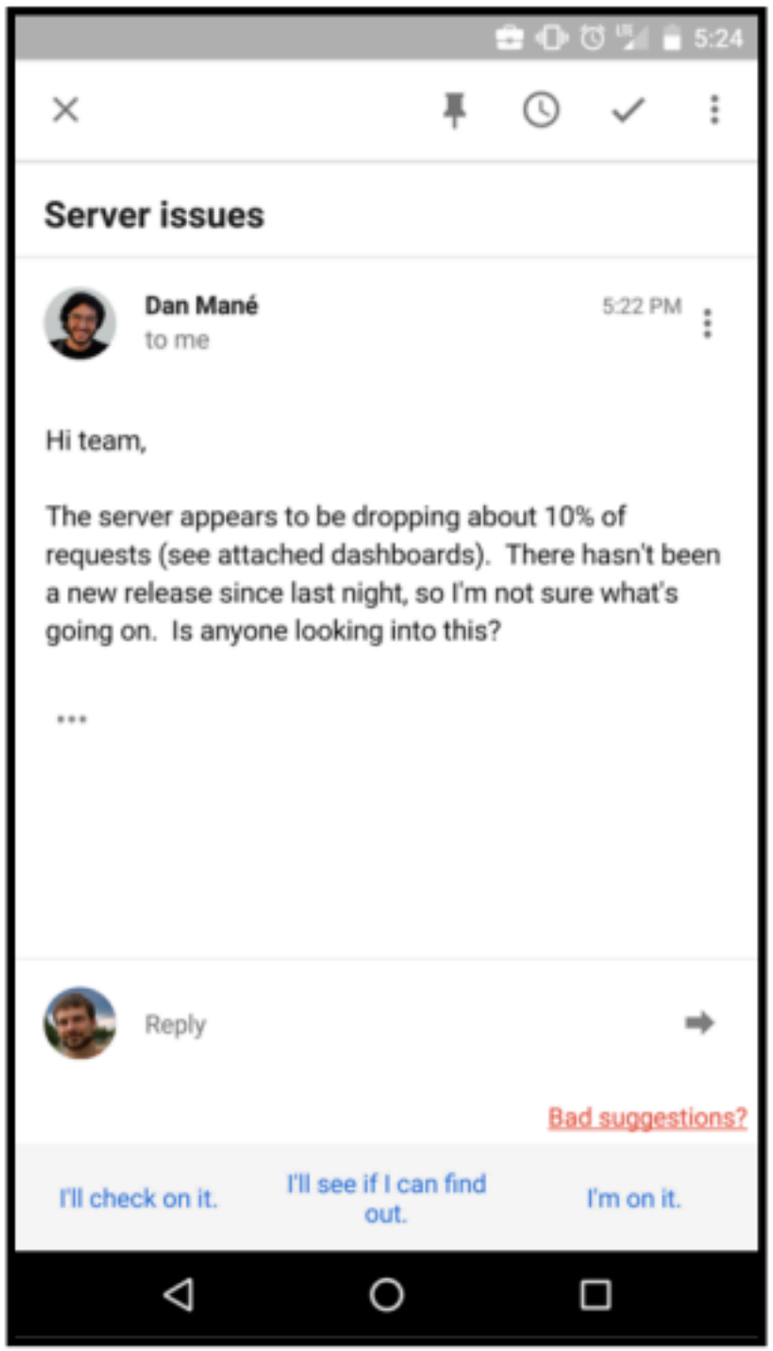
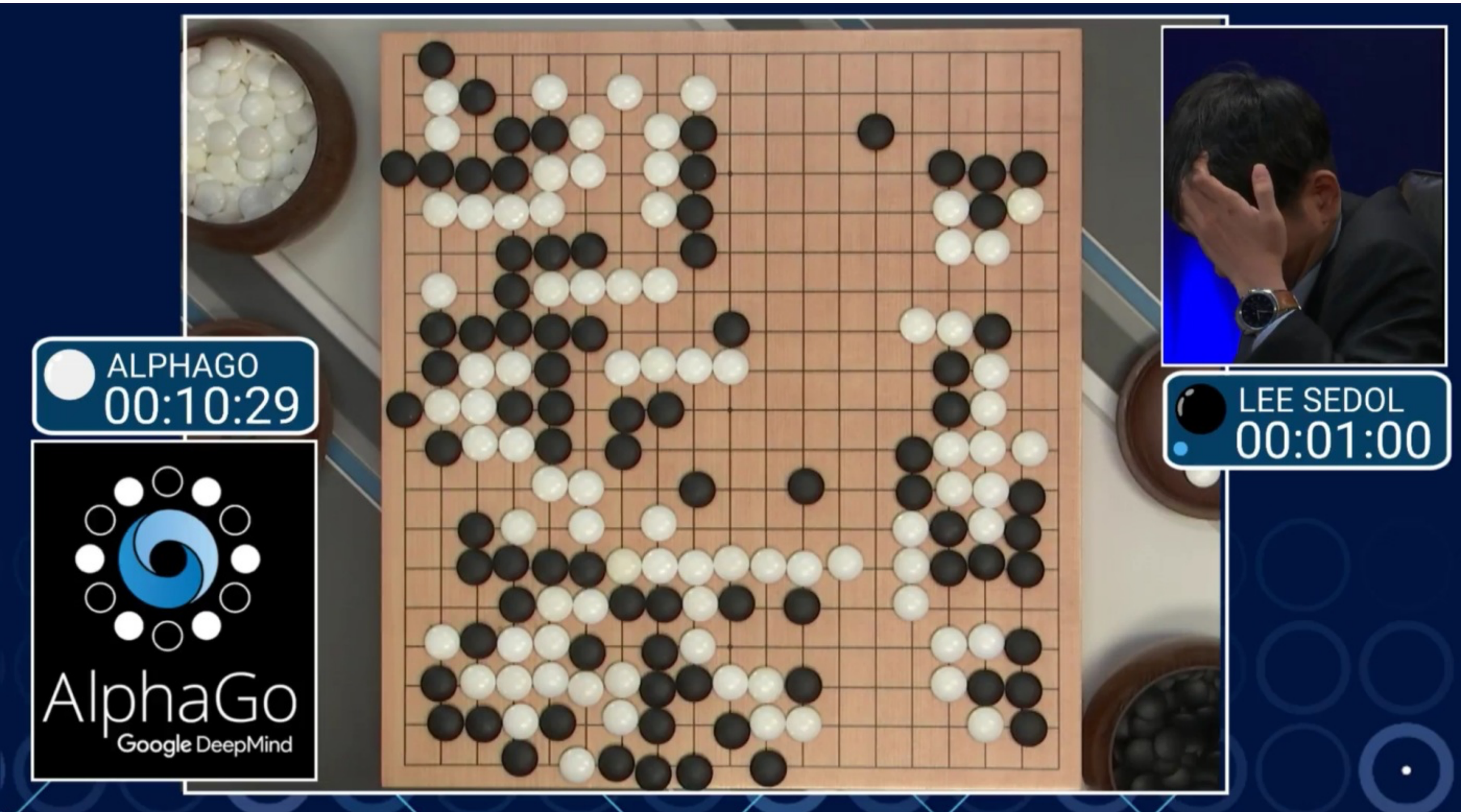
Auto Reply


5:38
Turkey!
dcorrado
to me
5:37 PM
Hi all,
We wanted to invite you to join us for an early Thanksgiving on November 22nd, beginning around 2PM. Please bring your favorite dish! RSVP by next week.
Dave
Reply
Bad suggestions?
Count us in!
We'll be there!
Sorry, we won't be able to make it.


5:24
Server issues
Dan Mané
to me
5:22 PM
Hi team,
The server appears to be dropping about 10% of requests (see attached dashboards). There hasn't been a new release since last night, so I'm not sure what's going on. Is anyone looking into this?
...
Reply
Bad suggestions?
I'll check on it.
I'll see if I can find out.
I'm on it.

Machine Learning Applications

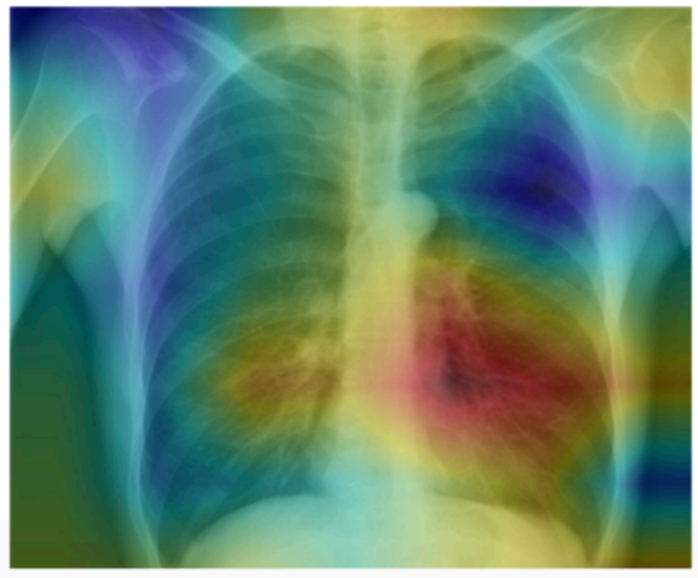


Machine Learning Applications

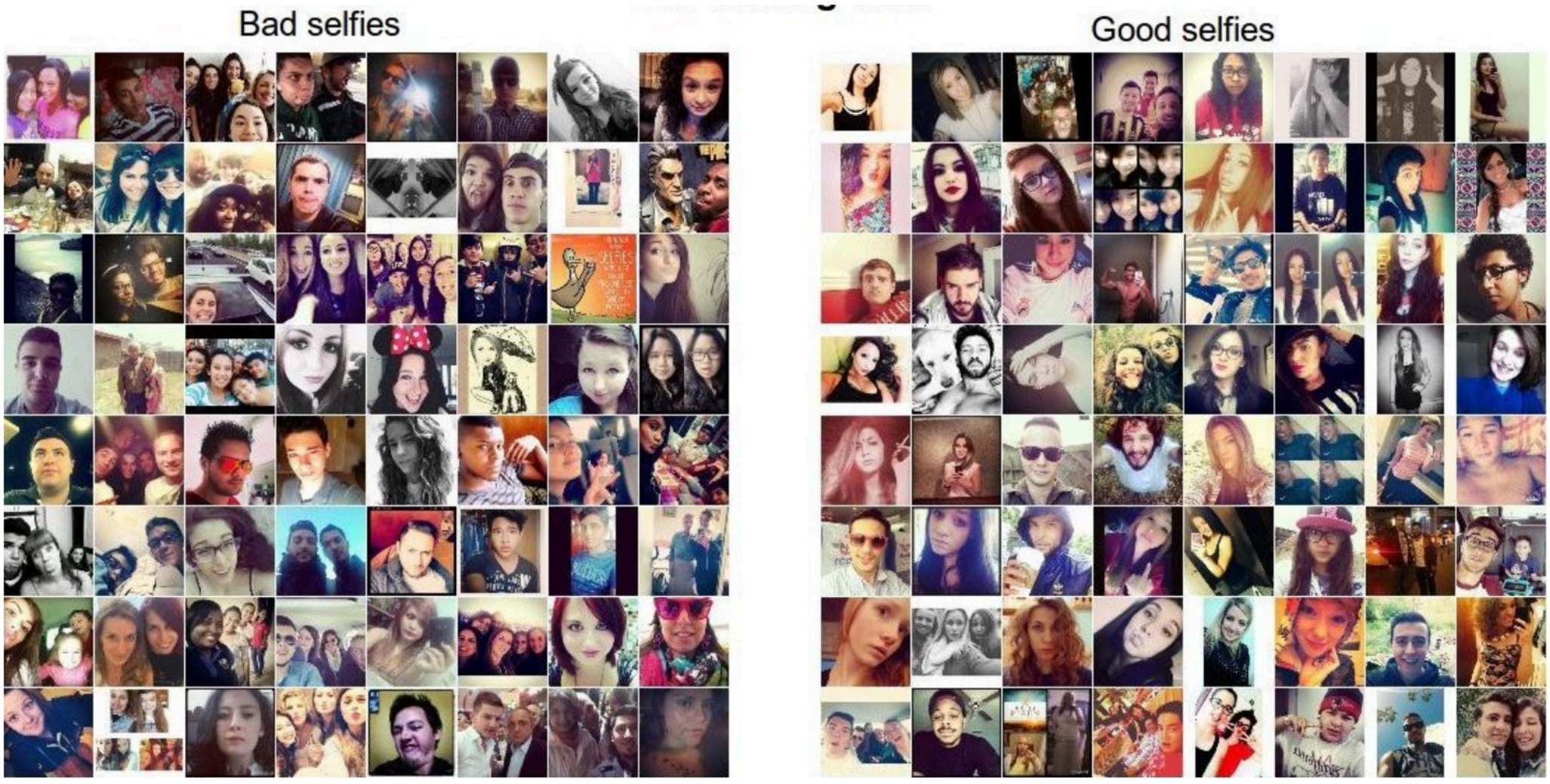
Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Machine Learning Applications

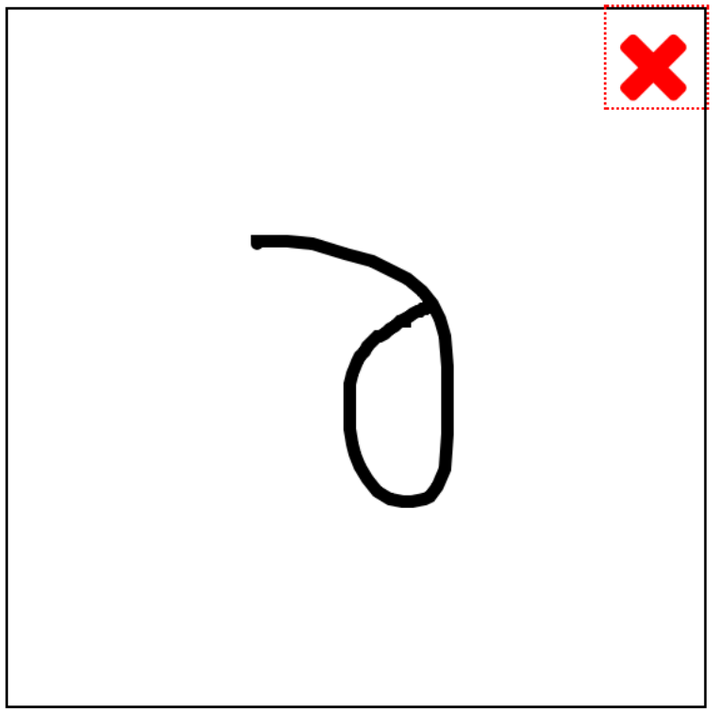


Example images showing good and bad selfies in our training data. These will be given to the ConvNet as teaching material.

- Face should occupy about 1/3 of the image.
- Cut off your forehead

Machine Learning Applications

Detexify classify symbols



Score: 0.12107724371908918
`\partial`
mathmode

Score: 0.1744210074369589
`\usepackage{ amssymb }`
`\Game`
mathmode

Score: 0.18567692685446785
`\usepackage{ tipa }`
`\textbabygamma`
textmode

Score: 0.19845446379011045
`\usepackage{ upgreek }`
`\upgamma`
mathmode

Score: 0.19849650347374576
`\usepackage[T1]{fontenc}`
`\dh`
textmode

The symbol is not in the list? Show more

Did this help?

Want a Mac app?

Lucky you. The Mac app is finally stable enough. See how it works on Vimeo. Download the latest version here.

Restriction: In addition to the LaTeX command the unlicensed version will copy a reminder to purchase a license to the clipboard when you select a symbol.

You can purchase a license here:

Buy Detexify for Mac

Machine Learning Applications

Labels | Web | Properties | Safe Search | JSON

image_20121216120914.jpg

Test Cricket	98%
Cricket	98%
Baseball Player	98%
Cricketer	97%
Bat And Ball Games	96%
Team Sport	91%
Ball Game	88%
Games	86%
Sports	85%

Machine Learning Applications

Visual Q and A

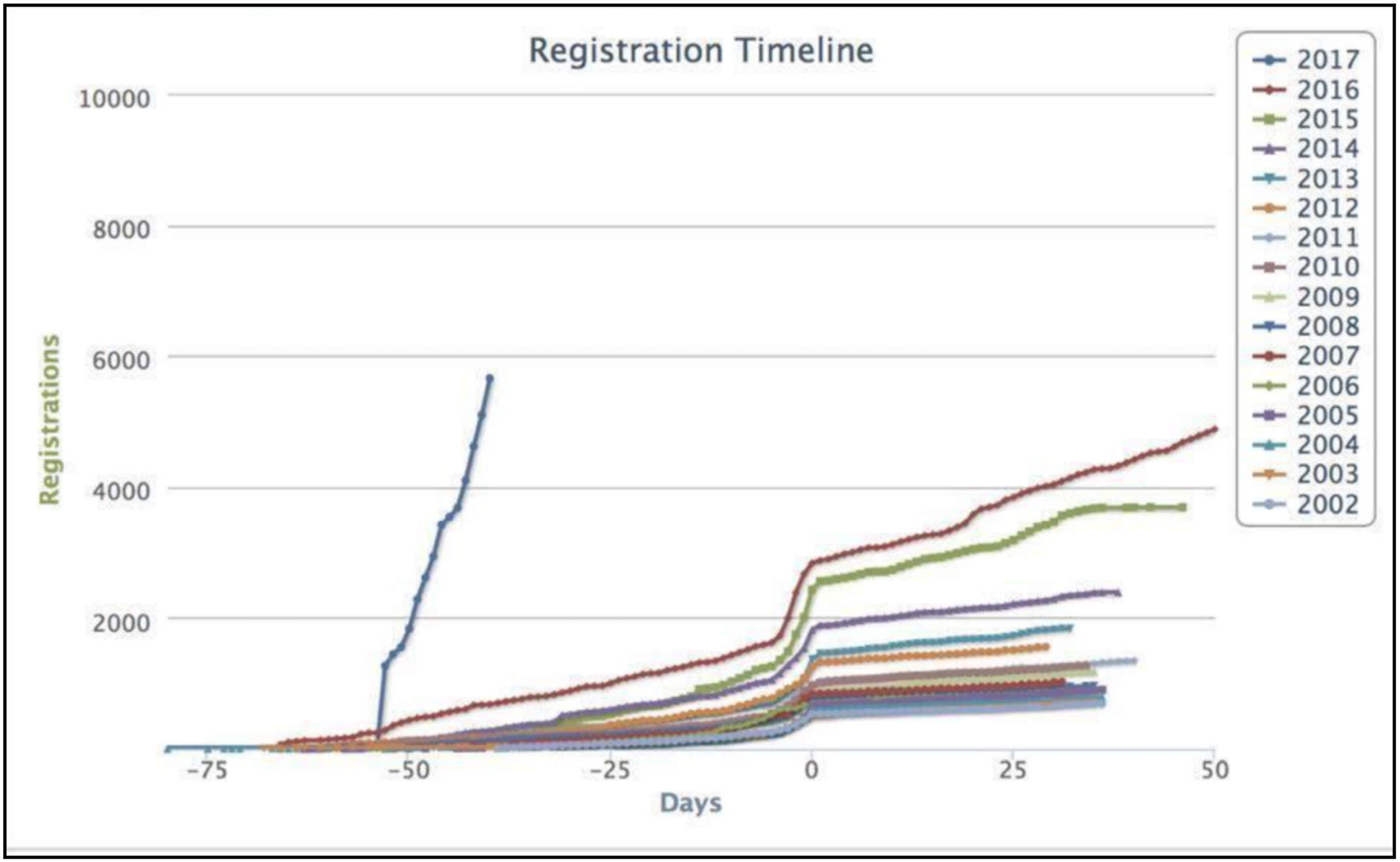
What is the mustache made of?

AI System

bananas

NeurIPS registration

x=0 -> early registration deadline



Machine Learning Gone Wrong

THE VERGE TECH SCIENCE CULTURE CARS REVIEWS LONGFORM VIDEO MOR

STORYSTREAM TRANSPORTATION UBER RIDE-SHARING

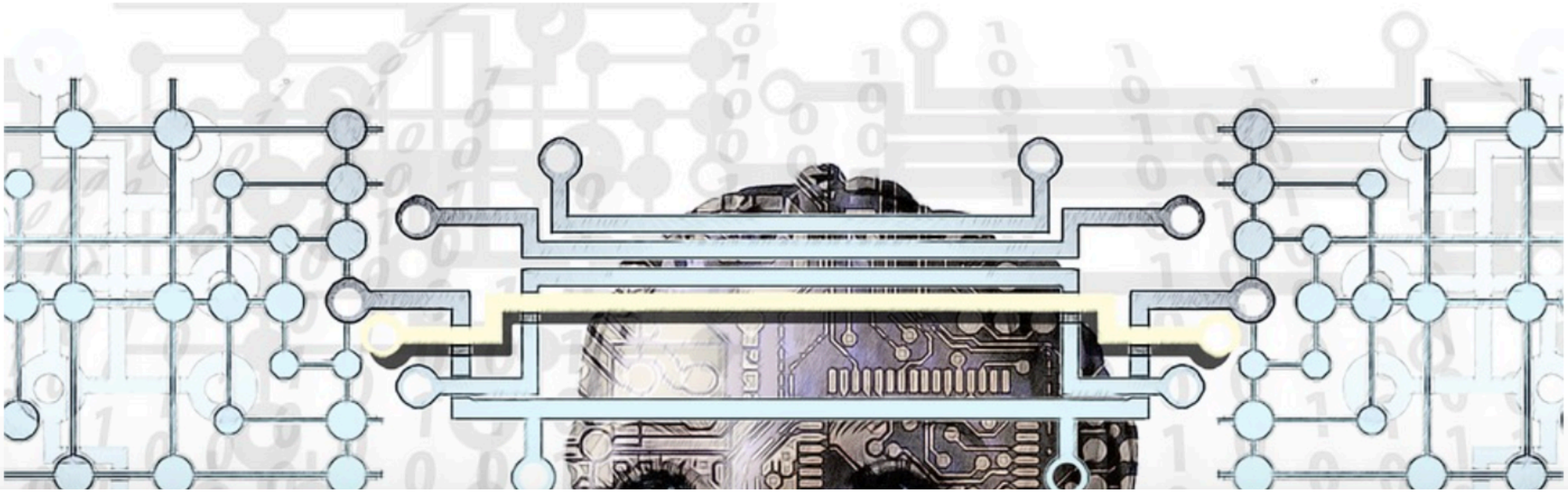
Uber's fatal self-driving crash: all the news and updates

Machine Learning Gone Wrong

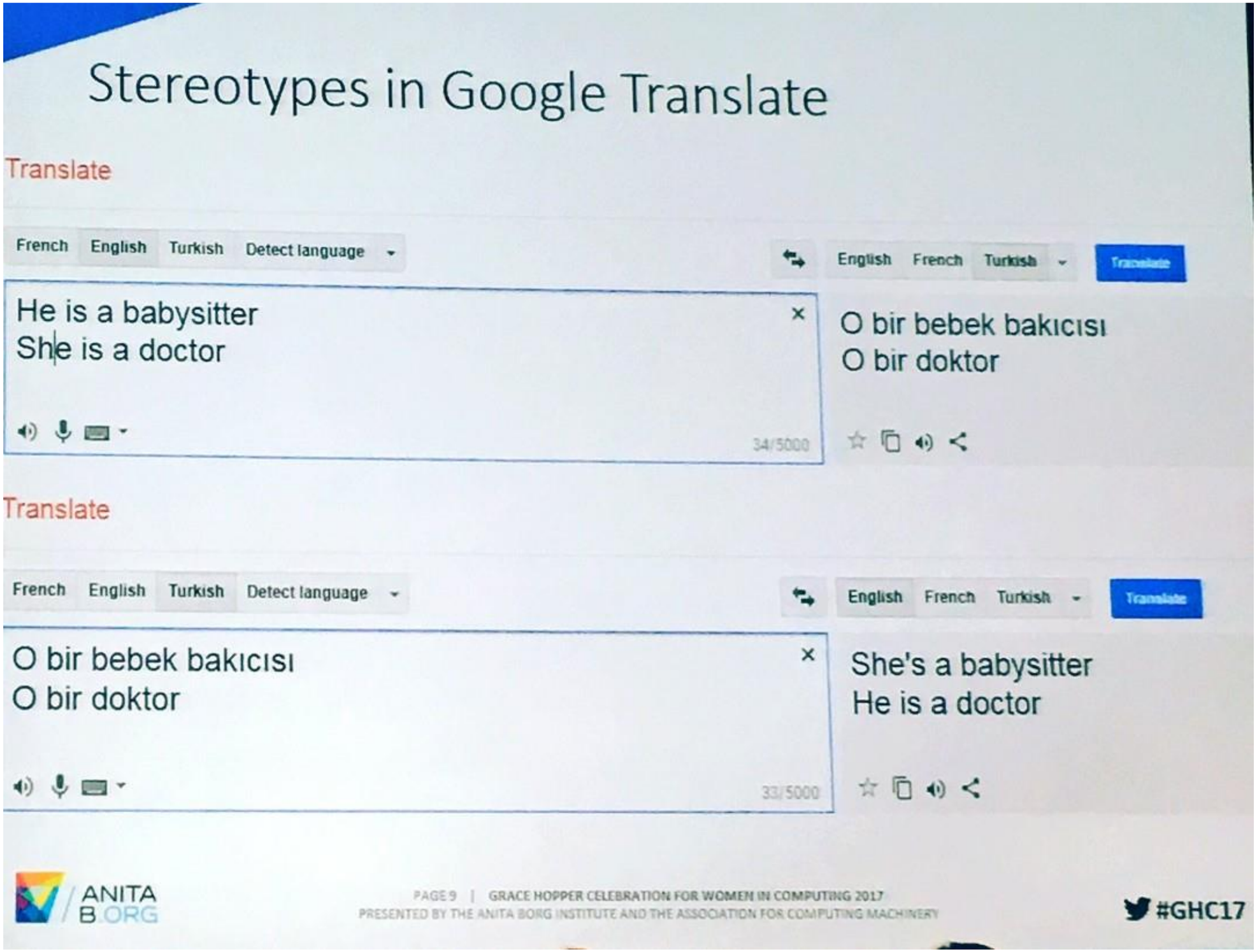
Home › Cool Science › After Uber, Tesla Incidents, Can Artificial Intelligence Be Trusted?

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

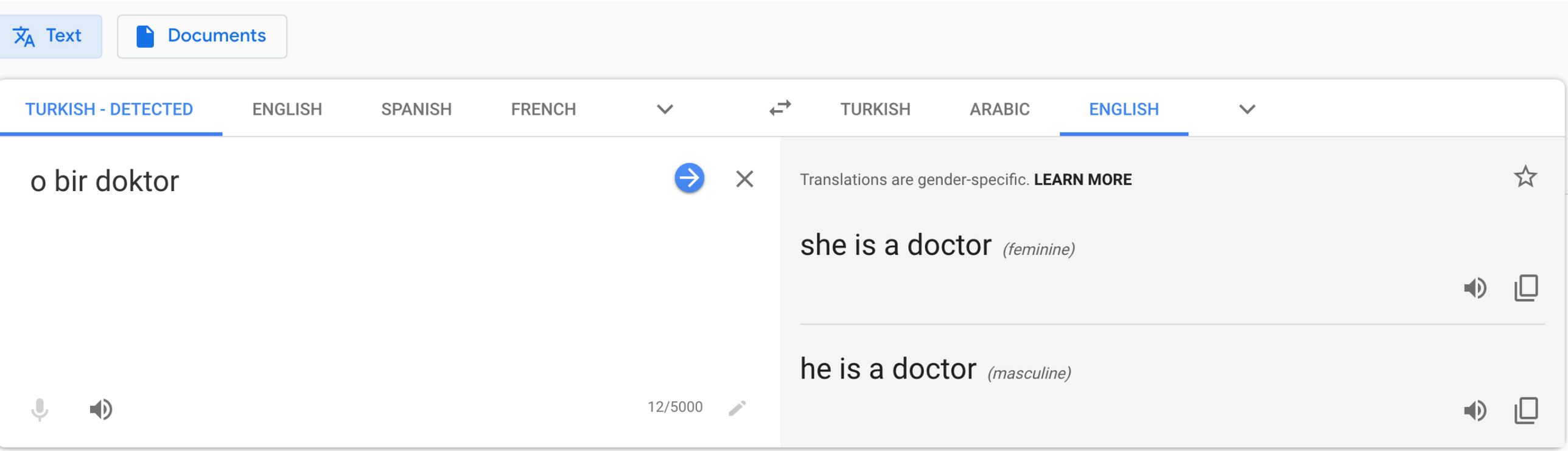
April 13, 2018



“Bias” in Machine Learning

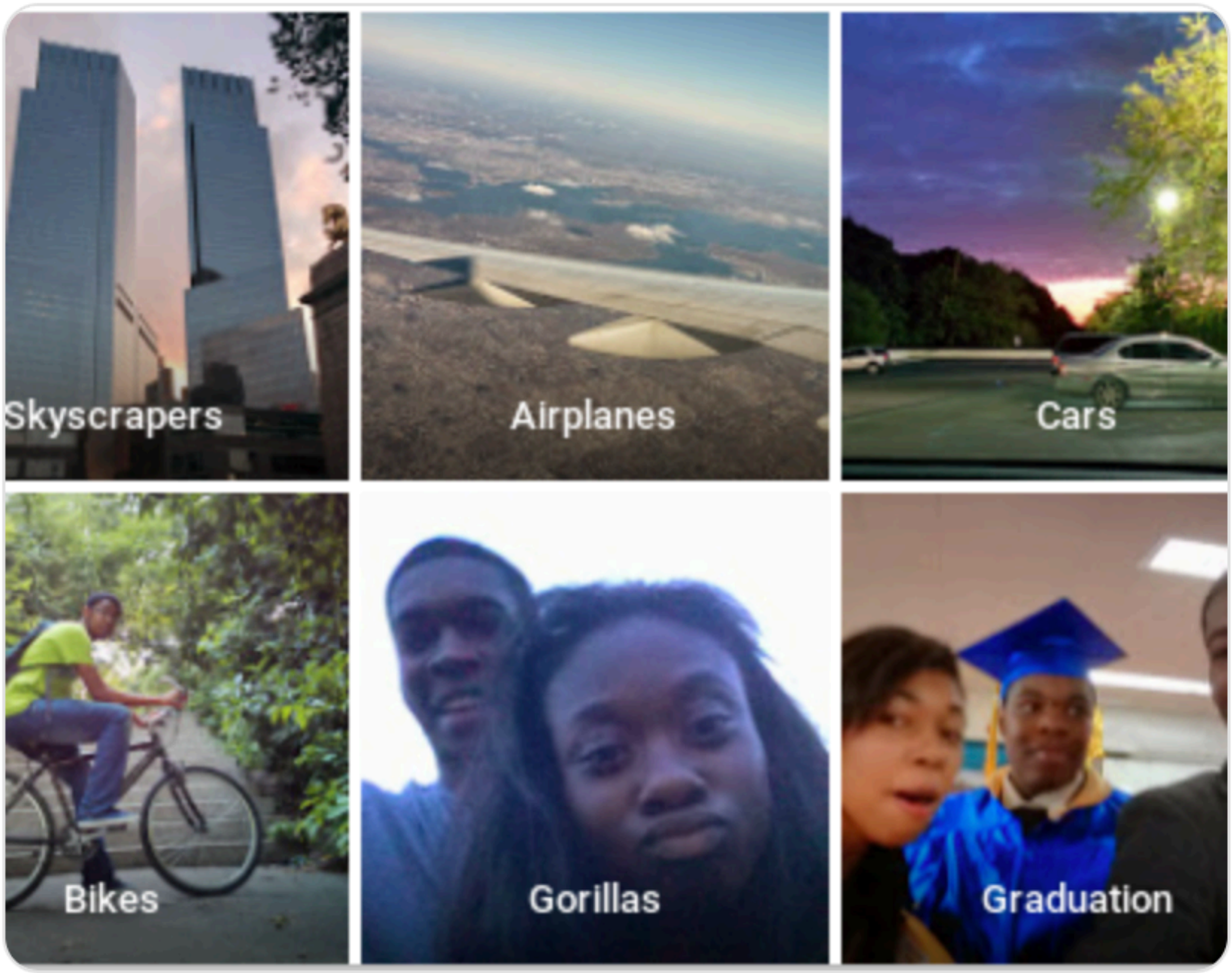


“Bias” addressed



“Racist” Machine Learning?

not a gorilla.



6:22 PM - 28 Jun 2015

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

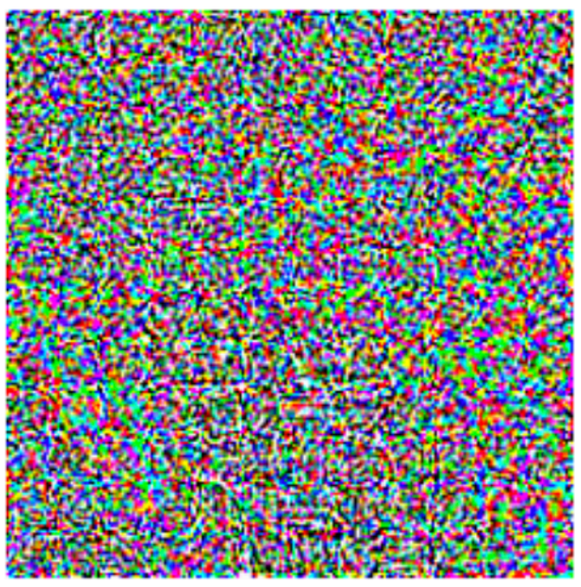
https://www.youtube.com/watch?v=UCwbJxW-ZRg

A “reality” check

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

Adversaries!

$+ .007 \times$



$=$

$\boldsymbol{x}$

“panda”
57.7% confidence

$\text{sign}(\nabla_{\boldsymbol{x}} J(\boldsymbol{\theta}, \boldsymbol{x}, y))$

“nematode”
8.2% confidence

$\boldsymbol{x} +$
$\epsilon \text{sign}(\nabla_{\boldsymbol{x}} J(\boldsymbol{\theta}, \boldsymbol{x}, y))$
“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]

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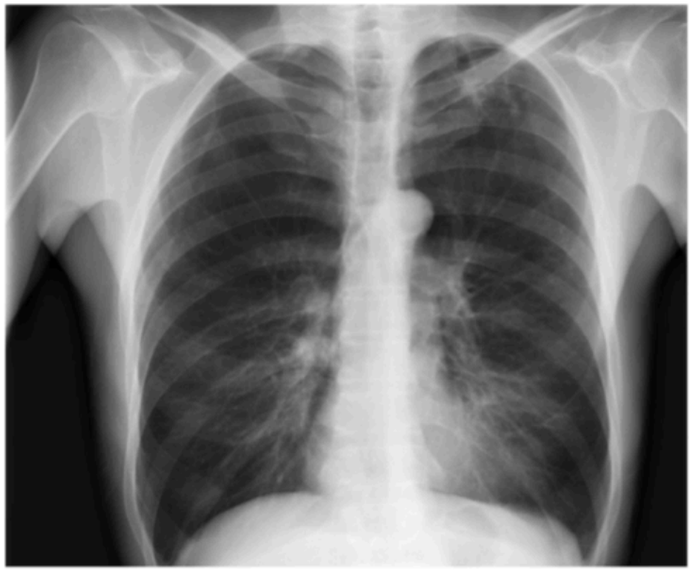
- “A computer program is said to **learn** from **experience E** with respect to some class of **tasks T** and **performance measure P** if its performance at tasks in T, as measured by P, improves with experience E.” - Tom Mitchell

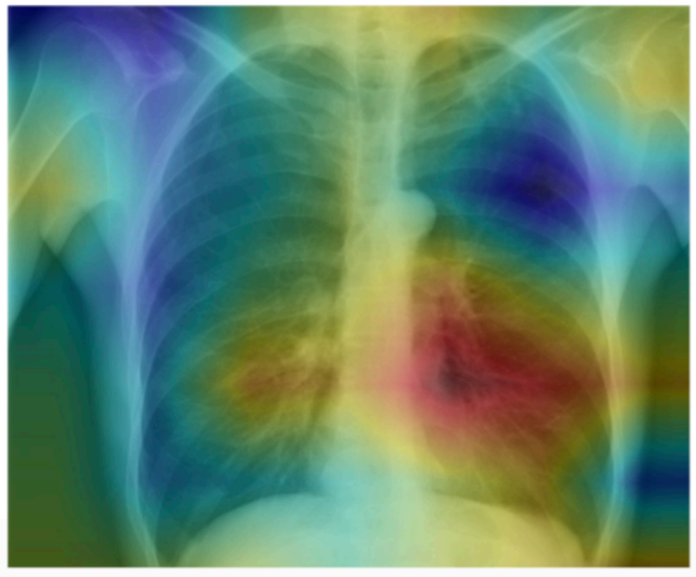
What is Machine Learning?



Input
Chest X-Ray Image

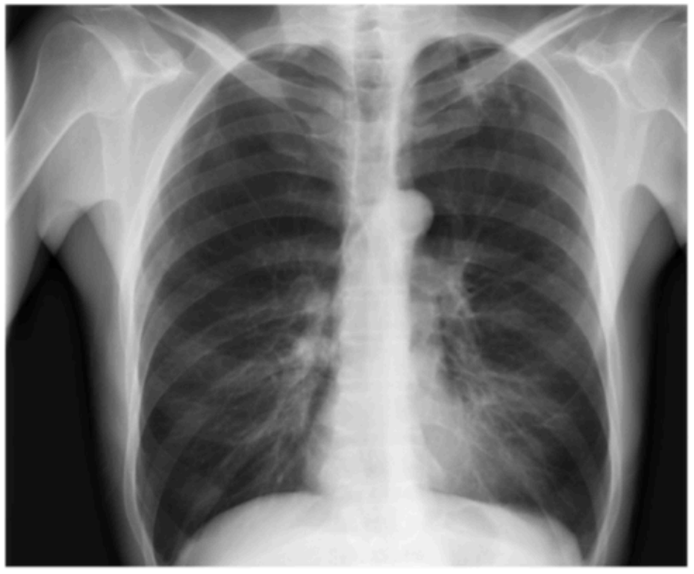
CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?



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Task

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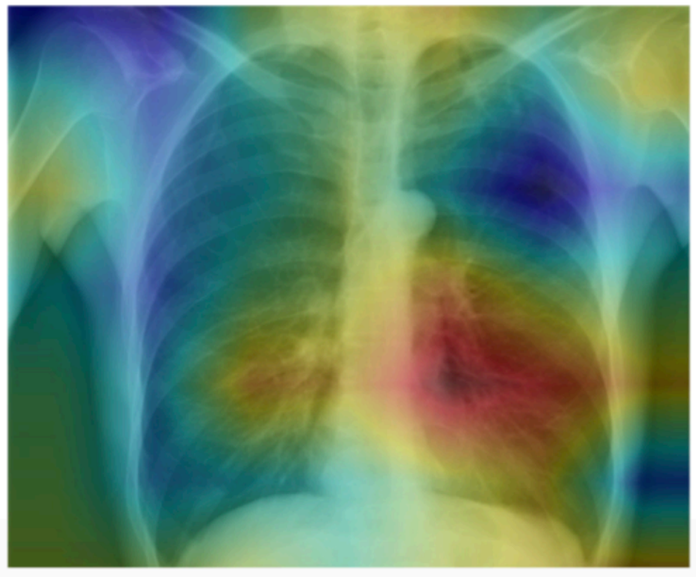

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What is Machine Learning?

Performance measure

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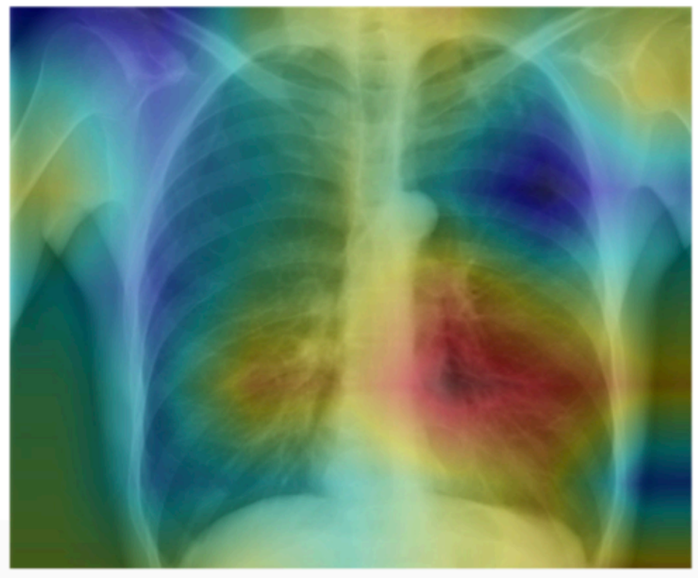

Q: Identify task, performance measure, and experience

What is Machine Learning?

Experience
1000s of <image, disease> pairs

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CheXNet
121-layer CNN

Performance measure

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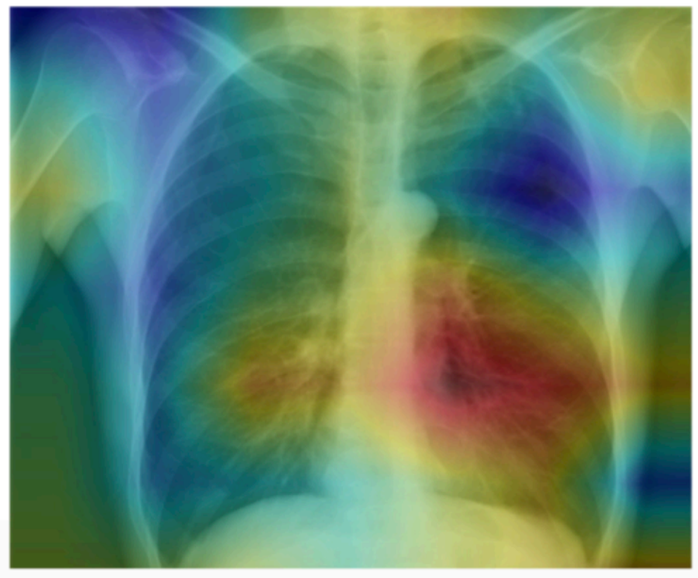

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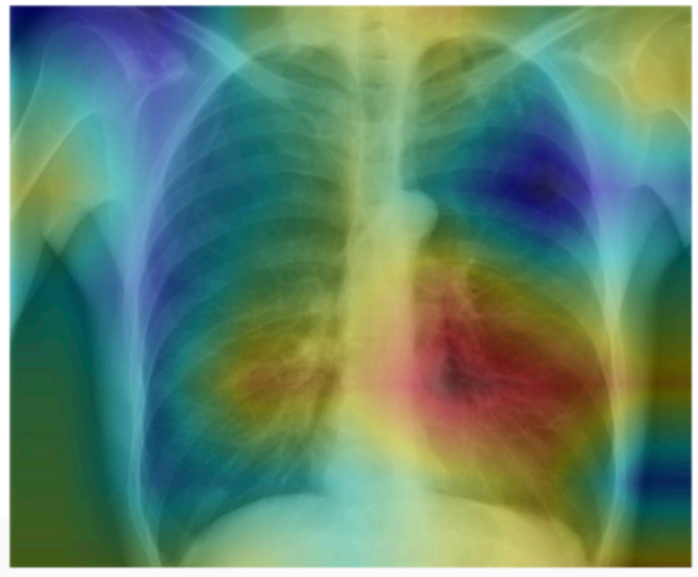

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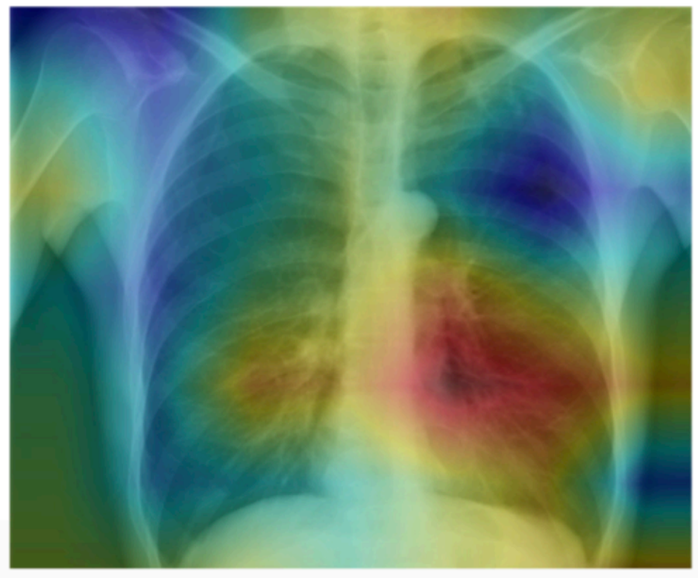

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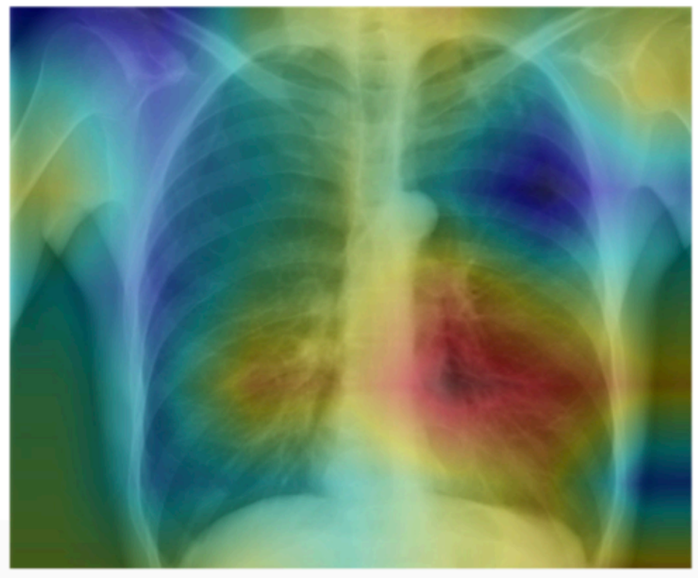

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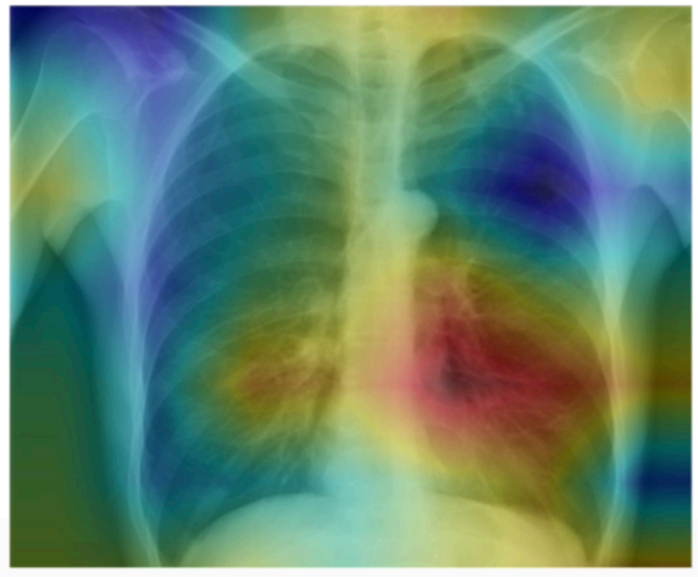
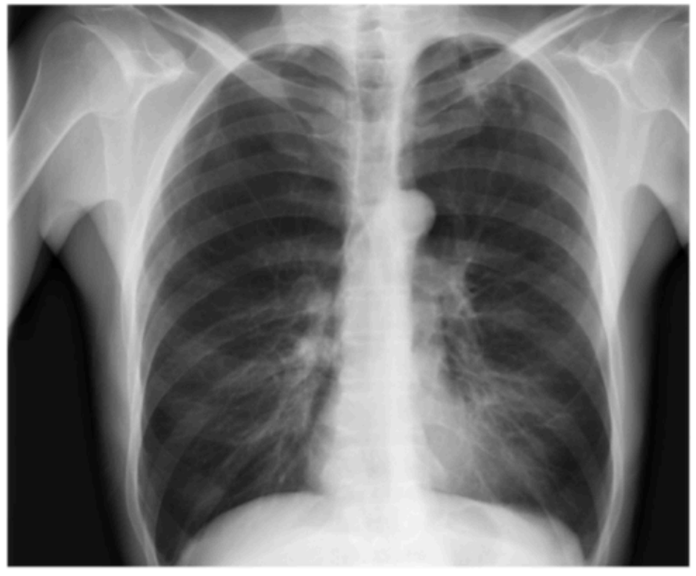


What is Machine Learning?

Experience
1000s of <image, disease> pairs

Supervised Learning



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)