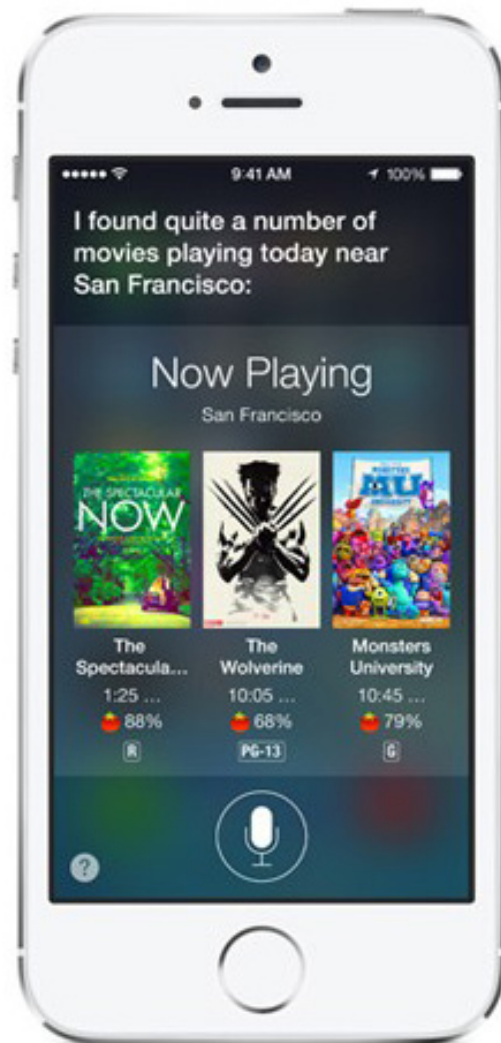


Introduction to ML

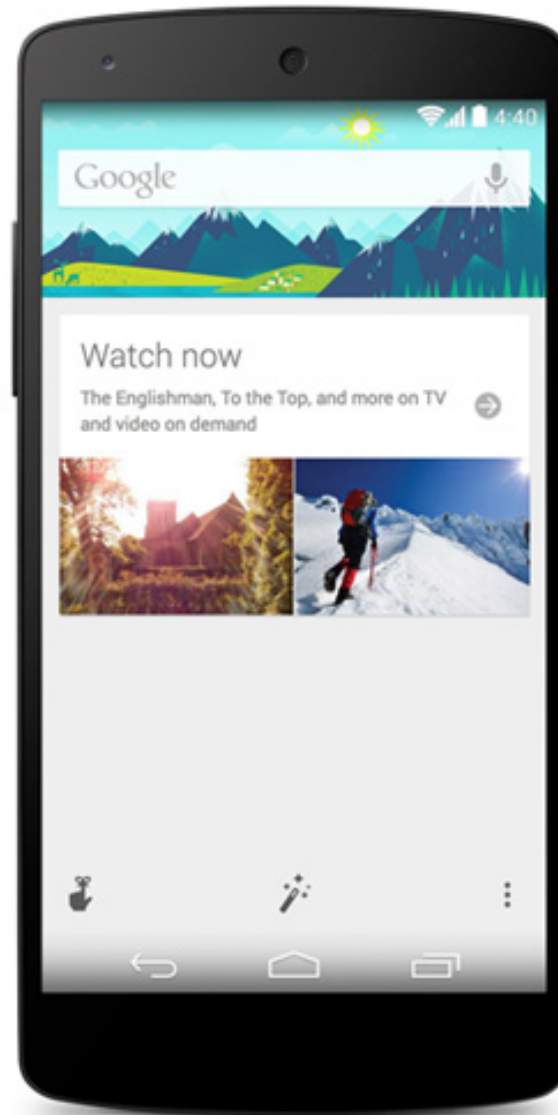
Nipun Batra

Machine Learning Applications

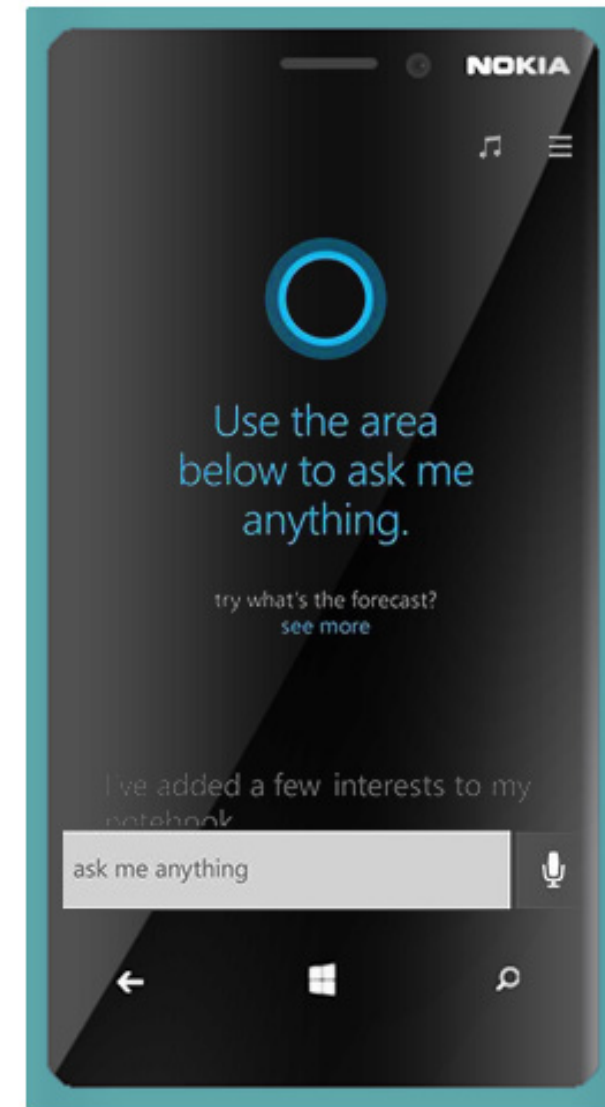
Apple Siri



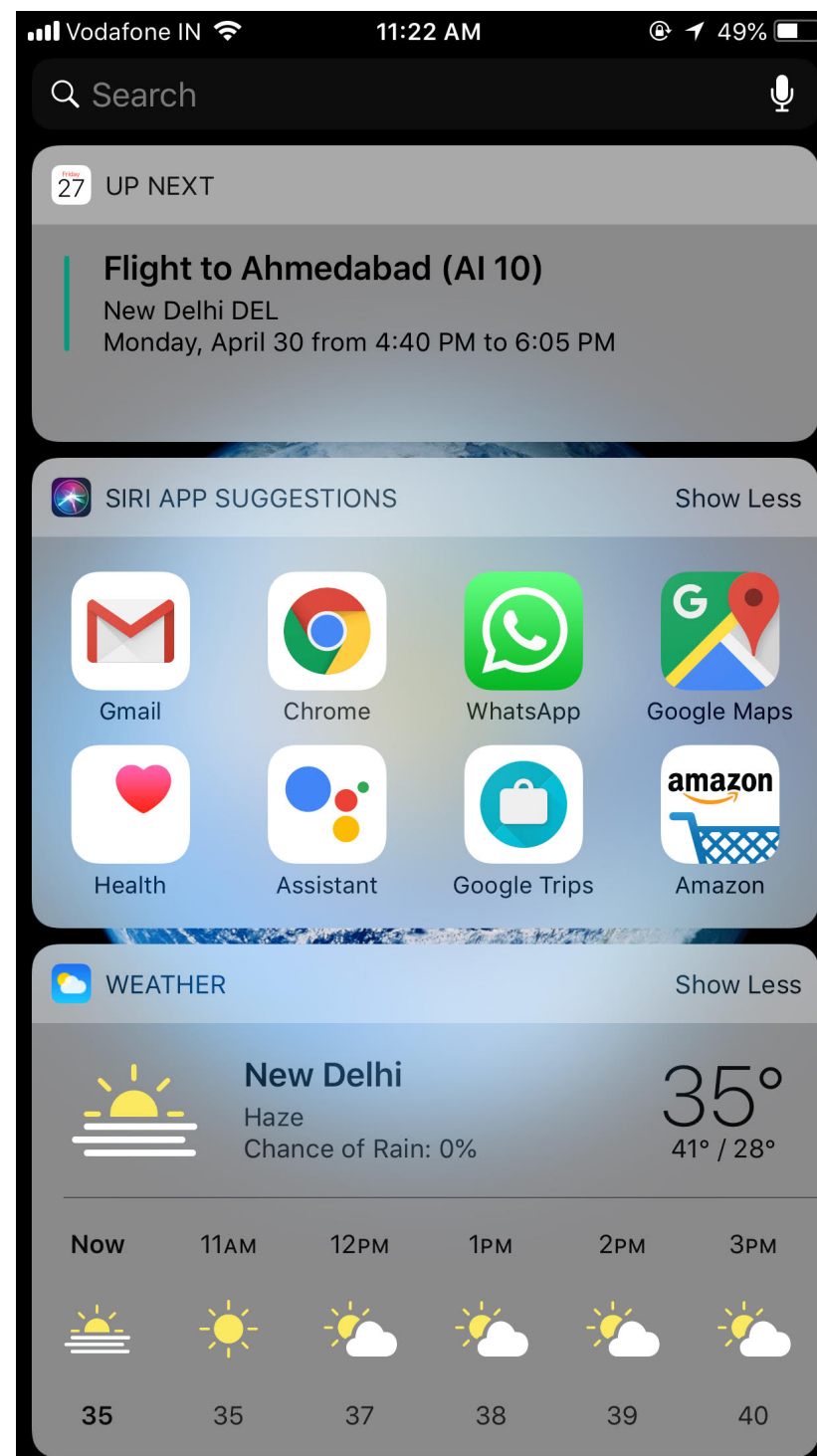
Google Now



Windows Cortana



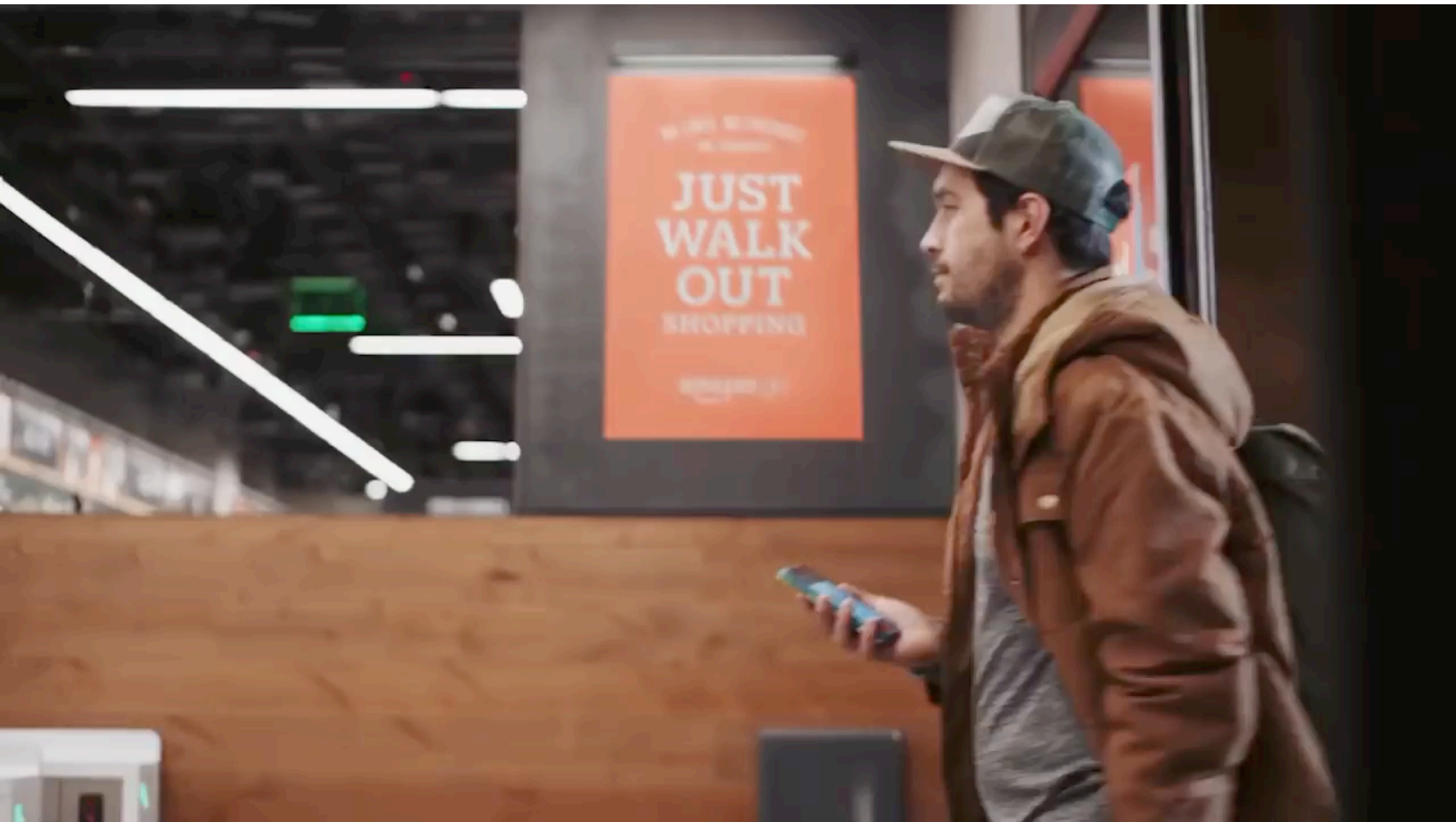
Machine Learning Applications



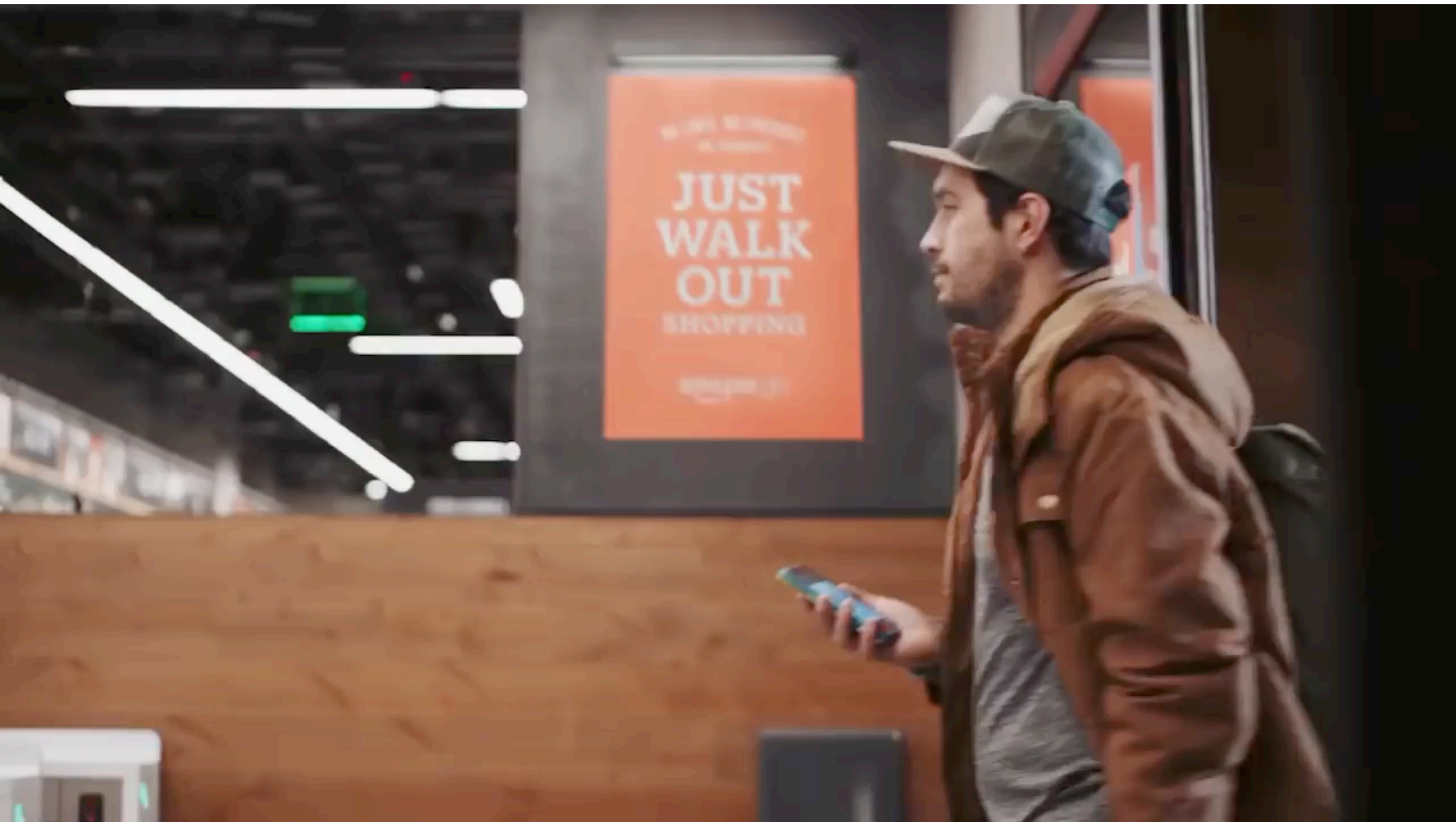
The Long Wait ...



Machine Learning Applications



Machine Learning Applications



Machine Learning Applications



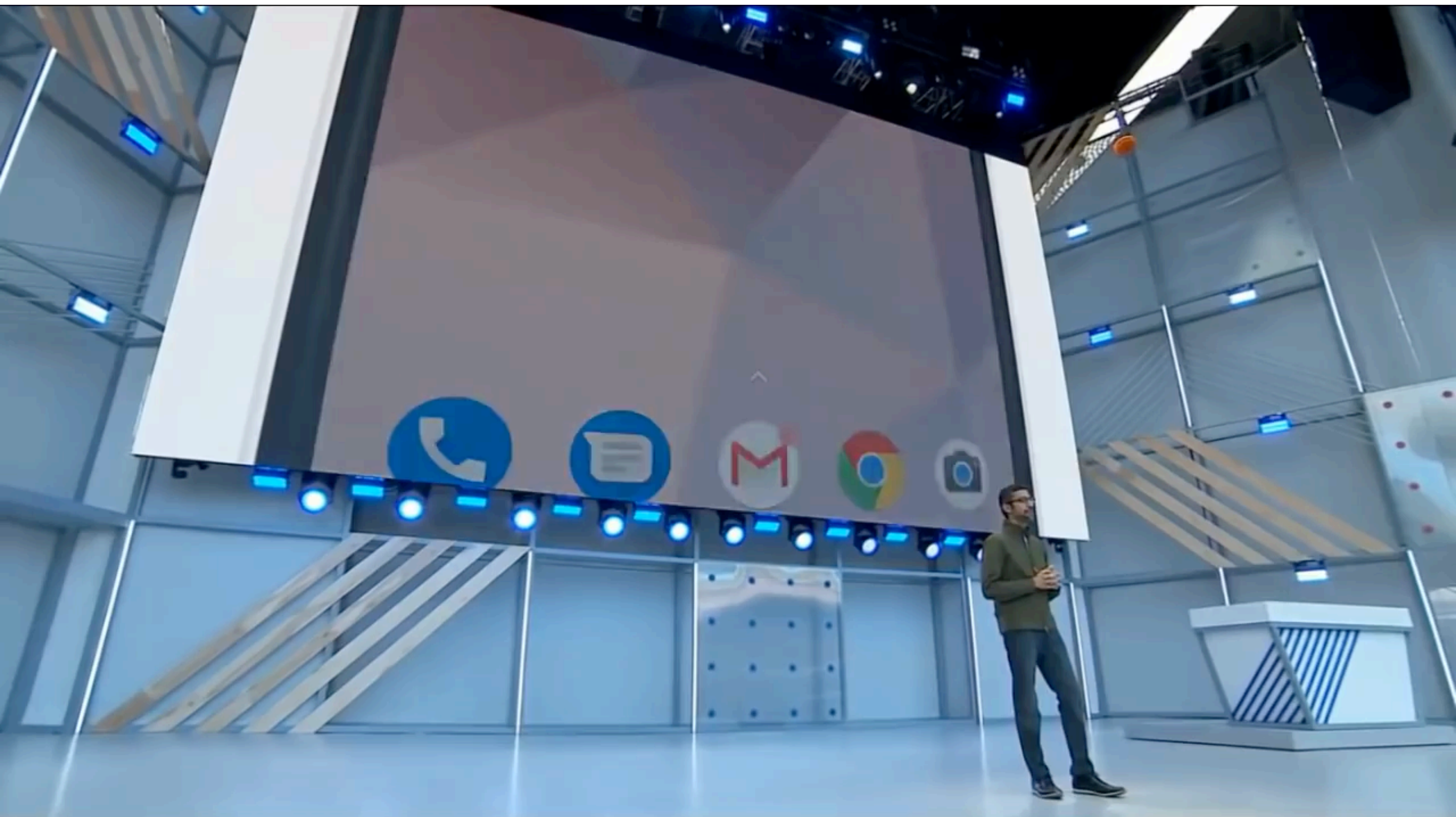
Machine Learning Applications



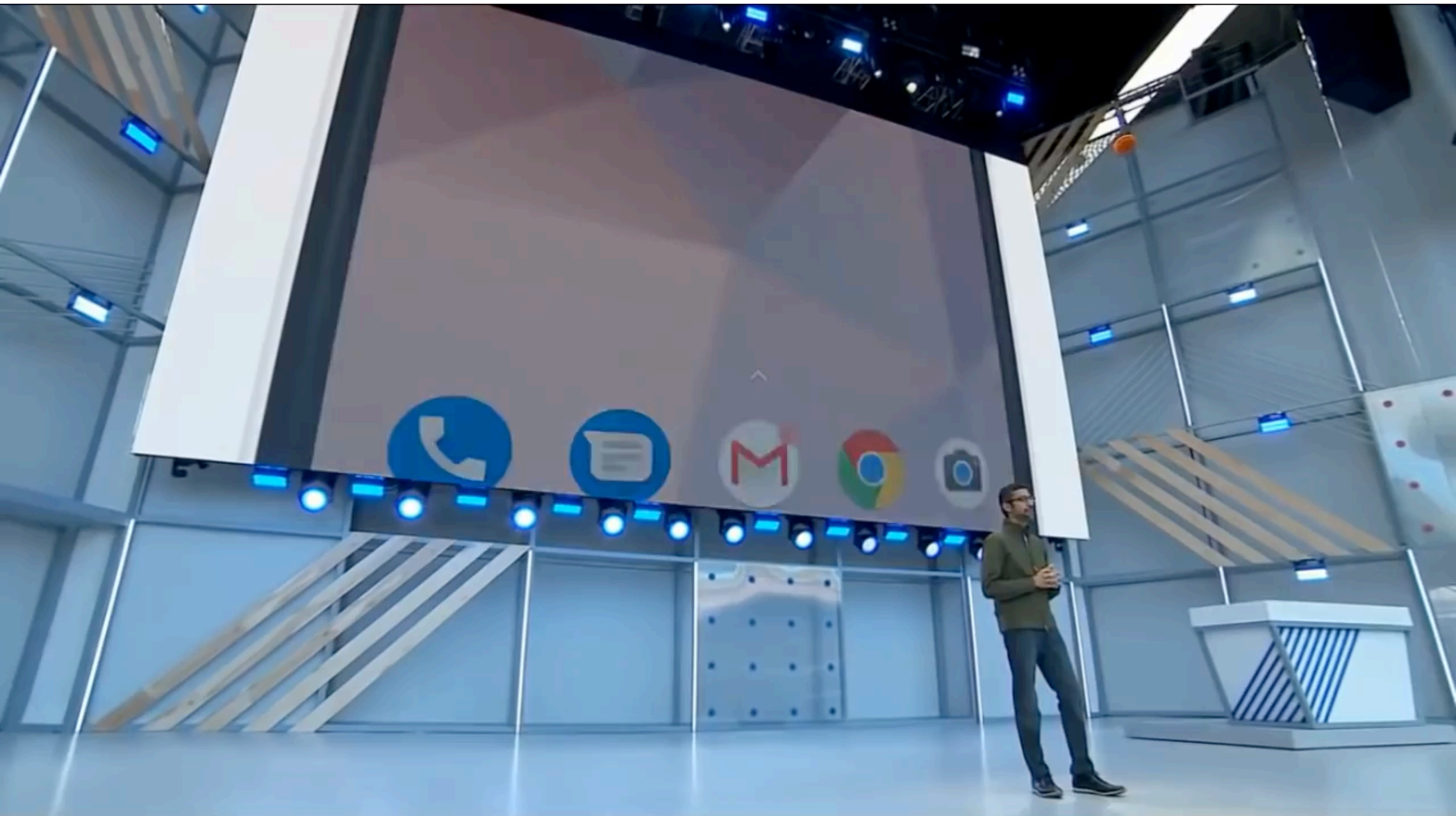
Never Liked To Call People!



Google Duplex!



Google Duplex!



Saving The Planet - One Watt A time

Saving The Planet - One Watt A time

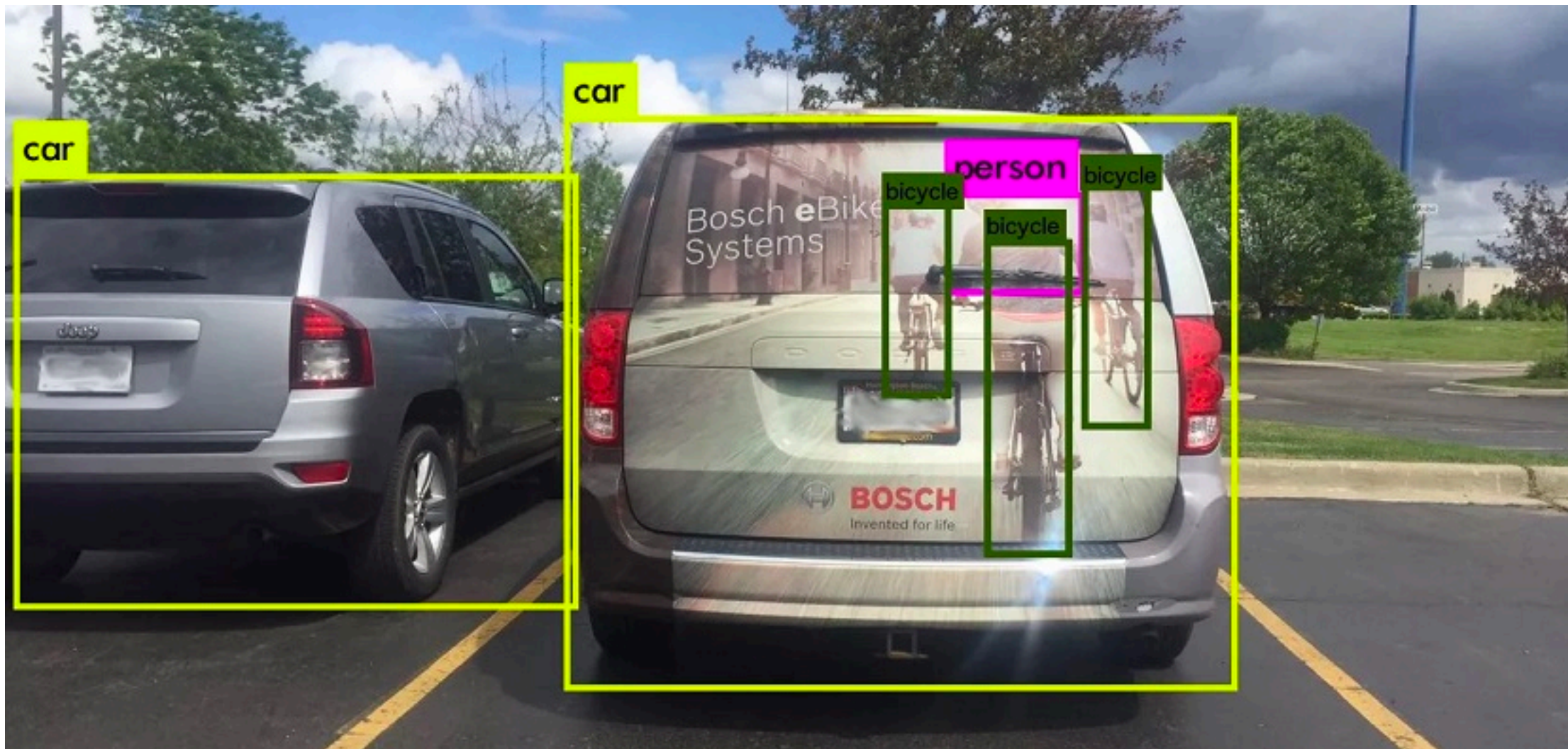
Self Driving Car



Self Driving Car



Self Driving Car



Courtesy: Cognata

ML for Farm



ML for Farm



ML for Healthcare

WORLD
ECONOMIC
FORUM

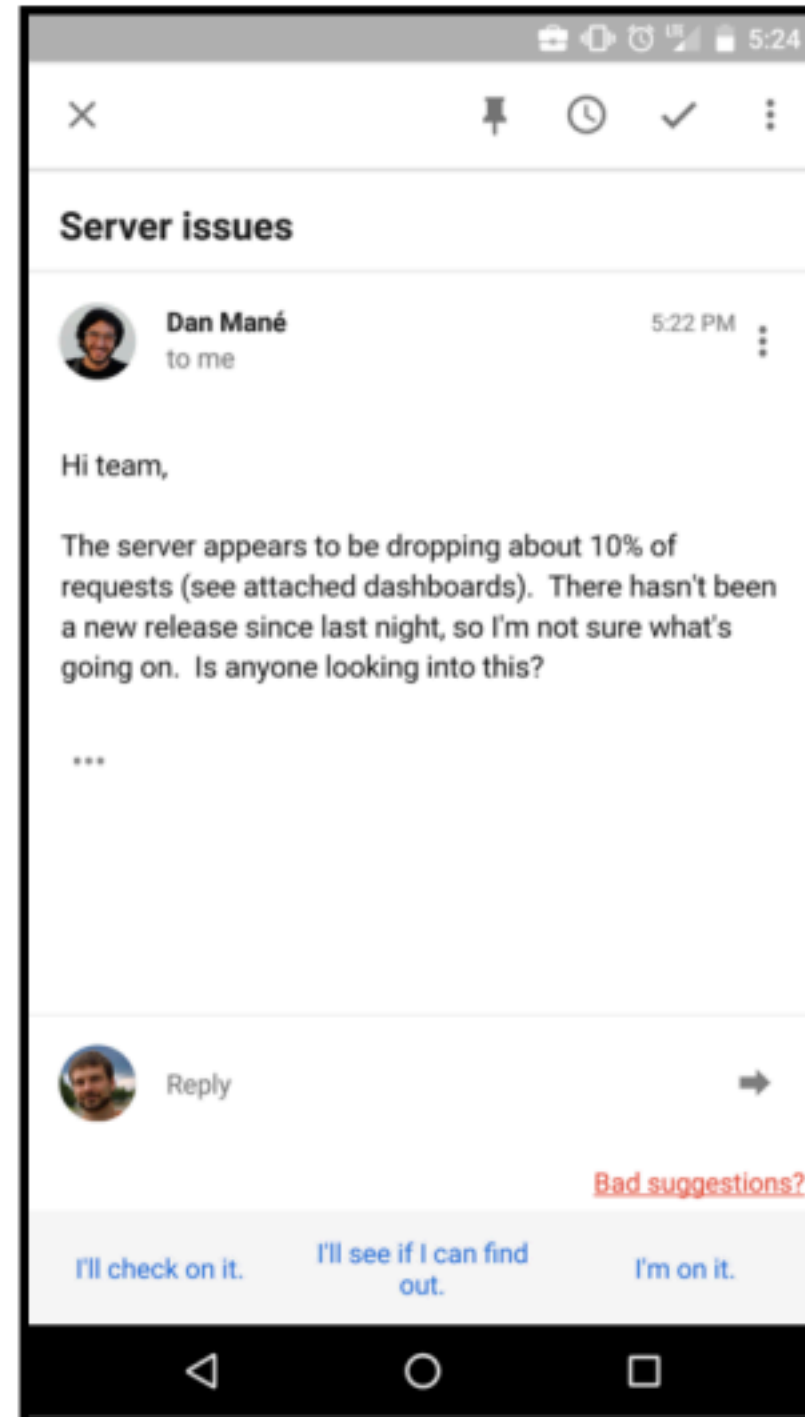
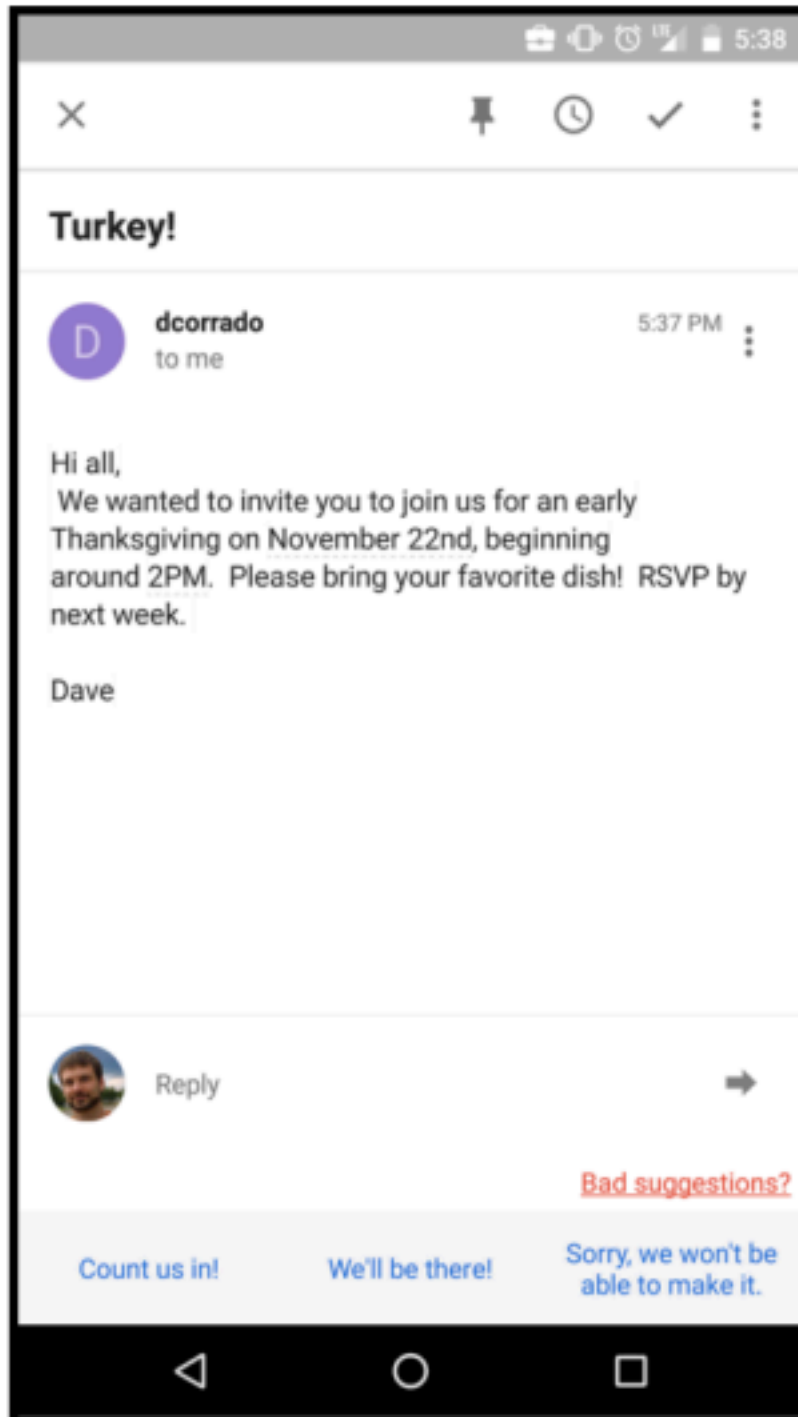
The logo of the World Economic Forum, featuring a blue arc that forms a partial circle around the text.

ML for Healthcare

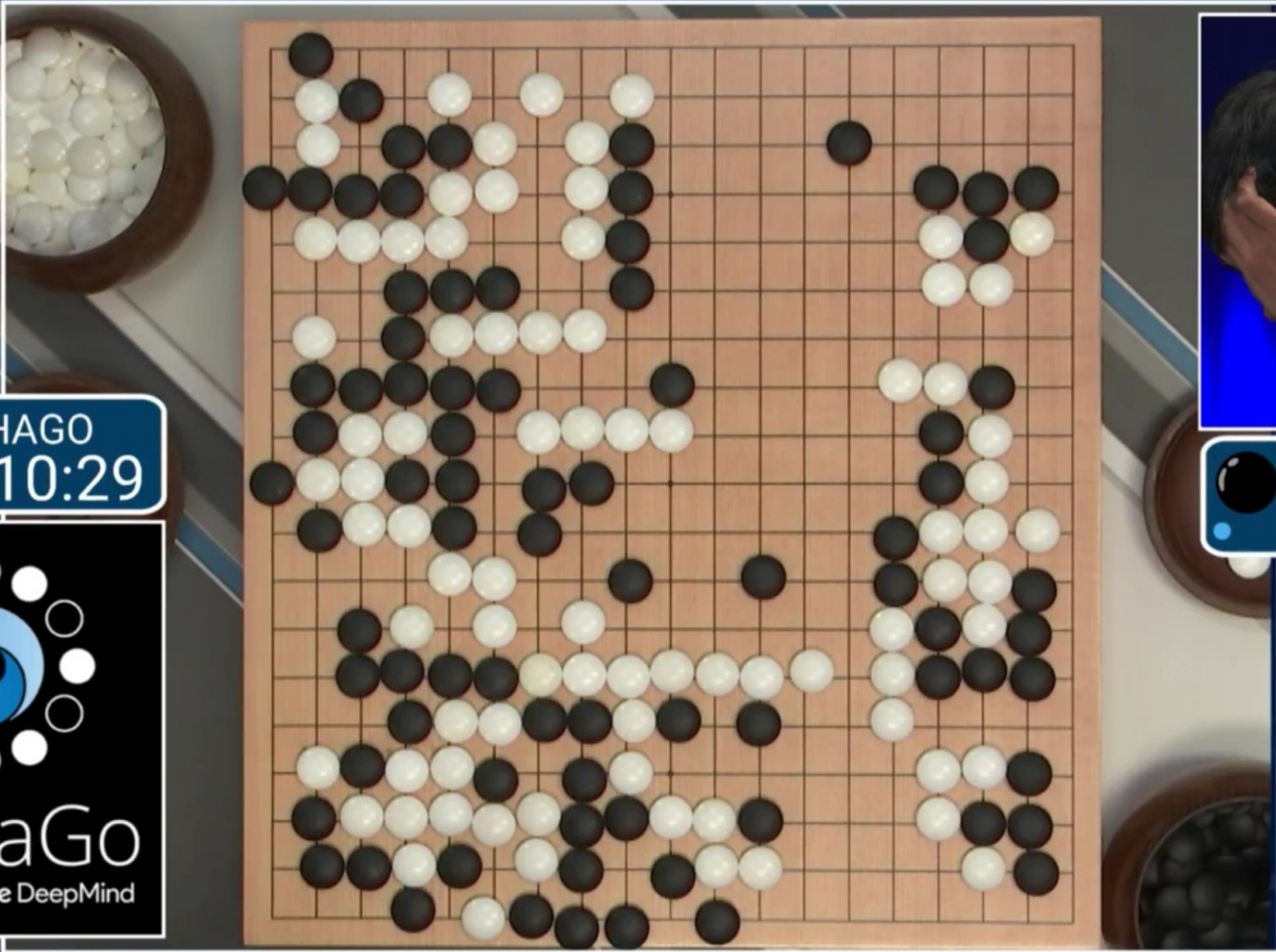
WORLD
ECONOMIC
FORUM

The logo of the World Economic Forum, featuring a blue arc that forms a partial circle around the text.

Auto Reply



Machine Learning Applications



● ALPHAGO
00:10:29



● LEE SEDOL
00:01:00

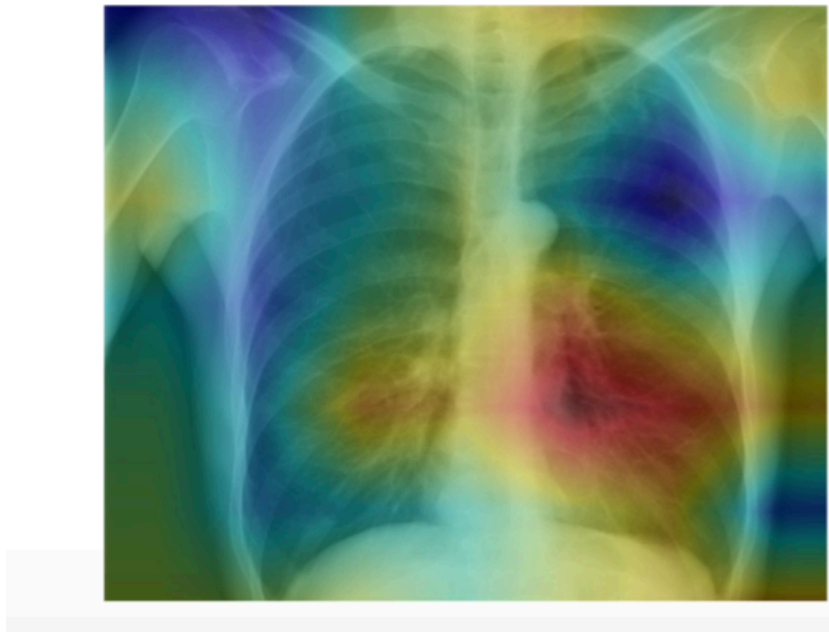
Machine Learning Applications



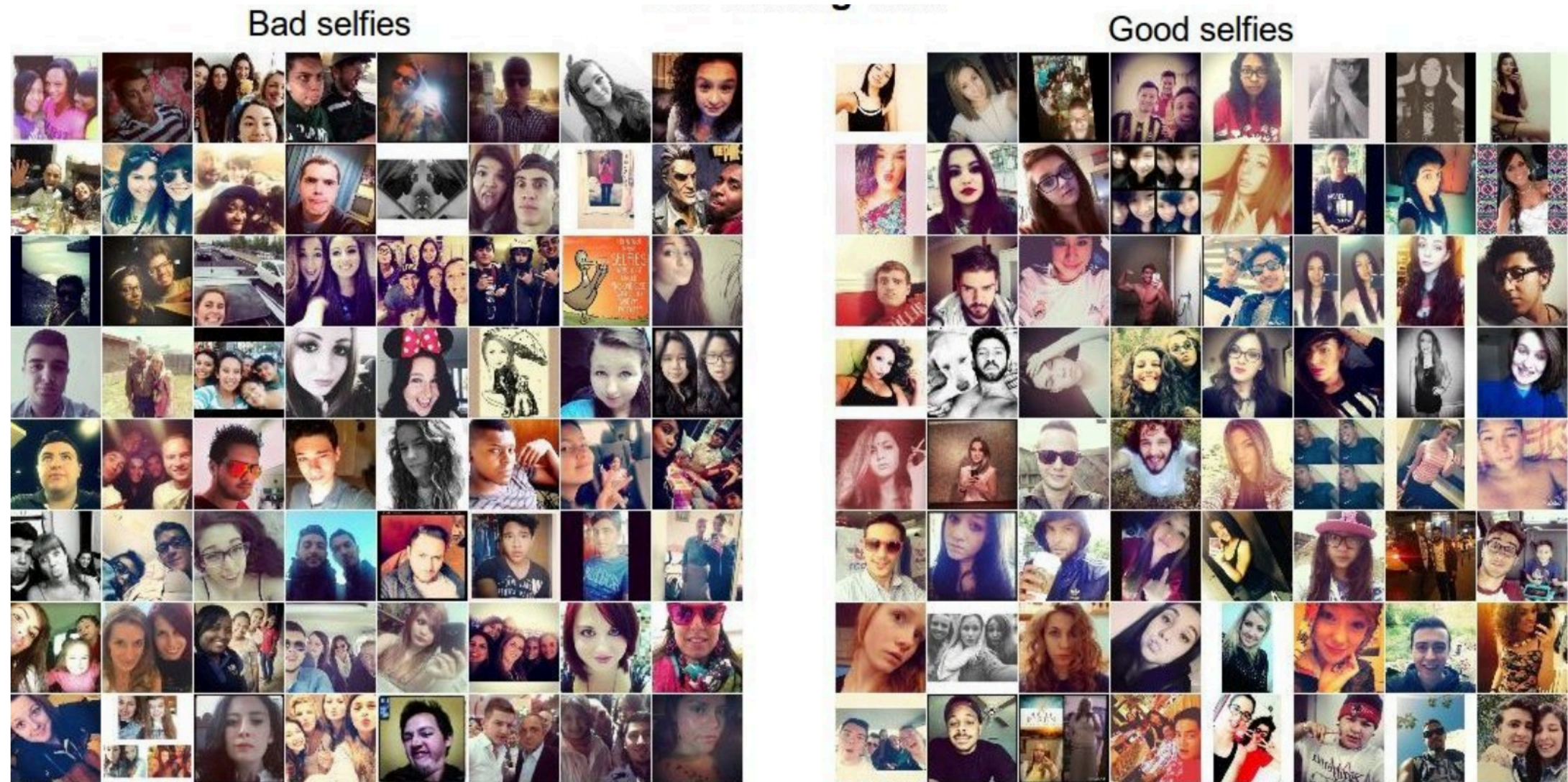
Input
Chest X-Ray Image

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.

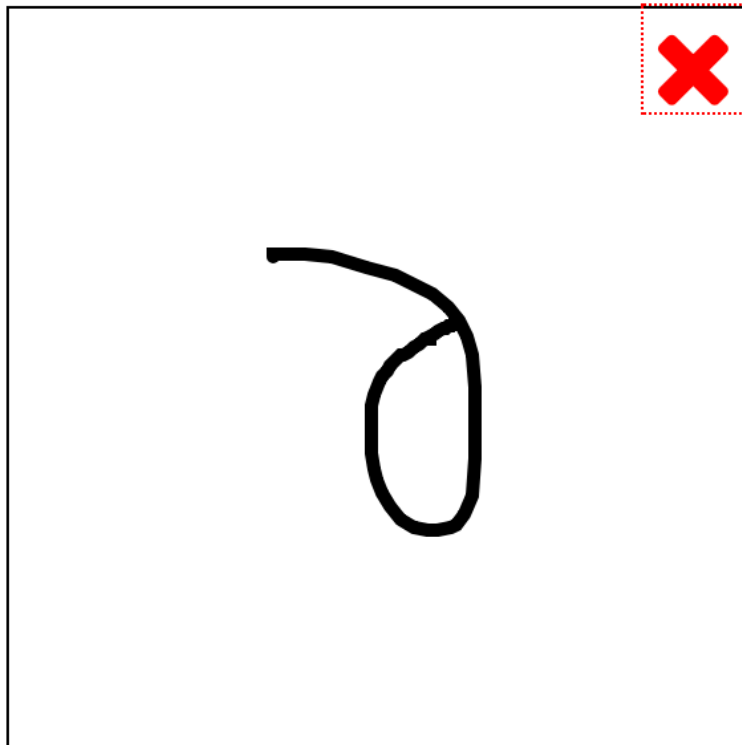
- Face should occupy about 1/3 of the image.
- Cut off your forehead

Machine Learning Applications

Detexify

classify

symbols



∂

Score: 0.12107724371908918

`\partial`
mathmode

\mathcal{D}

Score: 0.1744210074369589

`\usepackage{ amssymb }`
`\Game`
mathmode

γ

Score: 0.18567692685446785

`\usepackage{ tipa }`
`\textbabygamma`
textmode

Υ

Score: 0.19845446379011045

`\usepackage{ upgreek }`
`\upgamma`
mathmode

δ

Score: 0.19849650347374576

`\usepackage[T1]{fontenc}`
`\dh`
textmode

The symbol is not in the list? [Show more](#)

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

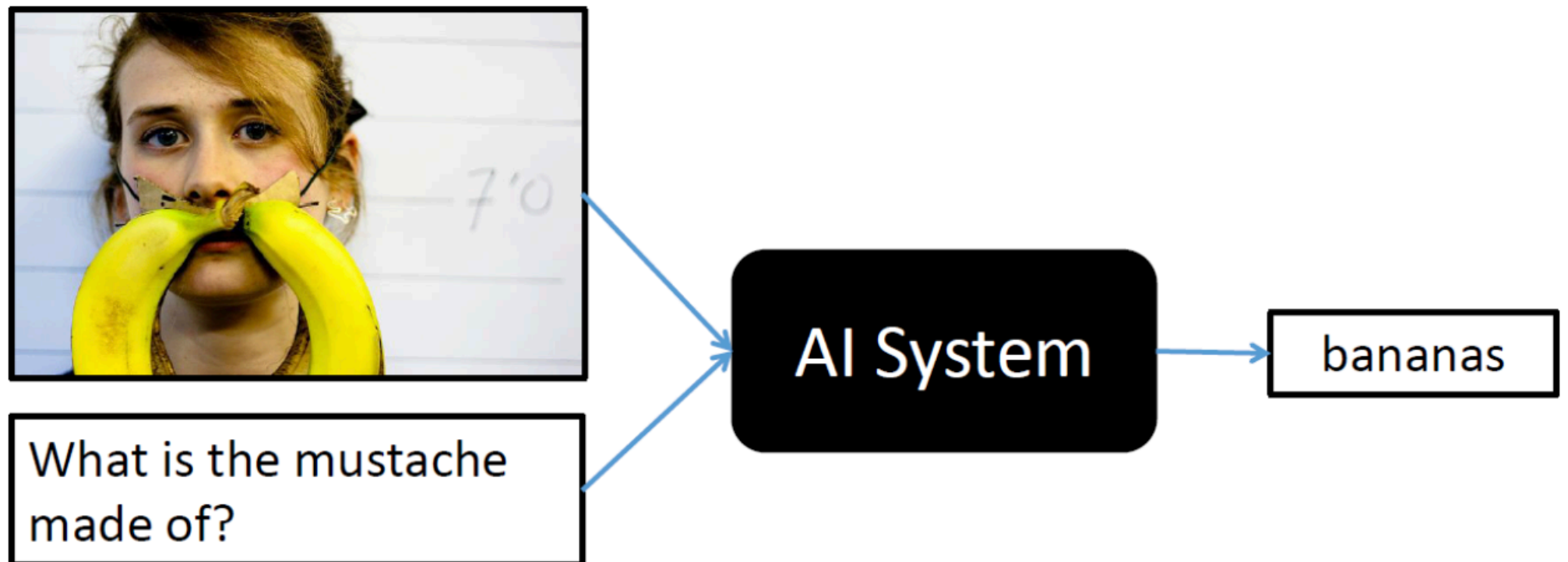
Did this help?

Machine Learning Applications

Labels	Web	Properties	Safe Search	JSON																		
																						
image_20121216120914.jpg																						
<table><tbody><tr><td>Test Cricket</td><td>98%</td></tr><tr><td>Cricket</td><td>98%</td></tr><tr><td>Baseball Player</td><td>98%</td></tr><tr><td>Cricketer</td><td>97%</td></tr><tr><td>Bat And Ball Games</td><td>96%</td></tr><tr><td>Team Sport</td><td>91%</td></tr><tr><td>Ball Game</td><td>88%</td></tr><tr><td>Games</td><td>86%</td></tr><tr><td>Sports</td><td>85%</td></tr></tbody></table>					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%
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%																					

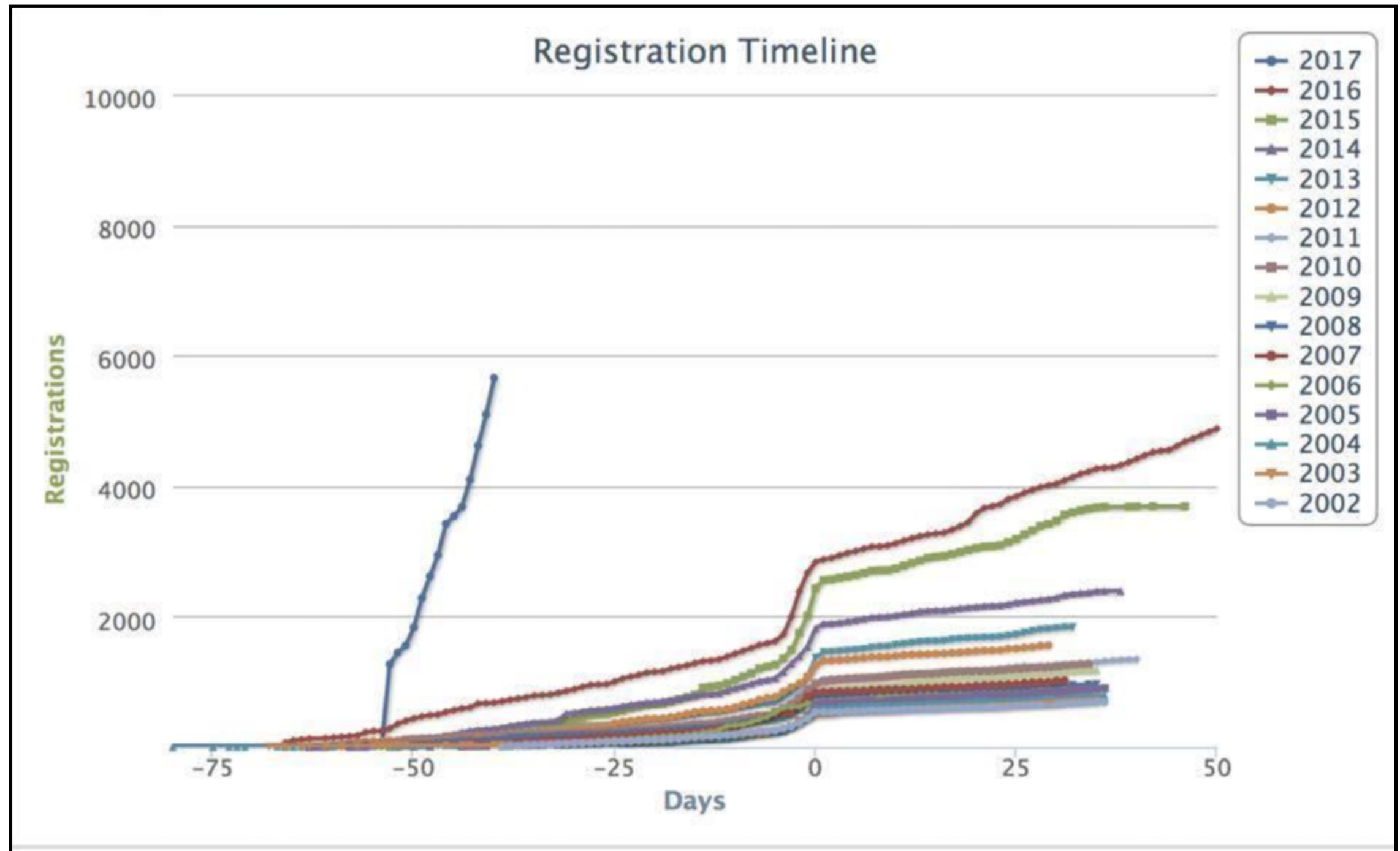
Machine Learning Applications

Visual Q and A



NeurIPS registration

$x=0$ -> early registration deadline



Machine Learning Gone Wrong

🕒 STORYSTREAM TRANSPORTATION | UBER | RIDE-SHARING



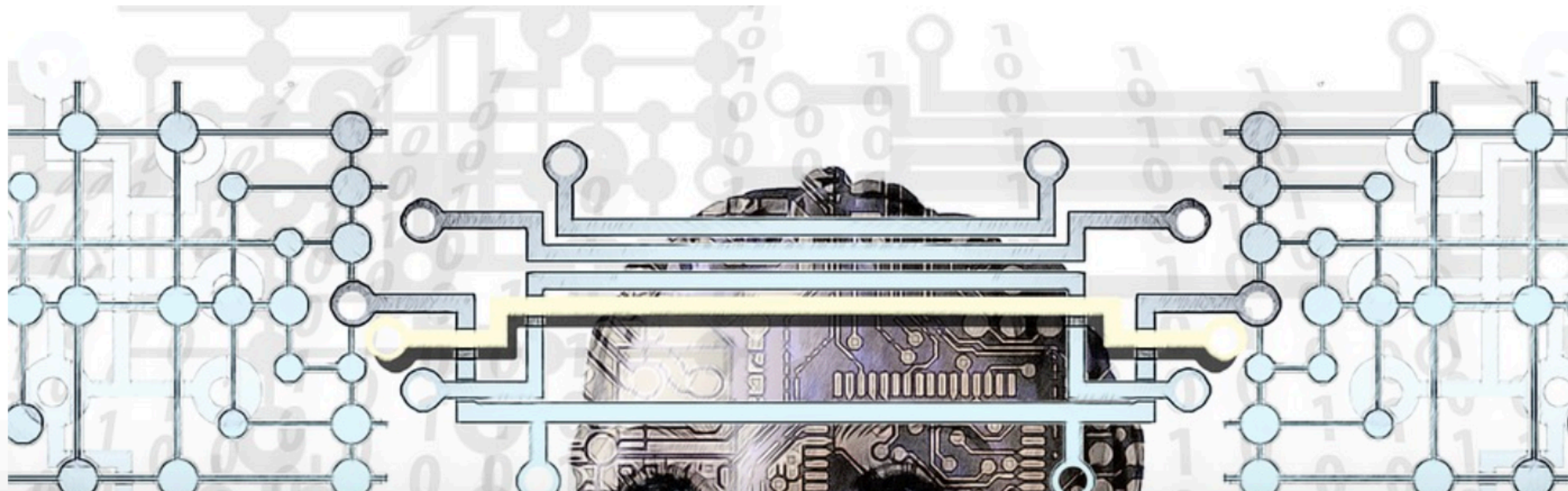
Uber's fatal self-driving crash: all the news and updates

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

Stereotypes in Google Translate

Translate

French English Turkish Detect language

English French Turkish Translate

He is a babysitter
She is a doctor

O bir bebek bakıcısı
O bir doktor

34/5000

Translate


French English Turkish Detect language

English French Turkish Translate


O bir bebek bakıcısı
O bir doktor

She's a babysitter
He is a doctor

33/5000

 ANITA B.ORG

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

Text Documents

TURKISH - DETECTED ENGLISH SPANISH FRENCH TURKISH ARABIC ENGLISH

o bir doktor

Translations are gender-specific. [LEARN MORE](#)

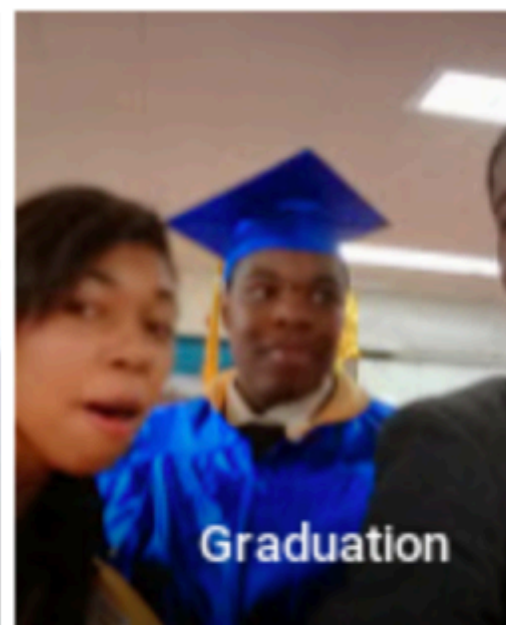
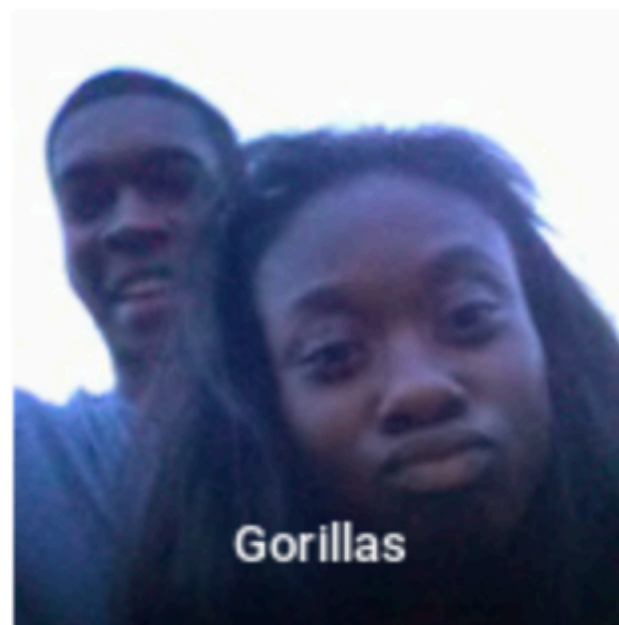
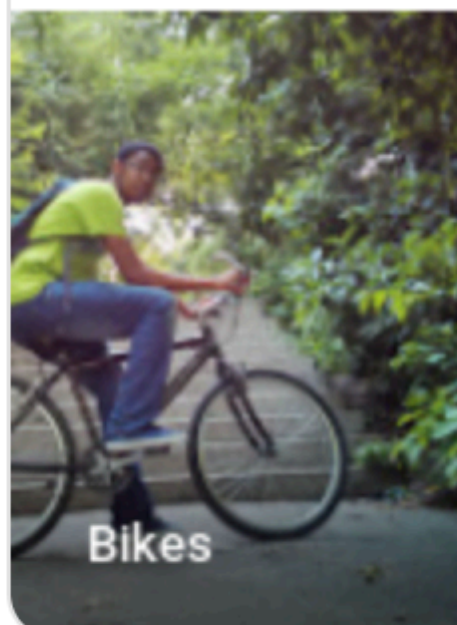
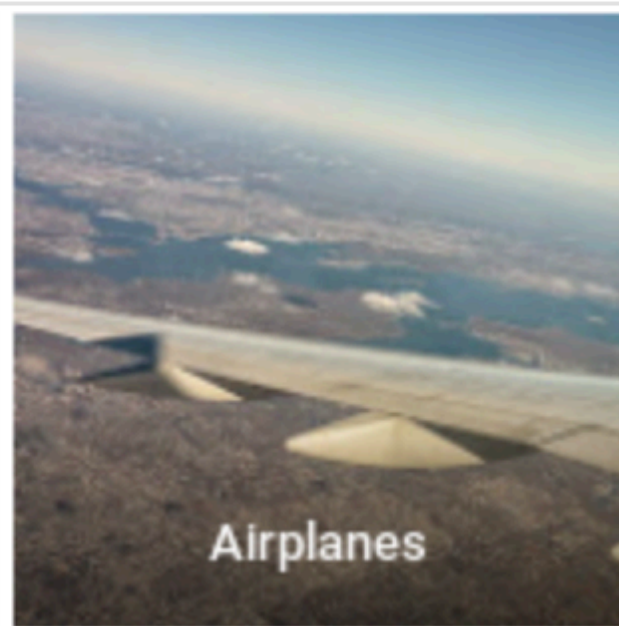
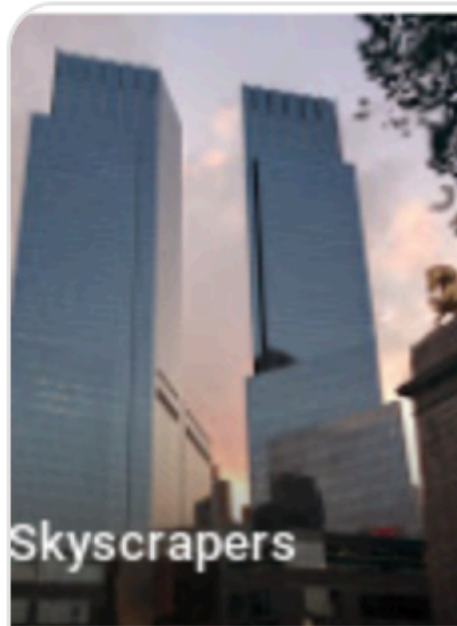
she is a doctor *(feminine)*

he is a doctor *(masculine)*

12/5000

“Racist” Machine Learning?

not a gorilla.



Where is the bride?



“Bias” addressed

“Bias” addressed

A “reality” check



A “reality” check



ABC
CLICK
BBC
NEWS

WH
.GOV

Adversaries!

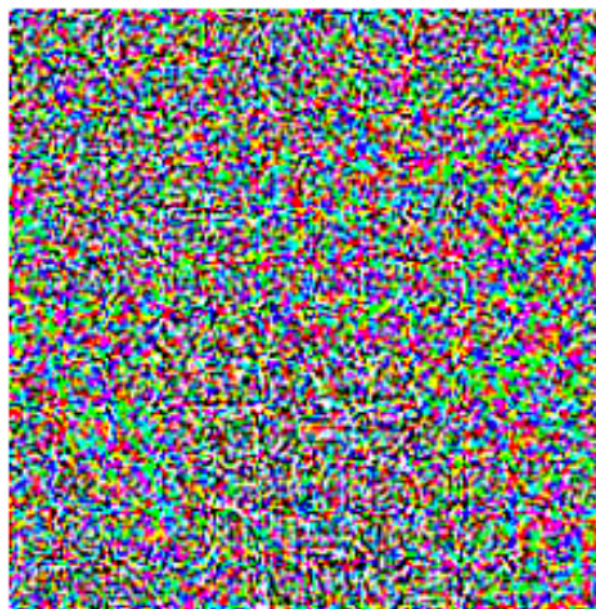


x

“panda”

57.7% confidence

+ .007 ×

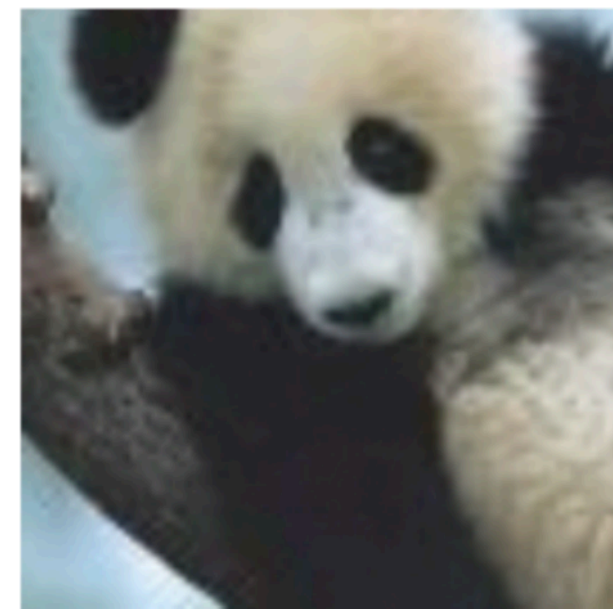


$\text{sign}(\nabla_x J(\theta, x, y))$

“nematode”

8.2% confidence

=



$x +$

$\epsilon \text{sign}(\nabla_x J(\theta, x, y))$

“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?

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

What is Machine Learning?

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

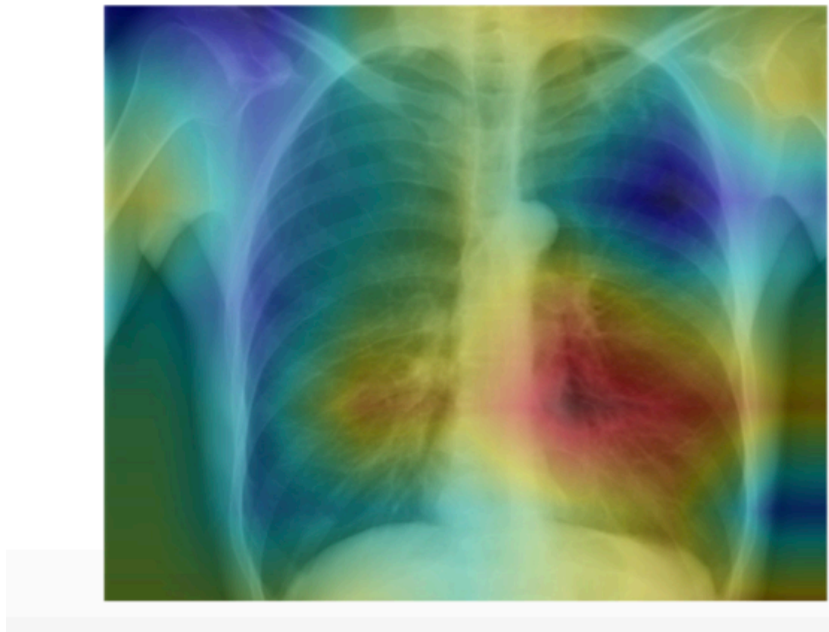
What is Machine Learning?



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?

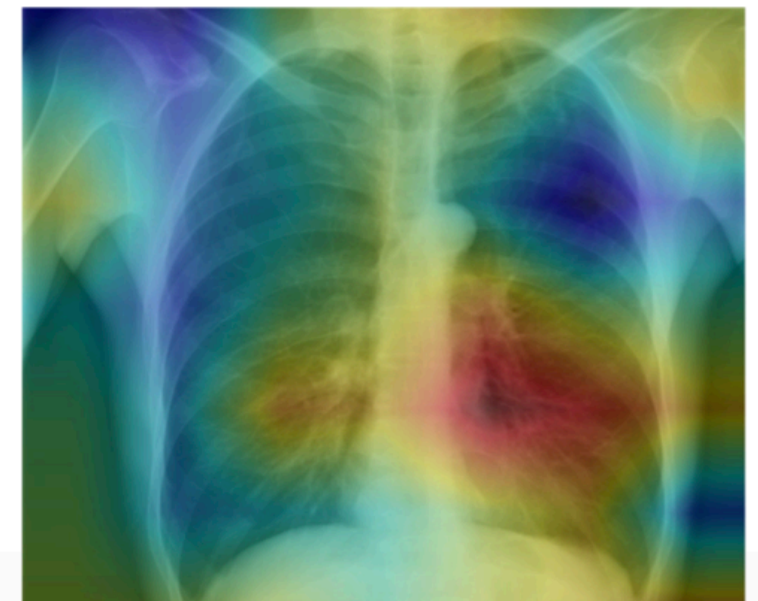


Input
Chest X-Ray Image

Task

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?

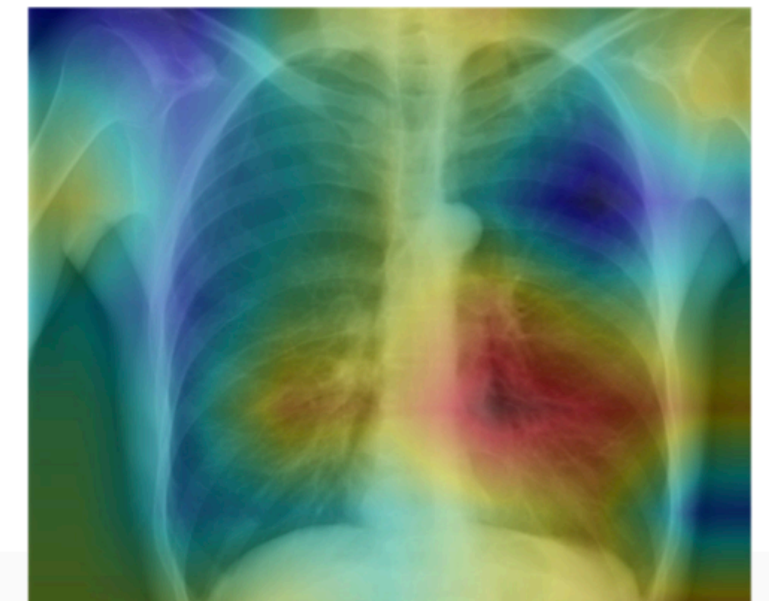
Performance
measure

Output

Pneumonia Positive (85%)

Task

CheXNet
121-layer CNN



Input

Chest X-Ray Image

Q: Identify task, performance measure, and experience

What is Machine Learning?

Experience

1000s of <image, disease> pairs

Performance
measure

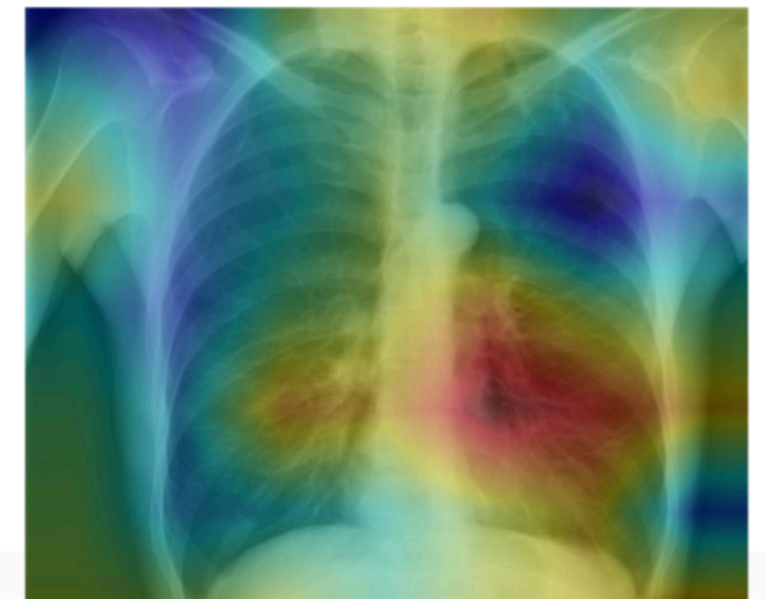
Output

Pneumonia Positive (85%)



Task

CheXNet
121-layer CNN



Input

Chest X-Ray Image

Q: Identify task, performance measure, and experience

What is Machine Learning?

Experience

1000s of <image, disease> pairs

Performance
measure

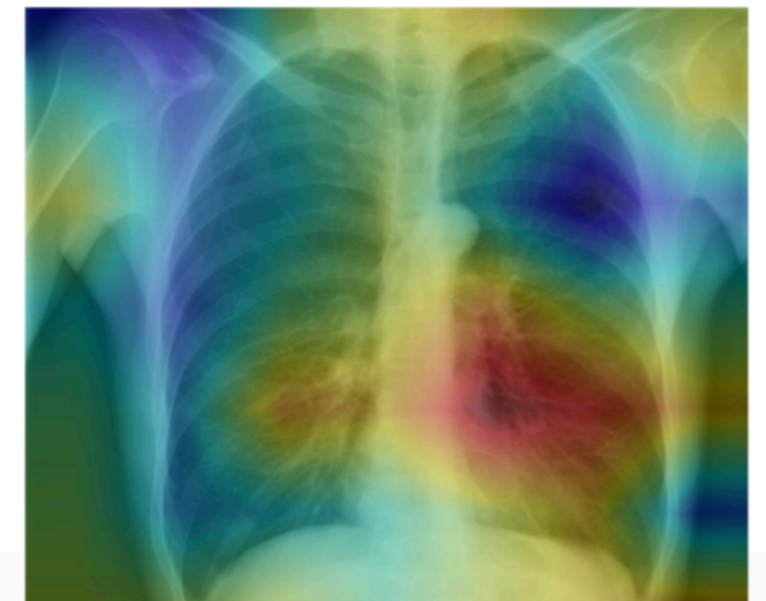
Output

Pneumonia Positive (85%)



Task

CheXNet
121-layer CNN



Input

Chest X-Ray Image

What is Machine Learning?

Experience

1000s of <image, disease> pairs



Input

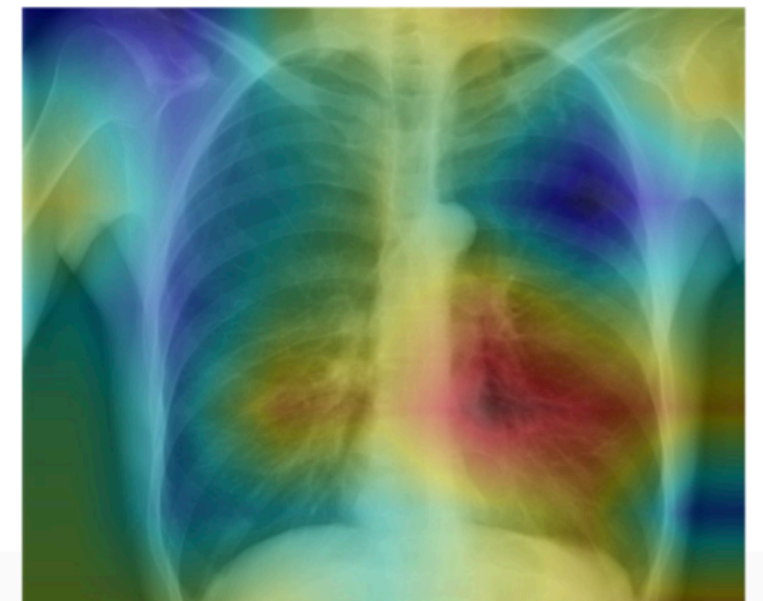
Chest X-Ray Image

Task

CheXNet
121-layer CNN

Output

Pneumonia Positive (85%)



What is Machine Learning?

Experience

1000s of <image, disease> pairs



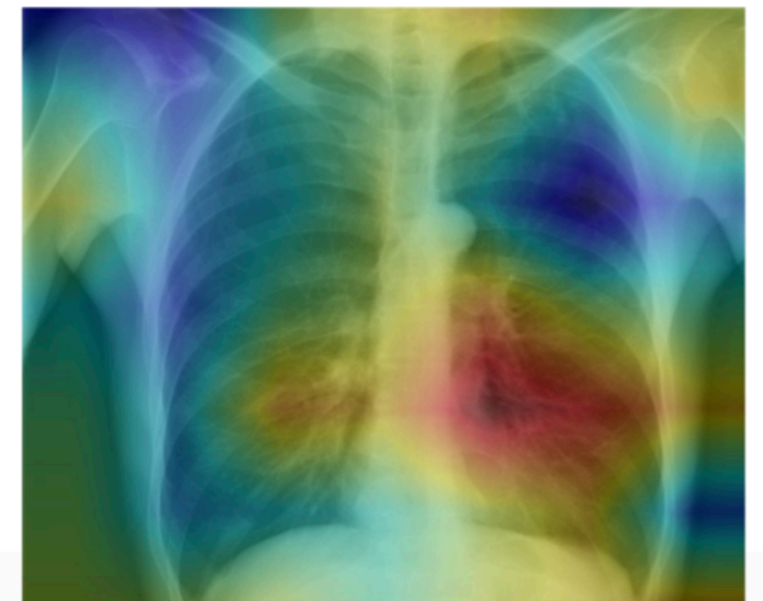
Input

Chest X-Ray Image

CheXNet
121-layer CNN

Output

Pneumonia Positive (85%)



What is Machine Learning?

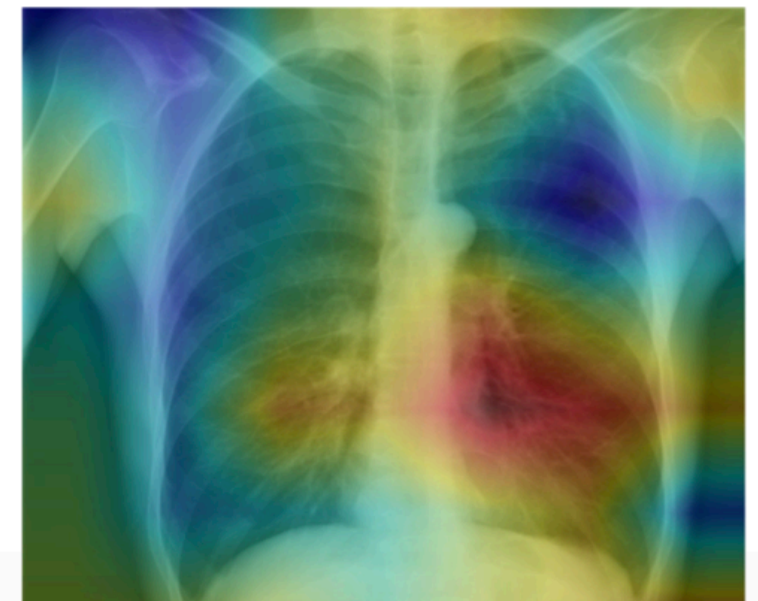
Experience
1000s of <image, disease> pairs



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



What is Machine Learning?

Experience
1000s of <image, disease> pairs

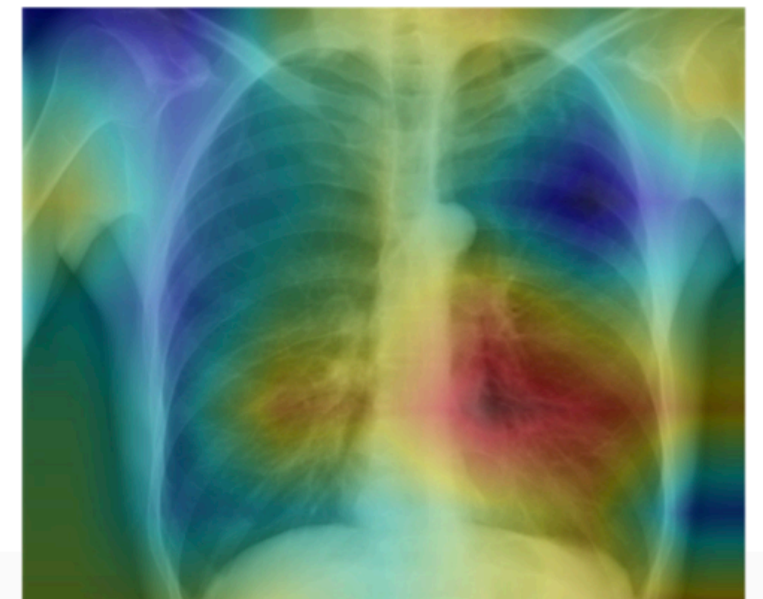
Supervised Learning

Output

Pneumonia Positive (85%)



CheXNet
121-layer CNN



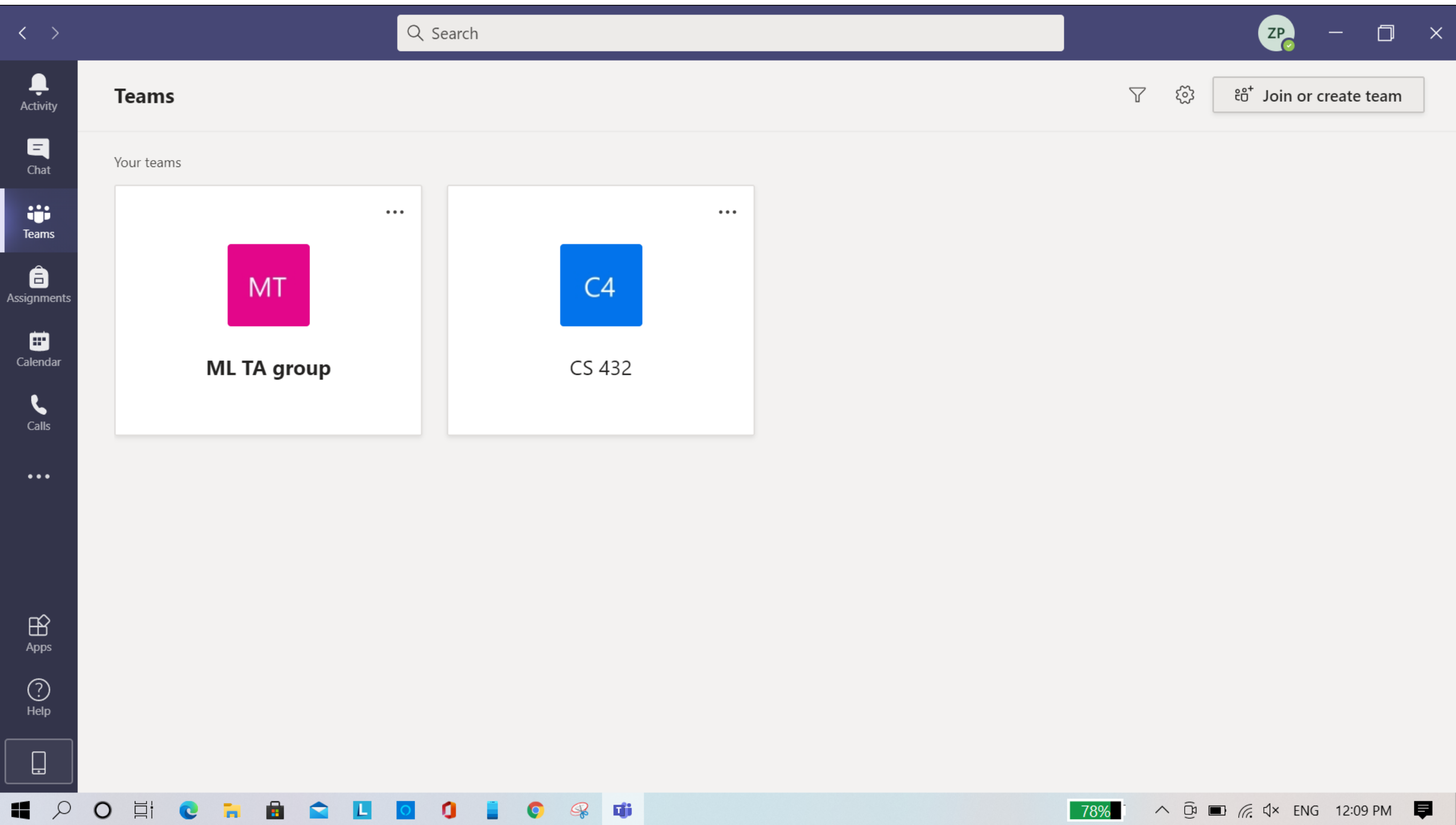
Input

Chest X-Ray Image

MS Teams

Team code: dr1od52

MS Teams (first interface)



MS Teams (joining using team code)

The screenshot displays the Microsoft Teams application interface. At the top, there is a search bar with the text "Search". Below the search bar, the main area is titled "Teams" and contains a section labeled "Your teams". This section displays two team cards: one with a pink square icon labeled "MT" and the name "ML TA group", and another with a blue square icon labeled "C4" and the name "CS 432". In the top right corner, a button labeled "Join or create team" is highlighted with a black rectangular box. The left sidebar contains navigation icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Apps, and Help. The bottom of the screen shows the Windows taskbar with various application icons and system tray information including battery level (78%), network, and time (12:09 PM).

MS Teams (joining using team code)

The screenshot displays the Microsoft Teams application interface. At the top, there is a search bar and a user profile icon labeled 'ZP'. The left sidebar contains navigation icons for Activity, Chat, Teams (highlighted), Assignments, Calendar, Calls, and Help. The main content area is titled 'Join or create a team' and features two primary options: 'Create a team' and 'Join a team with a code'. The 'Join a team with a code' option is highlighted with a black rectangular box. Below this title, there is a text input field containing the code 'dr1od52' and a 'Join team' button. The Windows taskbar at the bottom shows various application icons, a battery level indicator at 78%, and the system clock displaying 12:11 PM on ENG.

MS Teams (joining call)

The screenshot displays the Microsoft Teams application interface. At the top, there is a search bar and a user profile icon labeled 'ZP'. The left sidebar contains navigation options: Activity, Chat, Teams, Assignments, Calendar, Calls, Apps, and Help. The main area shows a team chat for 'Machine Learning 2021...'. The chat title is 'Machine Learning 2021...'. Below the title, the 'General' channel is selected. The chat content includes a welcome message: 'Welcome to Machine Learning 2021 [ES654]' and 'Try @mentioning the class name or student names to start a conversation.' Below the message is an illustration of a person with glasses and a lab coat. At the bottom of the chat, there is a notification: 'New channel meeting ended: 56s' with a 'Reply' button and a 'New conversation' button. The Windows taskbar is visible at the bottom, showing various application icons, a battery level of 78%, and the time 12:11 PM.

MS Teams (joining call)

The screenshot displays the Microsoft Teams application interface. On the left is a dark navigation sidebar with icons for Activity, Chat, Teams, Assignments, Calendar, Calls, and Help. The main area shows a channel named "Machine Learning 2021..." with a "General" sub-channel selected. At the top of the channel, there are tabs for "General", "Posts", "Files", "Class Notebook", "Assignments", and "1 more". A search bar is located at the top center. A notification for a "New channel meeting" is highlighted with a black border. The notification card is dark blue and contains the text "New channel meeting", a "Join" button, and a timer showing "00:14" with a user icon "NB". Below the notification, a smaller message says "New channel meeting started" with a "Reply" button. At the bottom of the channel, there is a "New conversation" button. The Windows taskbar is visible at the very bottom, showing various application icons, a 78% battery level, and the time 12:12 PM.

MS Teams (joining call)

The screenshot displays the Microsoft Teams application interface. On the left is a dark sidebar with navigation icons for Activity, Chat, Teams, Assignments, Calendar, Calls, and Help. The main area shows a team named 'Machine Learning 2021...' with a 'General' channel. At the top right, a 'Meet' button is highlighted with a red rectangle. In the center, a meeting notification is shown with a 'Join' button highlighted by a black rectangle. Below the notification, another message says 'New channel meeting started'. The Windows taskbar is visible at the bottom, showing the system tray with a 78% battery level and the time 12:12 PM.

Do not click on meet