

Introduction to ML

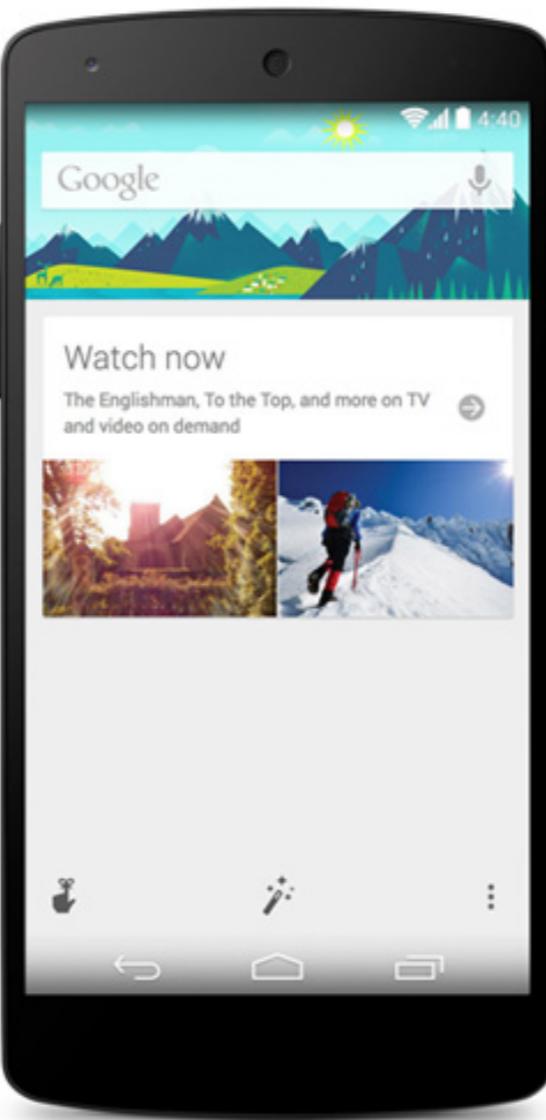
Nipun Batra

Machine Learning Applications

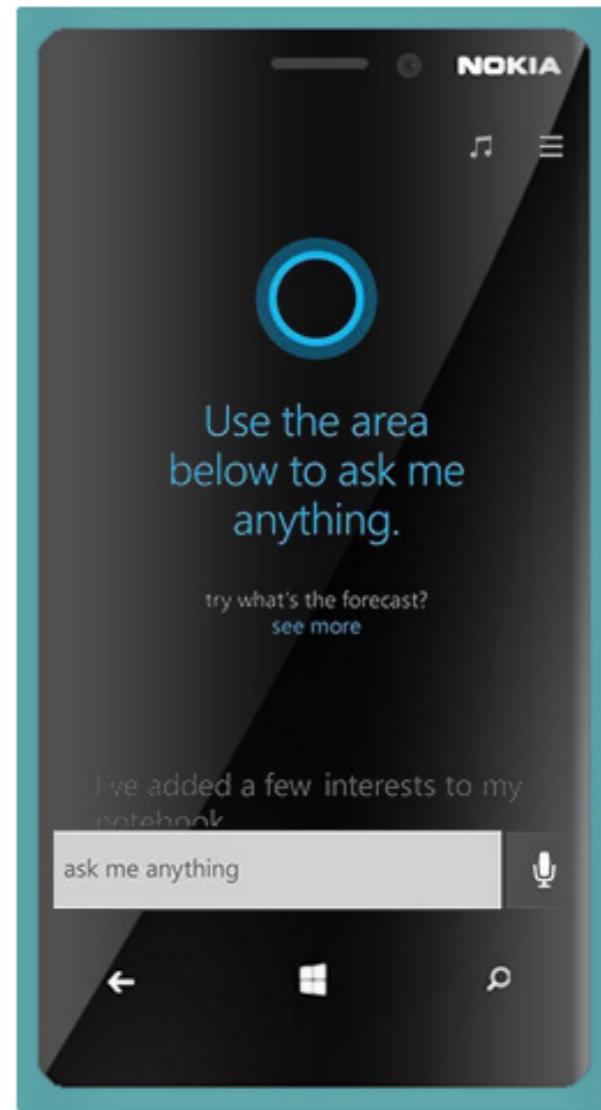
Apple Siri



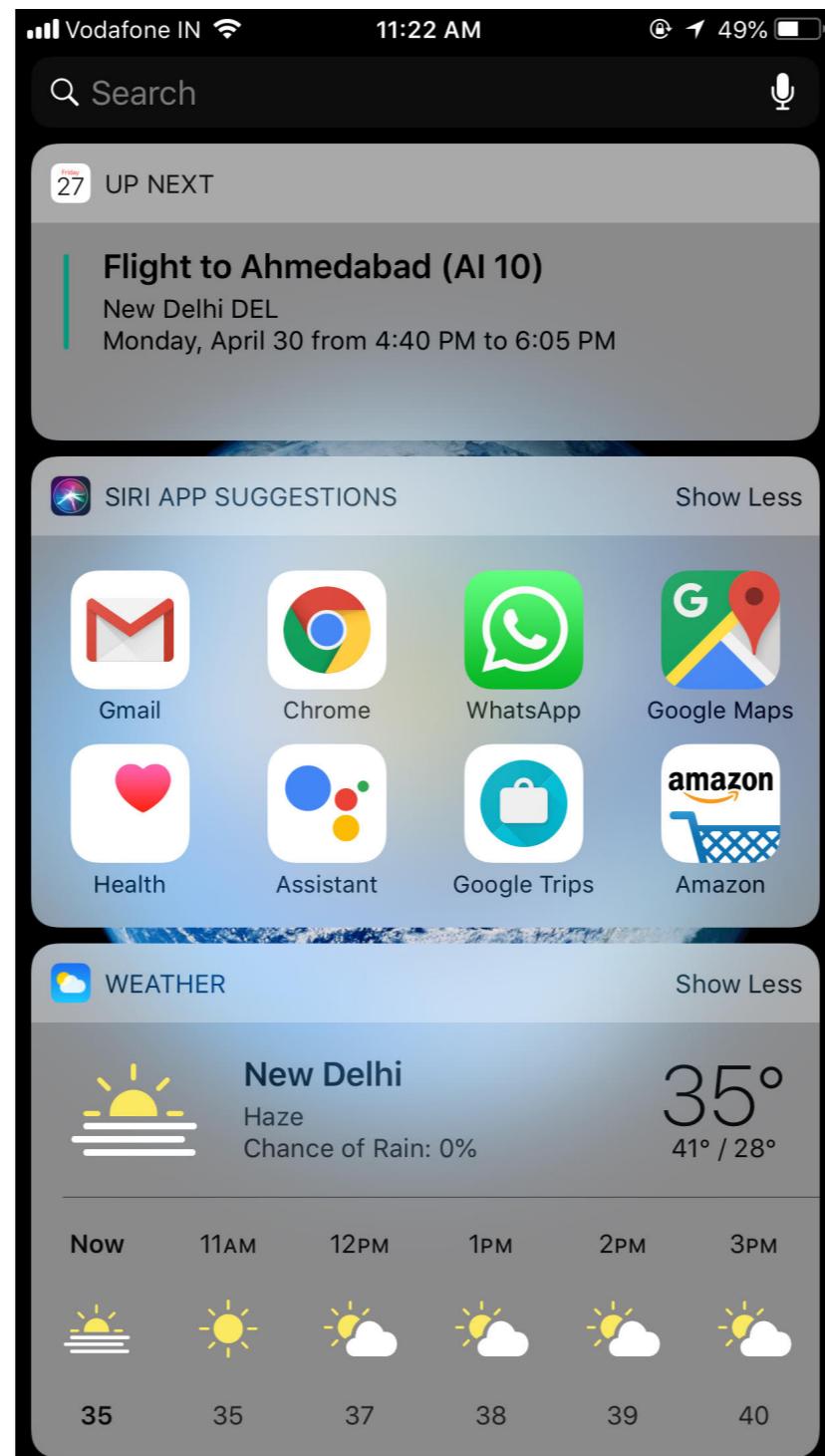
Google Now



Windows Cortana



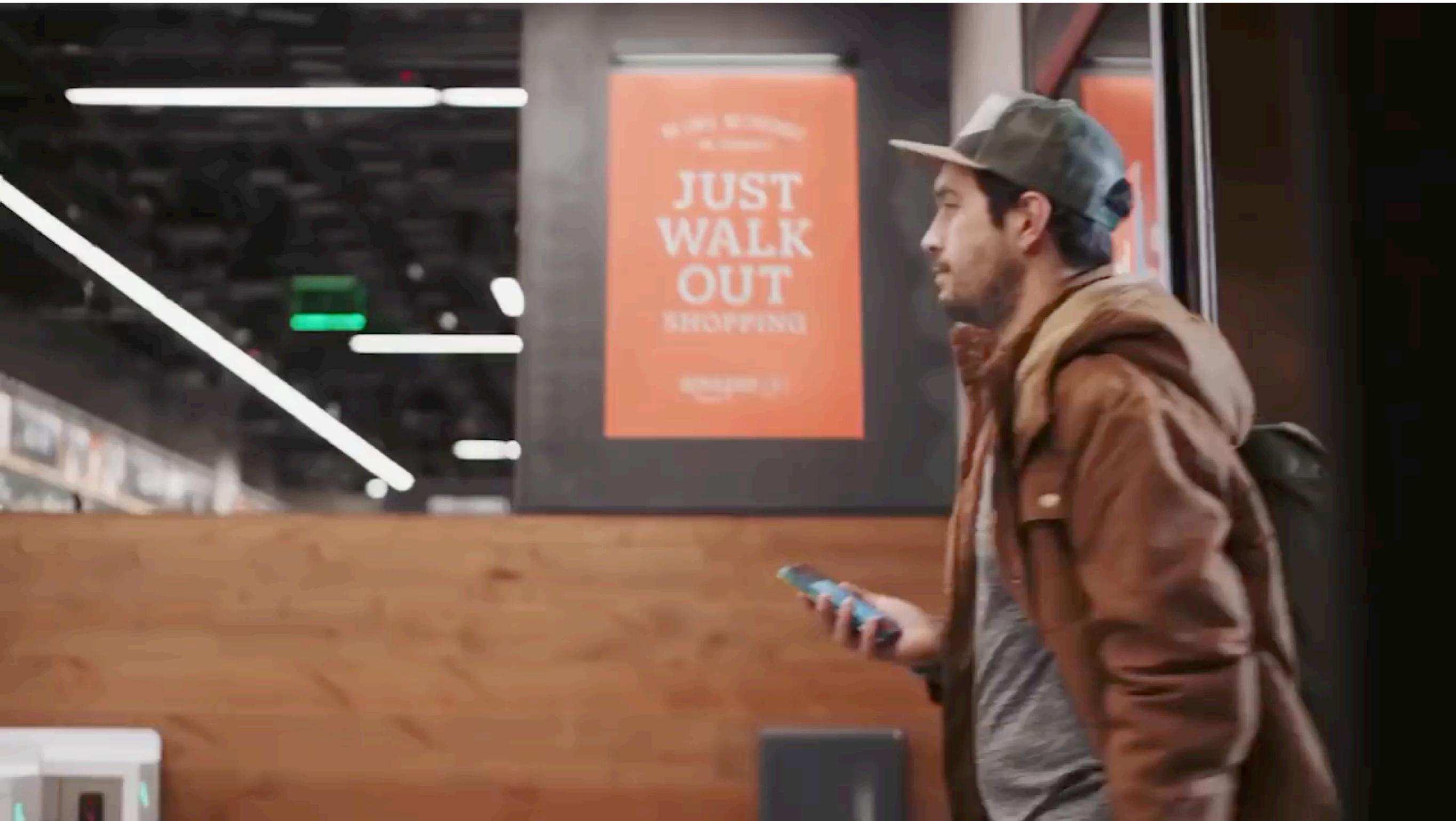
Machine Learning Applications



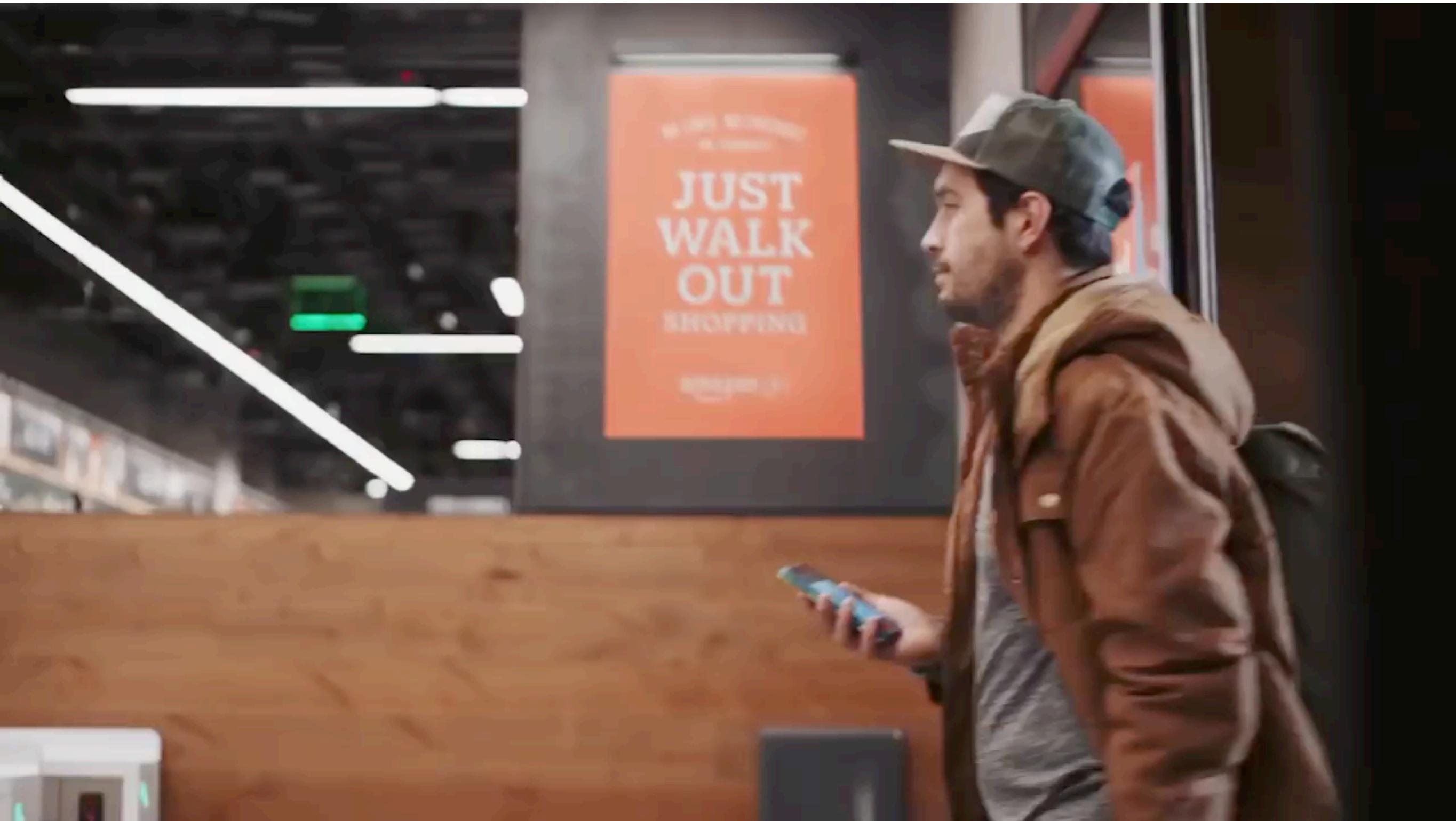
The Long Wait ...



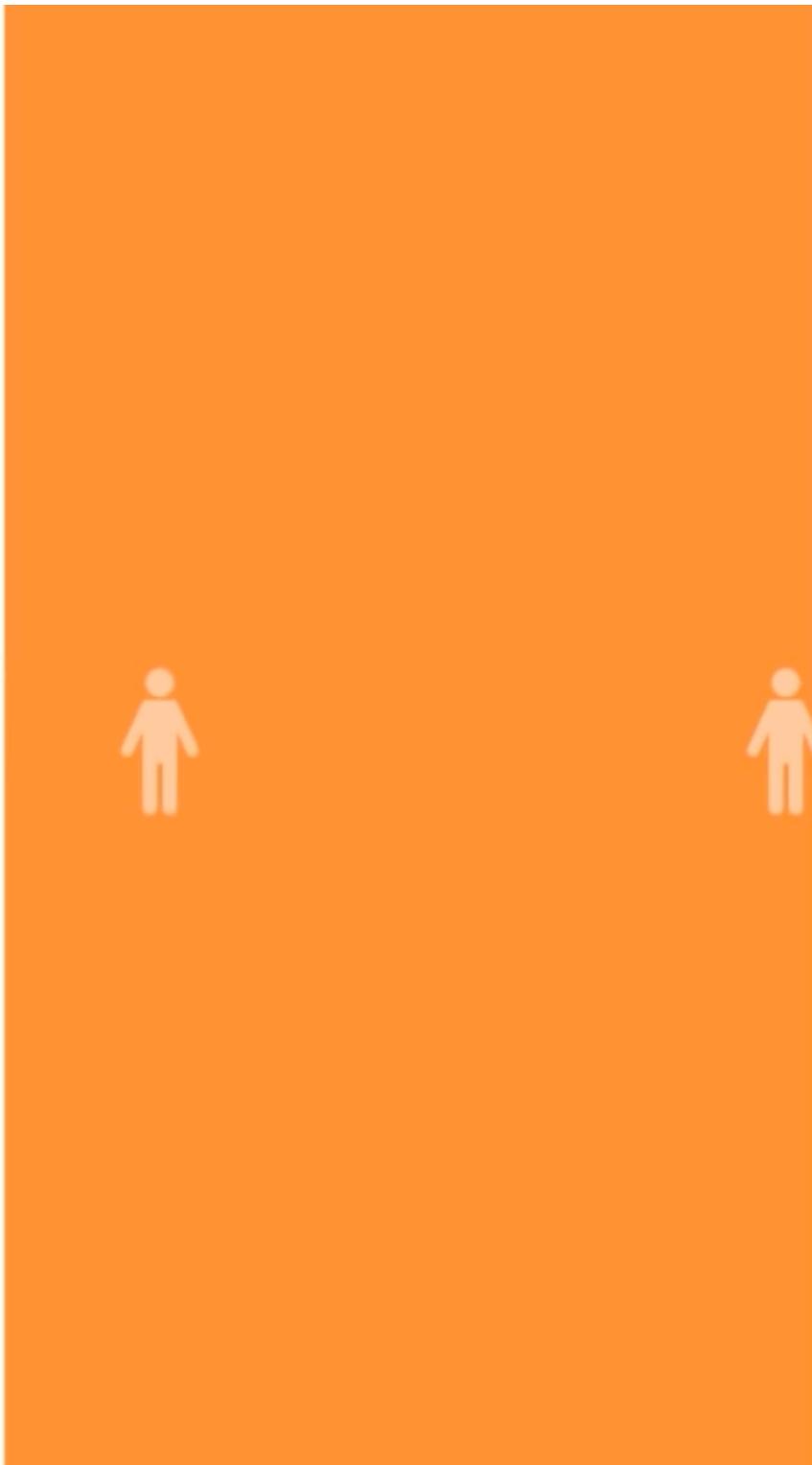
Machine Learning Applications



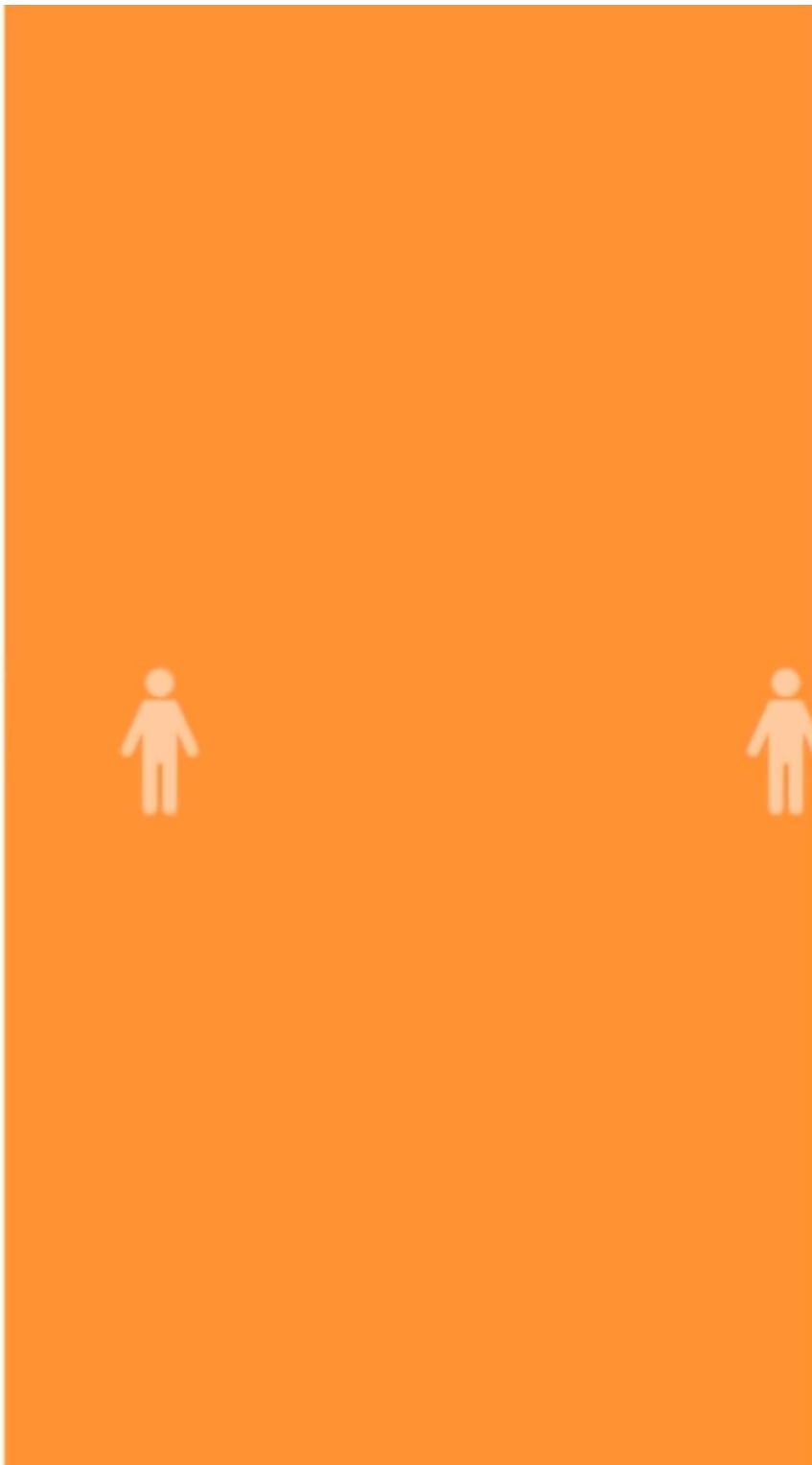
Machine Learning Applications



Machine Learning Applications



Machine Learning Applications

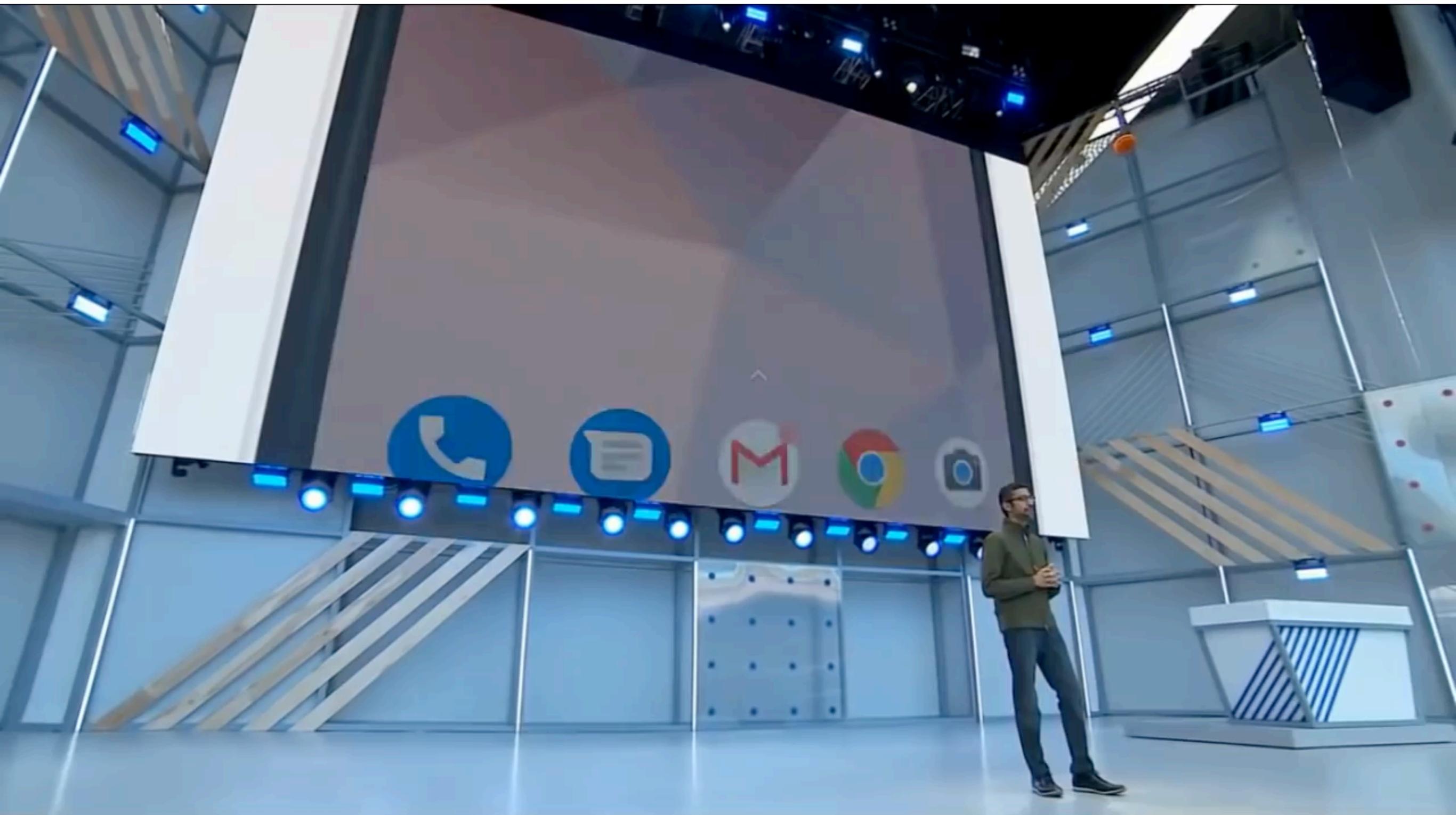


Never Liked To Call People!

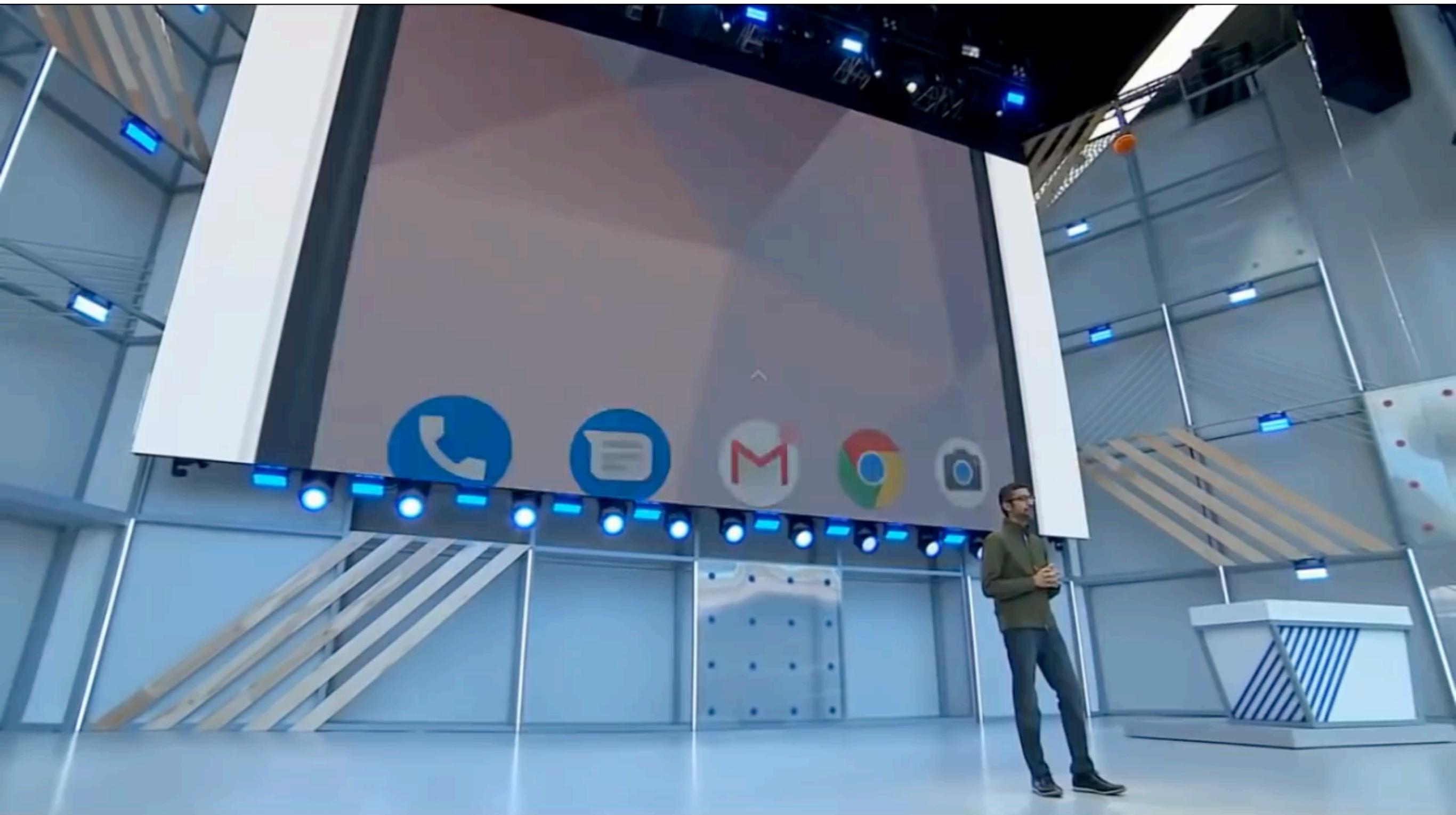


**I might be able to fit
you in on Monday...**

Google Duplex!



Google Duplex!



Saving The Planet - One Watt A time



Saving The Planet - One Watt A time



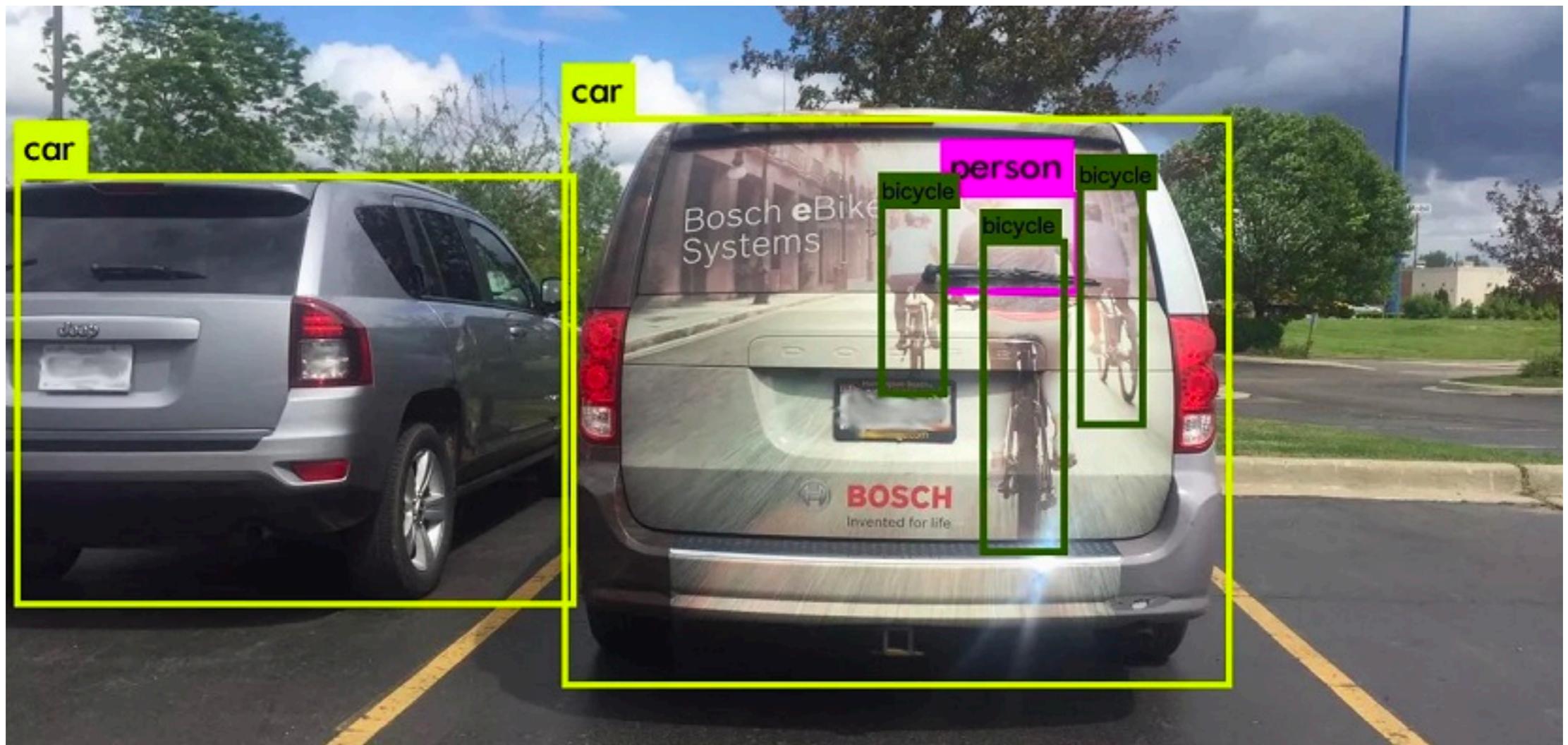
Self Driving Car



Self Driving Car



Self Driving Car



Courtesy: Cognata

ML for Farm



ML for Farm



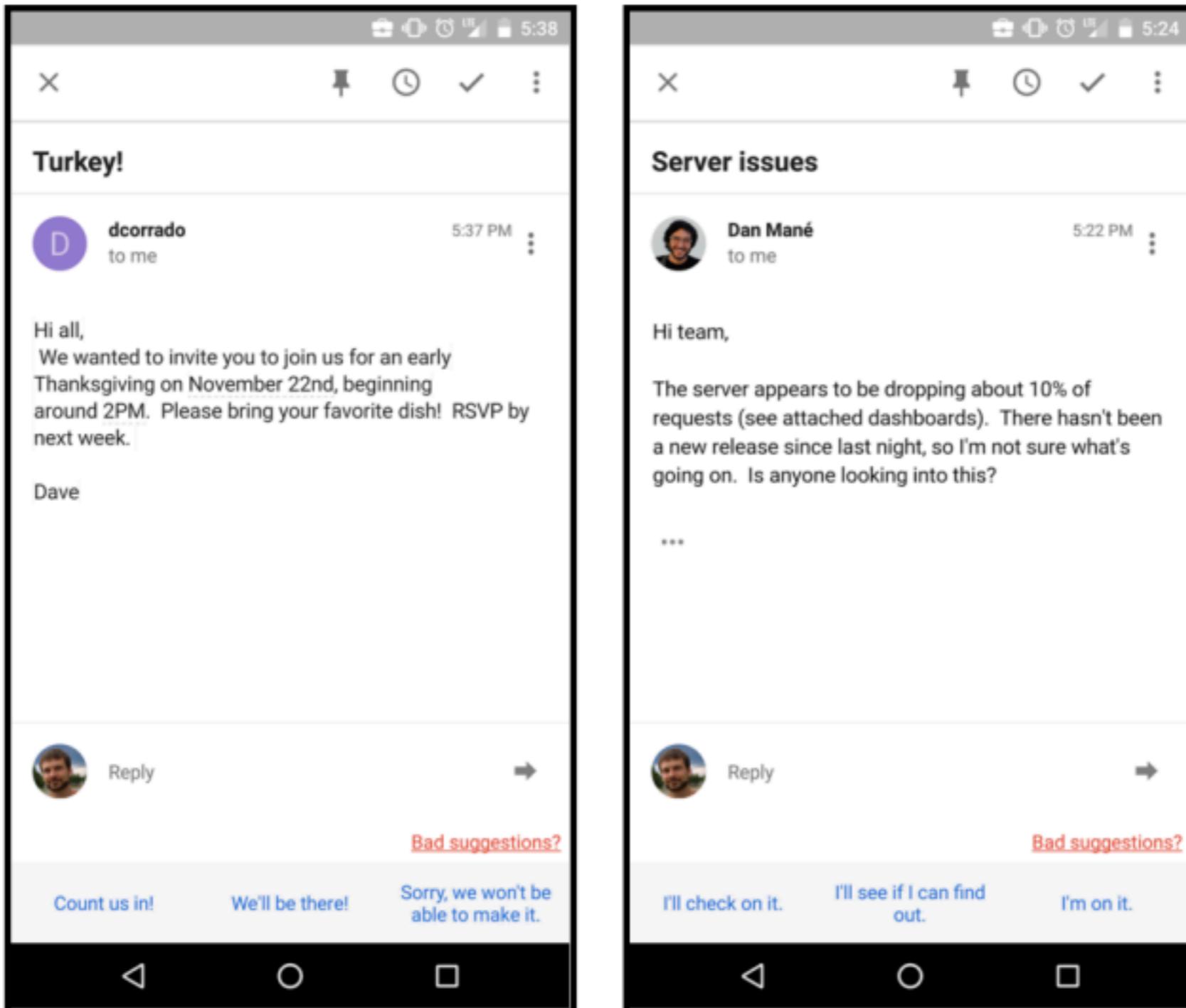
ML for Healthcare



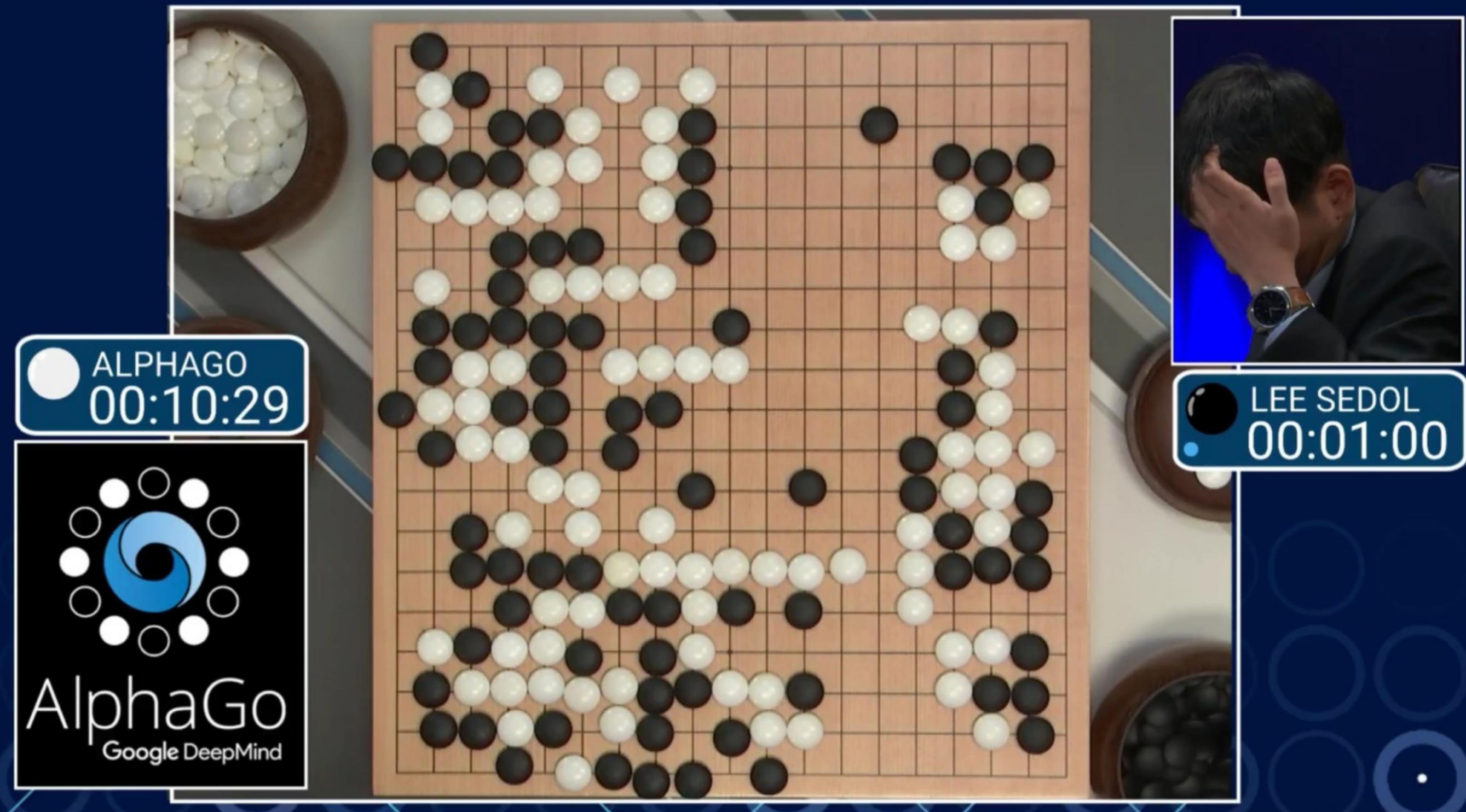
ML for Healthcare



Auto Reply



Machine Learning Applications



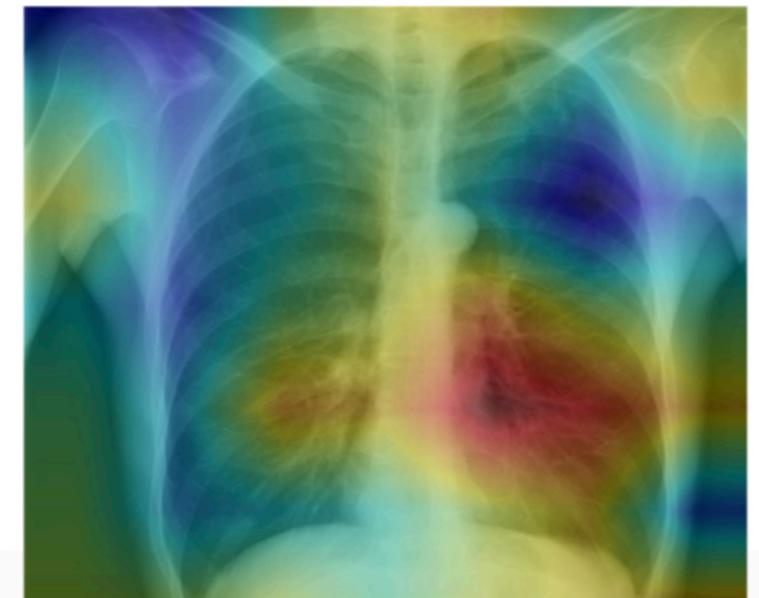
Machine Learning Applications



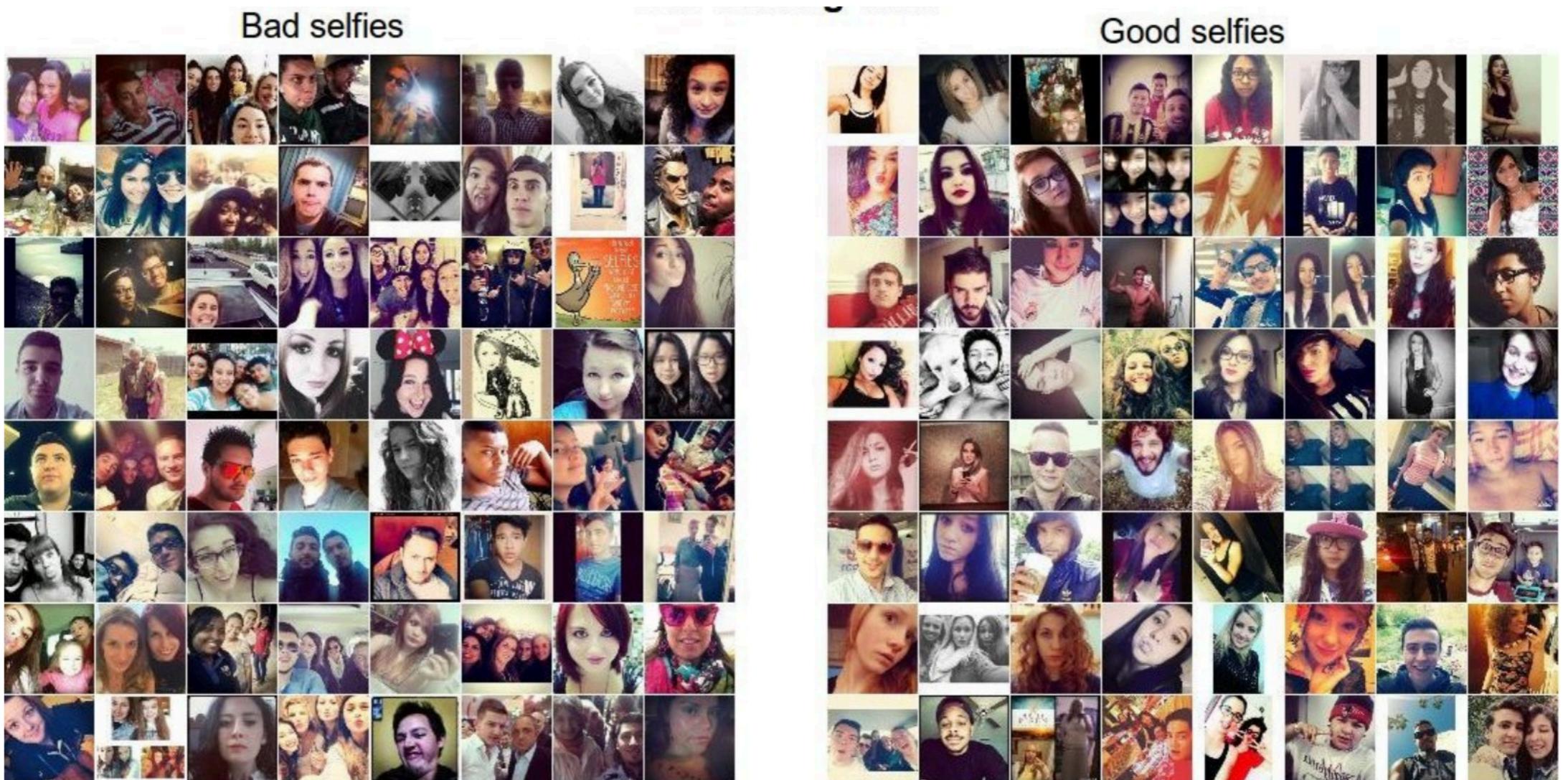
Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Machine Learning Applications

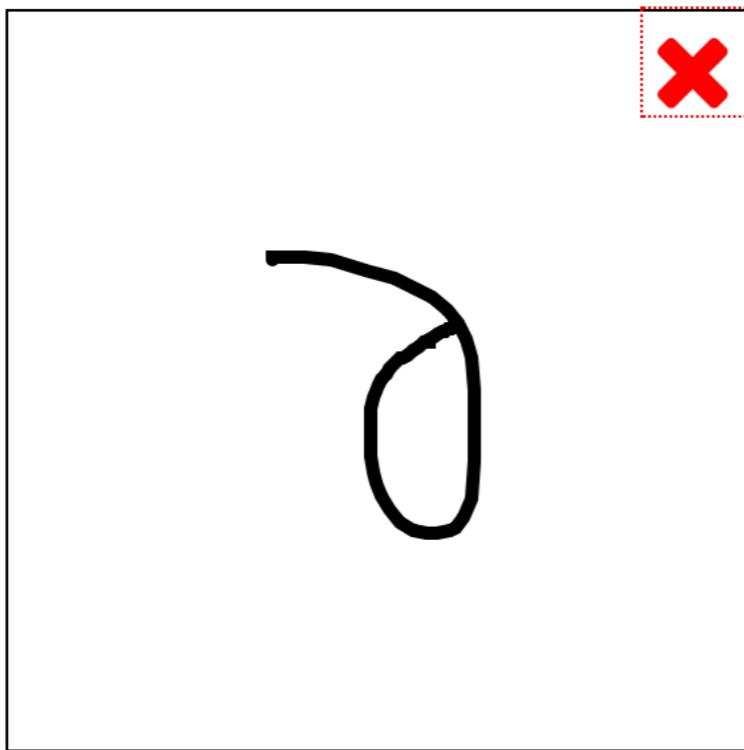


Example images showing good and bad selfies in our training data. These will be given to the ConvNet as teaching material.

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

Machine Learning Applications

Detexify

[classify](#)[symbols](#) ∂

Score: 0.12107724371908918

\partial
mathmode \exists

Score: 0.1744210074369589

\usepackage{ amssymb }
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mathmode γ

Score: 0.18567692685446785

\usepackage{ tipa }
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Score: 0.19845446379011045

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\upgamma
mathmode \eth

Score: 0.19849650347374576

\usepackage[T1]{fontenc}
\dh
textmode

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](#)

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

Did this help?

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

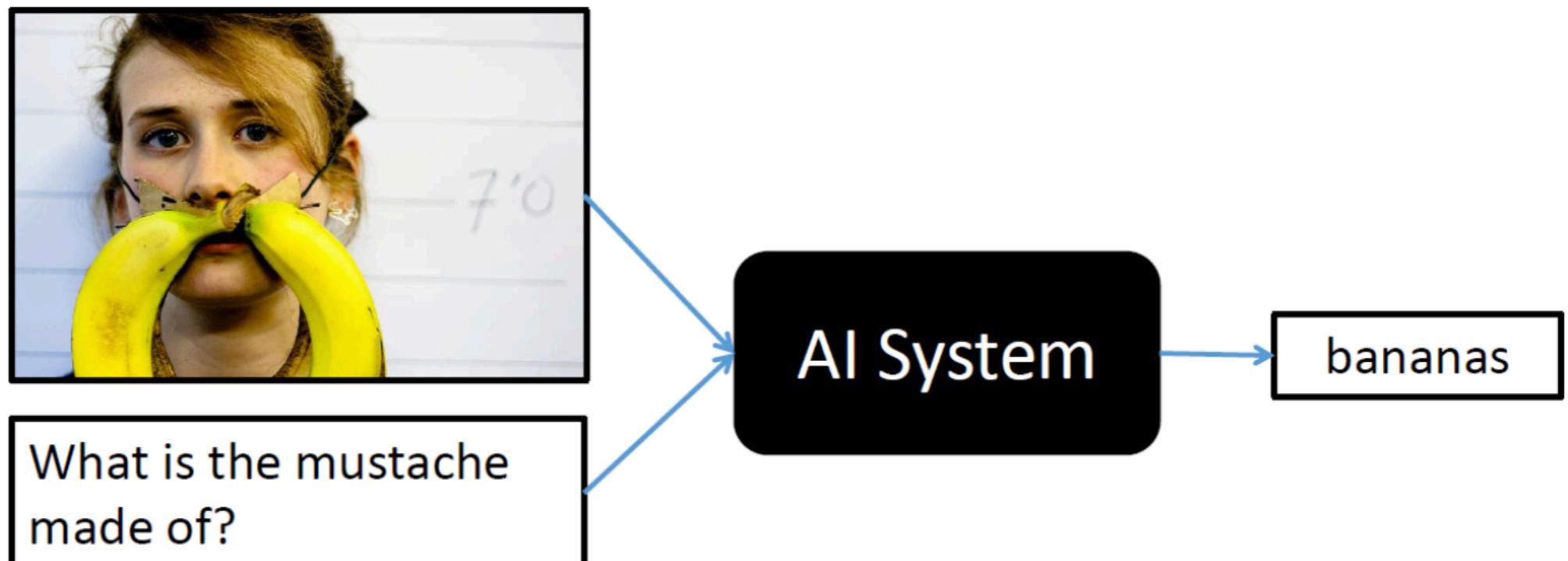
86%

Sports

85%

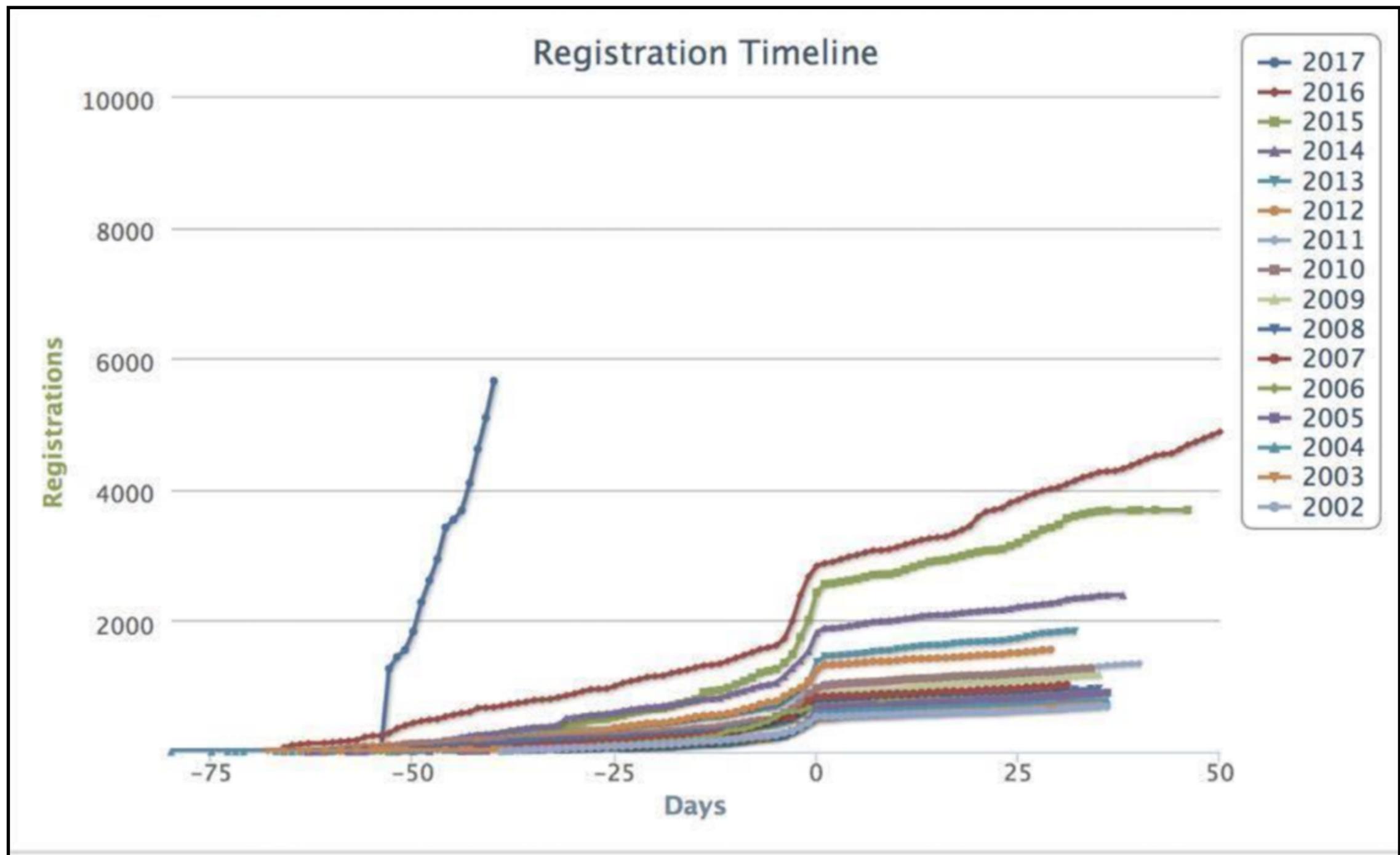
Machine Learning Applications

Visual Q and A



NeurIPS registration

$x=0 \rightarrow$ early registration deadline



Machine Learning Gone Wrong

THE VERGE

TECH

SCIENCE

CULTURE

CARS

REVIEWS

LONGFORM

VIDEO

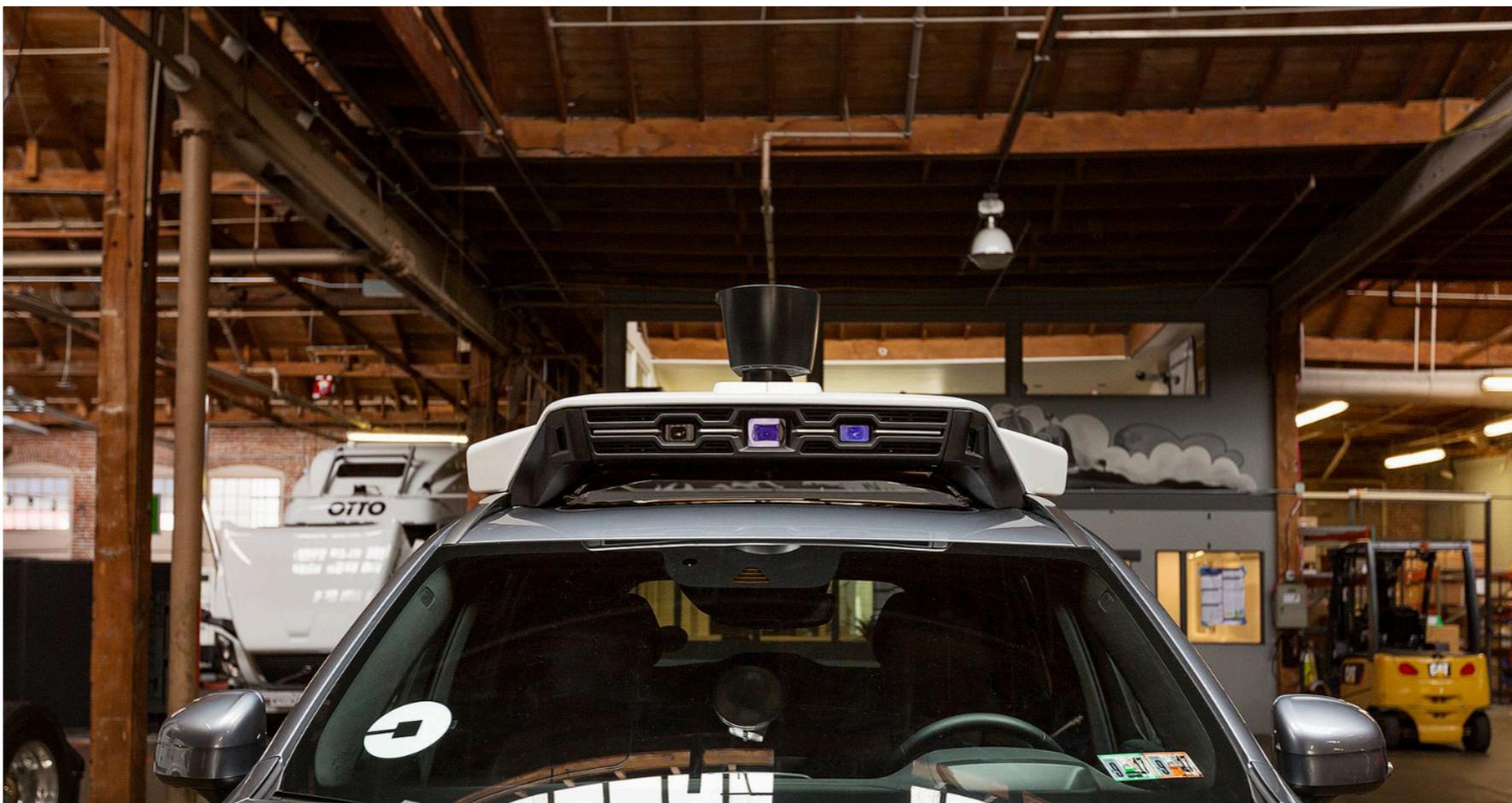
MORE

STORYSTREAM

TRANSPORTATION

UBER

RIDE-SHARING



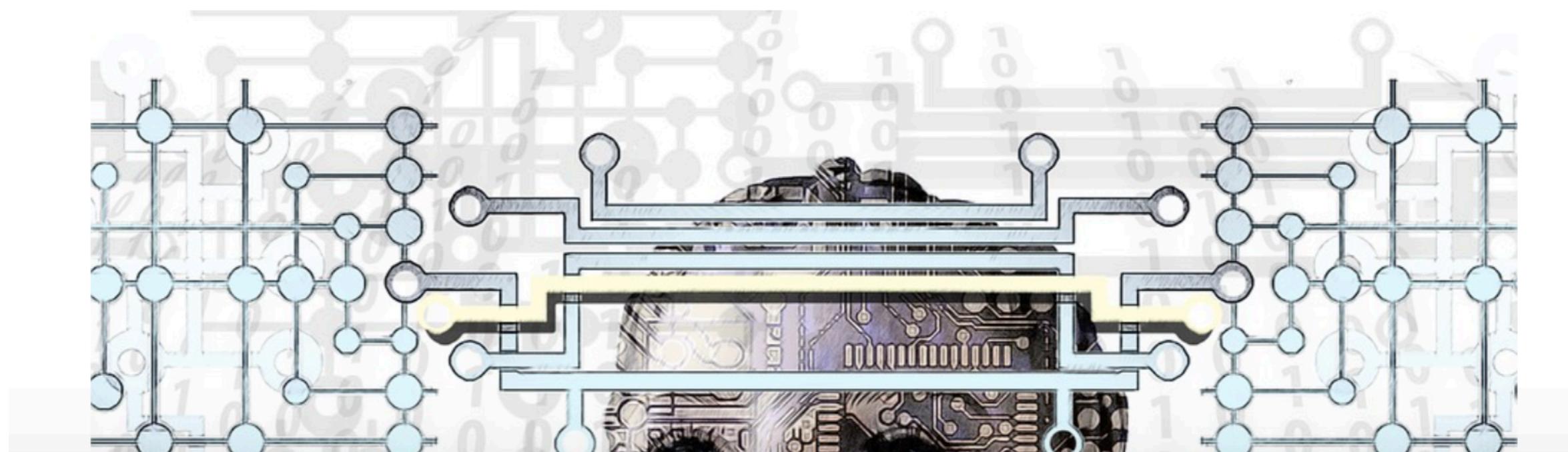
Uber's fatal self-driving crash: all the news and updates

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 image shows two screenshots of the Google Translate interface demonstrating gender bias.

Top Screenshot: The title "Stereotypes in Google Translate" is displayed. The source text "He is a babysitter
She is a doctor" is translated to "O bir bebek bakıcısı
O bir doktor".

Bottom Screenshot: The source text "O bir bebek bakıcısı
O bir doktor" is translated to "She's a babysitter
He is a doctor".

ANITA BORG Logo: Located in the bottom left corner.

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

#GHC17

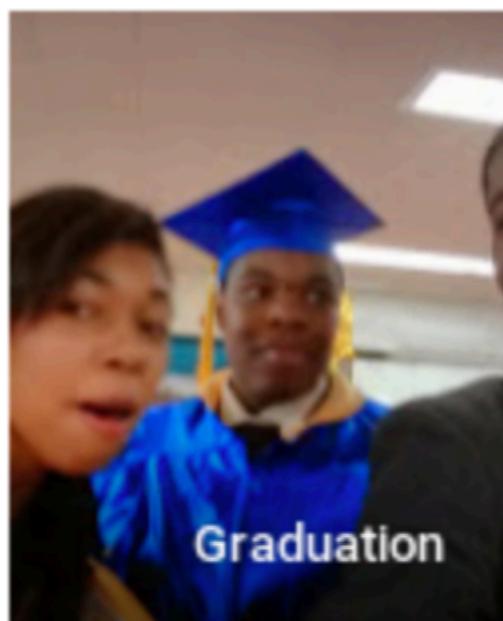
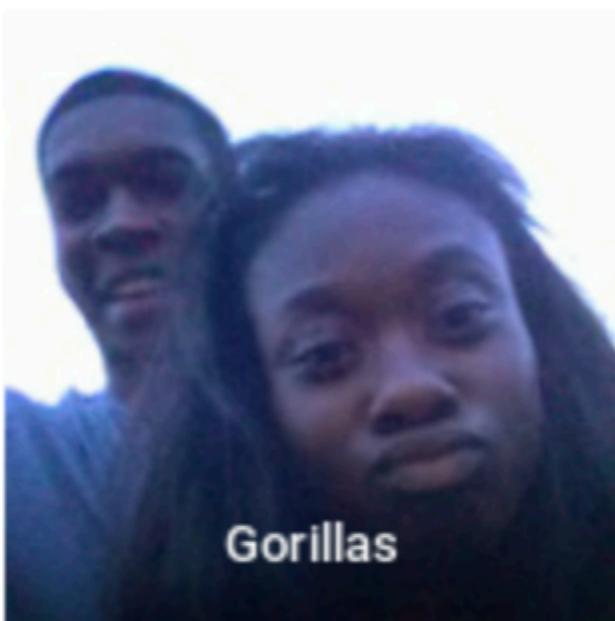
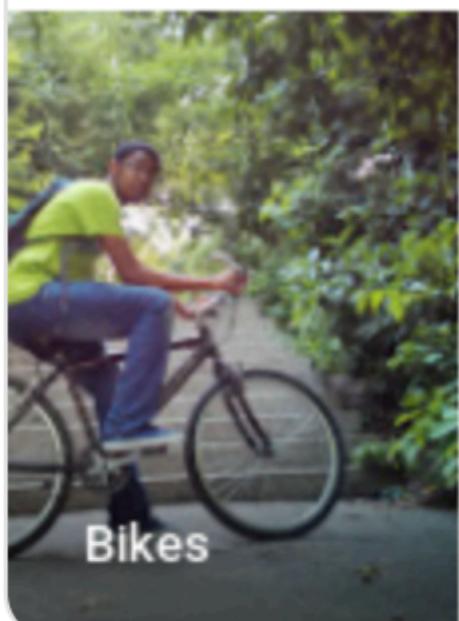
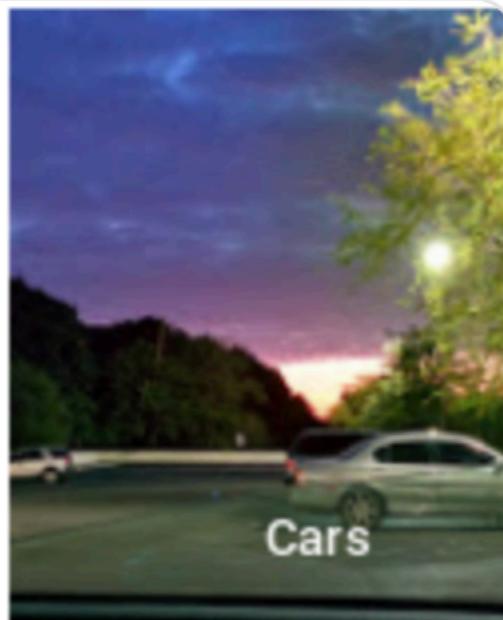
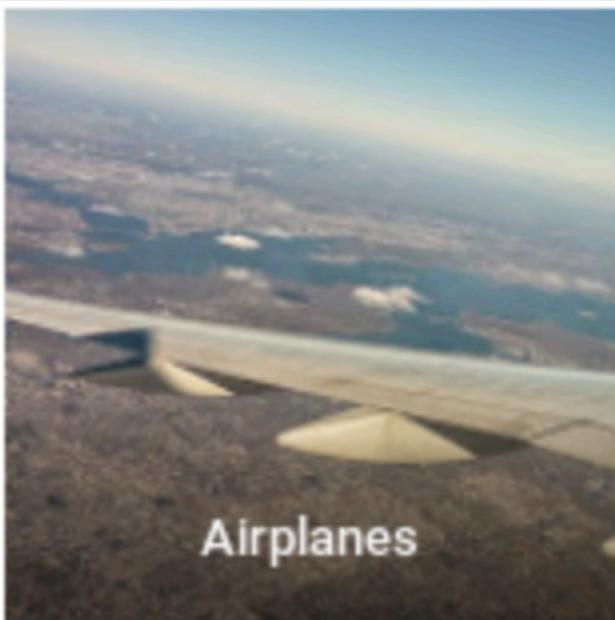
“Bias” addressed

The screenshot shows a translation interface with the following settings:

- Source language: TURKISH - DETECTED
- Target language: ENGLISH
- Other available languages: SPANISH, FRENCH, TURKISH, ARABIC
- Input text: o bir doktor
- Output translations:
 - she is a doctor (feminine)
 - he is a doctor (masculine)
- Annotations:
 - A note states: "Translations are gender-specific. [LEARN MORE](#)"
 - Speaker icons indicate audio availability for each translation.
 - Star and document icons are present on the right.
- Bottom status: 12/5000 and a pencil icon.

“Racist” Machine Learning?

not a gorilla.



Where is the bride?



“Bias” addressed

“Bias” addressed

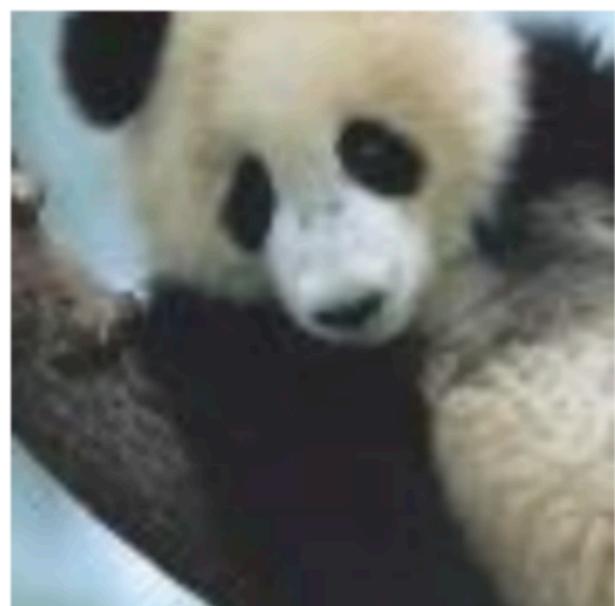
A “reality” check



A “reality” check

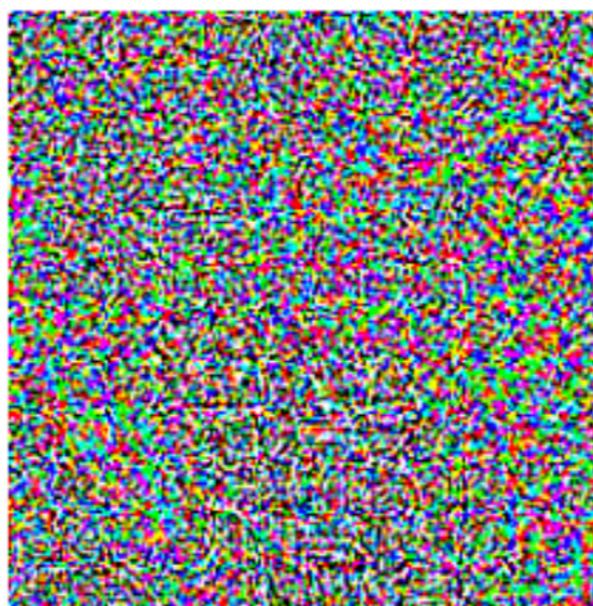


Adversaries!



\mathbf{x}
“panda”
57.7% confidence

+ .007 ×



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

=



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

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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

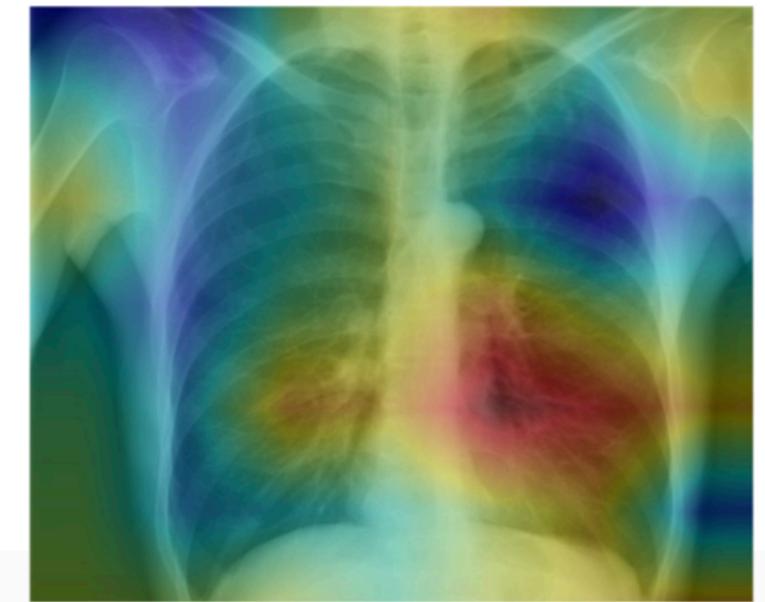
What is Machine Learning?



Input
Chest X-Ray Image

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?

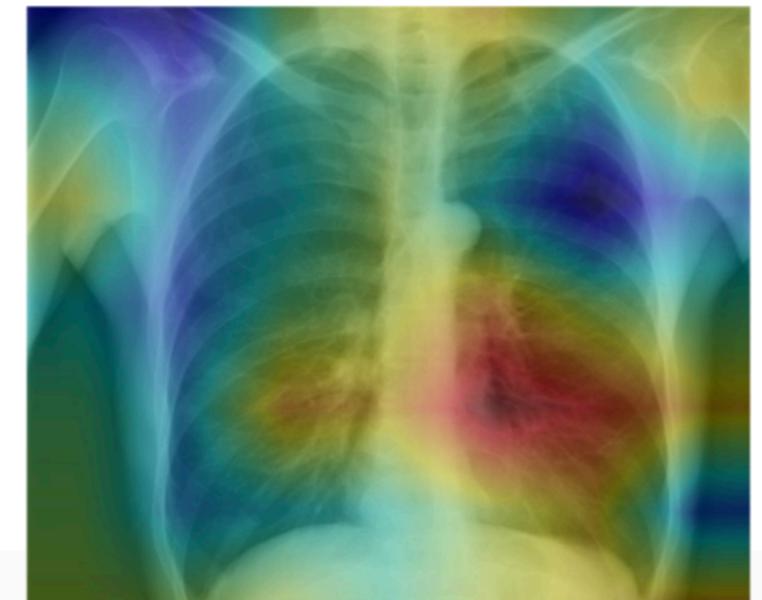


Input
Chest X-Ray Image

Task

CheXNet
121-layer CNN

Output
Pneumonia Positive (85%)



Q: Identify task, performance measure, and experience

What is Machine Learning?



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%)



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?

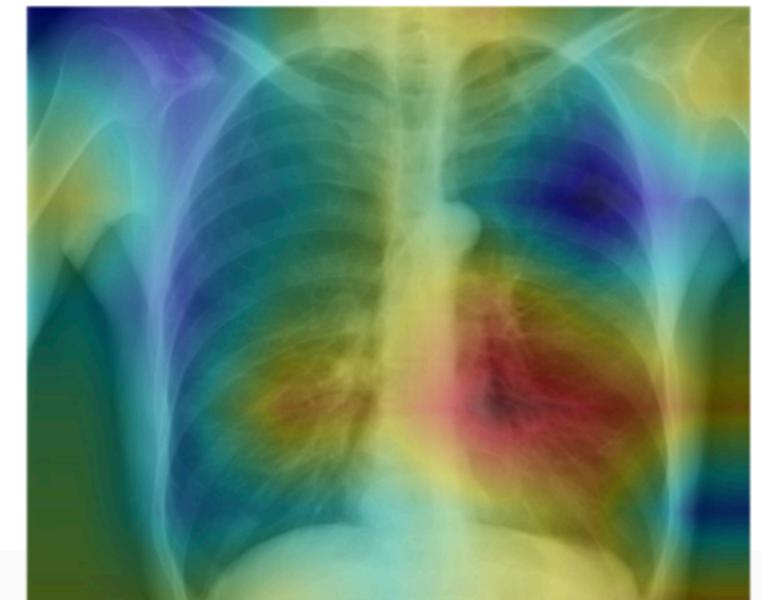
Experience
1000s of <image, disease> pairs



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

MS Teams

Team code: dr1od52

MS Teams (first interface)

The screenshot shows the Microsoft Teams desktop application interface. The top navigation bar includes a back/forward button, a search bar, and a user profile icon (ZP) with a green checkmark. Below the navigation bar, the 'Teams' tab is selected, indicated by a blue background. The main area displays 'Your teams' with two visible team cards: 'ML TA group' (pink card with 'MT') and 'CS 432' (blue card with 'C4'). A sidebar on the left contains icons for Activity, Chat, Teams (selected), Assignments, Calendar, Calls, and Help. The taskbar at the bottom shows various pinned application icons, and the system tray indicates battery level (78%), signal strength, and system status.

MS Teams (joining using team code)

The screenshot shows the Microsoft Teams application window. The left sidebar has a dark blue header with icons for Activity, Chat, Teams (selected), Assignments, Calendar, Calls, ..., Apps, and Help. The main area has a light gray header with a search bar and a user profile icon (ZP). The 'Teams' tab is selected, displaying a list of 'Your teams'. Two teams are visible: 'ML TA group' (pink square with 'MT') and 'CS 432' (blue square with 'C4'). A 'Join or create team' button is located in the top right corner of the main area, with a black rectangle highlighting it. The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators.

MS Teams (joining using team code)

The screenshot shows the Microsoft Teams interface. On the left, there's a vertical sidebar with icons for Activity, Chat, Teams (which is selected), Assignments, Calendar, Calls, ..., Apps, Help, and a mobile device icon. The main content area has a dark blue header with a search bar and a user profile icon. Below the header, the title "Join or create a team" is displayed. There are two main options: "Create a team" (with a plus sign icon) and "Join a team with a code" (with a group of people icon). A modal window is open over the "Join a team with a code" button, containing the text "dr1od52" in a input field and a "Join team" button. At the bottom of the screen, there's a taskbar with various application icons and system status indicators.

MS Teams (joining call)

The screenshot shows the Microsoft Teams application window. On the left is a vertical sidebar with icons for Activity, Chat, Teams, Assignments, Calendar, Calls, ..., Apps, and Help. The main area displays a team named "Machine Learning 2021...". The "General" channel is selected, indicated by a grey bar at the top. The channel header includes tabs for General, Posts, Files, Class Notebook, Assignments, and "1 more". A search bar is at the top right, along with user profile "ZP", window controls, and a "Meet" button. The main content area features a welcome message: "Welcome to Machine Learning 2021 [ES654]" and "Try @mentioning the class name or student names to start a conversation." Below this is a cartoon illustration of a person with a speech bubble, a bell, a calendar, and a phone. A notification at the bottom left says "New channel meeting ended: 56s" with a "Reply" link. At the bottom center is a blue "New conversation" button. The taskbar at the bottom shows various pinned icons, and the system tray indicates battery level (78%), signal strength, and the date/time (12:11 PM).

MS Teams (joining call)

The screenshot shows the Microsoft Teams application interface. On the left is a vertical navigation bar with icons for Activity, Chat, Teams (selected), Assignments, Calendar, Calls, ..., Apps, and Help. The main area displays a team channel named "Machine Learning 2021...". The "General" tab is selected. A recent post from "General" is highlighted, showing a message about a "New channel meeting ended: 56s" with a "Join" button. This message is enclosed in a black rectangular box. Below it, another message shows a "New channel meeting started" with a "Reply" button. At the bottom of the channel page, there is a "New conversation" button. The top right corner shows a user profile "ZP" with a green checkmark, and the top right of the window has standard minimize, maximize, and close buttons.

MS Teams (joining call)

The screenshot shows the Microsoft Teams application interface. On the left, there's a vertical sidebar with icons for Activity, Chat, Teams (which is selected), Assignments, Calendar, Calls, ..., Apps, and Help. The main area displays a team channel named "Machine Learning 2021...". The "General" tab is selected. A message from "General" is shown, stating "New channel meeting ended: 56s" with a "Reply" link. Below it, another message says "New channel meeting started" with a "Reply" link. At the bottom of the message list is a "New conversation" button. In the top right corner of the main window, there's a "Meet" button with a video camera icon. This "Meet" button is highlighted with a red rectangular box. The status bar at the bottom shows various system icons and the battery level at 78%.

Do not click
on meet