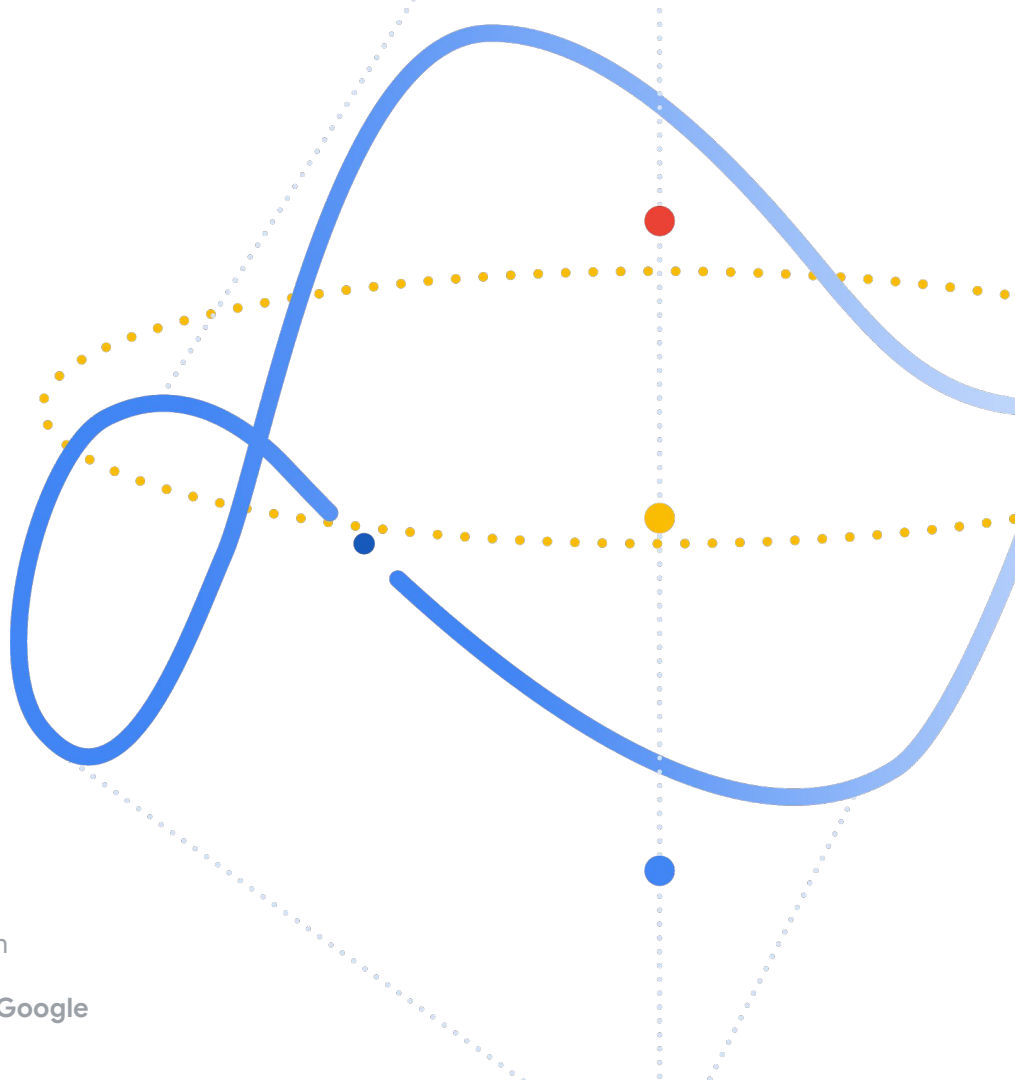


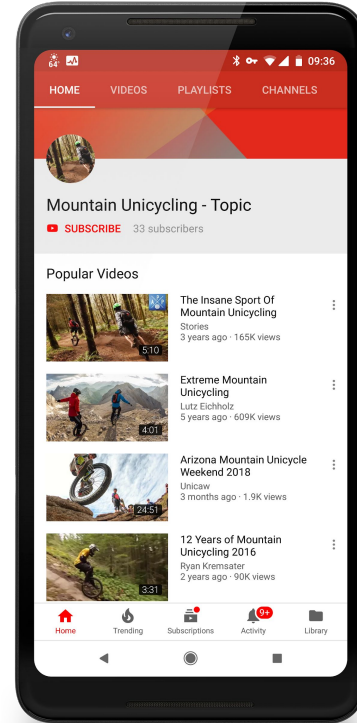
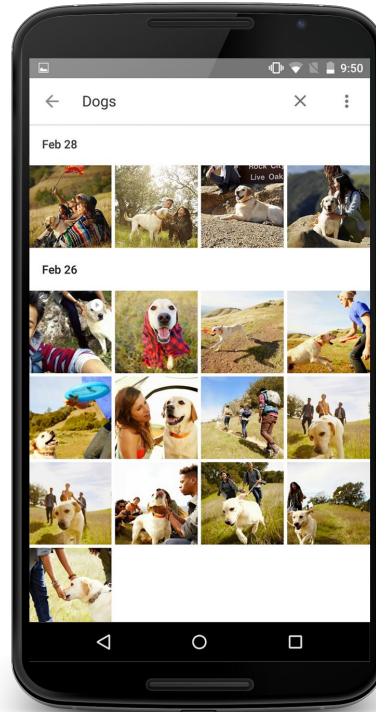
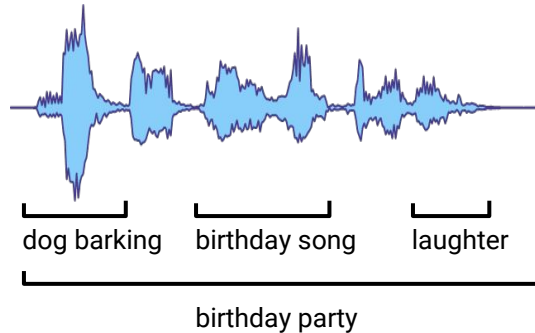
Applications of Computer Vision in Image and Video Web Advertising

Jesse Berent, Research Scientist, Google AI Perception
with help from Jingbin Wang, Google
work presented is from many people and teams at Google



Google AI Perception

“Enable machines to achieve human expert-level intelligence in sensory perception”



Outline

Image and Video Adverts on the Web

Understanding Advert Content with Computer Vision

Image Advert Retargeting

Video Advert Summarization

Image Advert Enhancement

Open Research Challenges



Image and Video Ads on the Web

Display and Video Ads

Advertisers



Ad Network

Publishers



Image Creative



Video Creative



Text Creative

History: The first banner ad in 1994

1994: AT&T ad on Hotwired appears as one of the 1st banner ads, Click Rate = 44%



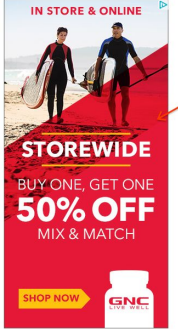
Image and Video Ads Online Today

bing and hiking keep you active during the warmer months. Learn
ling and the Iditarod to keep you moving this winter.

graphy
y is the perfect way to enjoy the outdoors. Whether it's taking action
pictures or going underwater with your camera, adventure
fun. See more >

Clubs and Networks
and networks have become very popular in recent years. They are a
les and trail locations with other adventure sport enthusiasts. Find
enture sports clubs and networks here. See more >


ving gives you the freedom to soar through the air like a bird. Learn
sme air sports. See more >



AT&T 10:19 PM 100%

3.6k 773

Picked for you Style tips



BLACK FRIDAY PRICES
40% OFF
MAKING THE MOST OF THE TOP DEALS

Looking for deals? Do not wait, there is Black Friday prices...
532 581

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Live Election Coverage
7 Days Free. Restrictions Apply.
Sling.com

Learn More

3 1 Comment


Like Comment Share

Alphabet Inc.

Sponsored

Battle head-to-head in the Clash Royale Arena!

Battle head-to-head for Trophies, Crowns and glory!
From the creators of Clash of Clans.



Clash Royale ★★★★★ Install

Clash Royale

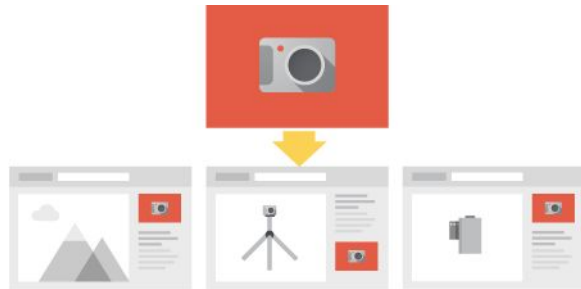
TWTR +3.99% CRM -1.14% GOOGL -0.56%

Google looking into buying Twitter, says report

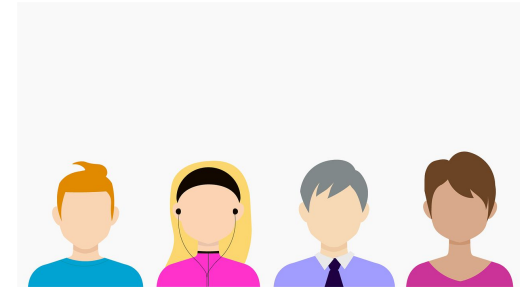
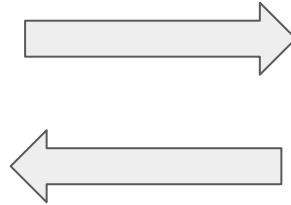


How does the ecosystem benefit from computer vision

Better looking ads - Enhancing, Generating
More useful and enjoyable ads - Visual Understanding



Advertisers



Users

More engaged users

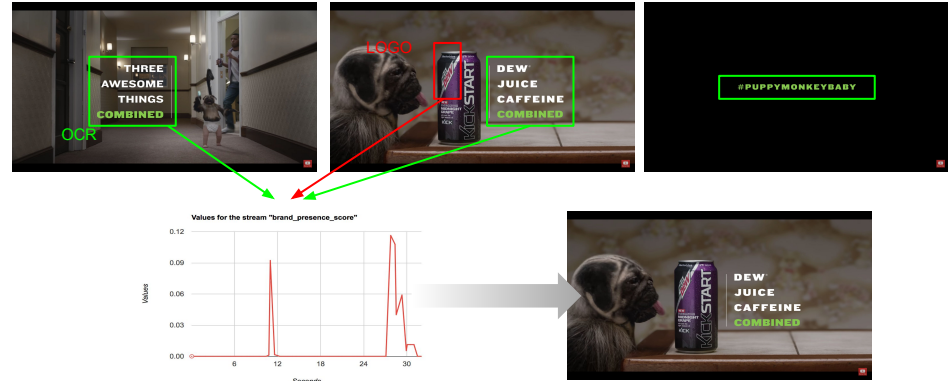


Understanding Ad Content

What can we do with today's computer vision

Understanding the structure of the adverts with vision models

- Topics and Objects
- Text (OCR)
- Brand (logo) and Products
- Faces
- Salient regions



Example: Brand Presence along the video advert

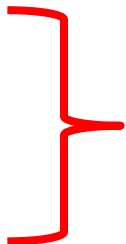
What can we do with today's computer vision

Allows to do for example:

Adapt creative to different formats

Visual quality improvements

Relevance scoring



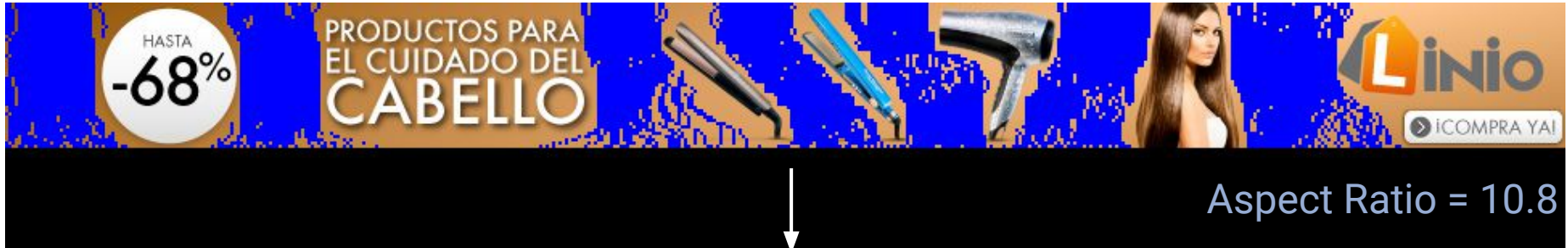
Focus of this talk



Image Ad Resizing

Automatic Retargeting to different aspect ratios

Seam Carving for Image Ad Resizing



Seam Carving Example

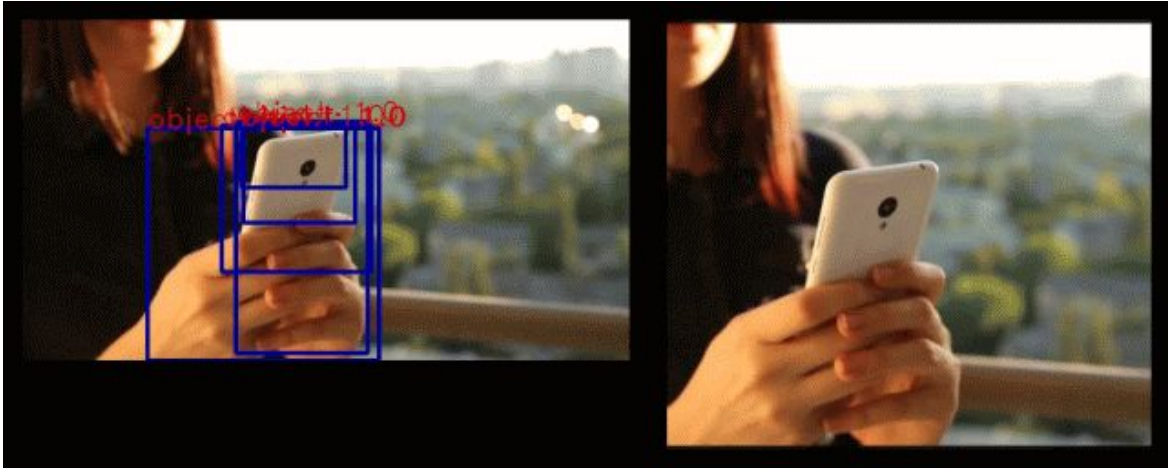




Video Ad Resizing

Automatic conversion from landscape to portrait

Adaptive Video Cropping



Video Landscape to Portrait Retargeting

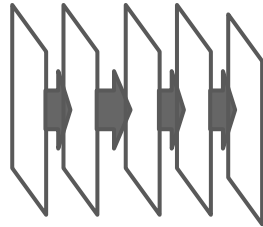




Video Ad Summarization

Automatic reduction of long video ads to short ones

Automatic Creation of Shorter Video Ad Creatives



Convolutional Neural
Networks



Temporal saliency of
each frame

Automatic Creation of Shorter Video Ad Creatives



15sec video

Selected highest scoring clips

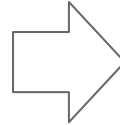
5sec video



Automatic Creation of Shorter Video Ad Creatives



17 sec video ad



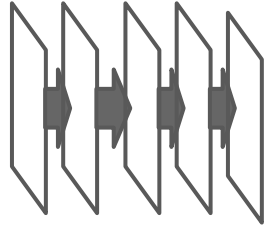
6 sec video ad

A decorative graphic in the top-left corner consisting of a yellow circle, a green arc, a red line, and a dotted yellow path.

Image Ad Enhancement

Making ads look better on all screens

Sharpening and superresolution



Deep Upscaling Neural Network



Sharpening and superresolution



Sharpening and superresolution

**Get Auto Insurance For
As Low As \$7 / Month**

**Get A Free Quote In
Less Than 3.5 Minutes!**

**Certified
Money Saver!**

[Click Here!](#)




**Get Auto Insurance For
As Low As \$7 / Month**

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Less Than 3.5 Minutes!**

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Conclusion and Open Research Challenges

Conclusions

There are a lot of applications for computer vision technology in the digital advertising world

Current technology for understanding image and video creatives can help advertisers deal with all the formats and platforms

However, there are still a lot of research challenges in this space..

Open research challenges

Some examples:

Modeling temporal saliency in video advertisements

Non-topical understanding - emotion, mood, style, cinematography

Understanding the storyline, visual rhetoric, punch line, climax and other higher level concepts

Generative models for image and video ad creation

Thanks!