Applications of Computer Vision in Image and Video Web Advertising

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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

Ad Network

Advertisers

Image Creative

Video Creative

Text Creative

Publishers
History: The first banner ad in 1994

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

Source: https://mashable.com/2013/08/09/first-banner-ad
Image and Video Ads Online Today

- **In Store & Online**
  - **Storewide Buy One, Get One 50% Off Mix & Match**
  - **Black Friday Deals 40% Off Top Deals**

- **Clubs and Networks**
  - Hiking and biking are popular during the warmer months. Learn more about trails and activities to keep you active.

- **Use the Pinterest App**

- **Sling TV**
  - Watch live election coverage, debates, and more on CNN with Sling TV.

- **Alphabet Inc.**
  - 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.

- **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

More engaged users

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

Aspect Ratio = 10.8

Aspect Ratio = 6.4
Seam Carving Example

From 300x600 to 160x600
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

Temporal saliency of each frame

Convolutional Neural Networks
Automatic Creation of Shorter Video Ad Creatives

Selected highest scoring clips

15sec video

5sec video
Automatic Creation of Shorter Video Ad Creatives

17 sec video ad

6 sec video ad
Image Ad Enhancement

Making ads look better on all screens
Sharpening and superresolution

Deep Upscaling Neural Network

HUGE SAVINGS ON TOYOTA 4RUNNER

CLICK HERE
Sharpening and superresolution
Sharpening and superresolution
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!