

Better Vision for Computer Vision

The logo for ENTROPY features the word in a stylized, white, sans-serif font. The letters 'E', 'N', 'T', 'R', 'O', and 'P' are white. The 'I' is a solid green vertical bar. The 'Y' is white with a green horizontal bar across its upper portion. The background of the slide is dark gray, and a horizontal bar with segments of green, blue, purple, red, orange, and yellow is positioned above the logo.

ENTROPY

Presenter:

Nathan Wheeler
CEO, Co-Founder



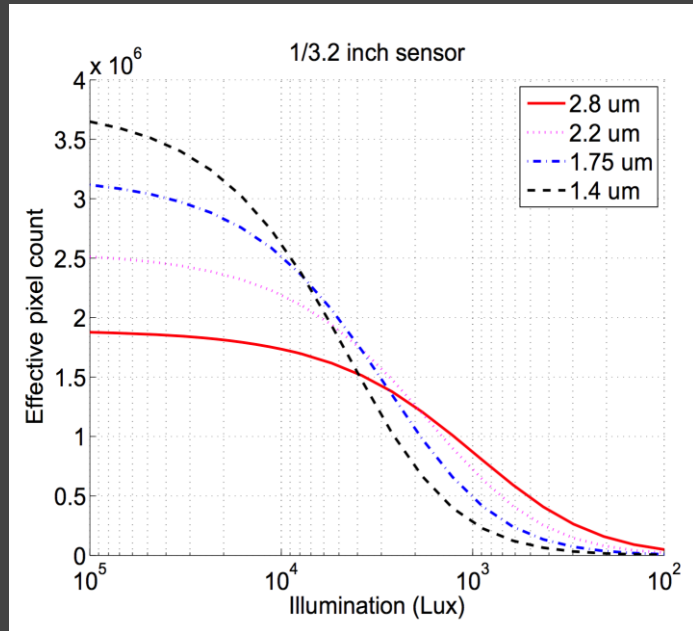
Computer Vision Craves Resolution!

- In a perfect world there would be unlimited resolution and processing power for IVA
- But in the real world, resolution is forever a game of tradeoffs
 - More pixels = slower speeds/more GPU/not "real time" etc.
 - Less pixels = reduced accuracy/higher error rate - greater risk in all analytics



Resolution of Conventional Video Capture is Limited

- Small pixels = poor sensitivity, low dynamic range, low SNR, motion blur
- Larger pixels = larger format sensors and optics, exponential cost
- Hard limit on pixel size: light diffraction
- Megapixel count \neq resolution!



Source: Xiao, Feng, et al. "Mobile Imaging: the big challenge of the small pixel." Digital Photography 7250 (2009): 72500

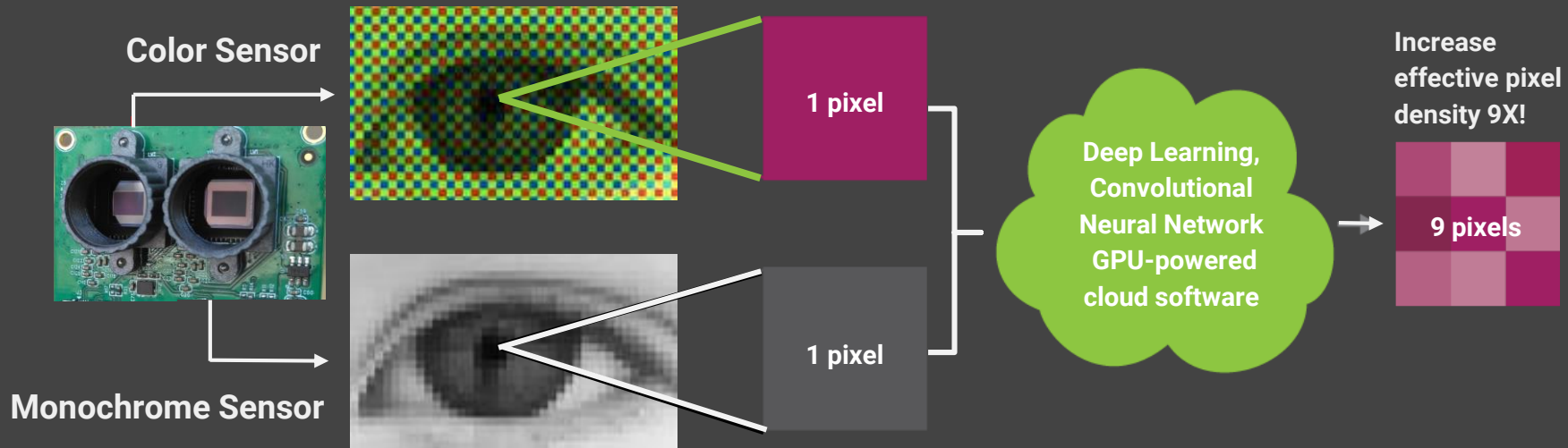
Computer Vision is NOT like Human Vision

- 42/yo color imaging methods based on heavy tradeoffs for human visual perception needs
- Modern cameras are based ONLY upon human perception
- What's good for human eyes does not correlate with what's good for computer perception



Fixing What's Broken

From two streams we reconstruct imagery to 9x effective resolution



Deep Learning the Degraded Pipeline



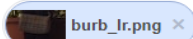
- DL of lens blur and sensor sampling
- DL of the imaging pipeline model
- DL of video compression artifacts
- DL of parallax model to fuse color and panchromatic frames

2MP / 1080p



18MP / 6K





darkness



All

Images

Maps

Shopping

More

Settings

Tools

About 2 results (0.83 seconds)

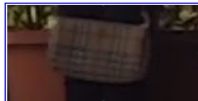


Image size:
1920 x 1080

No other sizes of this image found.

Best guess for this image: **darkness**

[Darkness - Wikipedia](#)

<https://en.wikipedia.org/wiki/Darkness>

Darkness, the polar opposite to brightness, is understood as a lack of illumination or an absence of visible

Darkness



Darkness, the polar opposite to brightness, is understood as a lack of illumination or an absence of visible light. Human vision is unable to distinguish color in conditions of either high brightness or darkness. In conditions with insufficient light levels, color perception ranges from



handbag



All

Images

Maps

Shopping

More

Settings

Tools

About 2 results (0.98 seconds)



Image size:
1920 x 1080

No other sizes of this image found.

Best guess for this image: **handbag**

[Handbags and Accessories - Macy's](#)

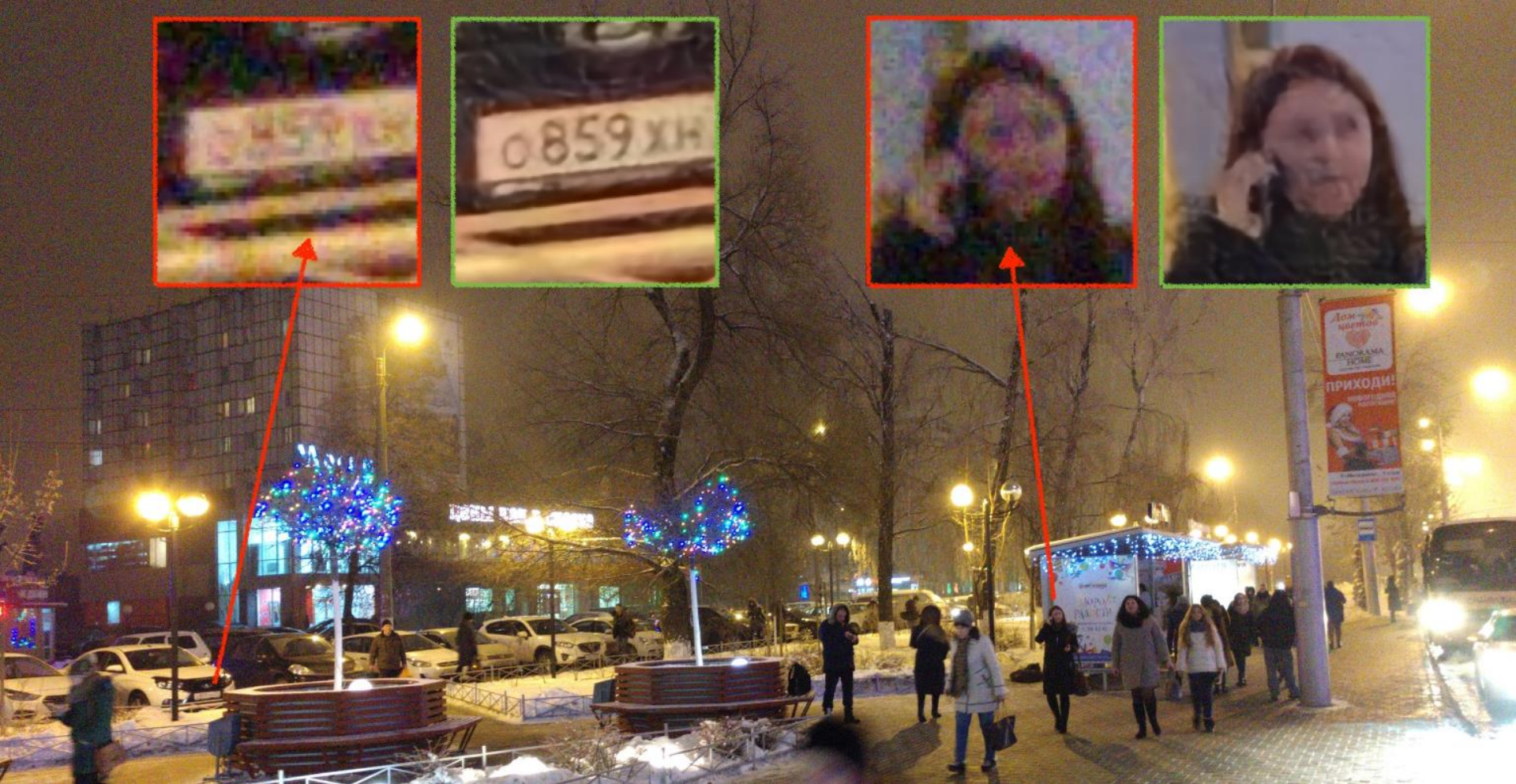
<https://www.macys.com/shop/handbags-accessories?id=26846>

Search With Entropix Technology

Handbags



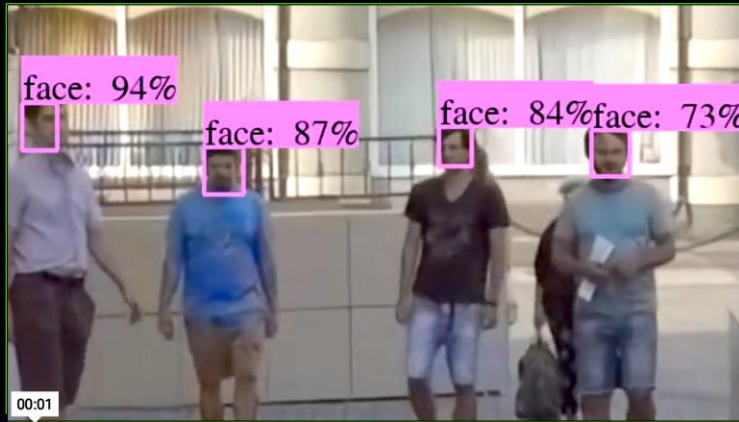
A handbag, also called purse in North American English, is a handled medium-to-large bag used to carry personal items. Wikipedia



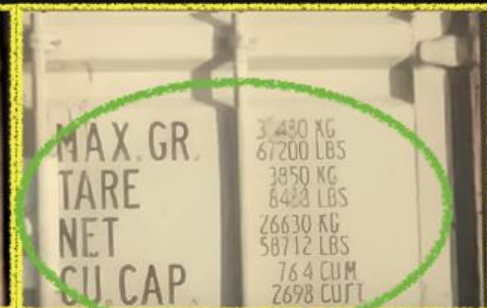


2018-Nov-13 12:26:13

from_dekabrist_treeye_faces...



Timeline and playback controls. The timeline shows a sequence of frames with markers at 500ms, 1s, 2s, and 3s. A green bar at the bottom indicates the current frame's position. Playback controls include a play button and a progress slider. The current time is 09:56:35. A '00:01' label is visible near the 2s mark.



New Layout* x + v

Search

NX4-SERVER-1
admin

Server NX4-SERVER

- Entropix-Archive
- GENERIC_RTSP-stream2
- GENERIC_RTSP-stream3
- http://192.168.3.130:7001
- http://192.168.3.130:7002
- http://192.168.3.141:8082
- http://192.168.3.143:6001
- http://192.168.3.143:6002
- http://192.168.3.161:8082/
- tv3-double

Web Pages

Users

Other Systems

Local Files

http://192.168.3.161:8082/

Accuracy: 7% Accuracy: 84%

LIVE

Search

Any time

Any camera

No objects detected

5:14:03 PM

http://192.168.3.161:8082/

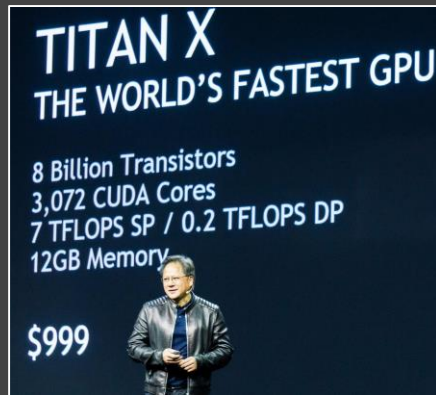
LIVE SYNC





Hyperscale Inferencing Makes it Possible

- Our magic is computationally intensive
- GTC 2015 was our Big Bang moment
- Bought a Pascal DIGITS devbox
- Migrated our testing to Volta
- Deploying our products this year on T4's in the cloud



T4

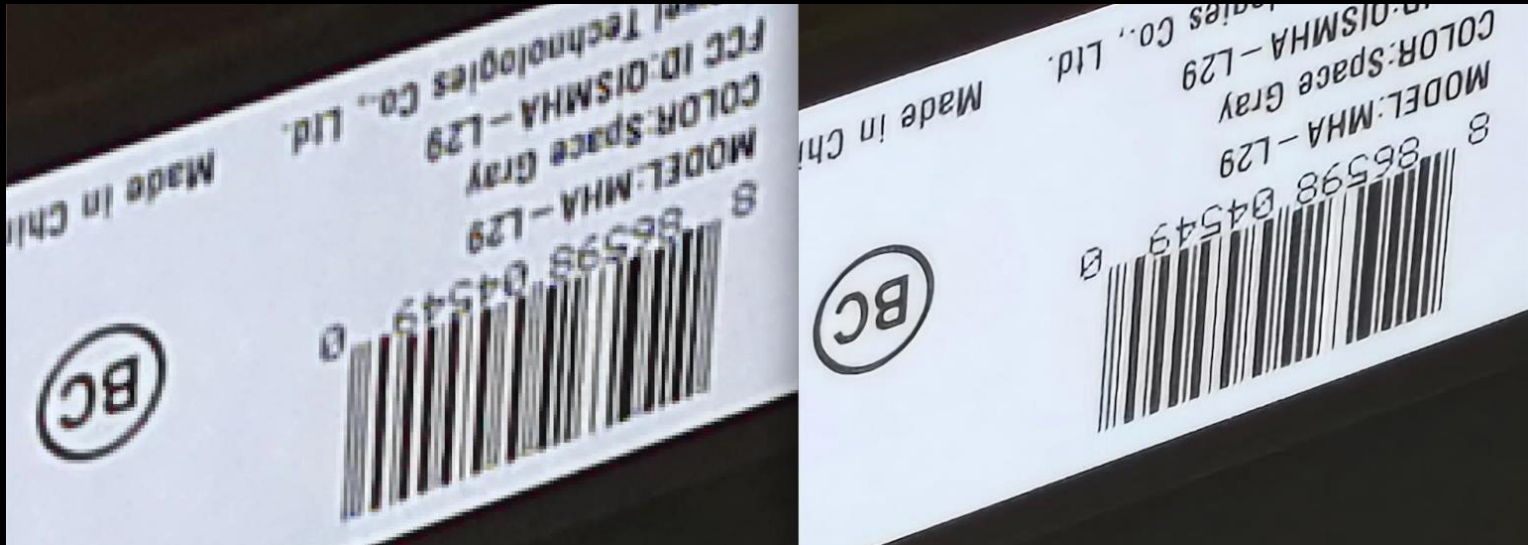
Use Case - Fellow Robots

- Inventory Mgmt System using 3x 50MP DSLR Cameras
- Dual 12MP for running detection portion
- Detected regions post-processed for barcode, text and product count details

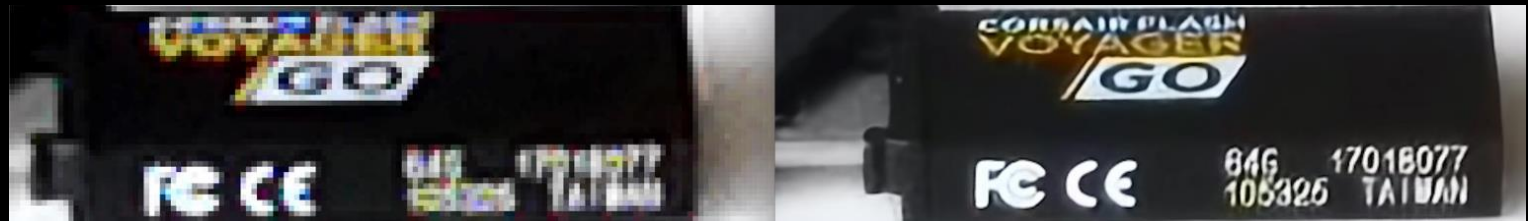


Use Case - Fellow Robots - Examples

Barcodes
and Text



Product
Details



How We're Deploying It



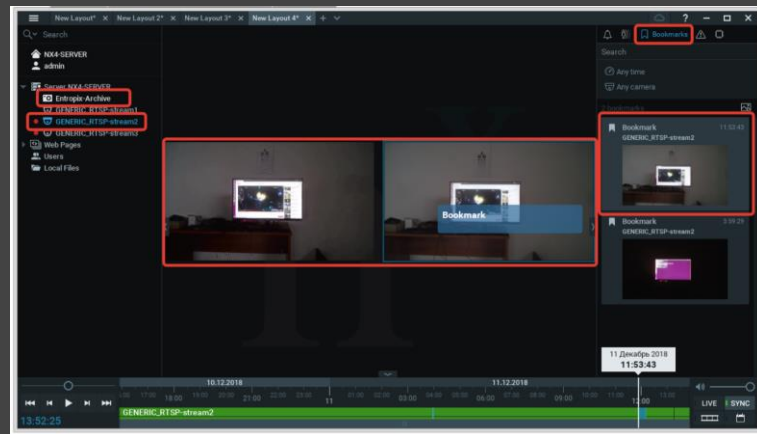
Dual Sensor Camera

- Enterprise Security/Public Safety markets
- Deployments of thousands of cameras
- Technology applicable to all CV applications



Ready for your IVA

- 15x prototype dual 1080p/6K surveillance cameras for testing
- Dual 12MP smartphone and associated app for testing with extreme resolution Visual Analytics
- Integrated with Nx Meta™ enterprise video management platform
- Entropix Resolution Engine™ SaaS is ready for testing with strategic partners



API

All Smart Video Applications Can Benefit



Security

- Retail Automation
- Transportation
- Logistics
- Construction

Planned

- Robotics
- Automotive
- Body-worn
- Consumer

Thank You!



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