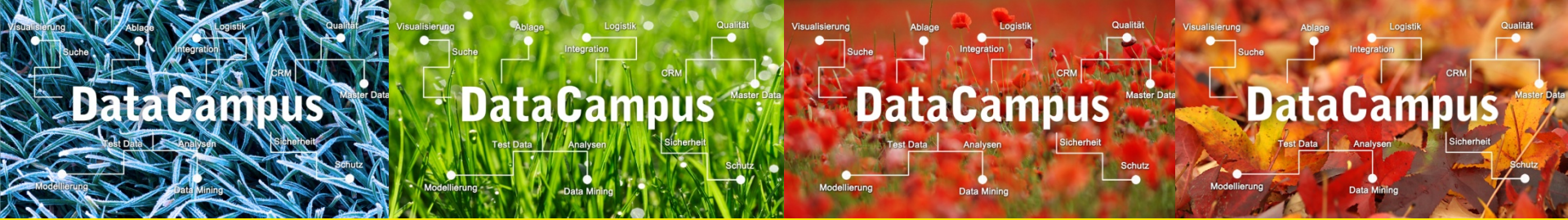

Artificial Super Vision

Ulf Schöneberg

Bundesdruckerei

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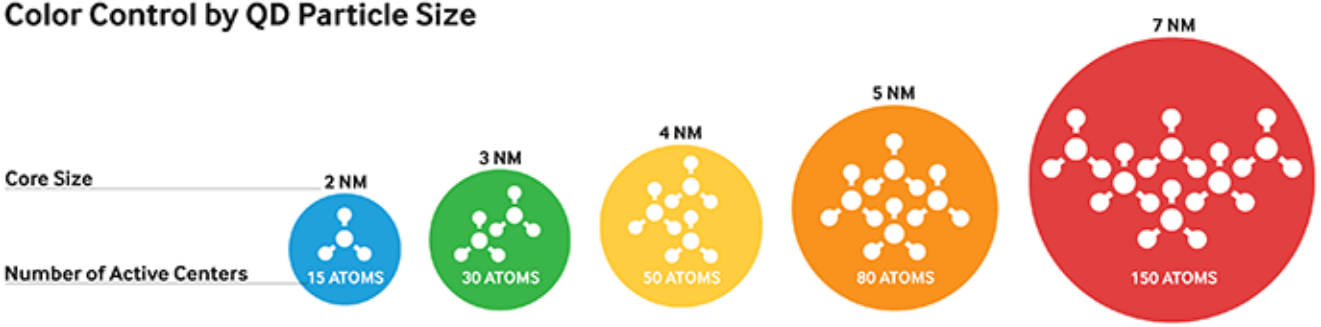
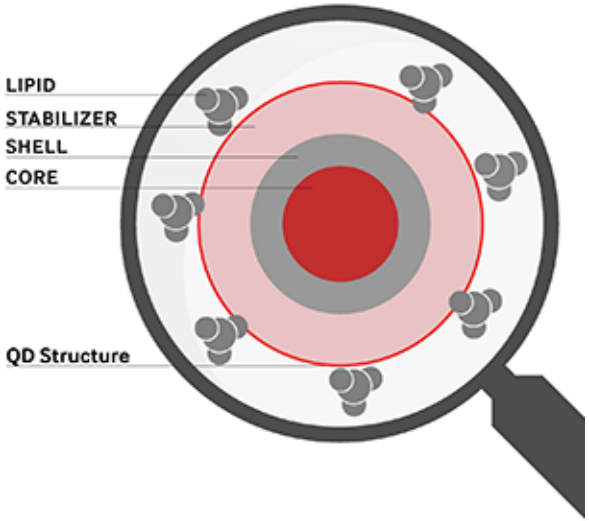
Color Control by QD Particle Size



Depending on size,
quantum dots emit different color light
due to quantum confinement.
Illustrated is the range of QDs with emission
gradually stepping from violet to red.



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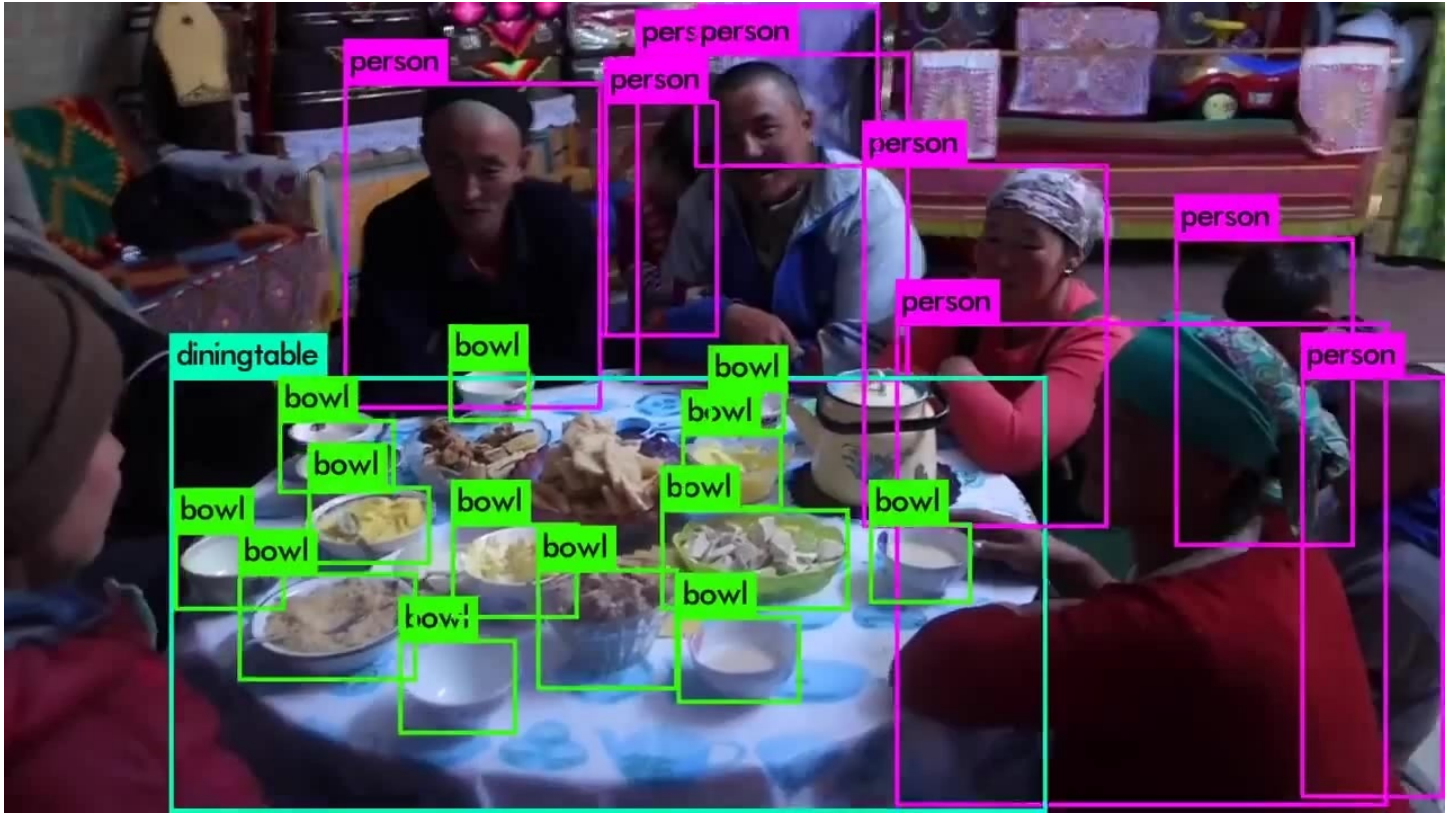
/weaving
d = 0.1045
bundle
one
(01)
(02)
(03)
(04)
0.0 m
9.3 m
/binding
d = 0.4725
9.3 m
0.0 m
/binding
d = 0.7956
y = 30
y = 40
y = 50
y = 60
y = 70



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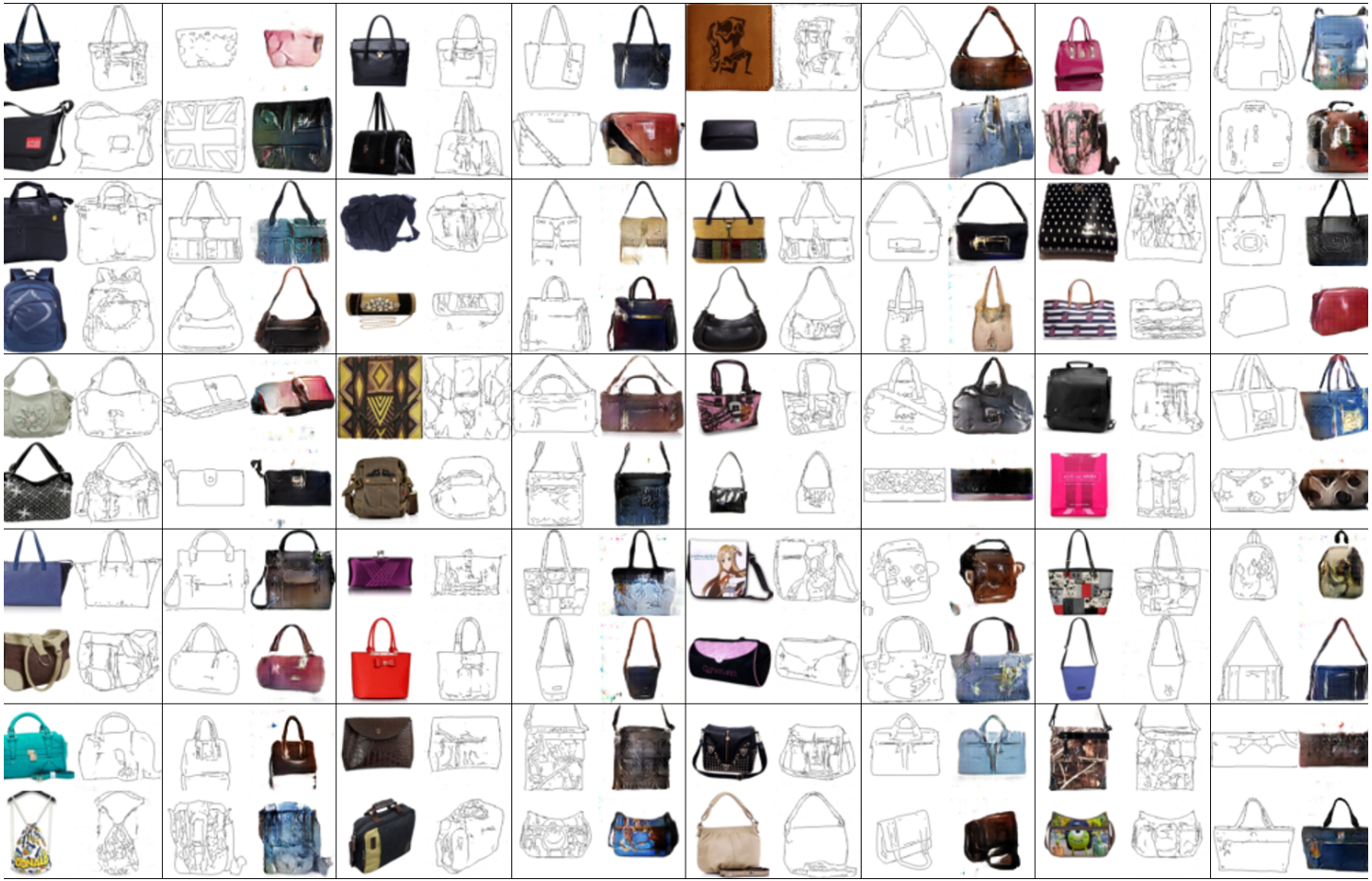

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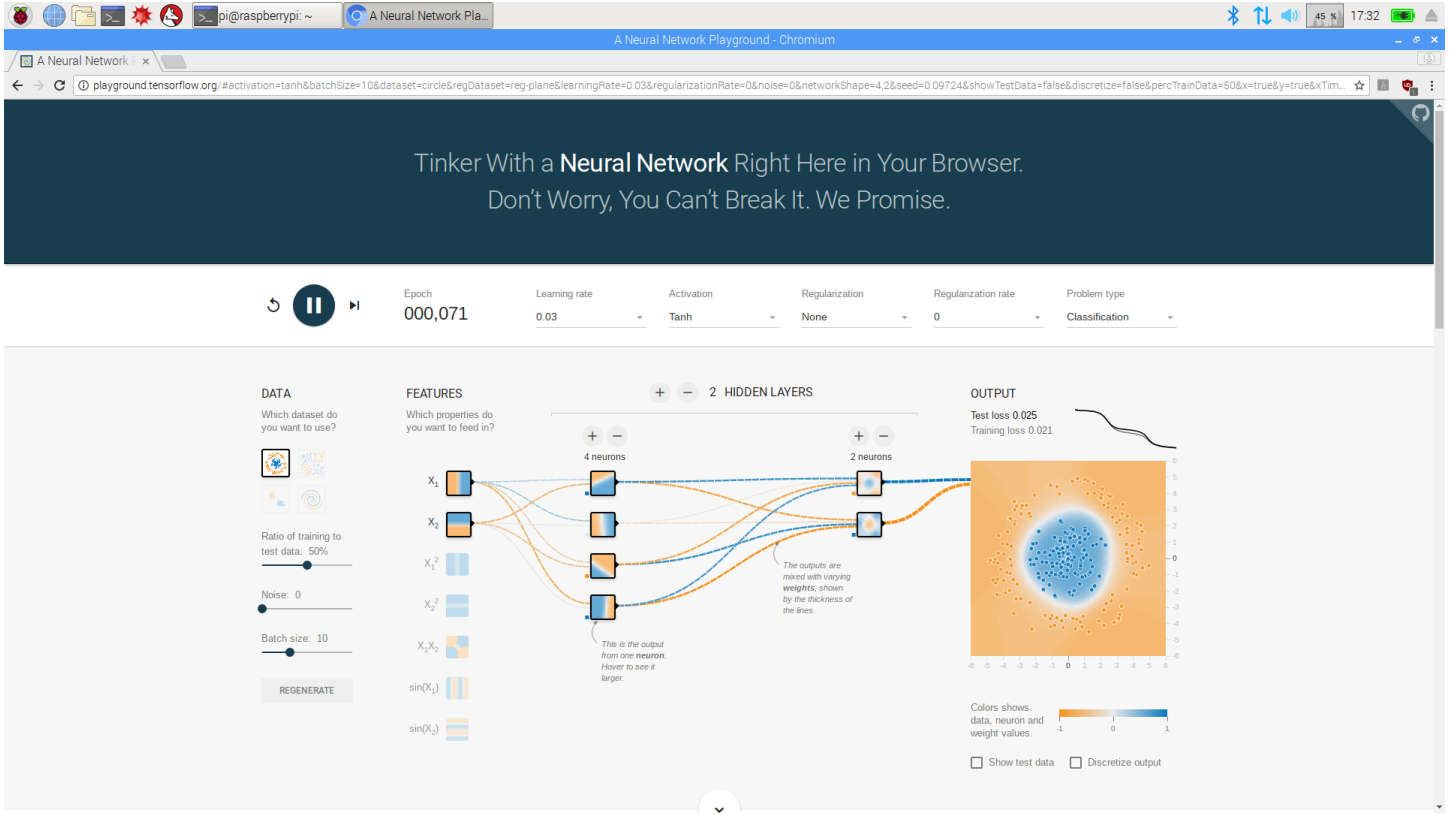
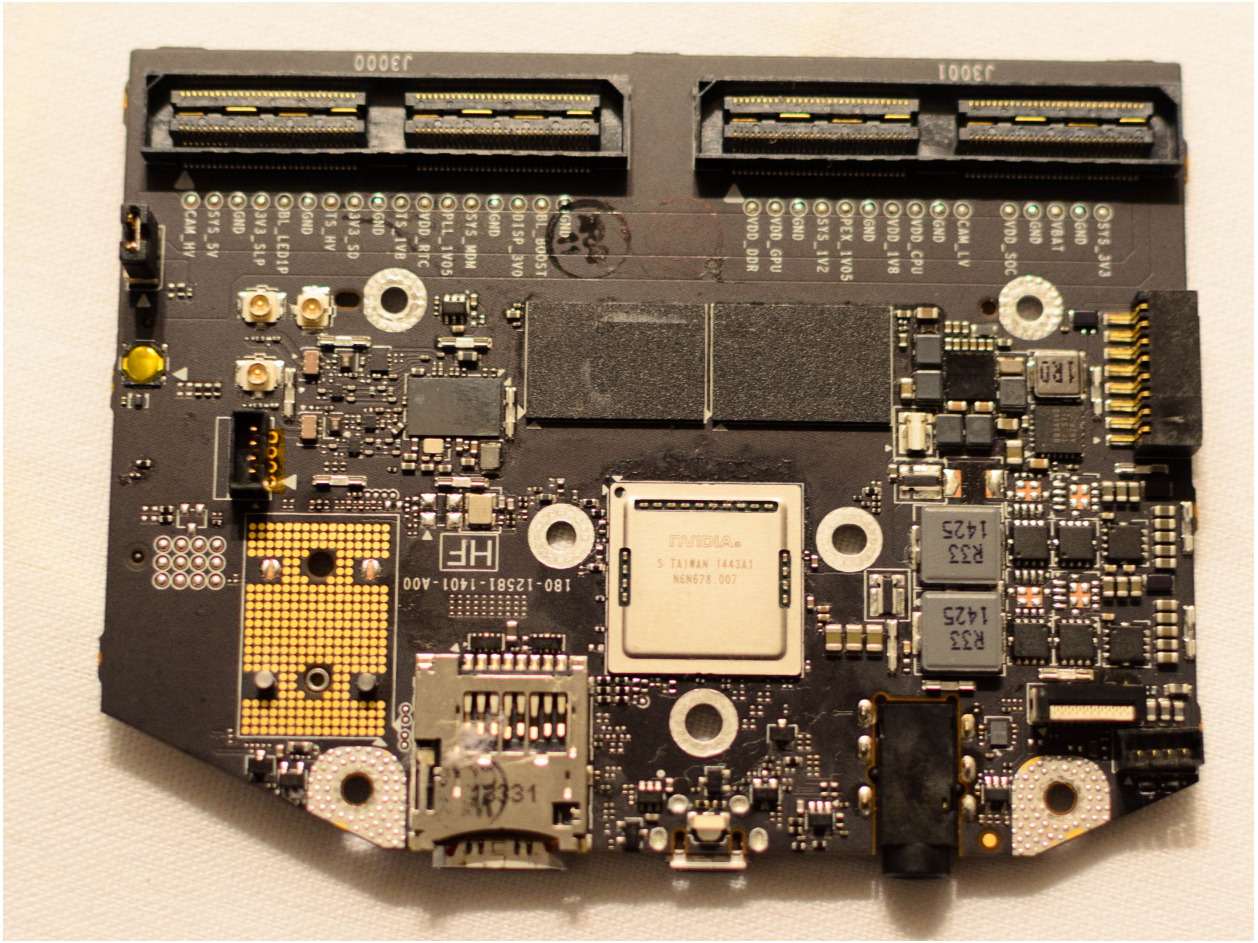

A Neural Network Playground - Chromium
playground.tensorflow.org/#activation=tanh&batchSize=10&dataset=circle&regDataset=reg-plane&learningRate=0.03&regularizationRate=0&noise=0&networkShape=4,2&seed=0.09724&showTestData=false&discretize=false&percTrainData=50&x=true&y=true&xTim...
Tinker With a Neural Network Right Here in Your Browser.
Don't Worry, You Can't Break It. We Promise.
Epoch
000,071
Learning rate
0.03
Activation
Tanh
Regularization
None
Regularization rate
0
Problem type
Classification
DATA
Which dataset do you want to use?
Ratio of training to test data: 50%
Noise: 0
Batch size: 10
REGENERATE
FEATURES
Which properties do you want to feed in?
2 HIDDEN LAYERS
4 neurons
2 neurons
The outputs are mixed with varying weights, shown by the thickness of the lines.
This is the output from one neuron. Hover to see it larger.
OUTPUT
Test loss 0.025
Training loss 0.021
Colors shows data, neuron and weight values.
Show test data
Discretize output



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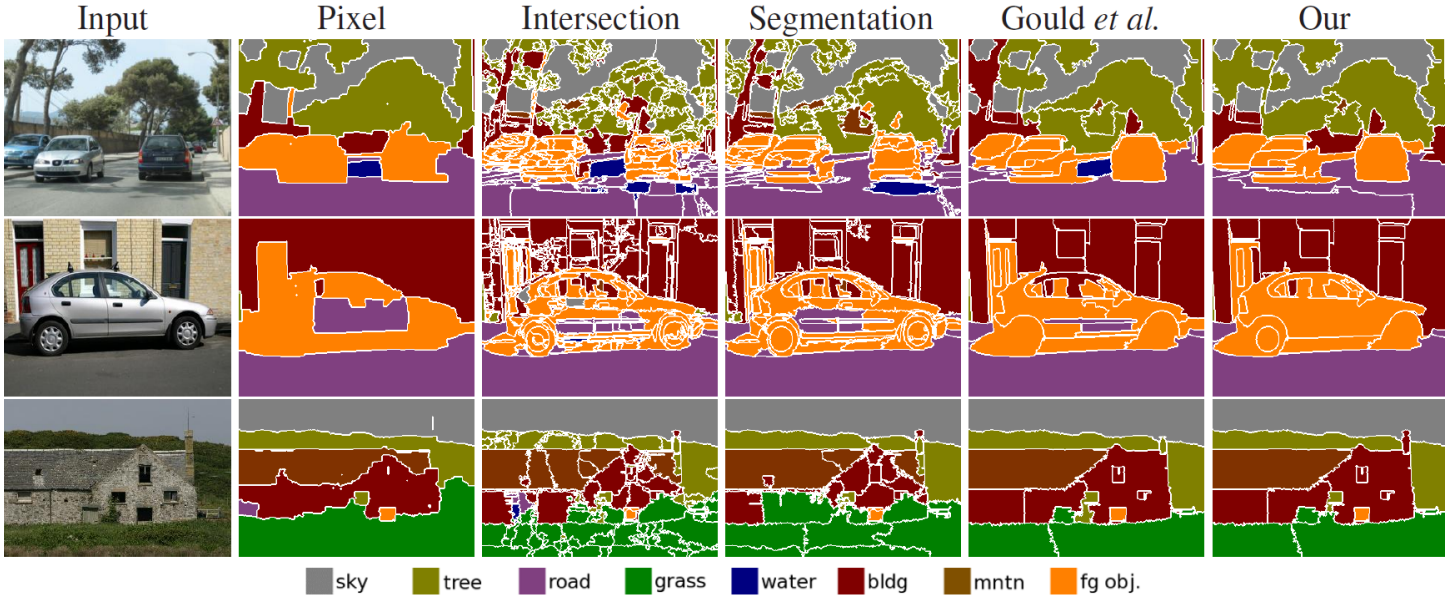
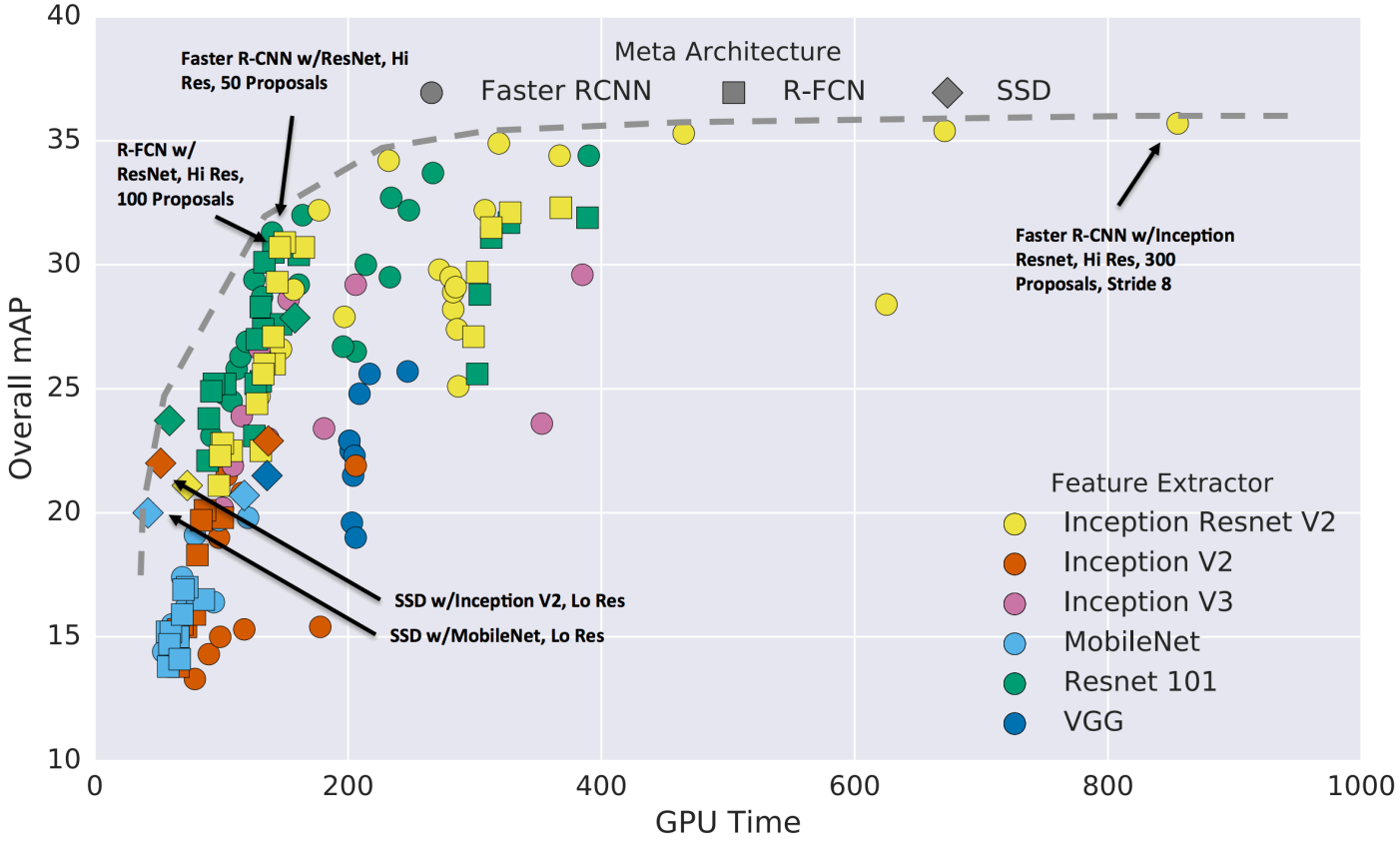
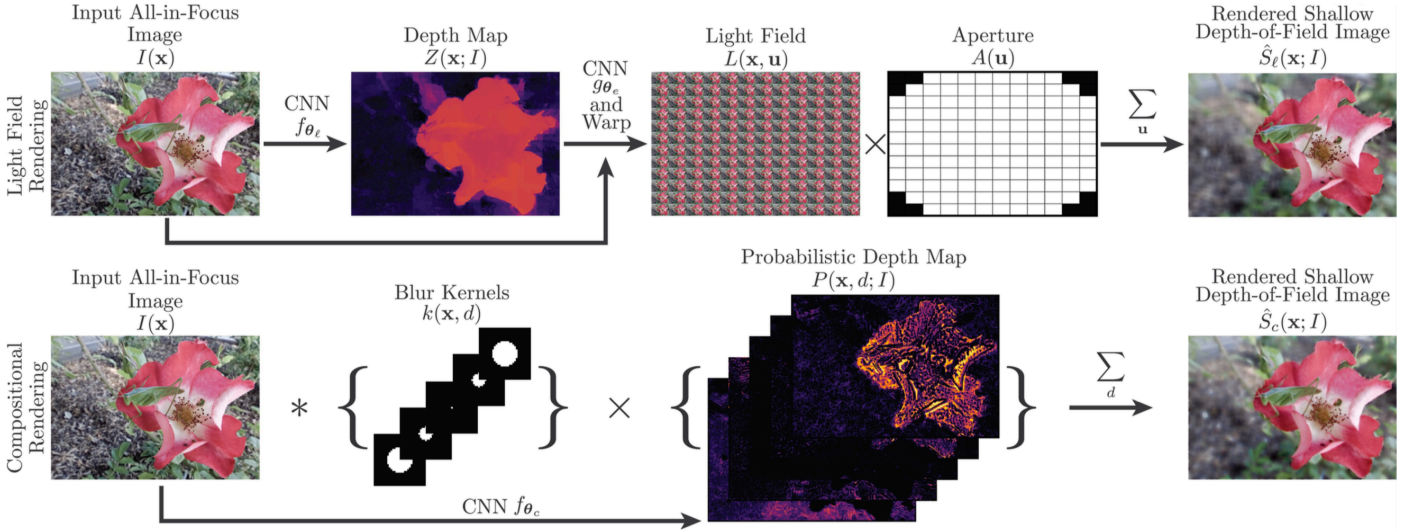
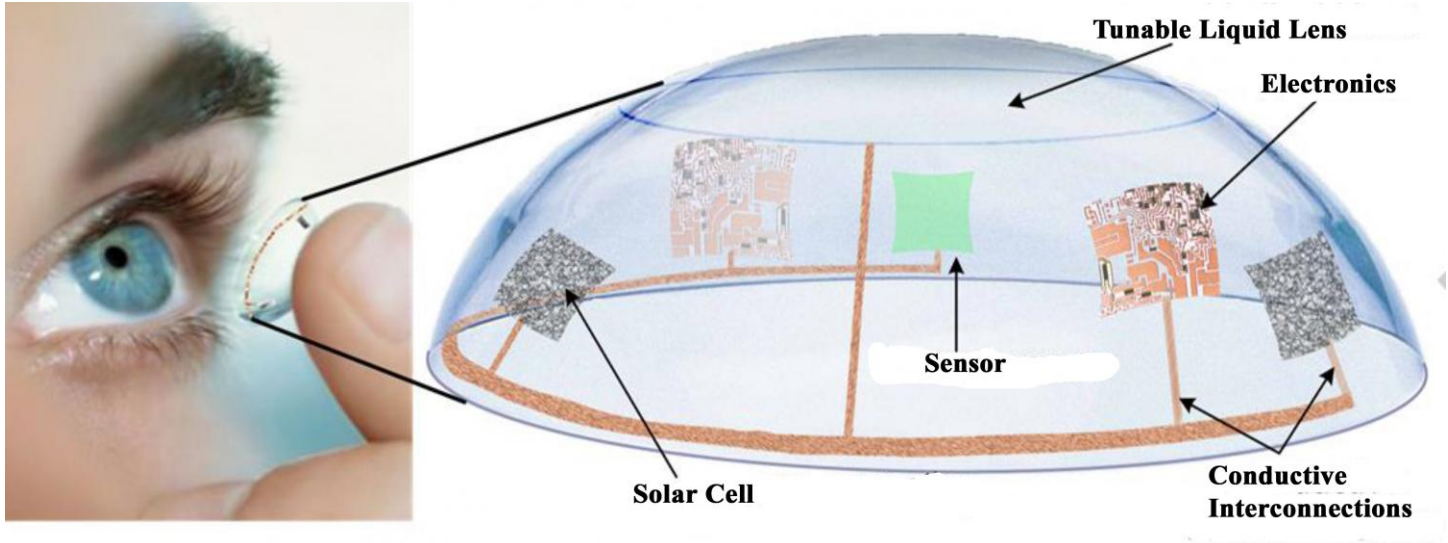

Input
Pixel
Intersection
Segmentation
Gould *et al.*
Our
sky
tree
road
grass
water
bldg
mntn
fg obj.


Meta Architecture
Faster RCNN
R-FCN
SSD
Faster R-CNN w/ResNet, Hi Res, 50 Proposals
R-FCN w/ ResNet, Hi Res, 100 Proposals
Faster R-CNN w/Inception Resnet, Hi Res, 300 Proposals, Stride 8
SSD w/Inception V2, Lo Res
SSD w/MobileNet, Lo Res
Feature Extractor
Inception Resnet V2
Inception V2
Inception V3
MobileNet
Resnet 101
VGG
Overall mAP
GPU Time
10
15
20
25
30
35
40
0
200
400
600
800
1000


Light Field Rendering
Input All-in-Focus Image $I(\mathbf{x})$
CNN f_{θ_ℓ}
Depth Map $Z(\mathbf{x}; I)$
CNN g_{θ_e} and Warp
Light Field $L(\mathbf{x}, \mathbf{u})$
Aperture $A(\mathbf{u})$
$\sum_{\mathbf{u}}$
Rendered Shallow Depth-of-Field Image $\hat{S}_\ell(\mathbf{x}; I)$
Compositional Rendering
Input All-in-Focus Image $I(\mathbf{x})$
Blur Kernels $k(\mathbf{x}, d)$
Probabilistic Depth Map $P(\mathbf{x}, d; I)$
$\sum_{d}$
Rendered Shallow Depth-of-Field Image $\hat{S}_c(\mathbf{x}; I)$
CNN f_{θ_c}


Tunable Liquid Lens
Electronics
Sensor
Solar Cell
Conductive
Interconnections

BRIGHT
High Visibility
BRIGHT
High Visibility
LAKE OSWEGO
BRIGHT
High Visibility
BRIGHT
High Visibility
GUN SIGHT
CLEANER
Lake Oswego, OR

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