

A decorative graphic on the left side of the slide consists of a network of light blue lines and small circles, resembling a circuit board or a neural network diagram. The lines are vertical and horizontal, with some diagonal connections, and the circles are placed at various points along these lines.

CLASSIFICATION AND DETECTION WITH CONVOLUTIONAL NEURAL NETWORKS

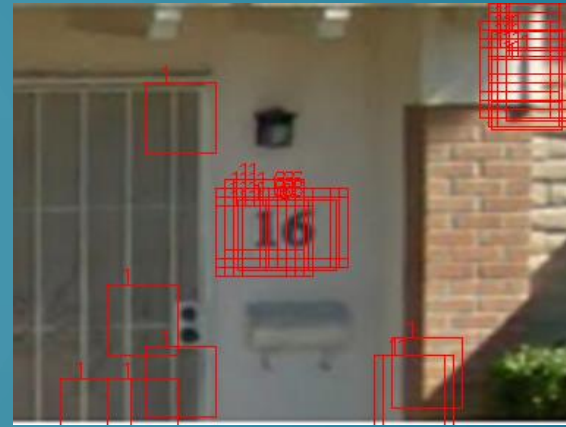
SCOTT LILLEBOE

CONVOLUTIONAL NEURAL NETWORK (CNN)

- VGG16
 - Pre-Trained on ImageNet data
 - Top 3 FCL removed and replaced with 3 FCL custom layers
 - 11 Classes with a softmax activation

PREDICTION FILTERING

- Digit threshold filtering
- Mean & Centroid distances
 - Mean filtering based on standard deviation from all the centroids
 - Average centroid distance for each detected digit filtering
- Non Maxima Suppression (results on next slide)





POSITIVE RESULTS

- Different fonts
- Scale invariance
- Orientation & Rotation
- Lighting (shadowing on bottom image)

EXAMPLE VIDEO





NEGATIVE RESULTS

- Text disrupted recognition
- Mean cluster filtering worked but removed the only positive result
- Didn't train on skewed digits
- Sliding window scaling was not robust enough

LESSONS LEARNED

- GPU vs CPU
 - 7s vs 50s per image
- Start simple
 - Work on less complicated images first
- Prototype quickly
 - Create smaller train/validation/test sets to iterate over more parameter/model combinations quickly

