

# Proofpoint Logo Detection & Classification

25th February 2021

Duke

# Agenda

- Image Reannotation
- Model Retraining (Faster RCNN & YOLO)
- Error Analysis & Scraping University Homepages
- Classifier Updates

# Reannotation

- Double-checked all our annotations
  - Catch missing logos
  - Improve training data quality
- 1100 additional logos
- Hopefully, detector performance improves



**LabelImg**

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# Example

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Read our response to the coronavirus pandemic.

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# Faster RCNN - Retraining

- Data Augmentation Incorporated
  - Brightness
  - Contrast
  - Rotation
  - Flip
- Model will be re-trained
  - Ran into some errors with GPU memory

# YOLO

- Using cleaned Test Annotations.
- 0.1 confidence threshold.

	Precision	Recall	mAP
New	0.803	0.882	0.824
Old	0.825	0.836	0.782

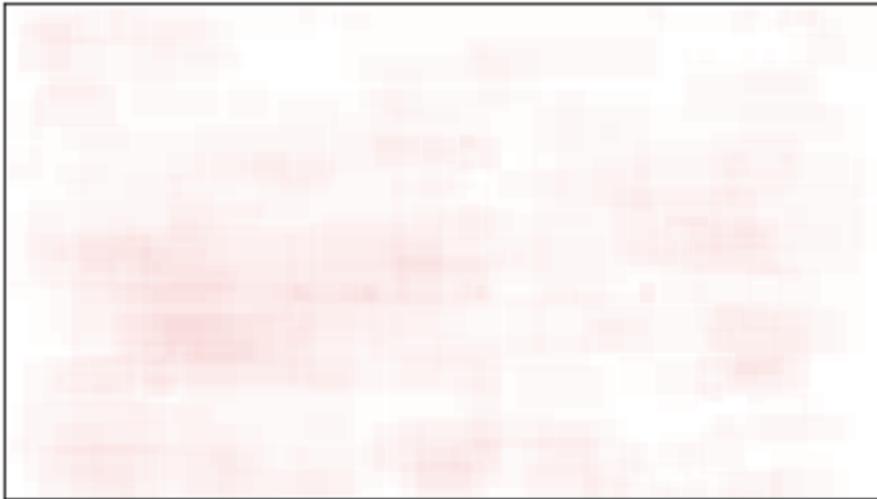
	Precision	Recall
<b>Faster-RCNN</b>	0.82	<b>0.855</b>
<b>YOLO-New</b>	<b>0.835</b>	<b>0.855</b>
<b>YOLO-Old</b>	0.816	0.832

	False-Positives	False-Negatives
<b>Faster-RCNN</b>	360	279
<b>YOLO-New</b>	<b>325</b>	<b>278</b>
<b>YOLO-Old</b>	360	321

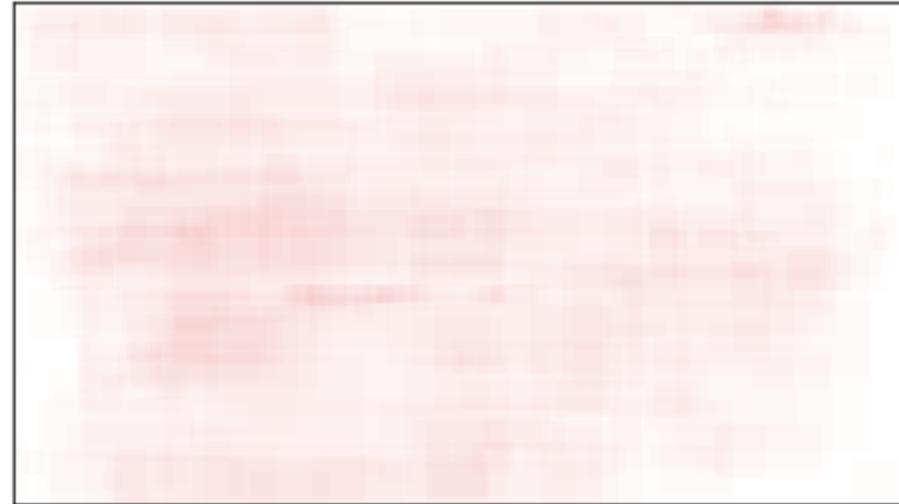
# Error Analysis

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YOLO-New False-Positives

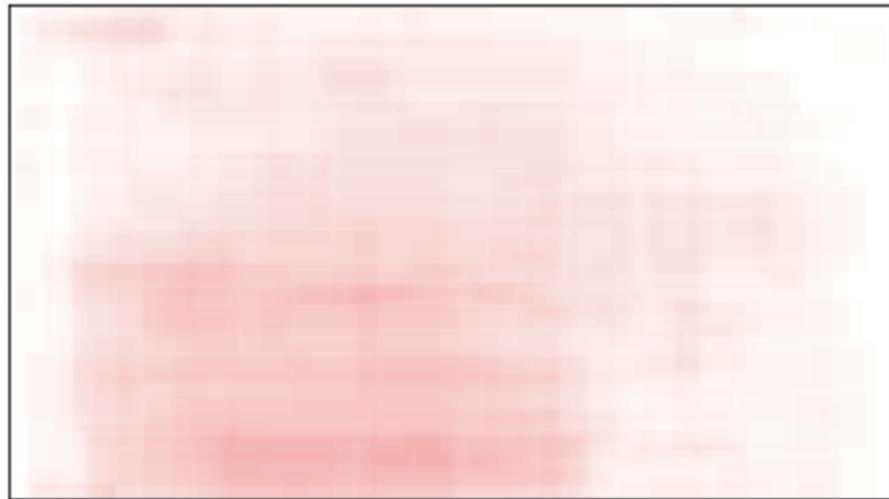


Faster-RCNN False-Positives



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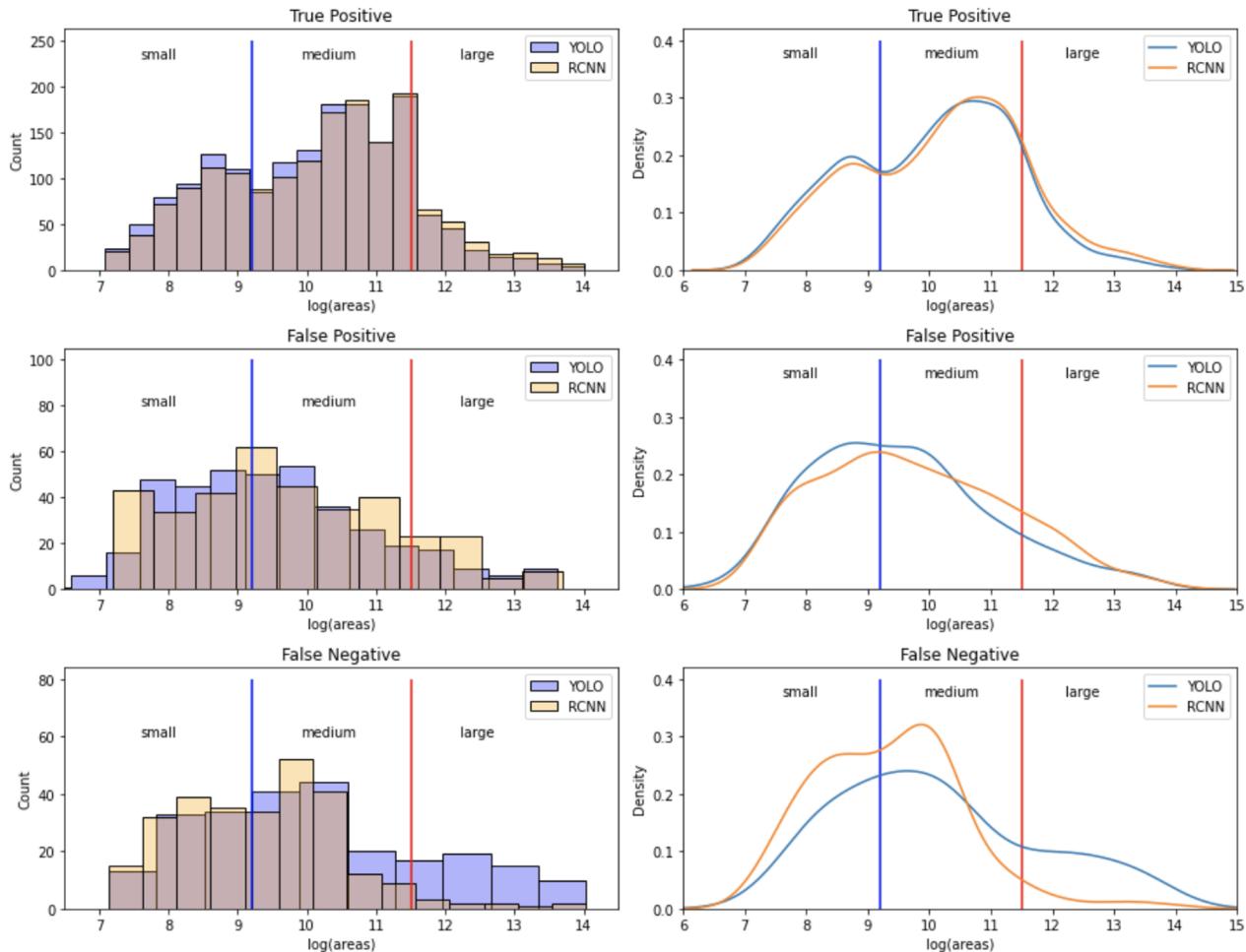
YOLO-New False-Negatives



Faster-RCNN False-Negatives



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# University Screenshots

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## The Galleries at CSU Spring 2021 Exhibits

Here There Be Monsters by Laura & Gary Dumm and Glimpses by Evie Zimmer run Feb. 23-April 3





# Touro Application

We offer this Web-based application in hopes that it will make our application process as easy and convenient as possible for you. You can get started right now and won't have to wait for us to mail you a package. With very few notable exceptions, Touro applications can only be submitted electronically.

This application is part of the ApplyYourself Application Network. You will receive a PIN and Password so that you can return to work on your application over several sessions. Your information is transmitted through a secured server and is kept confidential until you submit your application. Only after you submit your application will it be available for review by our admissions staff.

When you have completed your application and are ready to submit it, you can pay your application fees via credit card online. Applications cannot be submitted or processed until the fee is paid or waived.

Please carefully read the instructions that appear throughout the application pages. You can only submit your application one time. If you have updates to any information you have submitted, please notify the admissions office at once.

To get started on your application, create an account to the right.

*If you have previously submitted a Touro Application, you would be required to create a new account with a unique PIN for that application. Please select the Create Account tab on the right to begin this process. (Each school, program or location in Touro Apply Yourself requires a separate application even within the same semester.)*

Best of luck. We look forward to reviewing your application.

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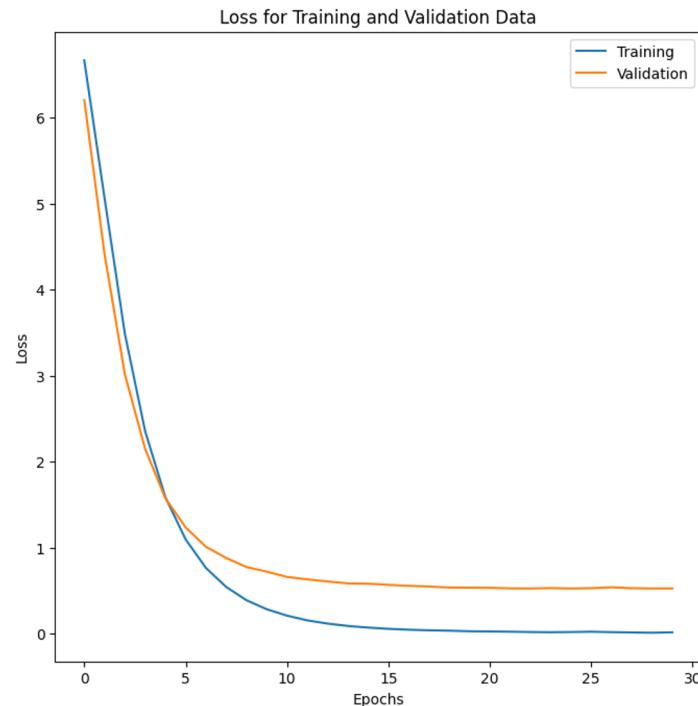
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# Classifier Data Updates

- Combined Bing images with extracted annotations from training data
  - Note: before annotations were updated
- Most common classes of train and test annotations (excluding generic logo)
  - Facebook, Twitter, Instagram, Wikipedia, Youtube, Pinterest, LinkedIn, Wikimedia Commons, Google Plus
    - Random sample of 30 annotations added to training dataset
- 1098 classes
  - Added more S&P 500 to improve coverage
  - 12848 train, 4655 validation
  - No “unknown” class yet
- Performance
  - Accuracy: 90.83%
  - Precision: 92.3% (note some classes are never predicted)
  - Recall: 90.83%

# Learning Curves



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# Next Steps

- Adjust ImageLoader
  - Images currently all being resized to 224x224
    - Smaller images may be losing quality
    - Pad smaller images
    - Maintain aspect ratio
- Train EfficientNetB4
- Unknown Class/Open-set
- Evaluate models on extracted test set annotation logos
  - Performance per class
- Top-1 and Top-5 Accuracy