Edwin Fung

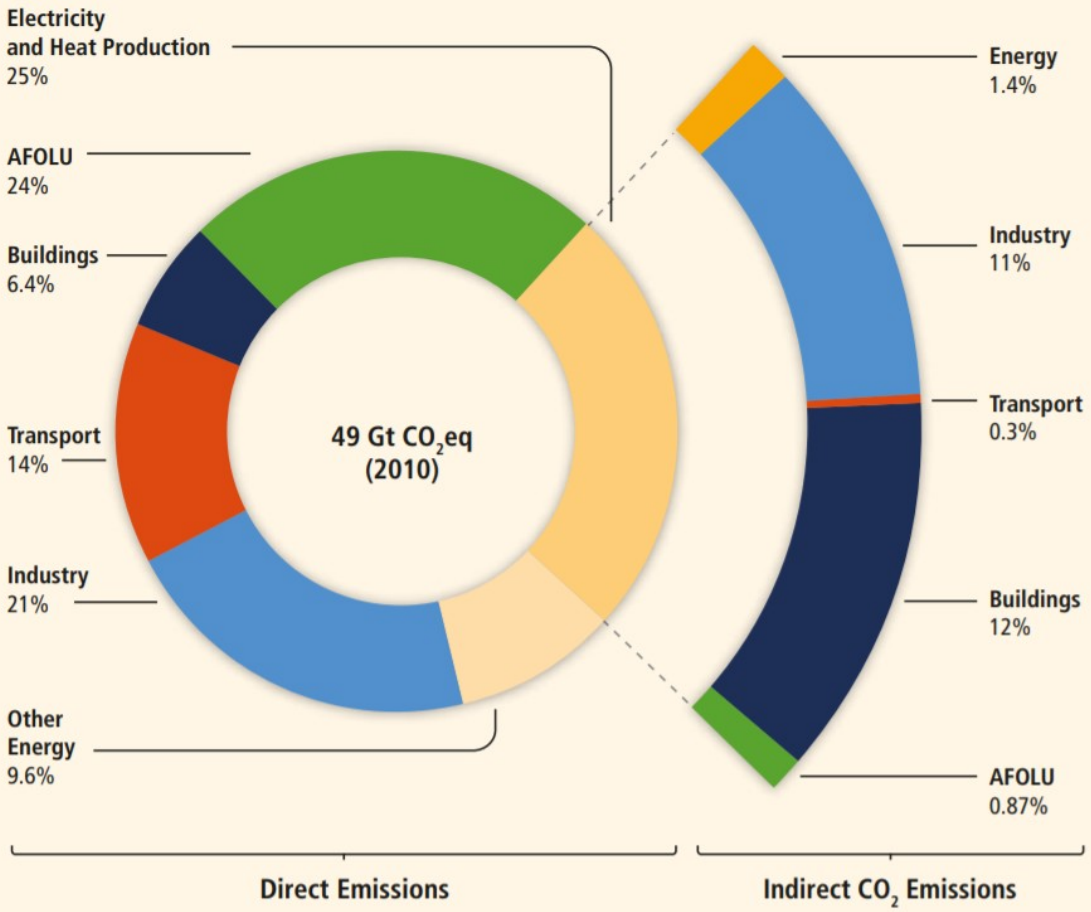
Steel Defect Detection

Why?

Source:
WikiCommons

Why?

Why?



Source: IPCC (2014)

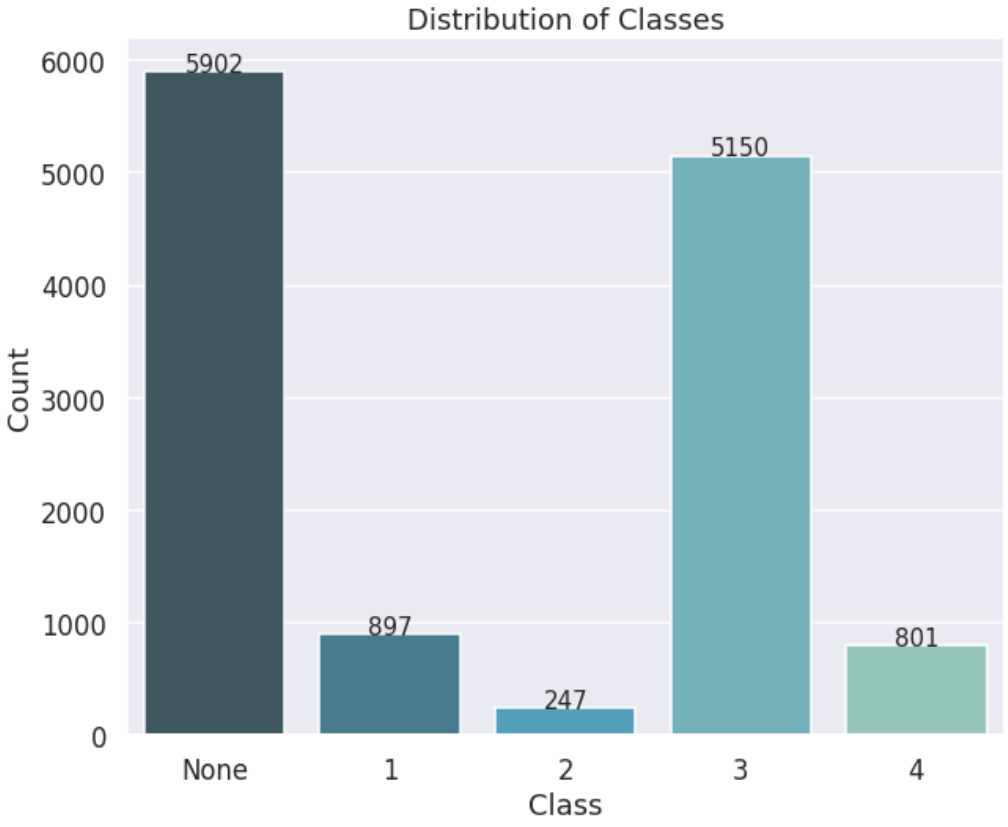

Featured Code Competition
Severstal: Steel Defect Detection
Can you detect and classify defects in steel?
Severstal · 2,431 teams · 4 months ago
$120,000
Prize Money

Data Source

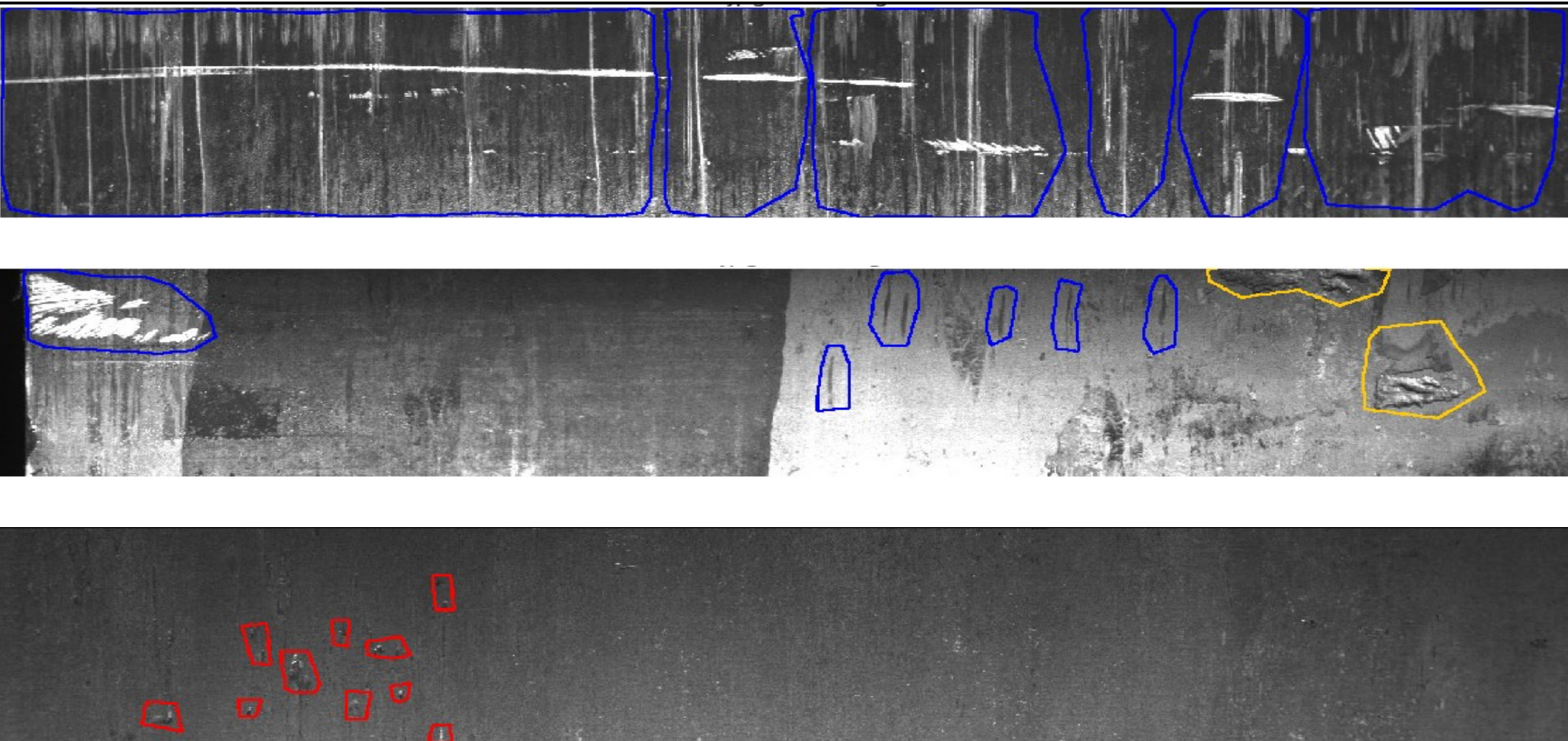
- sample_submission... 3 columns
- train.csv 3 columns
- test_images
- train_images

ImageId	ClassId	EncodedPixels
0002cc93b.jpg	1	29102 12 29346 24 29602 24 29858 24 3011
0007a71bf.jpg	3	18661 28 18863 82 19091 110 19347 110 19
000a4bcdd.jpg	1	37607 3 37858 8 38108 14 38359 20 38610

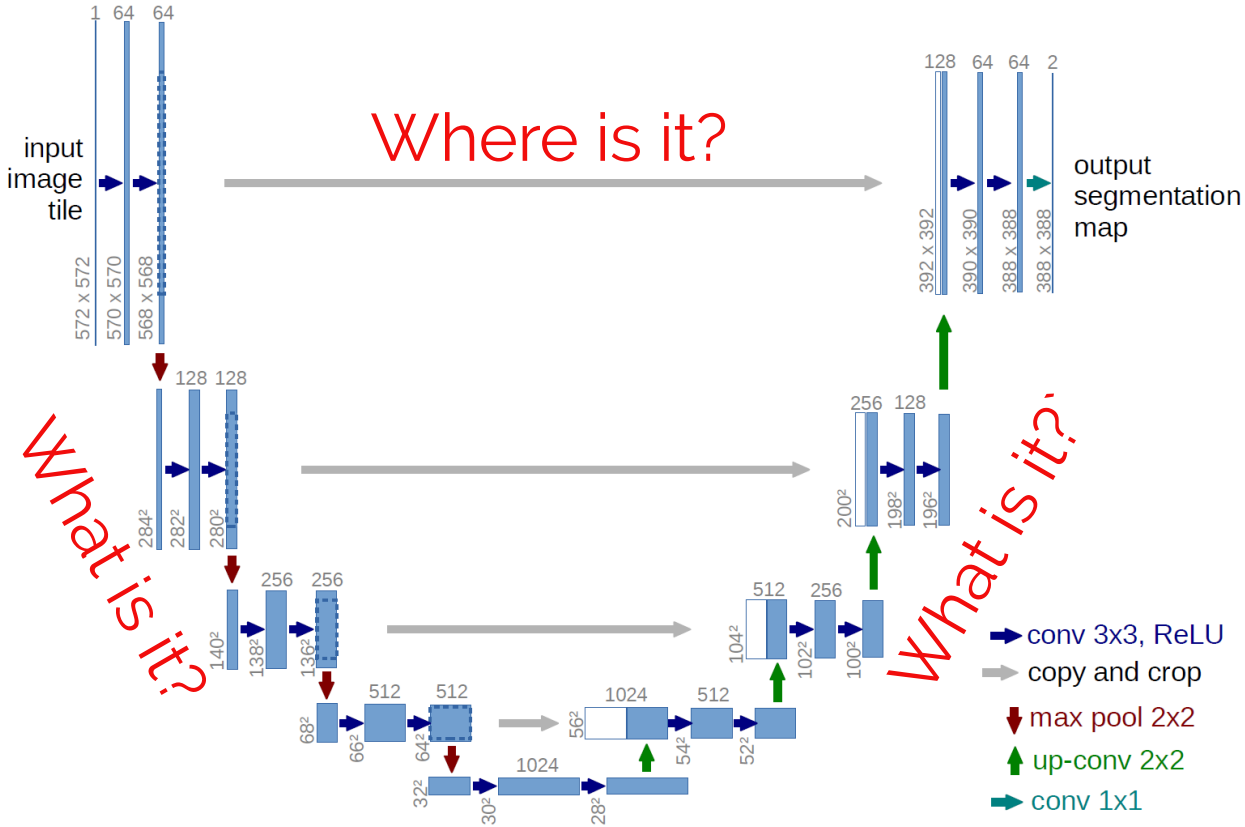
EDA | Defect & Class Distribution



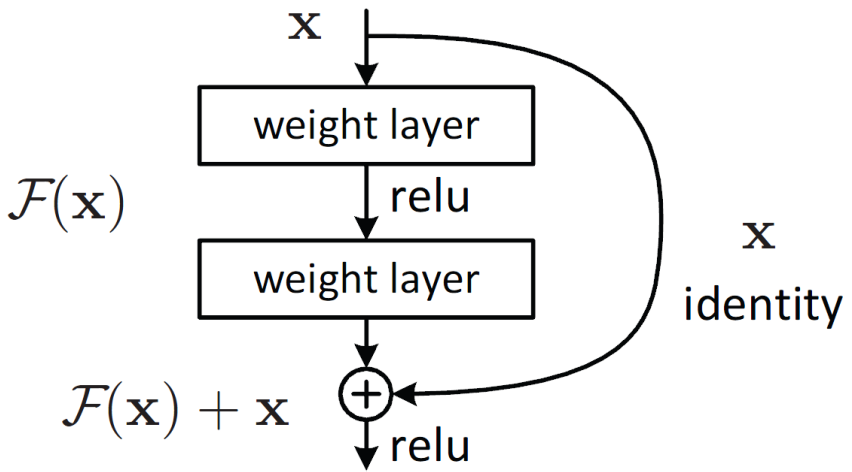
EDA | Training Images with Masks



Model | U-Net + ResNet



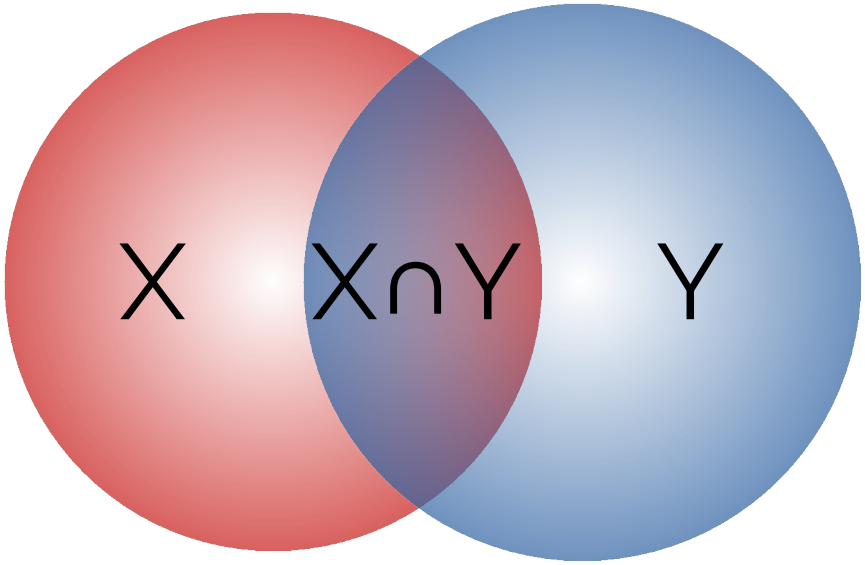
Source: arXiv:1505.04597 [cs.CV]



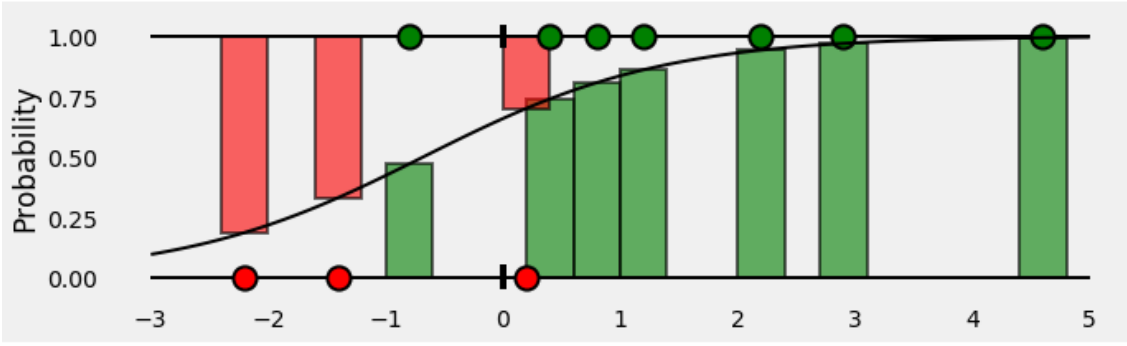
Does it help?

Source: arXiv:1512.03385 [cs.CV]

Model | Loss Functions



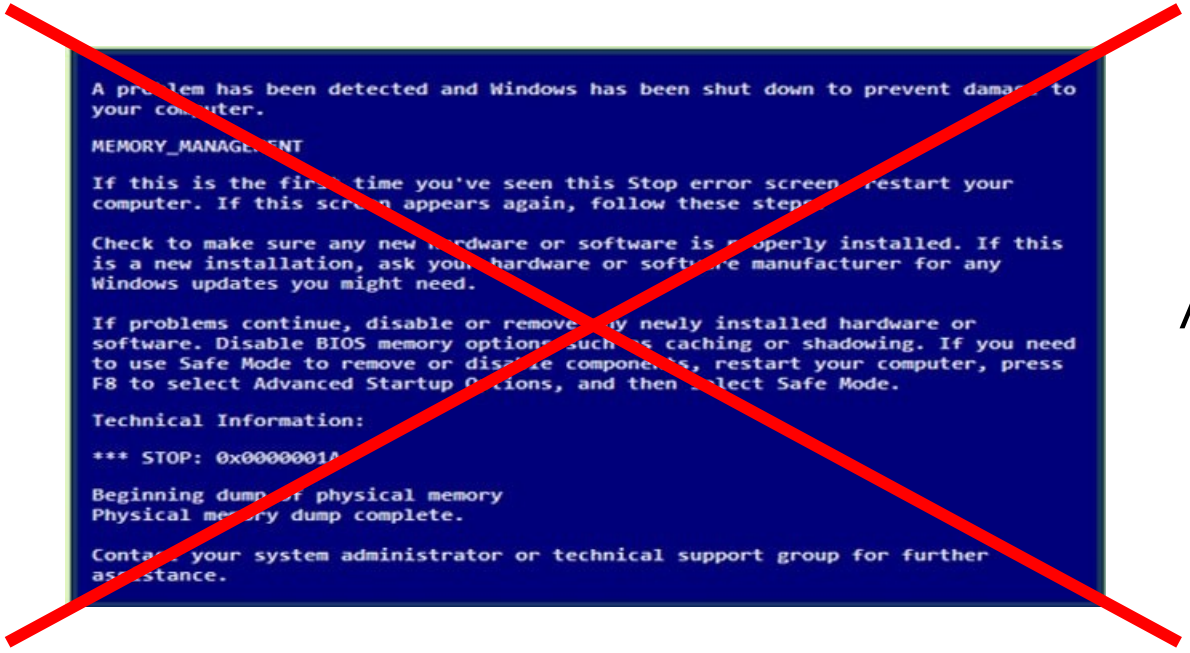
Dice Coeffi. -> Scalar



Binary Cross Entropy -> Matrix

Source: Daniel Godoy from Towards Data Science

Model | Custom Data Generator



Avoids memory problems

Flexible data transformation

ImageId	ClassId	EncodedPixels
0002cc93b.jpg	1	29102 12 29346 24 29602 24 29858 24 3011
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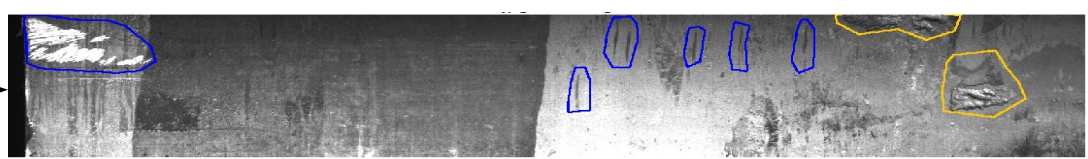
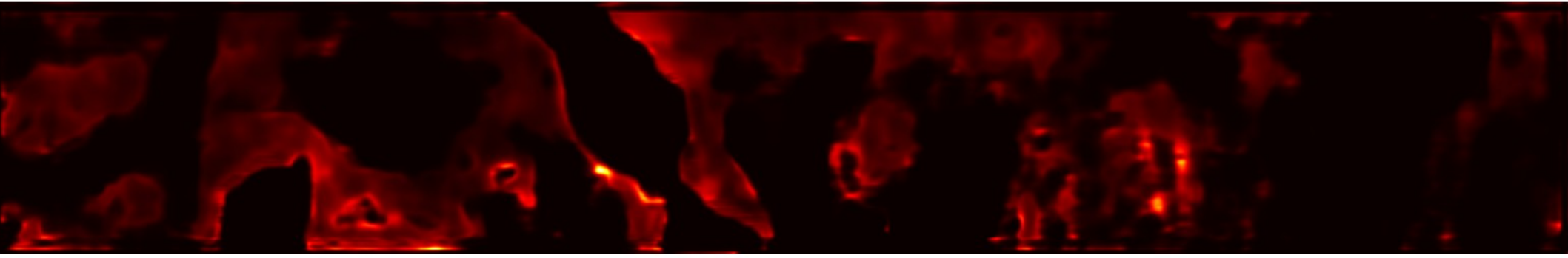
000a4bcdd.jpg	1	37607 3 37858 8 38108 14 38359 20 38610



Results – Predicted Probabilities

Predicted Class 2:

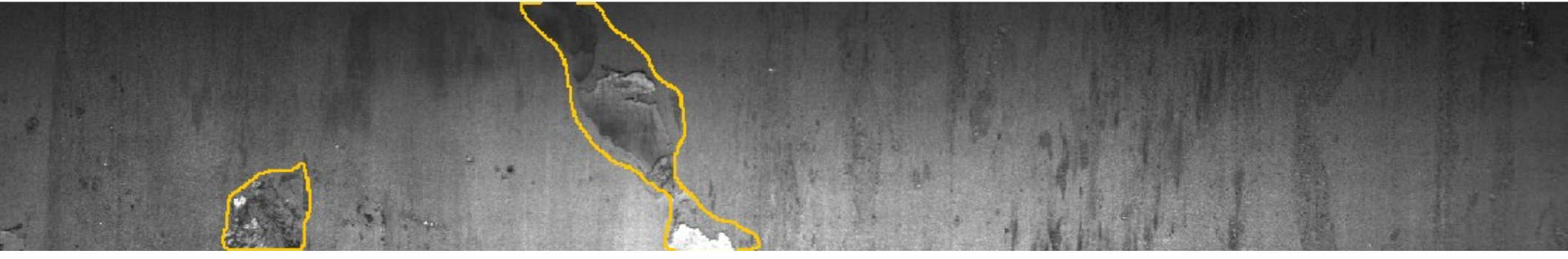


Predicted Class 4:

Results – Single Class Defect

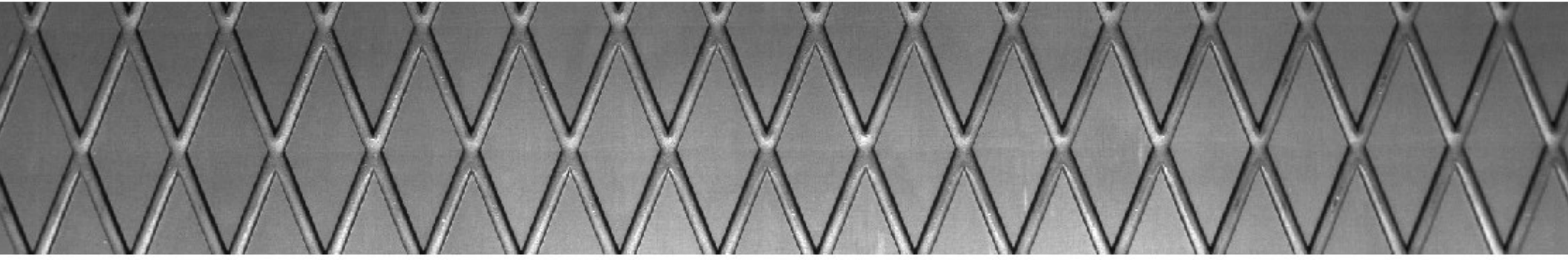
Target:

Predicted:

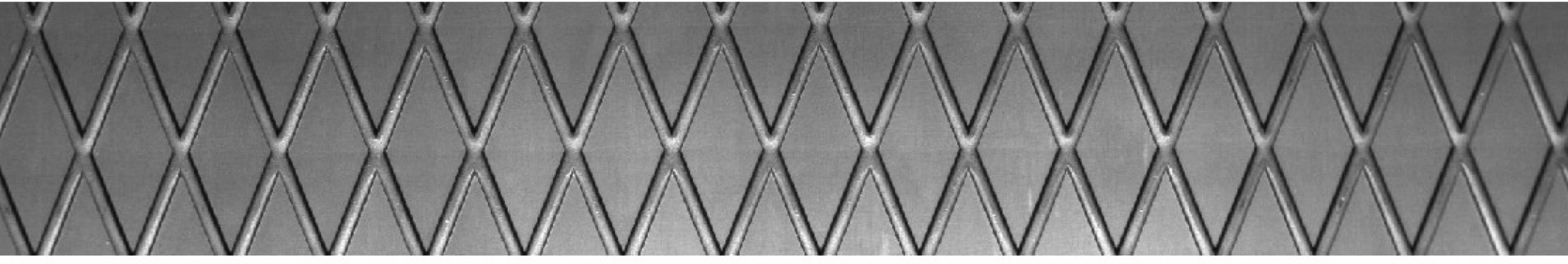


Results – No Defect

Target:



Predicted:

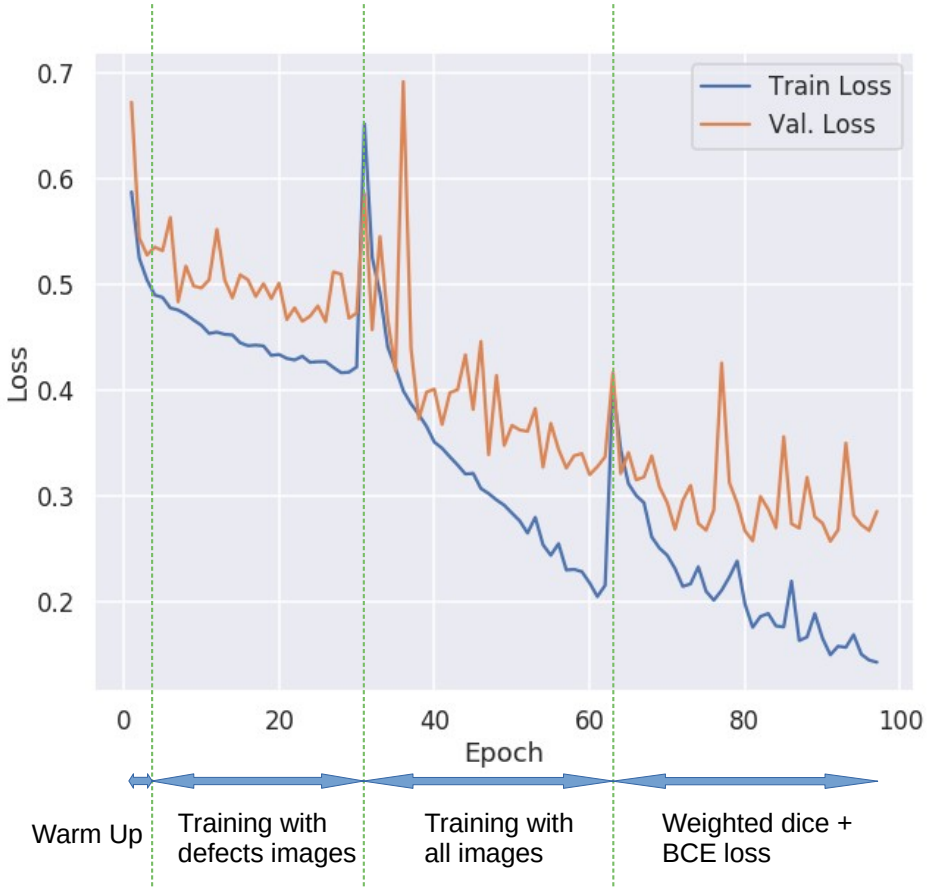


Results – Multiclass Defect

Target:

Predicted:

Results - Loss and Score



Ways to Improve

Image augmentation

Pipeline to reject defectless images

Improve loss functions

Regularization

Threshold