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Report On YOLO 5

Brief of Dataset:

This is a dataset of blood cells photos, originally open sourced by cosmicad and akshaylambda. There are 364 images across three classes: WBC (white blood cells), RBC (red blood cells), and Platelets. There are 4888 labels across 3 classes (and 0 null examples).

class balance:

red blood cell 4155 over represented

white blood cell 372 under presented

platelets 361 under presented

Yolo Architecture:

Loss function used: Binary Cross-Entropy with Logits Loss function from PyTorch for loss calculation of class probability and object score.

YOLO v5 authors decided to go with the Leaky ReLU and Sigmoid activation function.

Grid Size: YOLOv5 models use 3 multi-scale outputs at strides 8, 16 and 32.

Number of anchors: 3

Number of layers and details of each layer:

anchors:

```
  - [10,13, 16,30, 33,23]  # P3/8
  - [30,61, 62,45, 59,119]  # P4/16
  - [116,90, 156,198, 373,326]  # P5/32


# YOLOv5 backbone
backbone:
  # [from, number, module, args]
  [[-1, 1, Focus, [64, 3]],  # 0-P1/2
```

```
   [-1, 1, Conv, [128, 3, 2]],  # 1-P2/4
   [-1, 3, BottleneckCSP, [128]],
   [-1, 1, Conv, [256, 3, 2]],  # 3-P3/8
   [-1, 9, BottleneckCSP, [256]],
   [-1, 1, Conv, [512, 3, 2]],  # 5-P4/16
   [-1, 9, BottleneckCSP, [512]],
   [-1, 1, Conv, [1024, 3, 2]],  # 7-P5/32
   [-1, 1, SPP, [1024, [5, 9, 13]]],
   [-1, 3, BottleneckCSP, [1024, False]],  # 9]

# YOLOv5 head
head:
  [[-1, 1, Conv, [512, 1, 1]],
   [-1, 1, nn.Upsample, [None, 2, 'nearest']],
   [[-1, 6], 1, Concat, [1]],  # cat backbone P4
   [-1, 3, BottleneckCSP, [512, False]],  # 13

   [-1, 1, Conv, [256, 1, 1]],
   [-1, 1, nn.Upsample, [None, 2, 'nearest']],
   [[-1, 4], 1, Concat, [1]],  # cat backbone P3
   [-1, 3, BottleneckCSP, [256, False]],  # 17 (P3/8-small)

   [-1, 1, Conv, [256, 3, 2]],
   [[-1, 14], 1, Concat, [1]],  # cat head P4
   [-1, 3, BottleneckCSP, [512, False]],  # 20 (P4/16-medium)

   [-1, 1, Conv, [512, 3, 2]],
```

[[-1, 10], 1, Concat, [1]], # cat head P5

[-1, 3, BottleneckCSP, [1024, False]], # 23 (P5/32-large)

[[17, 20, 23], 1, Detect, [nc, anchors]], # Detect(P3, P4, P5)]

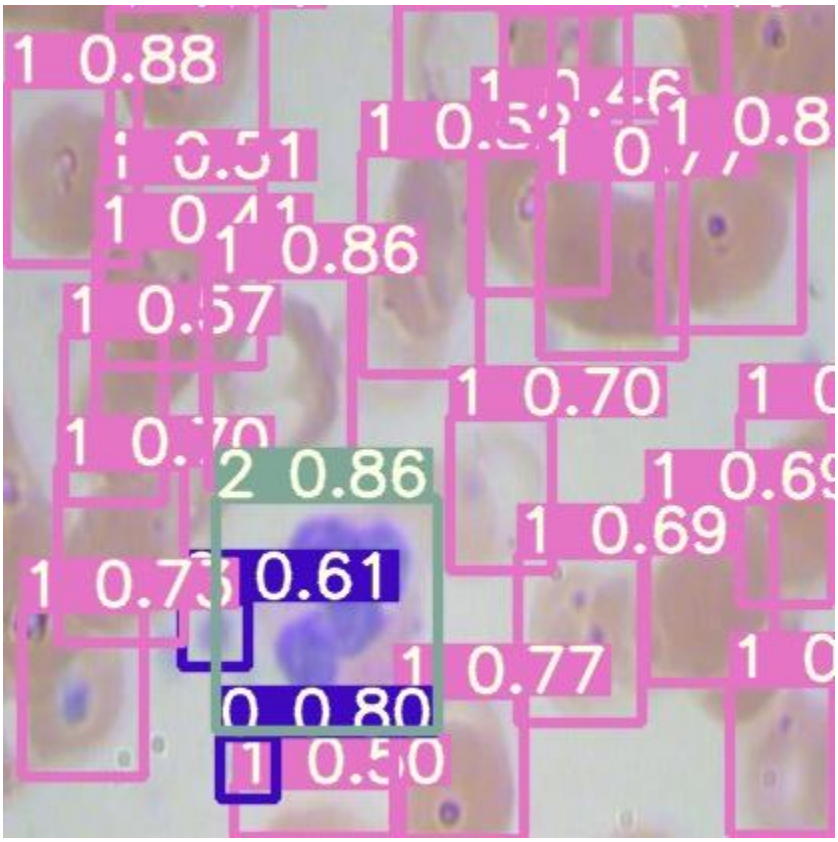
Predicted images:

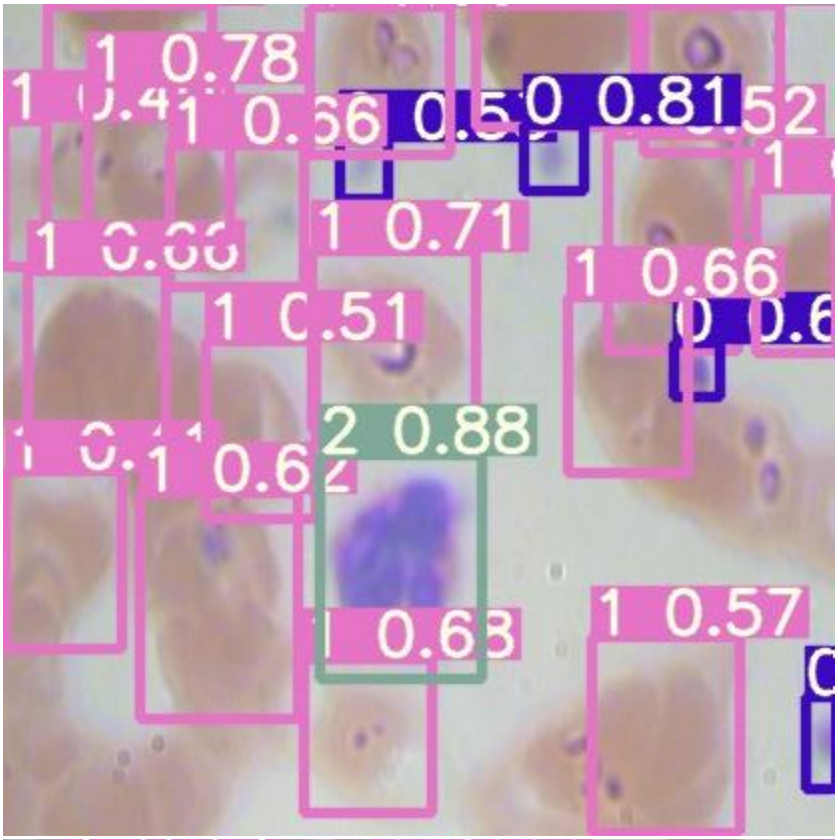
Pink boxes refer to RBC (red blood cells)

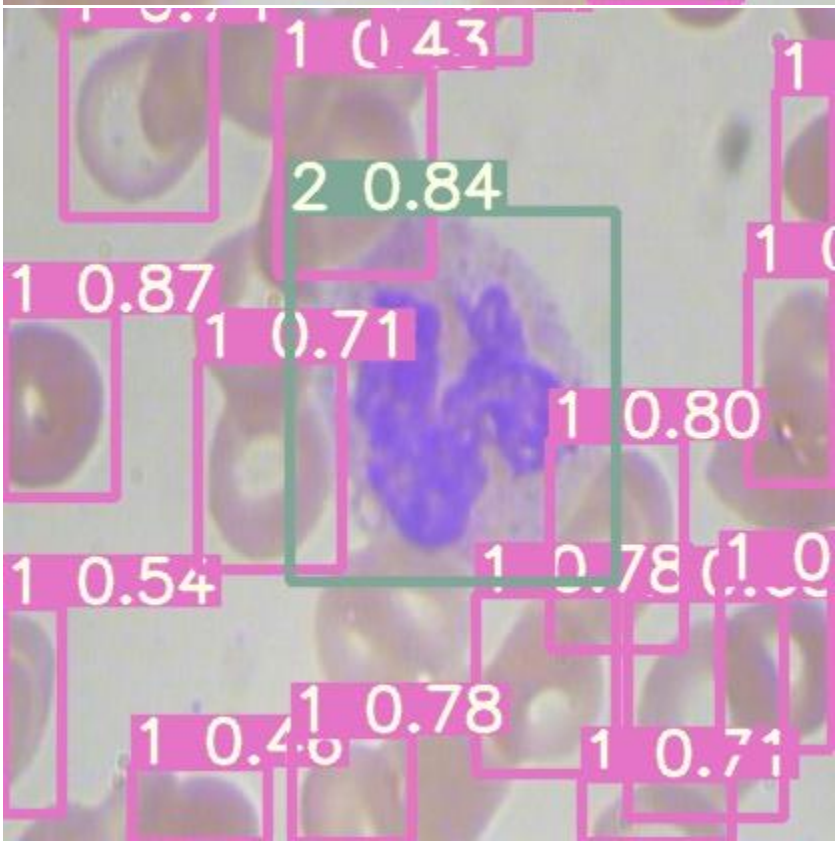
Green boxes refer to WBC (white blood cells),

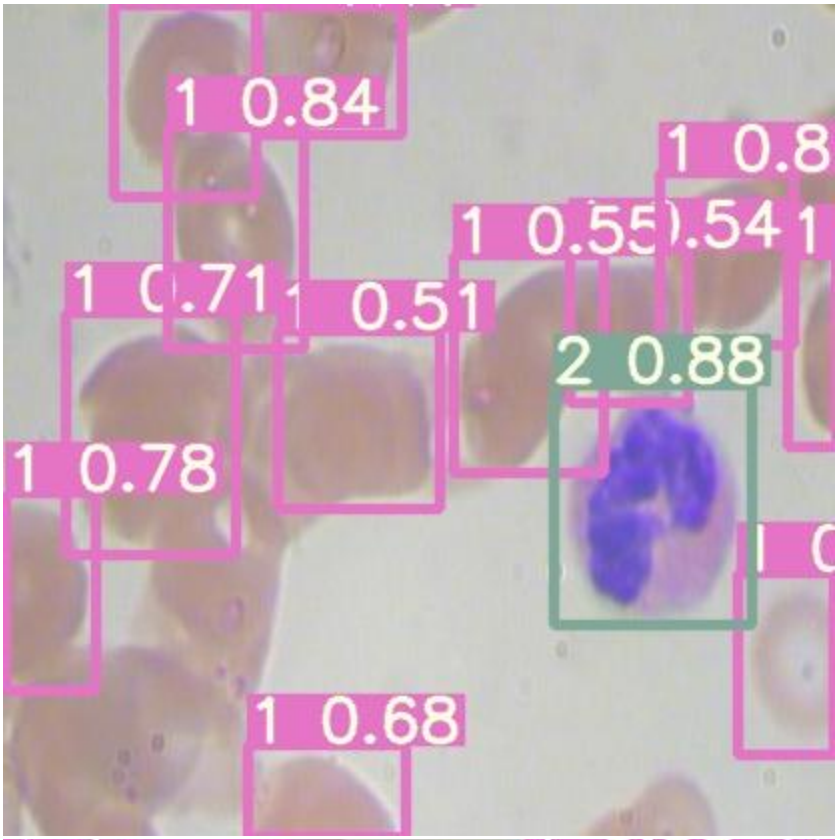
Blue boxes refer to Platelets

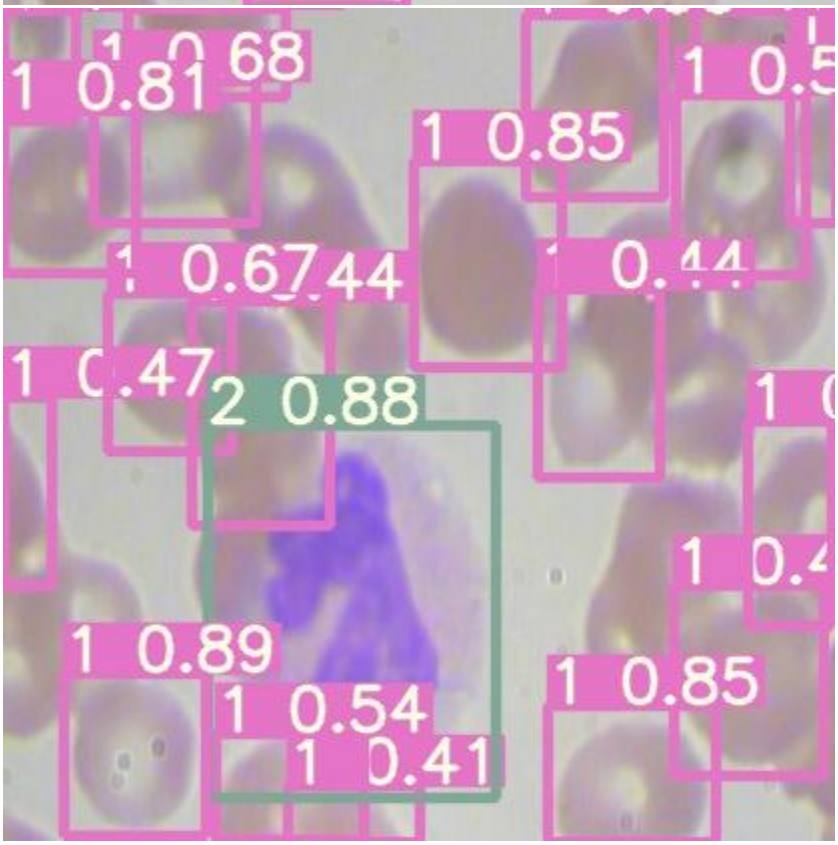
Time of prediction per image: 0.017 sec

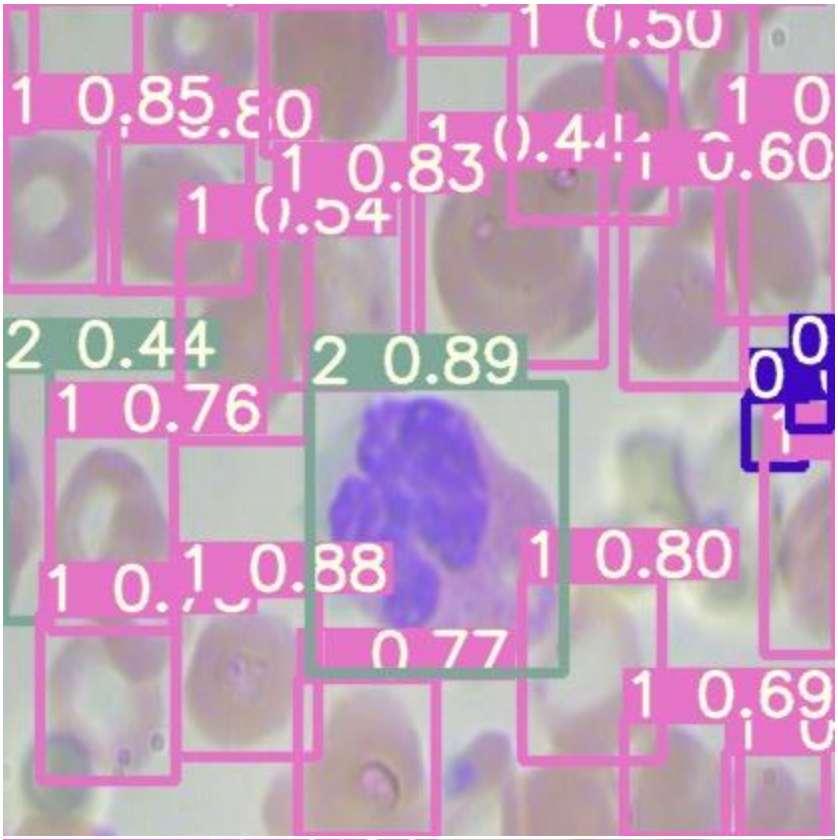


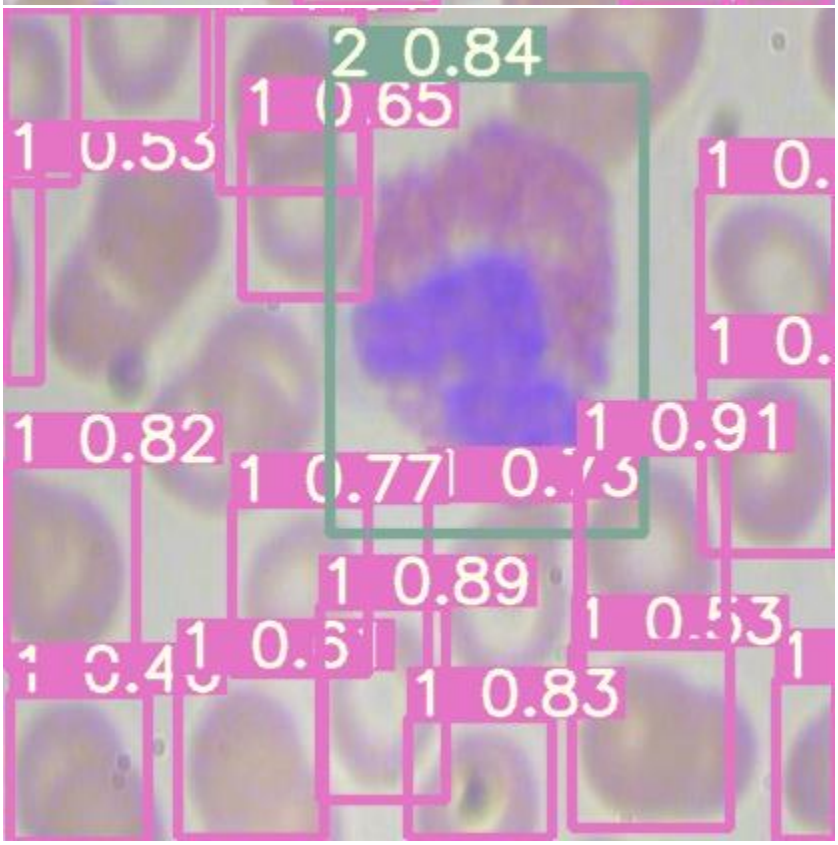

1 0.78
0 0.81
1 0.71
1 0.66
2 0.88
1 0.57

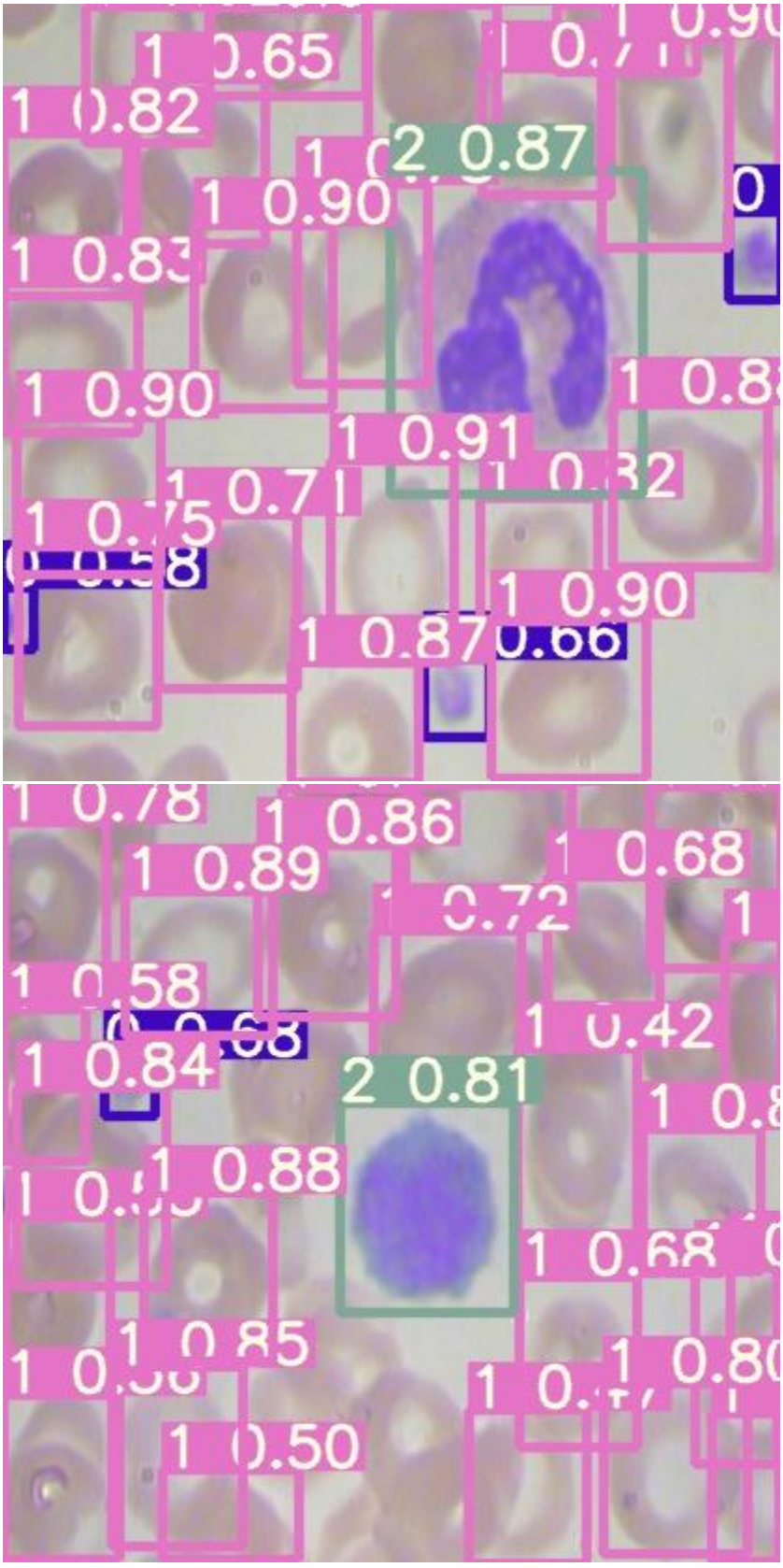

2 0.84
1 0.87
1 0.71
1 0.80
1 0.54
1 0.78


1 0.84
1 0.8
1 0.55
.54 1
1 0.71
1 0.51
2 0.88
1 0.78
1 0.68


1 0.81
1 0.85
1 0.67
.44
1 0.47
2 0.88
1 0.89
1 0.54
1 0.41
1 0.85


1 0.50
1 0.85
1 0.83
1 0.60
2 0.44
2 0.89
1 0.76
1 0.88
1 0.80
1 0.69


2 0.84
1 0.65
1 0.91
1 0.82
1 0.89
1 0.83


1 0.65
1 0.82
2 0.87
1 0.90
1 0.90
1 0.91
1 0.90
1 0.87
1 0.78
1 0.86
1 0.89
1 0.68
1 0.58
1 0.42
1 0.84
2 0.81
1 0.88
1 0.68
1 0.85
1 0.50


1 0.83
1 0.88
0.64
1
1 0.54
0.62
0 0.81
1 0.89
1 0.67
1 0.57
2 0.87
0.86
1
0 0.73