Efficient Precision Control in Object Detection Models for Enhanced and Reliable Ovarian Follicle Counting - Supplementary material

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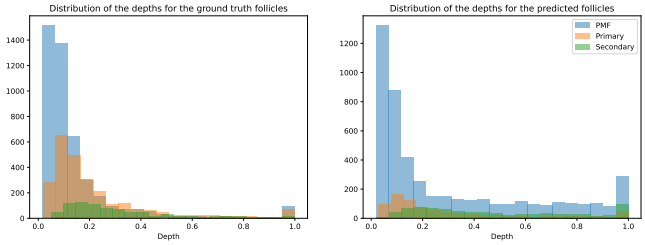

Fig. 1: Distribution of the depths of the ground truth and predicted follicles

Algorithm 1: Associate depth to each predicted bounding box

Data: $\mathcal{D} = \{X_1, \ldots, X_n\}$
foreach *element* x *in* D **do**
  $B \leftarrow \hat{f}(x)$;
  $C \leftarrow$ `FindContour(`x`)` ▷ Find the contour of the ovary;
  foreach *box* $b \in B$ **do**
    $C_{dilated} \leftarrow C$;
    while `Center(`b`)` $\notin C_{dilated}$ **do**
      $C_{dilated} \leftarrow$ `DilateContour(`$C_{dilated}$`)` ▷ Dilate the contour of the ▷ ovary until the box is inside
    end
    $depth \leftarrow \frac{\texttt{Area}(C_{dilated})}{\texttt{Area}(x)}$ ▷ `Area(`x`)` is the area of the ovary $b \leftarrow$ `AddToList(`b, $depth$`)` ▷ Add depth to box information `Update(`B, b`)` ▷ Update the predictions with the new information
  end
end

Table 1: Training Parameters of the Object Detectors and Classification models

EfficientDet Training Parameters	
Parameter	**Value**
Architecture	EfficientDet-d2
Learning Rate	0.001
Epochs	100
Batch Size	25
Image Size	1000
Prediction Confidence Threshold	0.3
WBF IoU Threshold	0.3
Number of Workers	4
LR Warmup Epoch	1

Yolo Training Parameters	
Parameter	**Value**
Architectures	Yolov8-Large
Learning Rate	0.01
Epochs	100
Batch Size	16
Image Size	640
Pretrained	True
Optimizer	Adam
Mask Ratio	4
IoU Threshold	0.7
Max Detections	300

VGG16 Training Parameters	
Parameter	**Value**
Architectures	VGG16
Learning Rate	10^{-6}
Weight Decay	0.01
Epochs	24
Batch Size	16
Image Size	512
Pretrained	True

Table 2: Precision and Recall for EfficientDet and Yolo models

	EfficientDet			**YOLO**		
Class	**Precision (%)**	**Recall (%)**	**mAP (%)**	**Precision (%)**	**Recall (%)**	**mAP (%)**
All Classes	29.8	83.8	32.8	44.2	74.9	33.7
Primordial	24.9	88.1		42.1	71.9	
Primary	58.3	87.0		58.3	82.6	
Secondary	23.4	96.4		44.2	74.9	