Annotated Raspberry Images for yield component Detection

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For characterization raspberry hybrids or cultivars and to make yield predictions, it is necessary to describe and evaluate fruit characteristics and quantity of yield components at various growth stages. This process is typically done visually, but it can be time-consuming and labour-intensive, requiring significant expert knowledge.
The RaspberrySet dataset was created to assist with this process, and it includes images of raspberry berries at four different stages of development. These stages are flower buds, flowers, unripe berries, and ripe berries. All these stages of raspberry images classified buds, damaged buds, flowers, unripe berries, and ripe berries and were annotated using ground truth ROI and presented in YOLO format. The dataset includes 2039 high-resolution RGB images, with a total of 46659 annotations provided by experts using LabelImg software. The images were taken in various weather conditions, at different times of the day and from different angles, and include fully visible: buds, flowers, berries, and also partially obscured.
This research is a valuable resource for those who is working in the field of agriculture, particularly in the selection and breeding of ecologically adaptable berry cultivars.
The Raspberryset data set is intended to improve the efficiency of berry breeding and yield estimation and to identify the raspberry phenotype more accurately. It may also be useful for breeding other fruit crops, as it allows for the reliable detection and phenotyping of yield components at different stages of development.
By providing a homogenized dataset of images taken on-site at the Institute of Horticulture in Dobele, Latvia, the RaspberrySet dataset offers a valuable resource for raspberry yield component identification and accounting.
Dataset: https://doi.org/10.5281/zenodo.7014728

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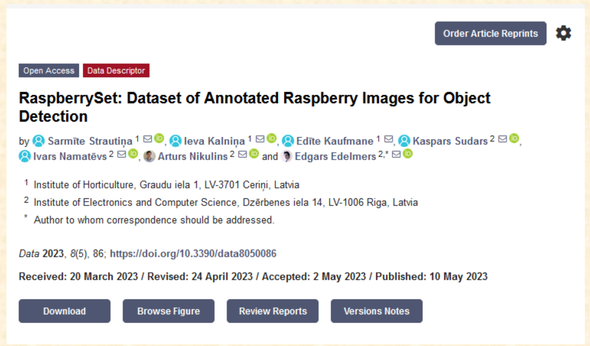

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RaspberrySet: Dataset of Annotated Raspberry Images for Object Detection

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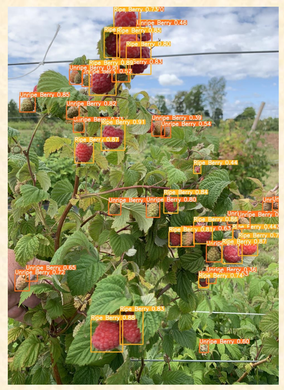
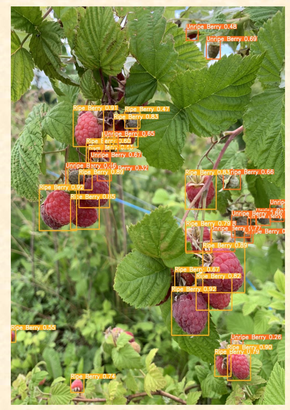
A neat and clean image dataset in precision agriculture supplemented with an image labeling tool is the basic requirement to build accurate and robust Machine Learning models for the real-time environment.

Detection results obtained with the trained detector

IMG_5448





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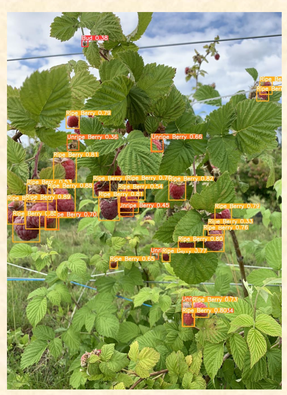

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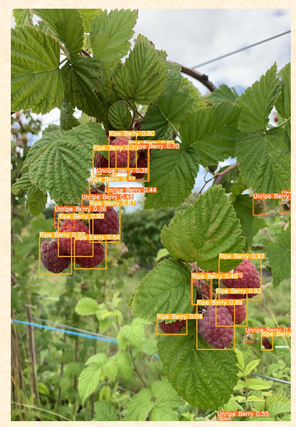
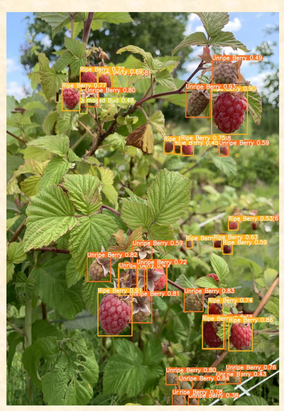


IMG_5452



IMG_5443

Fusing layers...
Model summary: 213 layers, 7029004 parameters, 0 gradients
image 1/5 C:\Users\Lietotajs\Desktop\Yolov5_AKFEN\dest**IMG_5443**.jpeg: 640x480 22 Unripe Berries, 18 Ripe Berries, 1 Damaged Bud, 344.2ms
image 2/5 C:\Users\Lietotajs\Desktop\Yolov5_AKFEN\dest**IMG_5448**.jpeg: 640x480 24 Unripe Berries, 20 Ripe Berries, 286.5ms
image 3/5 C:\Users\Lietotajs\Desktop\Yolov5_AKFEN\dest**IMG_5449**.jpeg: 640x480 15 Unripe Berries, 20 Ripe Berries, 288.2ms
image 4/5 C:\Users\Lietotajs\Desktop\Yolov5_AKFEN\dest**IMG_5450**.jpeg: 640x480 1 Bud, 7 Unripe Berries, 24 Ripe Berries, 294.7ms
image 5/5 C:\Users\Lietotajs\Desktop\Yolov5_AKFEN\dest**IMG_5452**.jpeg: 640x480 10 Unripe Berries, 15 Ripe Berries, 234.1ms
Speed: 1.8ms pre-process, 289.5ms inference, 3.9ms NMS per image at shape (1, 3, 640, 640)
Results saved to yolov5\runs\detect\exp17

Raspberry breeding at the Institute of Horticulture, Dobele, Latvia (**LatHort**), GPS location: N: 56°36’39” E: 23°17’50” has been carried out since 1980. **LatHort** has developed rich genetic material for red raspberry, including cultivars and promising hybrids, which are intensively used in hybridization. The genotypes differ in yield compounds (number of canes, fruit laterals per cane, and the weight of fruit); winter hardiness; disease resistance; fruit quality characteristics including shape, color, biochemical composition, etc.; and fruit ripening time.

Table 1 summarizes some of the most important fruit and yield component parameters of the florican raspberry cultivars and promising hybrids.

Cultivars and hybrids	Characterization of **floricane** raspberry yield components:												
	length of cane, cm	length of fruiting part of cane, cm	fruit laterals per cane	average weight of fruit, g	yield per cane, g	yield per bush, g	fruit length, mm	fruit width, mm	shape index (ratio length: width)	account of drupe	fruit glossiness (score 1-9)	fruit firmness (score 1-9)	fruit shape
S1-12-13	15.4	9.1	1.8	252.3	2018.0	11.7	11.8	1.0	74.3	5.6	6.3	conical	dark red
S11-25a-4 (Alise)	15.1	12.4	2.5	468.1	3744.8	17.3	16.6	1.0	80.1	3.8	4.2	conical	red
S2-6-13	21.5	11.7	2	503.1	4024.8	17.0	15.1	1.1	94.8	2.9	5.7	trapezoidal	red
S2-6-8	18.2	14.4	1.8	471.7	3774.0	19.0	18.2	1.0	75.5	2.2	4.4	conical	light red
Glen Ample	6.9	7.3	2.2	110.8	886.5	17.7	18.2	1.0	64.5	2.2	6.5	broad conical	light red
Lina	11.7	8.5	2.7	268.5	2148.1	17.7	15.8	1.1	85.5	3.0	6.0	broad conical	light red

Table 2 summarizes some of the most important fruit and yield component parameters of the primocane raspberry cultivars and promising hybrids.

Cultivars and hybrids	Characterization of **primocane** raspberry yield components:													
	length of cane, cm	length of fruiting part of cane, cm	fruit laterals per cane	average weight of fruit, g	yield per cane, g	yield per bush, g	fruit length, mm	fruit width, mm	shape index (ratio length: width)	account of drupe	fruit glossiness (score 1-9)	fruit firmness (score 1-9)	fruit shape	fruit colour
P6R3	107.4	41.2	14.4	3.9	183.1	1464.8	24.0	21.6	1.1	113.9	8.0	7.0	conical	red
P6R33	111.8	45.2	13.9	2.9	157.9	1263.2	19.6	19.4	1.0	70.2	6.9	6.7	round	red
B6R9	103.0	43.5	13.7	3.3	135.6	1084.8	18.1	18.6	1.0	66.3	5.2	4.3	round	dark red
Polonez	138.1	35.9	11.8	2.2	81.1	649.0	21.5	18.0	1.2	103.2	5.6	6.4	conical	light red
Polana	132.8	47.8	16.0	2.2	124.7	997.6	23.4	20.3	1.2	108.7	6.7	5.0	conical	red