



LDD

A Dataset for Grape Diseases Object Detection and Instance Segmentation

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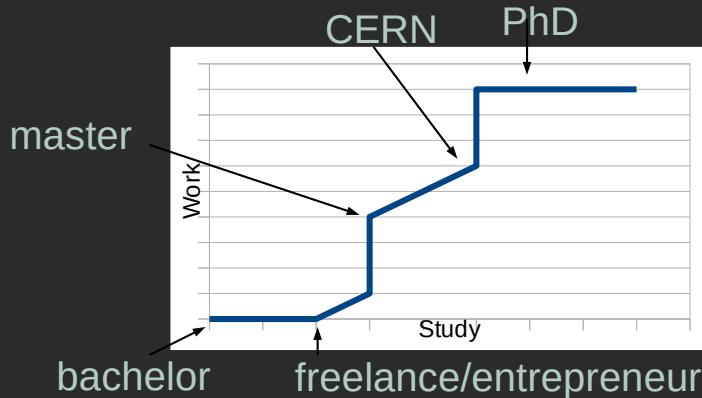
ICIAP 2021

About Me

- ✓ 3rd year of PhD at IMP lab (Parma - Italy).
(Image processing, Mobile vision and Pattern recognition lab)
- ✓ Feel free to contact me for questions.
- ✓ <https://github.com/hachbreak/>
- ✓ <http://implab.ce.unipr.it>



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Introduction

Recognizing grape diseases!

- 1) Early as possible
- 2) Smart / robust
- 3) Distributed



An expert for each plant!



Introduction

Recognizing grape diseases!

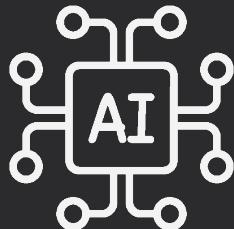
- 1) Early as possible
- 2) Smart / robust
- 3) Distributed



An expert for each plant!



Or an A.I.!

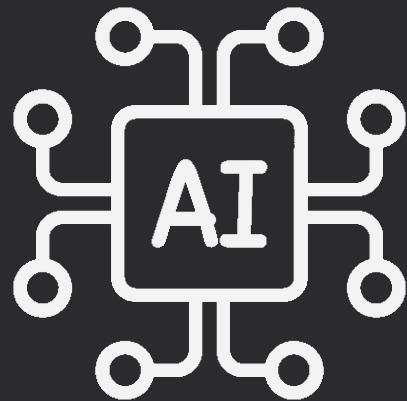


(*) Designed by Freepik

(**) Designed by pch.vector / Freepik



Introduction



Born in collaboration with Horta s.r.l
(spin off company of the Università Cattolica
del Sacro Cuore in Piacenza, Italy)

Final purpose

To give the possibility to an
inexperienced user to:

- **analyze** the general status
- **identify** any diseases

The Grape Dataset

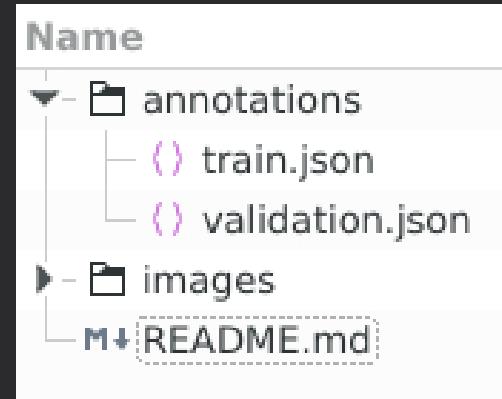


- 1'092 Grapes and Leaves images
- Foto from the **natural context**
- 17,706 annotations COCO-like format
- Grapevines + 8 diseases types
- Diseases are included inside grape/leave annotation
- Tasks:
 - (a) Object Detection
 - (b) Instance Segmentation
- ~80% training , ~20% validation

The Grape Dataset

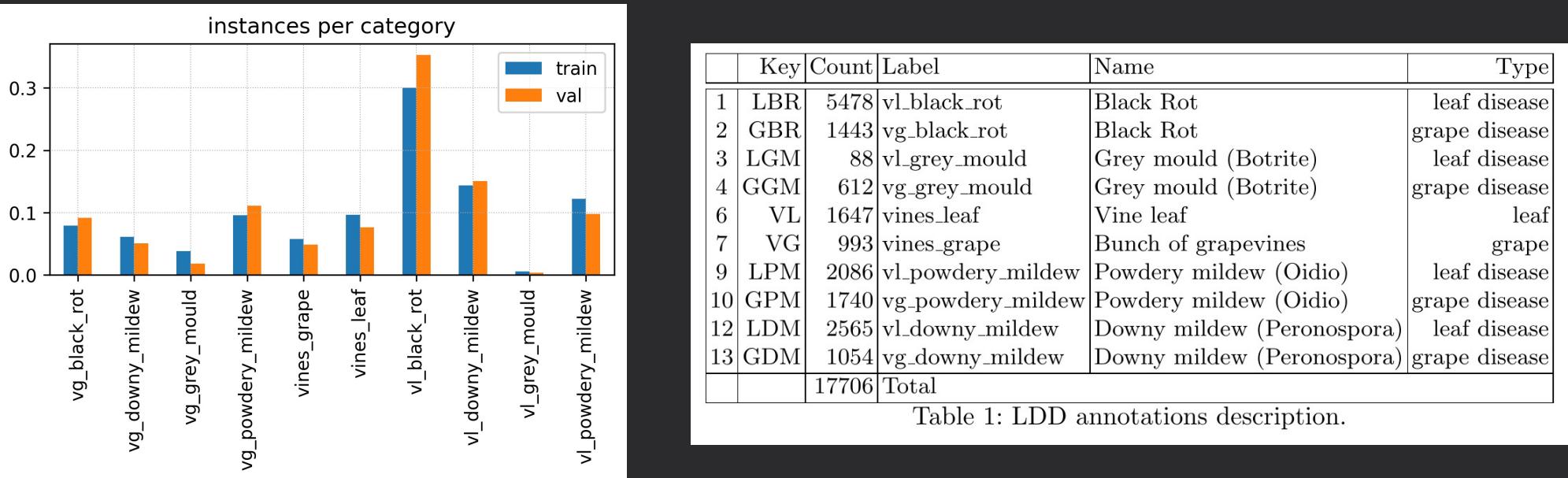


Label Studio configuration



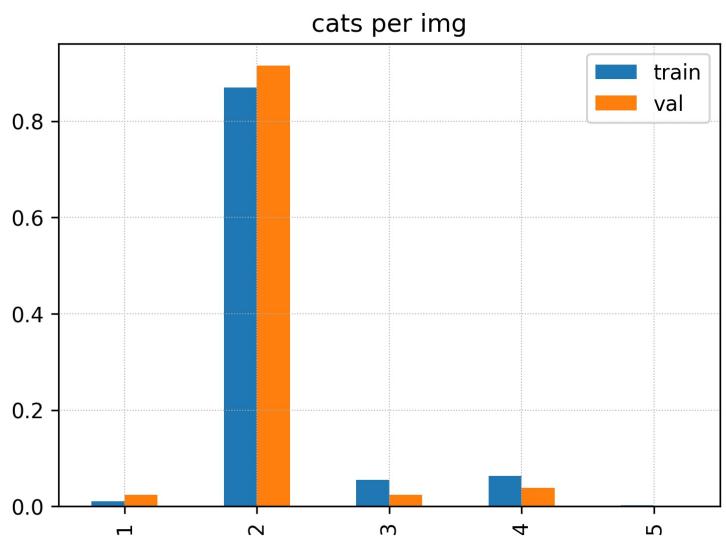
Directory output for annotations and images

The Grape Dataset

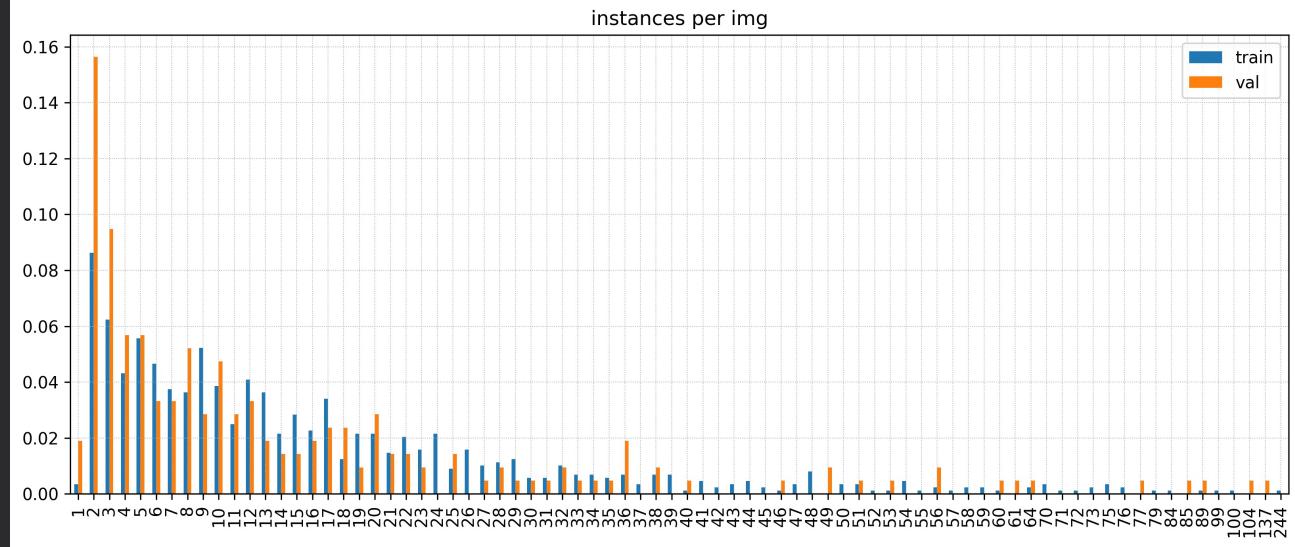


The Grape Dataset

cats per img

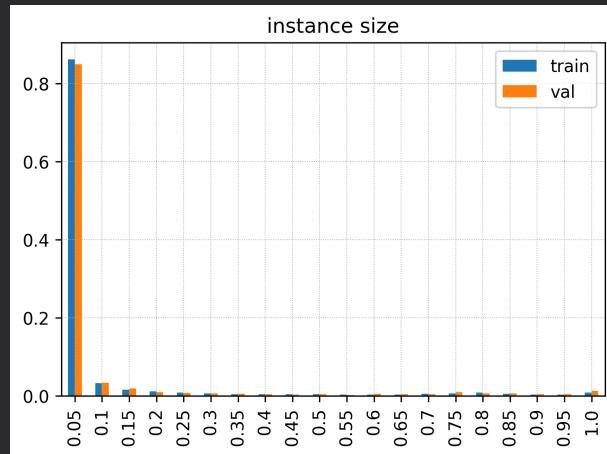
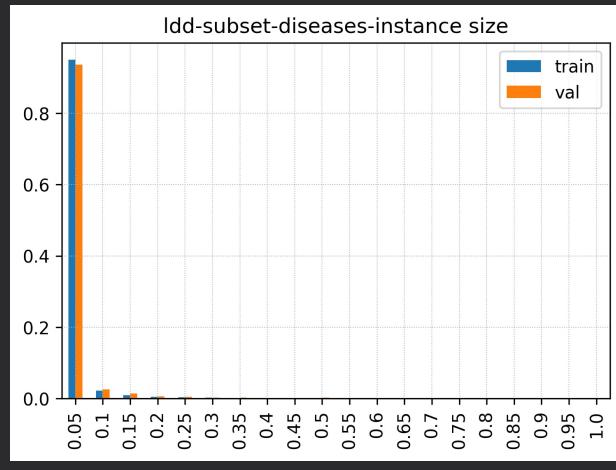
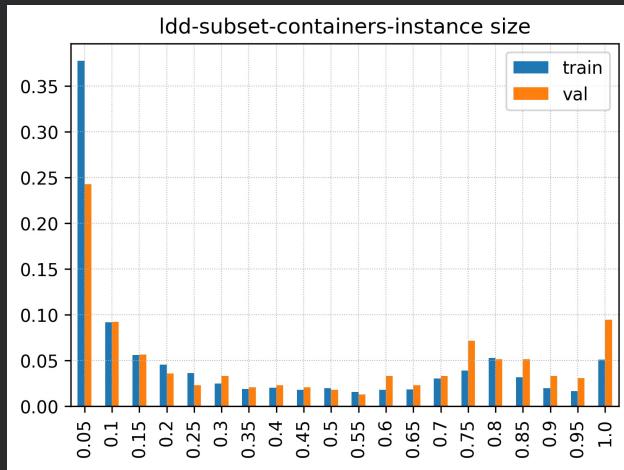


instances per img



The Grape Dataset

Grapes and leaves



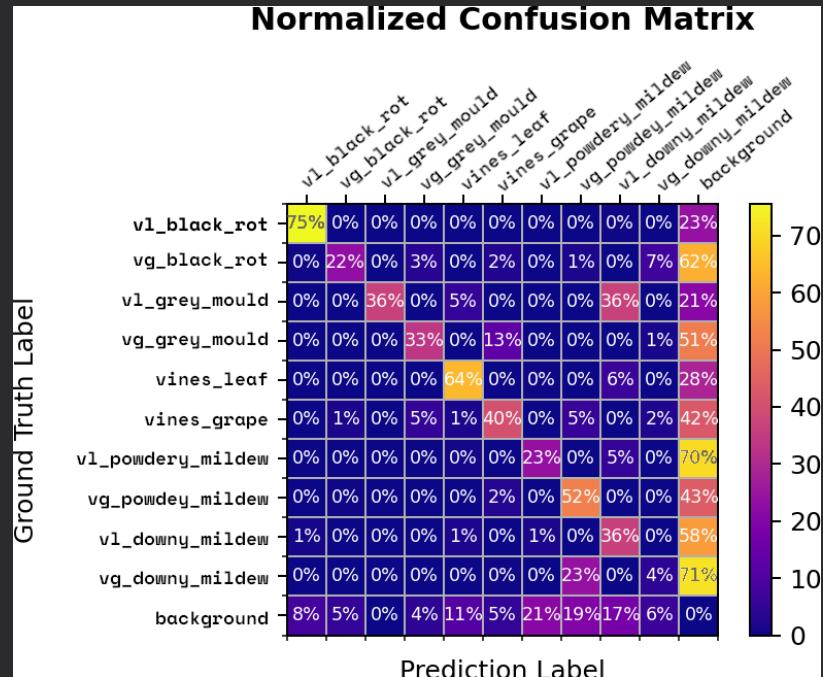
All

10

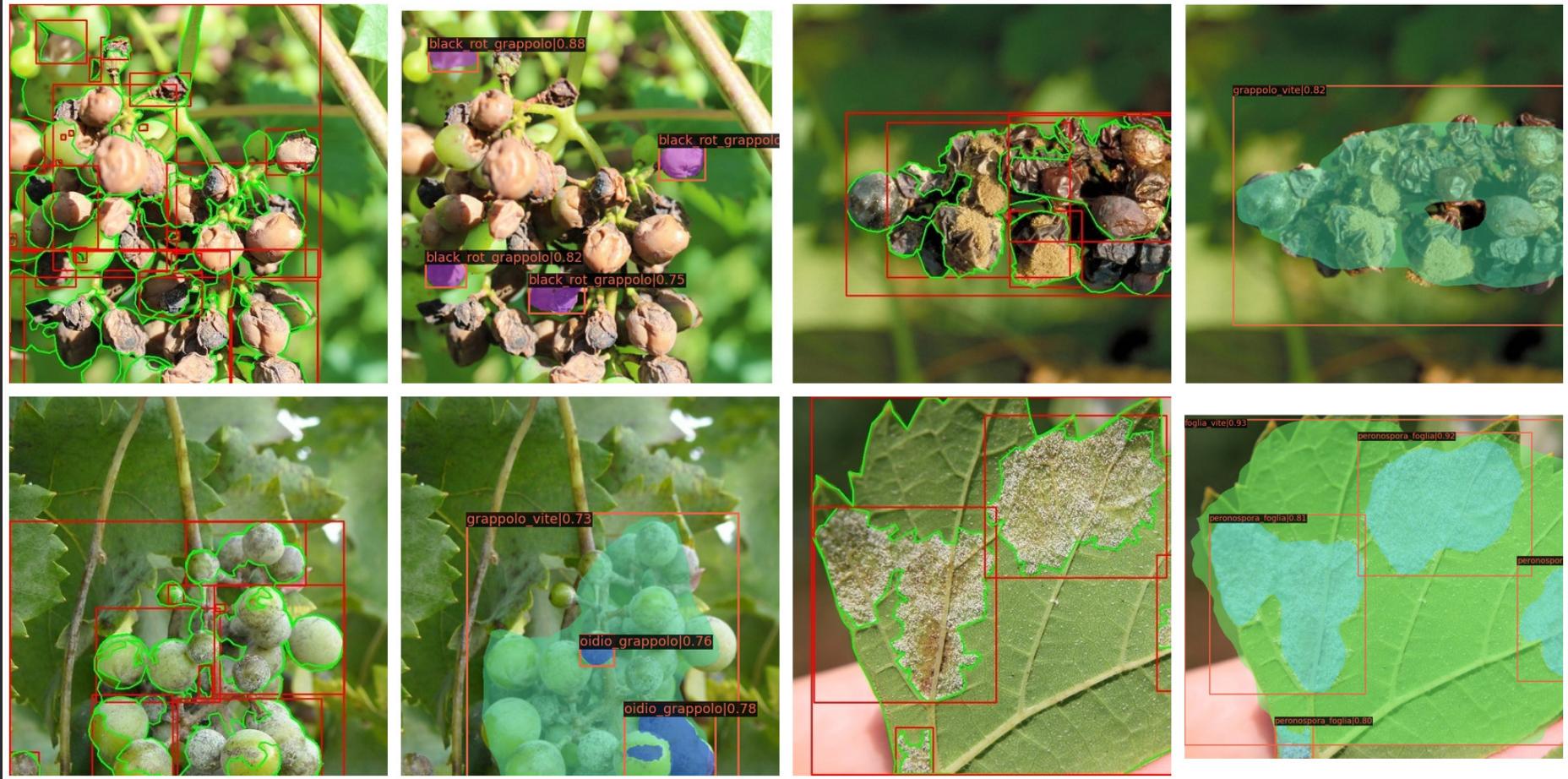
Results

#	Method	Bounding Box						Mask					
		AP	AP ₅₀	AP ₇₅	AP _s	AP _m	AP _l	AP	AP ₅₀	AP ₇₅	AP _s	AP _m	AP _l
1	Mask R-CNN	21.0	36.8	21.9	9.1	18.8	21.2	20.2	35.6	21.6	8.8	17.2	20.1
2	R^3 -CNN	22.7	38.4	22.8	9.5	19.9	30.9	22.2	36.2	24.3	9.4	19.3	29.8

Table 2: Performance of Mask R-CNN and R^3 -CNN models.



Conclusions and future works



Conclusions and future works

Job done:

- A) new dataset with +1k images
- B) 8 diseases
- C) good performance of the model

Job to do next:

- D) Expand the dataset with the images but also with new diseases!
- E) Increase the model performance
- F) .. integrate the system in production!



Thank you for listening..
Questions? :)