Improving Localization for Semi-Supervised Object Detection

Leonardo Rossi

IMP Lab

Università degli Studi di Parma (Italy)

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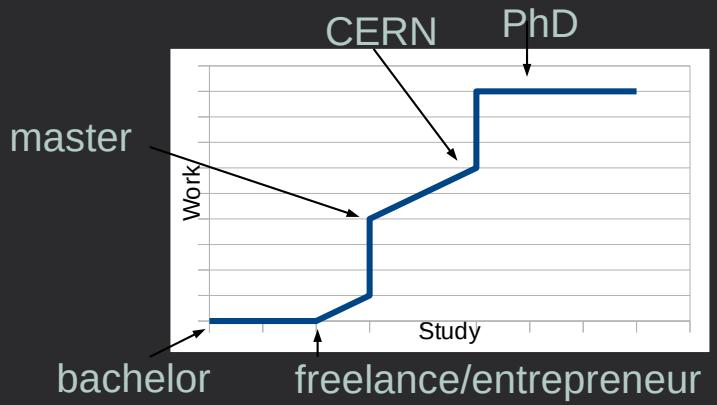
About Me

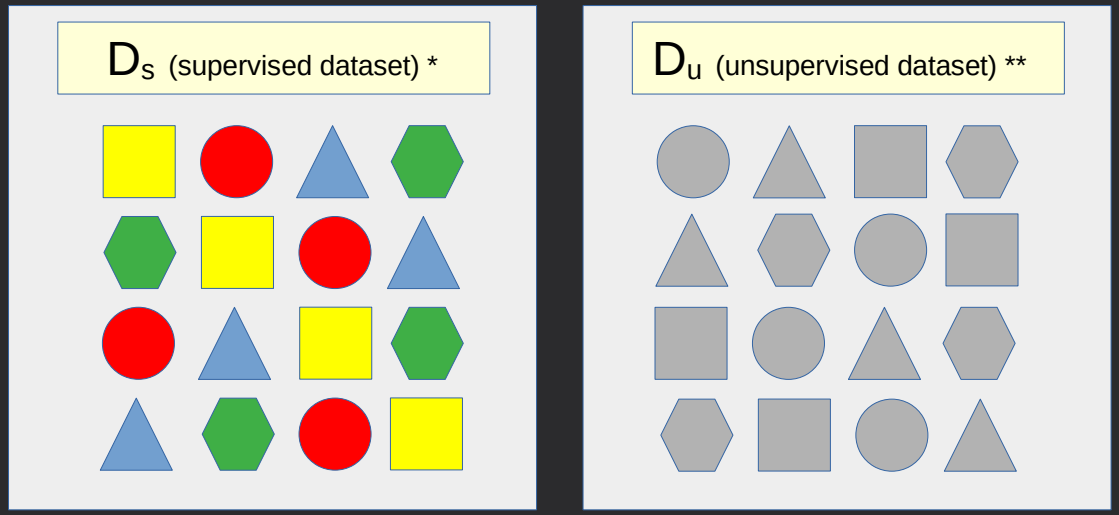
- 3rd year of PhD at IMP lab (Parma - Italy).
  (Image processing, Mobile vision and Pattern recognition lab)
- Feel free to contact me for questions.
- https://github.com/hachreak/
- http://implab.ce.unipr.it

leonardo.rossi@unipr.it



Introduction

Semi-supervised Learning



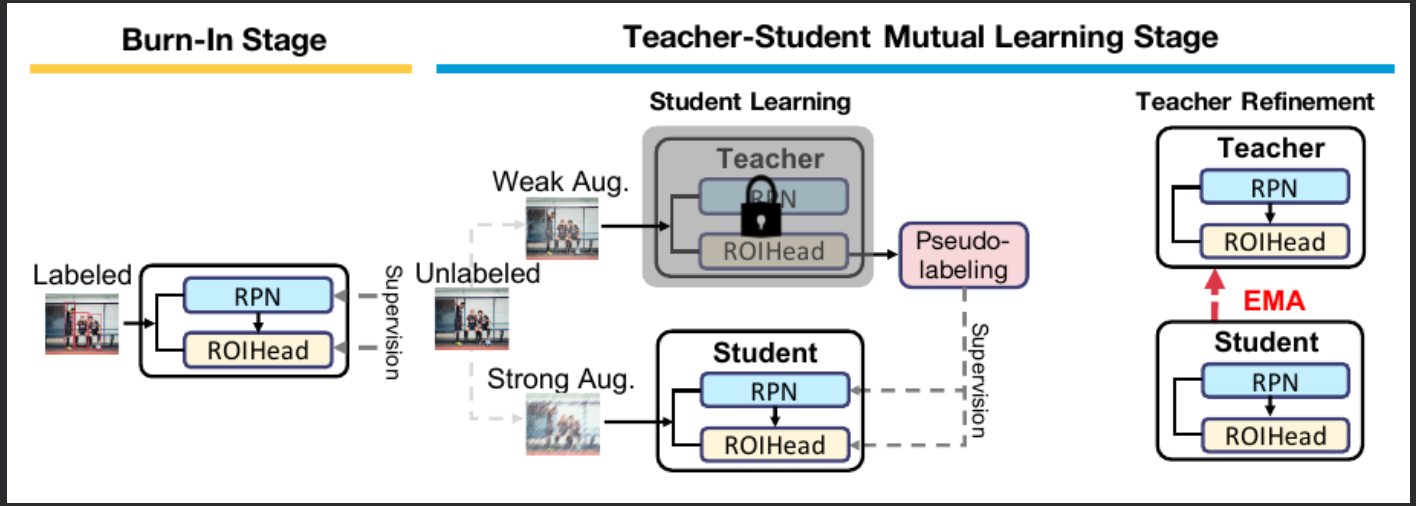
*** with labels**

**** without labels**

(labels cost a lot in terms of time and efforts)

State of the art

Semi-supervised Learning



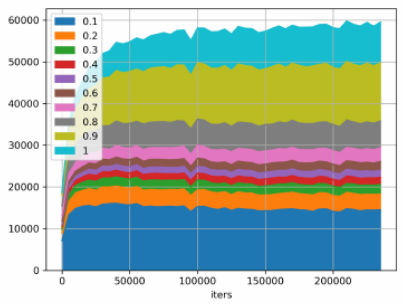
I. Teacher → Student
(pseudo-labeling with threshold filter)

II. Student → Teacher
(Exponential Moving Average)

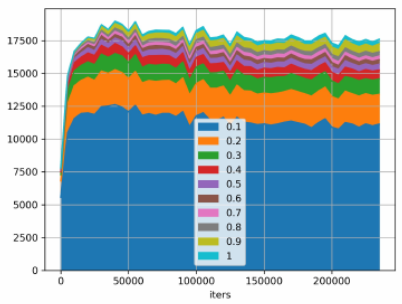
(*) Liu, Yen-Cheng, et al. "Unbiased teacher for semi-supervised object detection."

Contributions

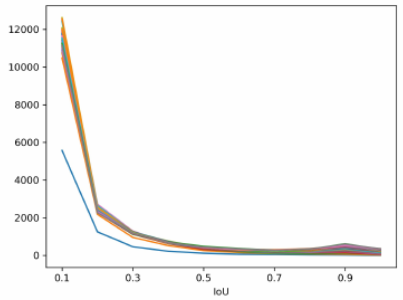
Problems definition



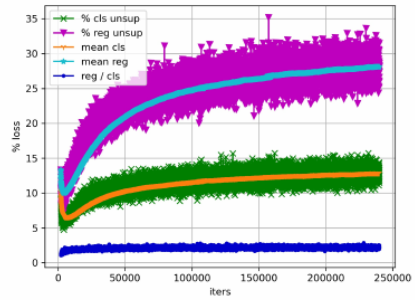
(a) count pseudo bboxes



(b) count class errors



(c) count class errors per IoU



(d) Unsupervised L_{cls} and L_{reg}

I. Unsupervised regression losses excluded from training!

II. Teacher pseudo-labels contains a lot or errors!

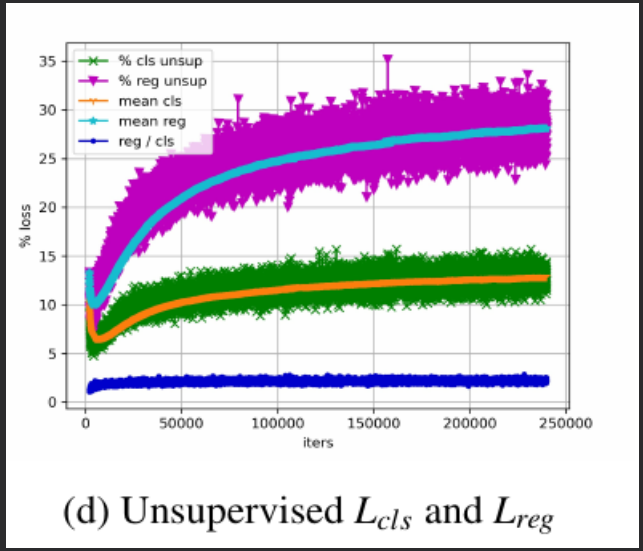
IL-net

Problem:

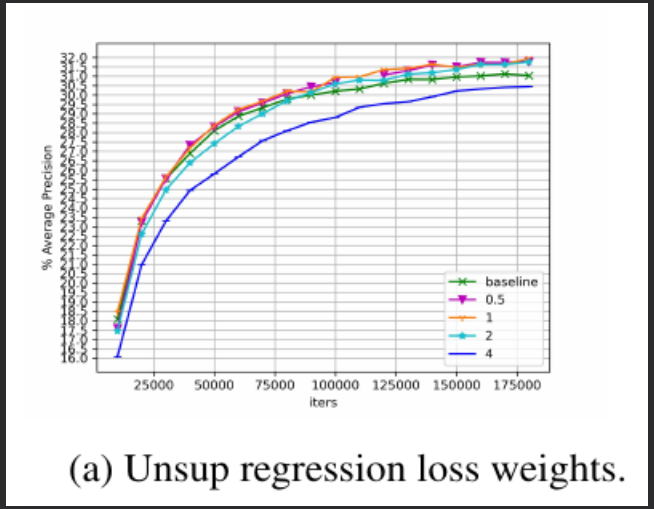
- Unsupervised regression losses excluded from training!

Solution:

- Rebalance losses depending on their contribution



(d) Unsupervised L_{cls} and L_{reg}



(a) Unsup regression loss weights.

IL-net

Problem:

- Teacher pseudo-labels contains a lot or errors!

Solution:

- New branch to learn bbox IoU quality (used to better filter)

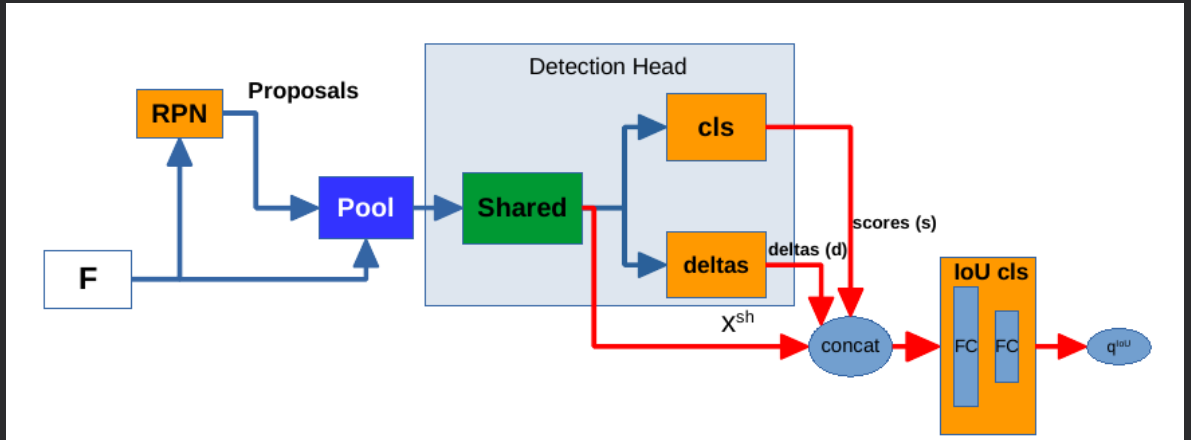


Figure 2.15: Faster R-CNN architecture with our branch in red.

Thank you for listening..

Questions? :)