



Paper



Code

Abstract

- We propose a novel **semi-supervised learning** method for leveraging unlabeled data by generating pseudo labels with a teacher-student approach.
- We introduce **three loss parametrizations** to introduce **doubt** in the pseudo labels based on their **confidence scores**.

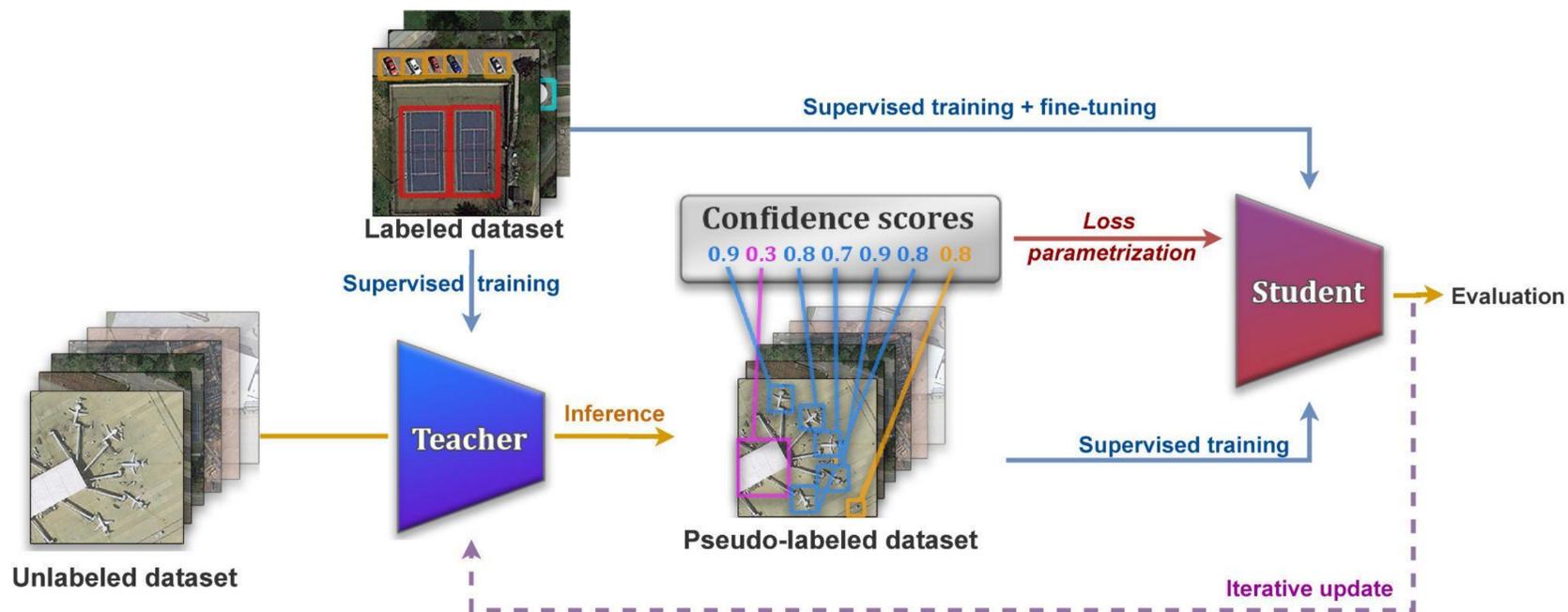
Motivations

- It is **expensive** in time or money to **annotate** large amounts of data.
- Unlabeled data are collected but often left unused.

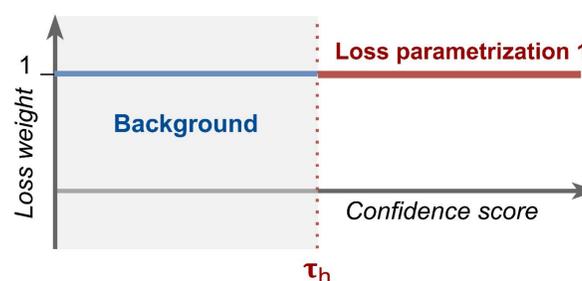
➤ Let's use them to **improve our models!**

Methodology

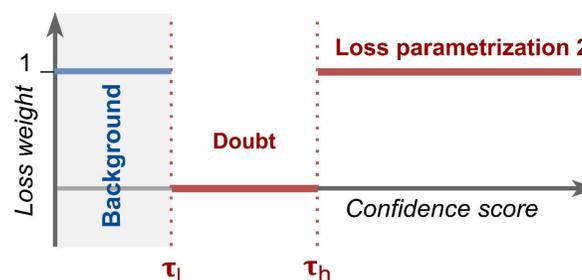
- **Step 1: Training the teacher:** We train a teacher model with the **labeled data** in a supervised way.
- **Step 2: Generating pseudo labels:** We use the trained teacher to **generate pseudo labels** on the unlabeled data.
- **Step 3: Training the student:** We train a student model with **the labeled and pseudo-labeled data**. We **introduce doubt for unsure predictions** of the teacher by **parametrizing the loss** and we fine-tune the student model with the labeled data.
- **Step 4 Iterating with a new teacher:** The fine-tuned **student becomes the new teacher** and is used to generate new pseudo labels.



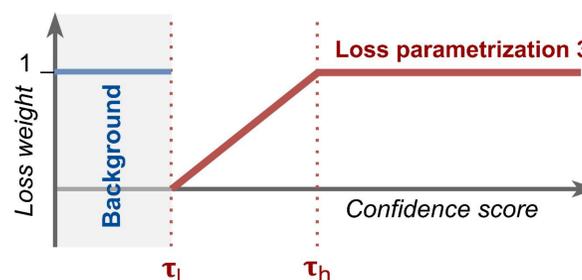
Loss parametrization



Single separation between the objects and the background



Doubt for unsure predictions of the teacher



Progressive doubt for unsure predictions of the teacher

Experimental Results

Quantitative results

Method	Metric: mAP		Teacher	Student 1	Student 2
	τ_l	τ_h			
Param. 1	-	0.5	36.91	40.43	40.82
Param. 2	0.5	0.7	36.91	40.32	41.10
Param. 3	0.5	0.7	36.91	40.41	41.17

Qualitative results

