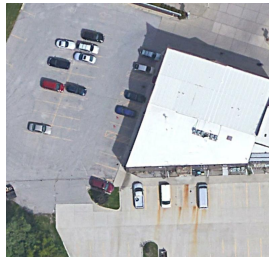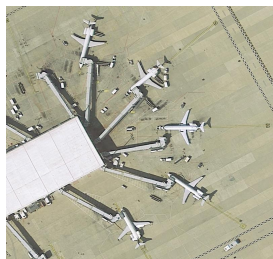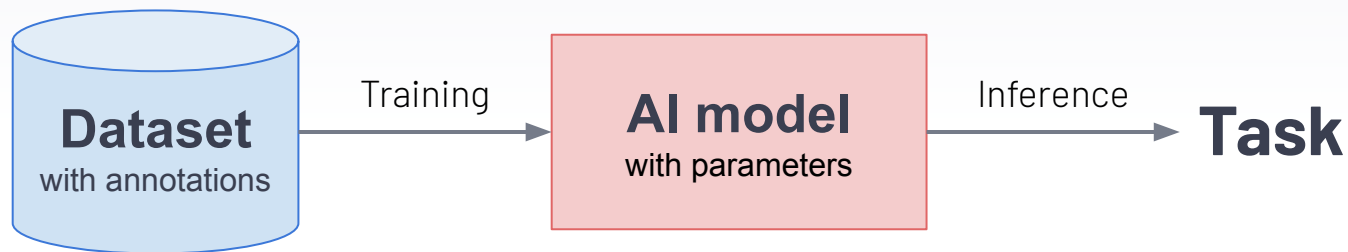# Semi-Supervised Training to Improve Detection for Satellite Images

"Data is gold!"

Anthony Cioppa and Renaud Vandeghen,

supervised by Marc Van Droogenbroeck

AI Basics

Dataset (with annotations) → Training → AI model (with parameters) → Inference → Task

A **model** is trained on a **dataset** to perform a specific **task**.
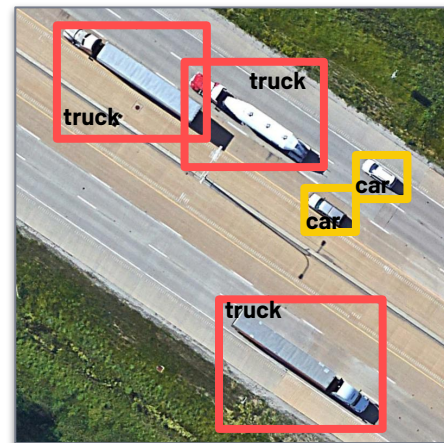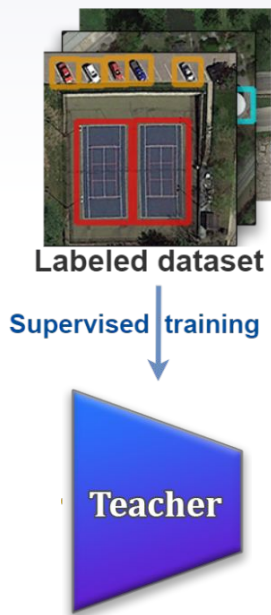
Availability of annotations

Raw data

Time

Money

Annotated data
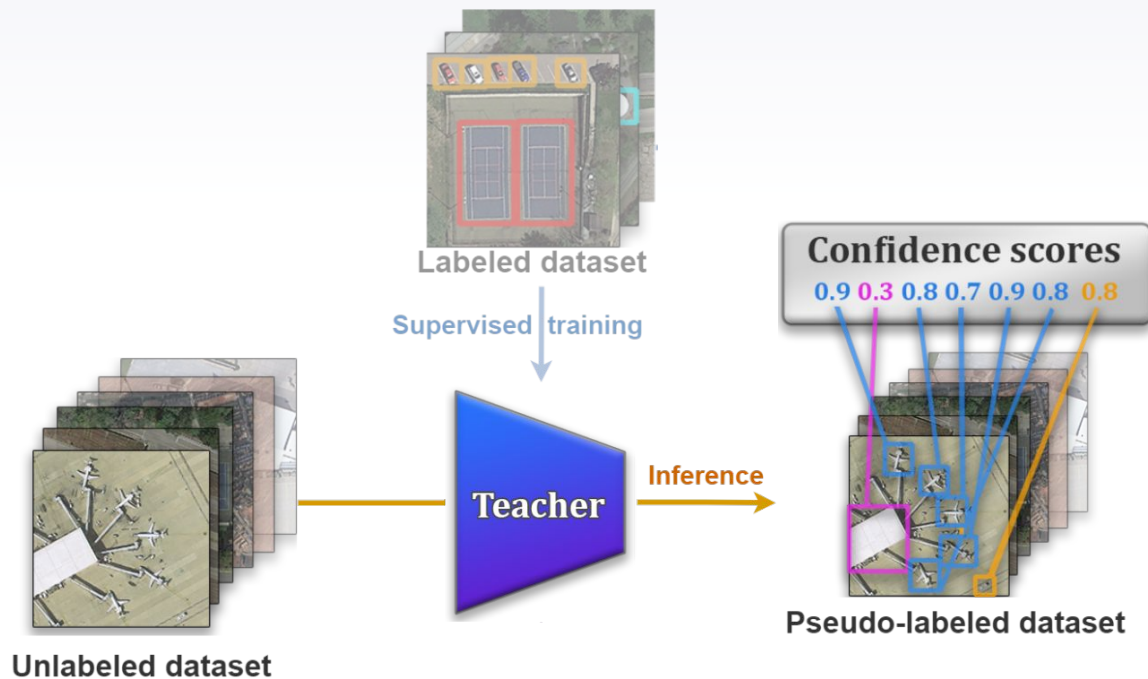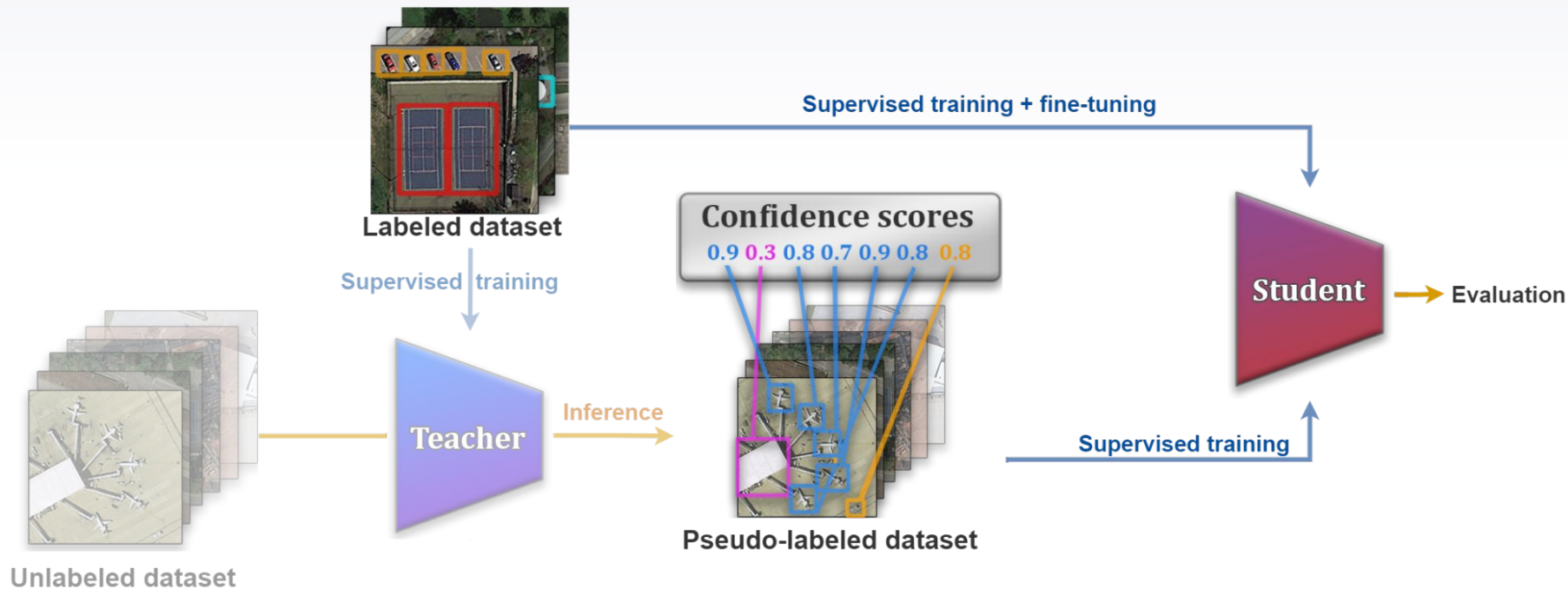
Step 1: supervised training

Labeled dataset

Supervised training

Teacher

Step 2: injecting raw data

Labeled dataset

Supervised training

Teacher

Inference

Confidence scores

0.9 0.3 0.8 0.7 0.9 0.8 0.8
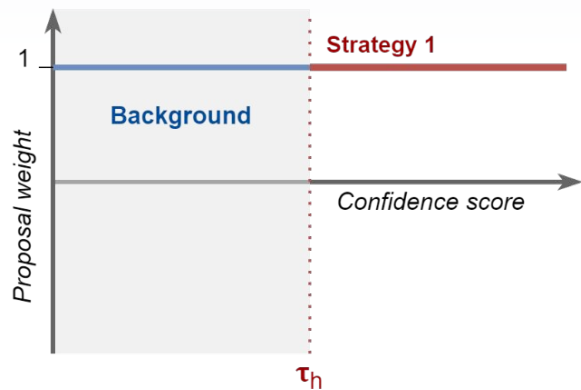
Pseudo-labeled dataset

Unlabeled dataset
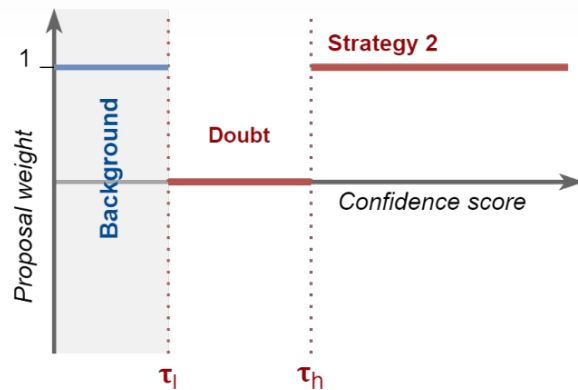
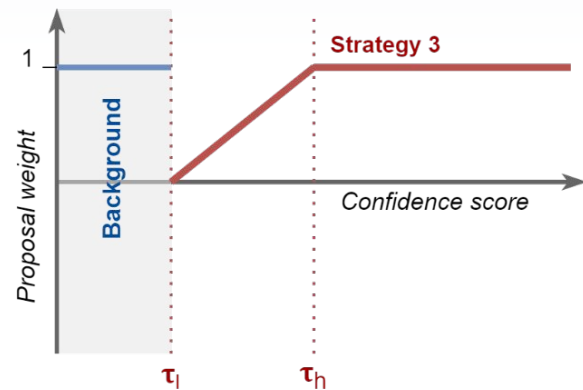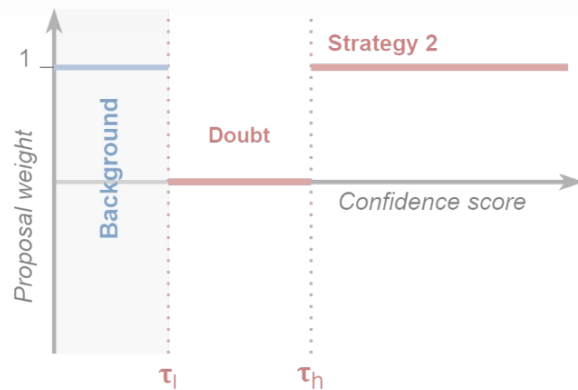# Step 3: training on all data

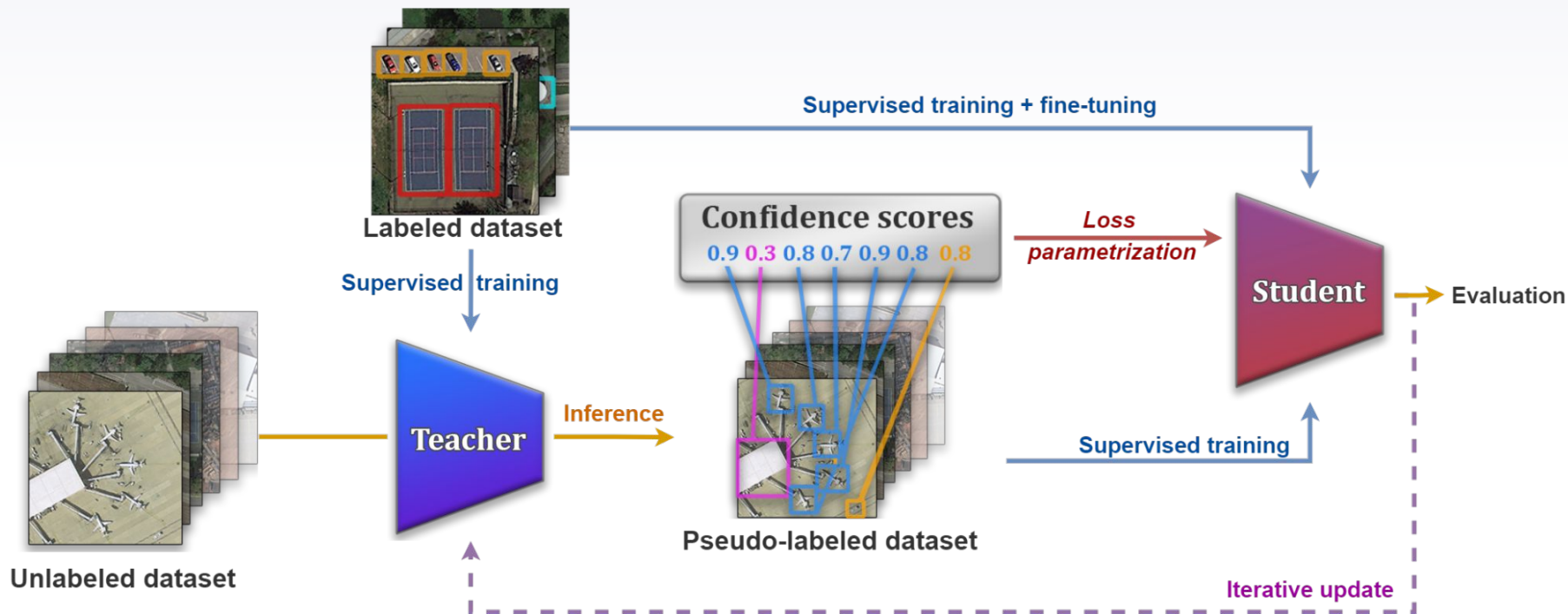# Step 4: confidence scores
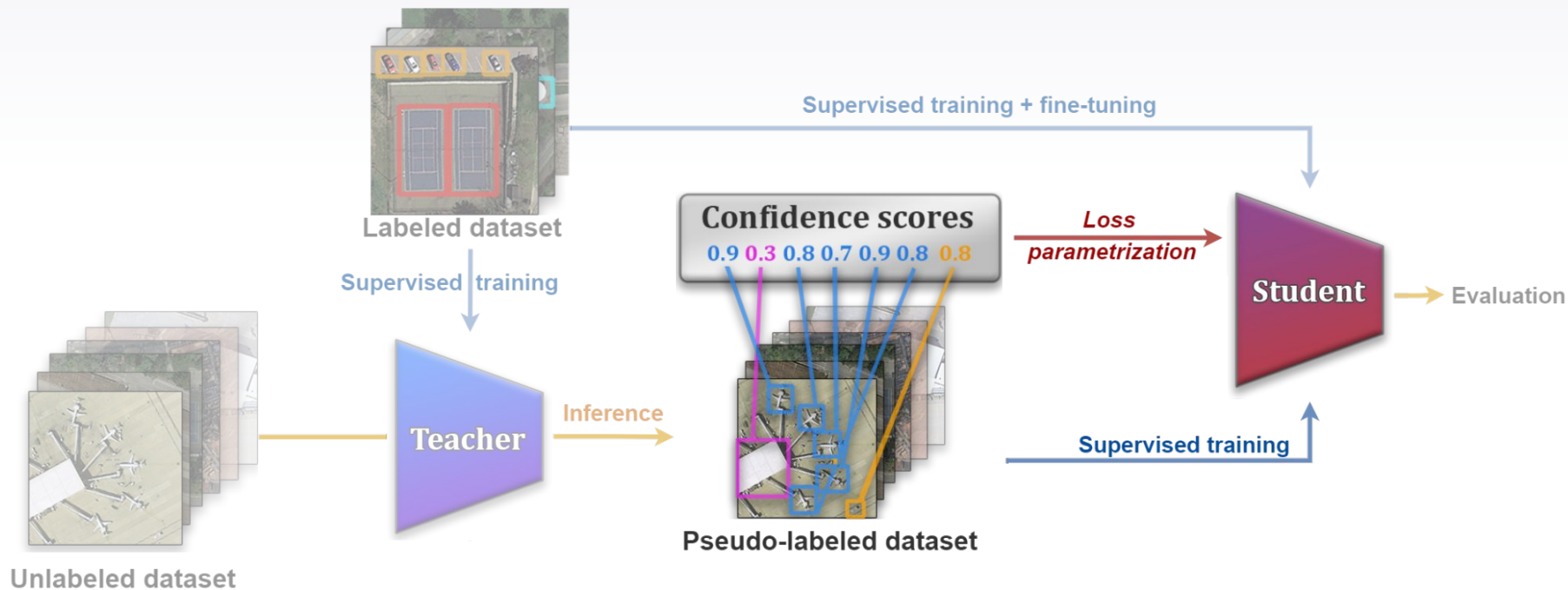
Strategy 1: Single separation

Strategy 2: doubt

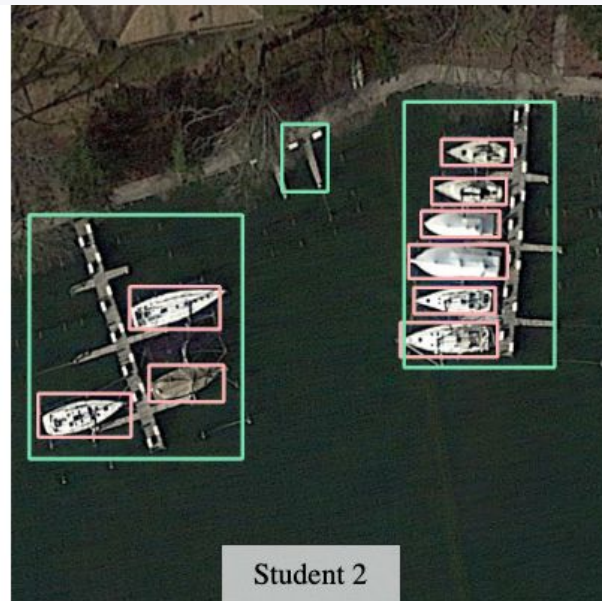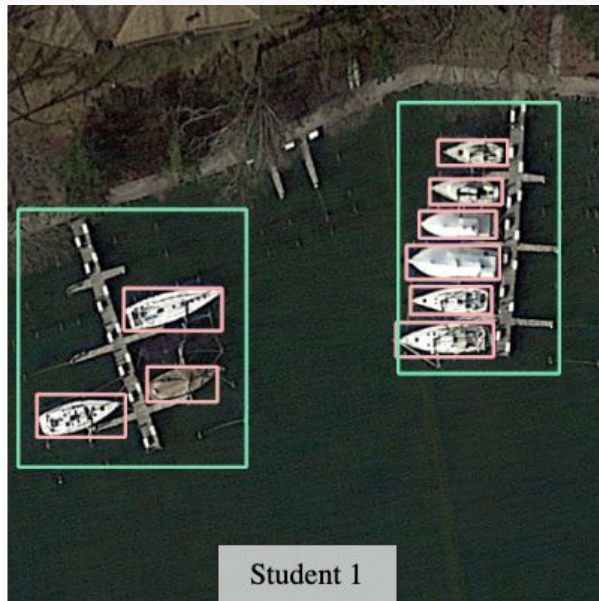# Strategy 3: progressive doubt

Our whole pipeline

Experiments

Method	τ_l	τ_h	Teacher	Student 1	Student 2
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**

Metric: mean Average Precision (mAP)

In practice

Teacher

Student 1

Student 2

Take away messages

Use raw data

Introduce **doubt**

Try it on your own tasks!

Python CPU and GPU codes available!

github.com/rvandeghen/SST

ACAD Research