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CVPR
VANCOUVER, CANADA

WED-PM-306:

Large-scale Training Data Search for Object Re-identification

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Highlights: training data search from a source pool

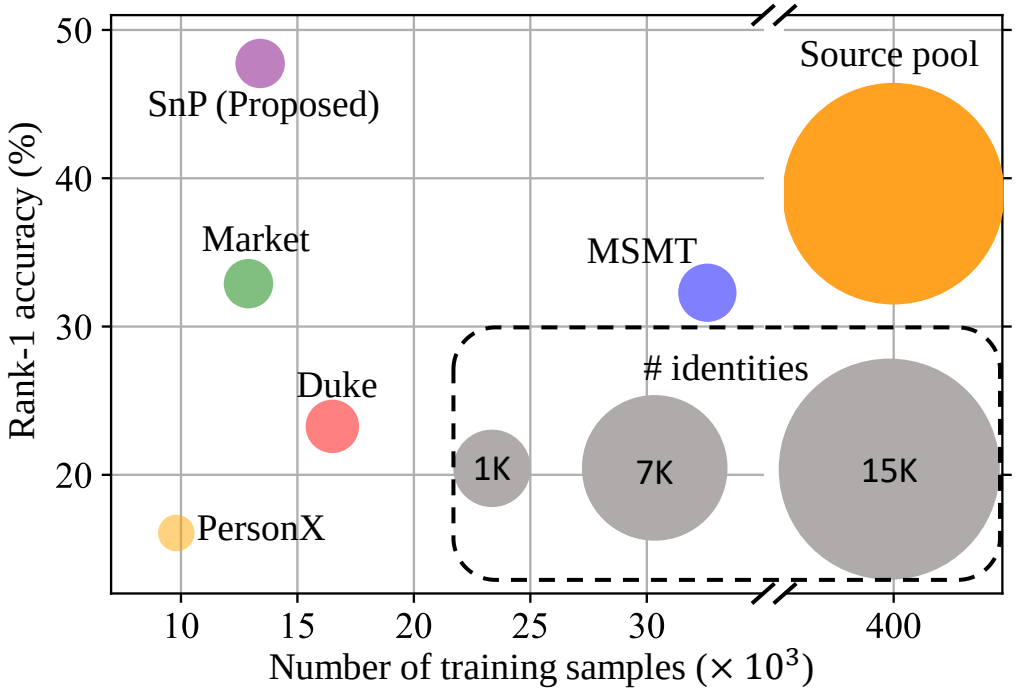
Source pool

Training set

Target validation/test set (unlabeled)

Objective: create a small training set from source pool but can train a model with high accuracy on target data

Highlights: results



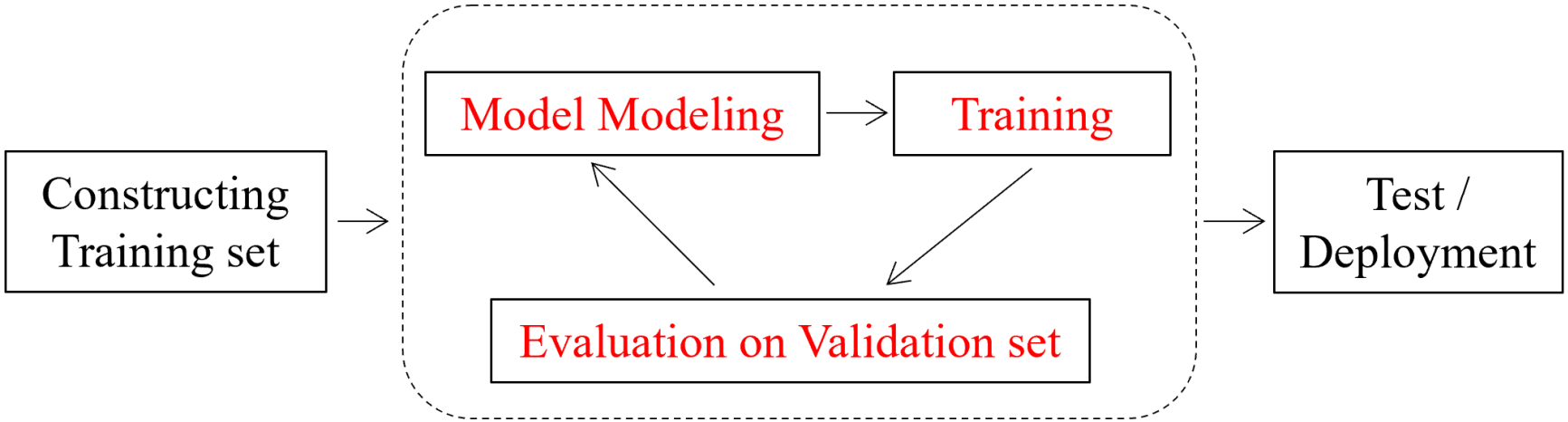
When the target is AlicePerson,

the searched training set (SnP) has

- higher accuracy than source pool
- higher accuracy than each individual dataset
- much more small scale in the number of samples and IDs

What most works are studying
model-centric

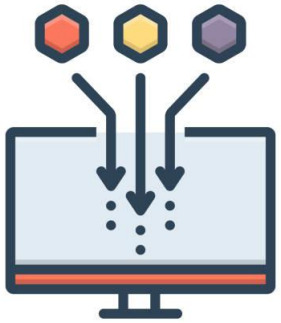
Based on **benchmarks** like ImageNet, COCO, etc



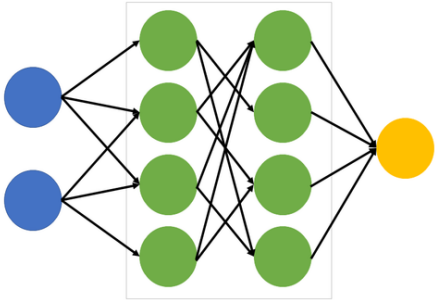
Under a fixed source training and target validation,
Can we improve the training algorithm or model?

Suppose we hope to have a deep learning system for a new target

- first half of time collecting/cleaning data

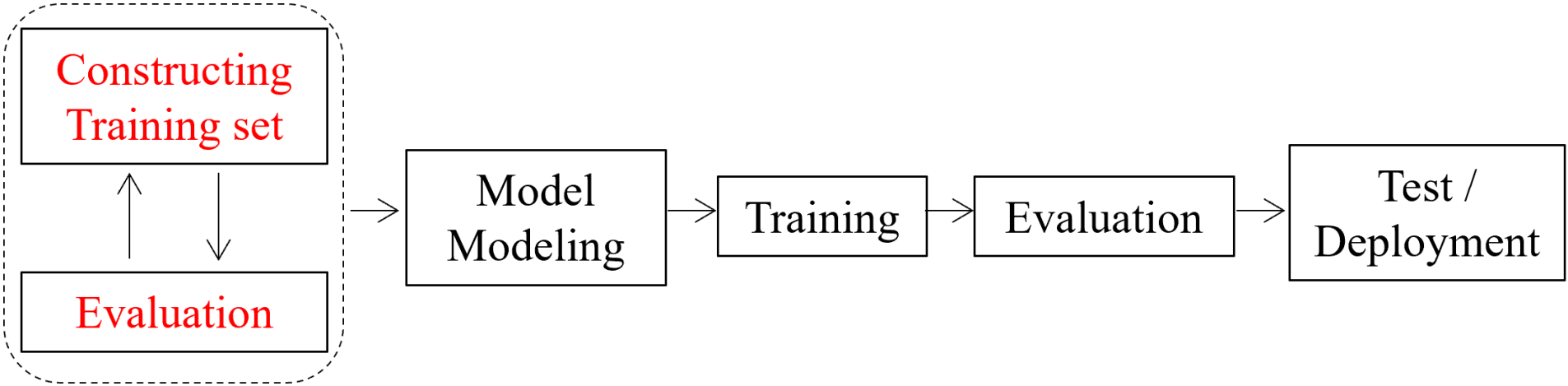


- The other half of time configuring your deep learning network



What I'm going to talk about

data-centric



Under a fixed target validation,
Can we improve the source training
data to improve target performance?

Training data search: from a source pool

Source pool

Train directly?

Target validation/test set (unlabeled)

Not a good idea:

- Time costly
- There could be a better choice

Training data search: from a source pool

Source pool

Training set

Target validation/test set (unlabeled)

Objective: create a small training set from source pool but can train a model with high accuracy on target data

We may select training from real training

Source pool

Training set A, B, C, D, E

Real training and validation

validation set

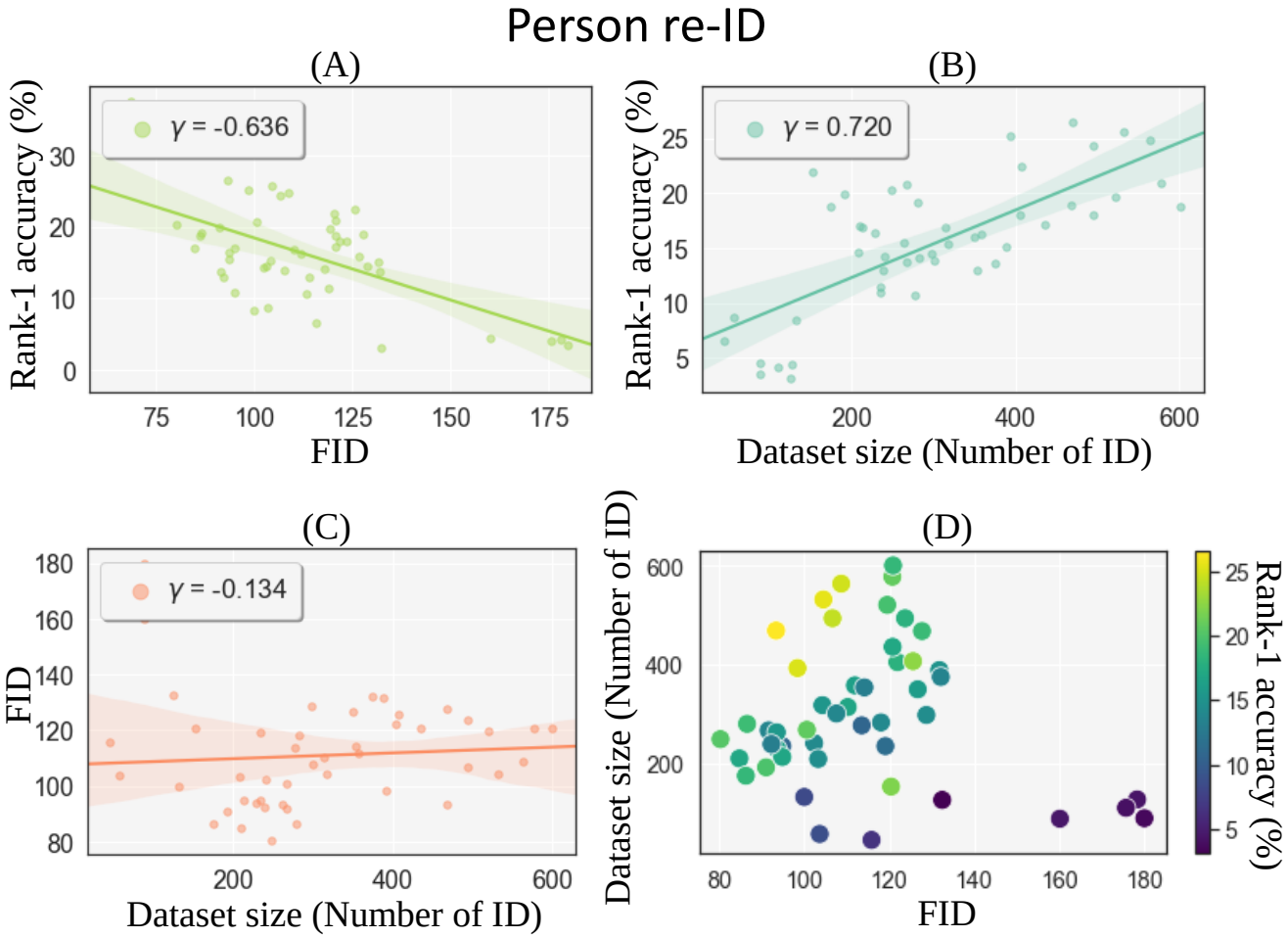
Data comparison

B ≻D ≻C ≻A ≻E

A time-consuming process!

Require validation labels!

If we can find a good training set without real training



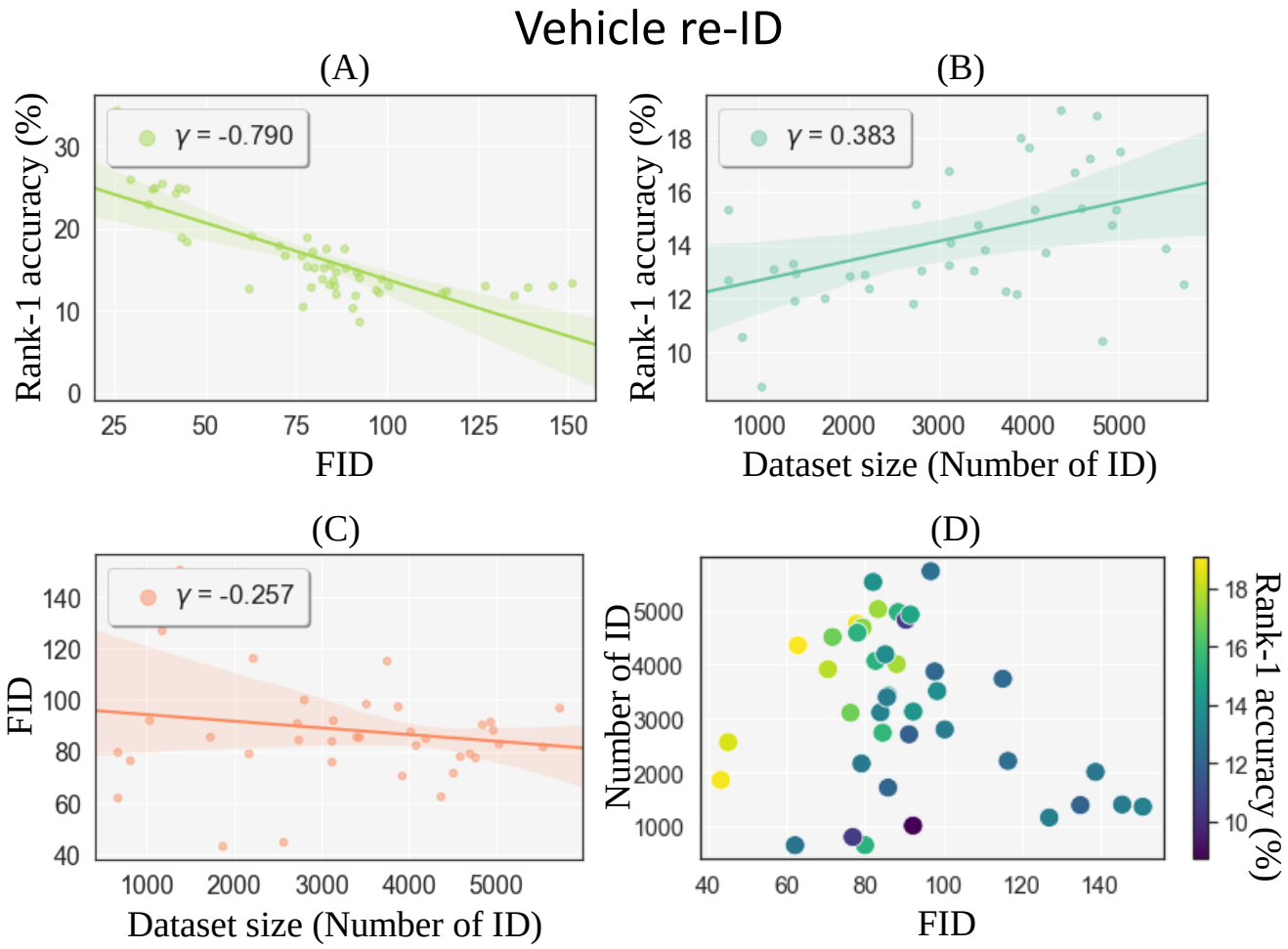
Negative correlation to the domain gap (FID)

Positive correlation to the dataset size

Jointly achieve best accuracy

Every point is a dataset

More experiments



Negative correlation to the domain gap (FID)

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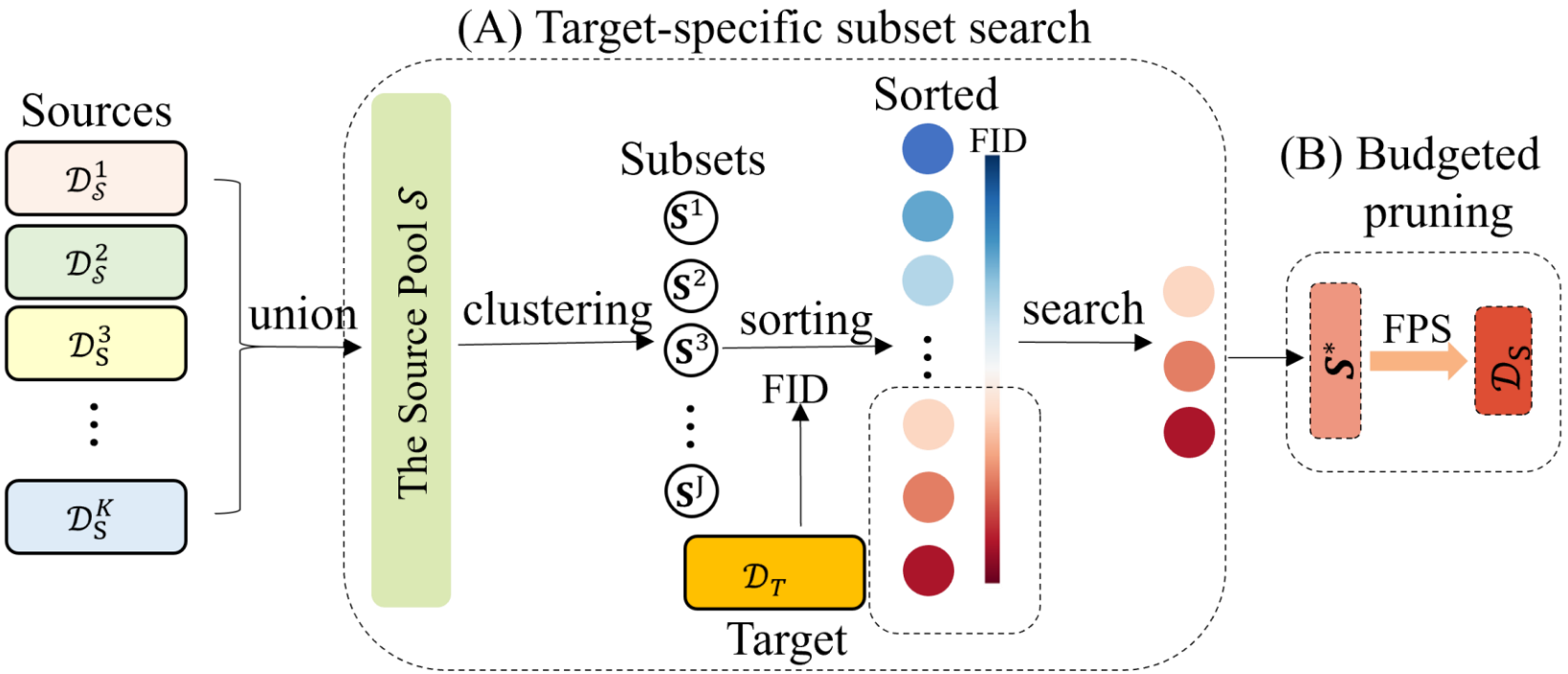
Jointly achieve best accuracy

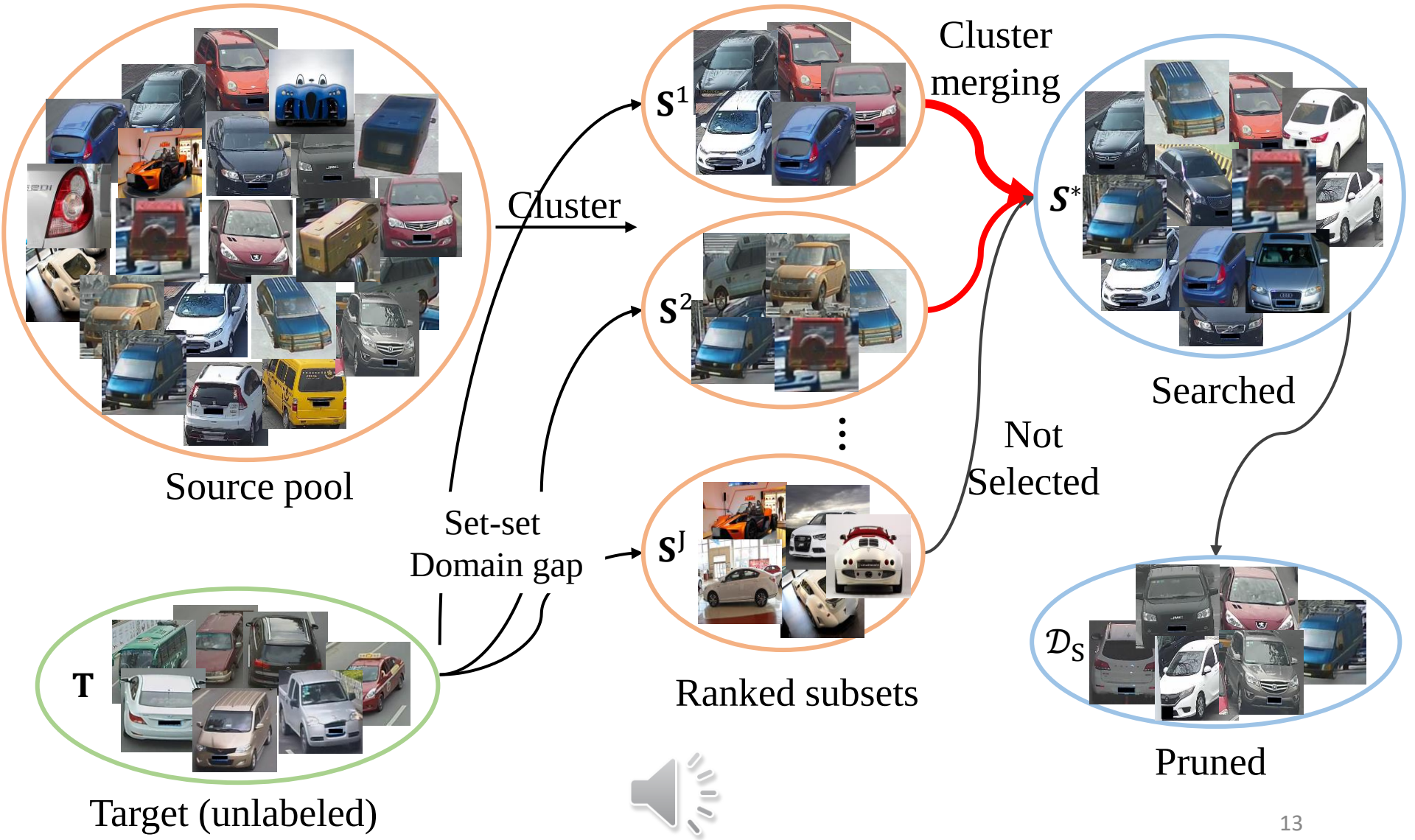
Every point is a dataset

Method: Search and Pruning (SnP)

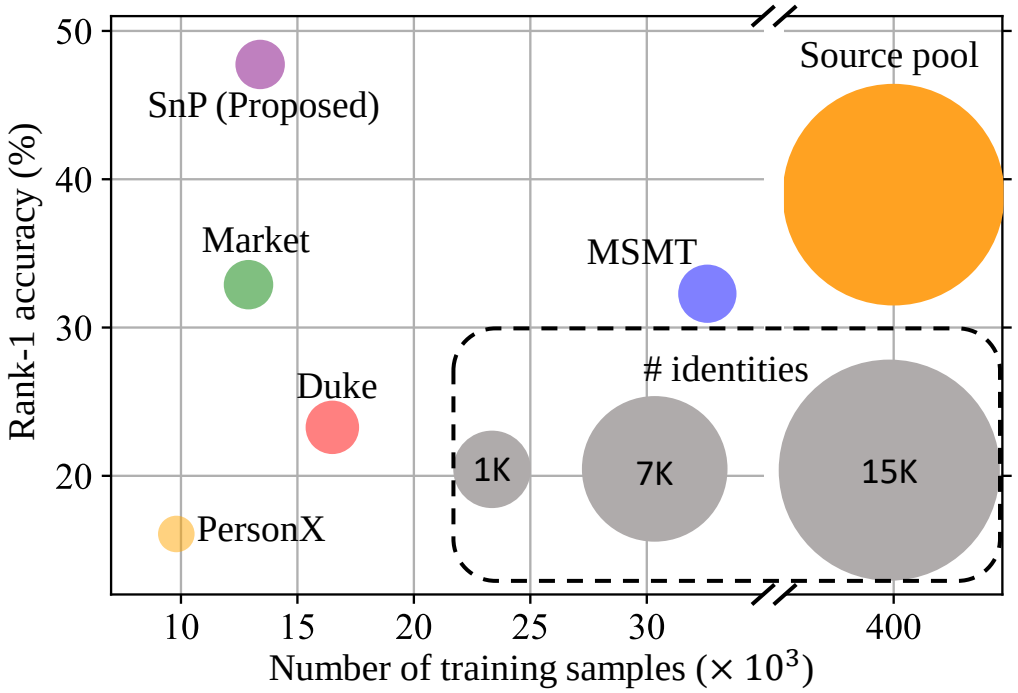


Simple Pipeline: Search for target-specific subset; then Pruning for efficient training

Labeled data from lots of existing datasets



Experiment



SnP has

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- much more small scale in the number of samples and IDs

Experiment

SnP result in better training set than both greedy sampling and random sampling

Conclusions and insights

- We study an interesting and unsolved problem:
  Training set search for unlabeled target

- We use a very simple method:
  Search and pruning framework

- Potential applications:
  Object detection, semantic segmentation, *etc*.

Scan for paper and code

Paper  Code