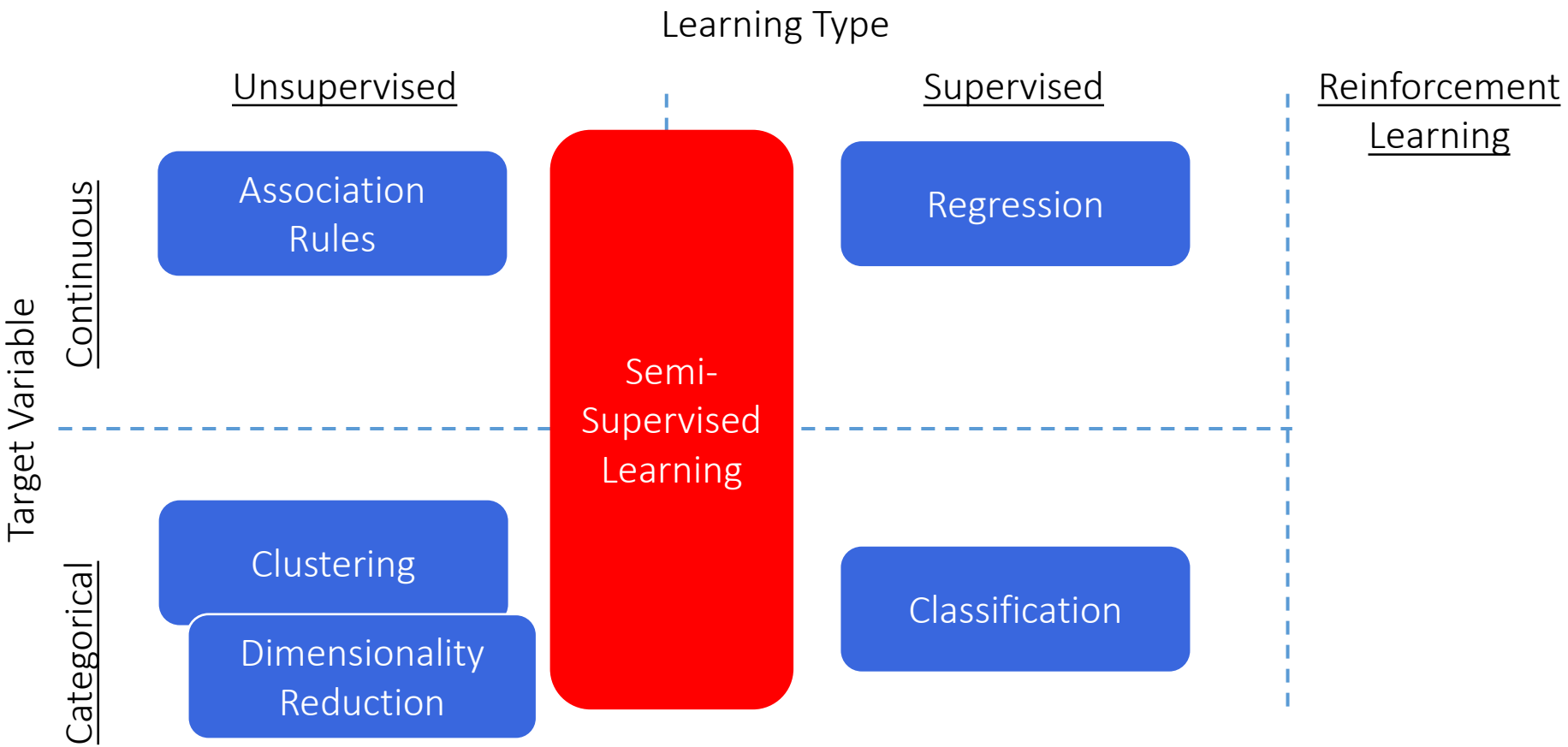
# Semi-Supervised Learning

# Semi-Supervised Learning

All Chapters

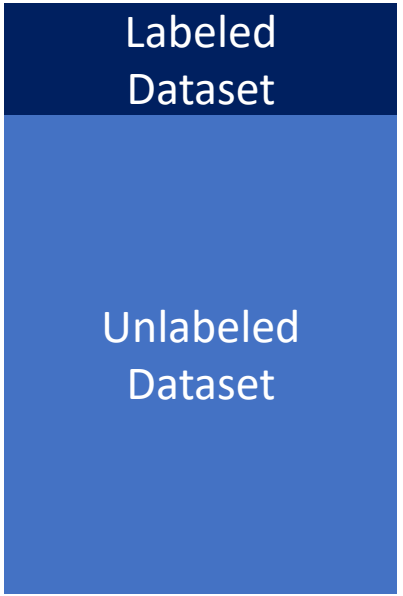


# Semi-Supervised Learning

Problem

Approach 1:
Train Model only
based on labeled data

Approach 2:
Label all unlabeled,
then train model on
complete dataset




Approach 3:
Train Semi-supervised
model!

# Semi-Supervised Learning

Paper

Published as a conference paper at ICLR 2018

## UNSUPERVISED REPRESENTATION LEARNING BY PREDICTING IMAGE ROTATIONS

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Source: https://arxiv.org/pdf/1803.07728.pdf

# Semi-Supervised Learning

Results

Table 2: Test classification error rates (%) on CIFAR-100 with data augmentation averaged over four runs. **Left** – Results with 10,000 and 50,000 labels. **Right** – Results with unlabeled Tiny Images.

| Method | 10,000 labels 50,000 images | 50,000 labels 50,000 images |
|---|---|---|
| Supervised [22] | $44.56 \pm 0.30$ | $26.42 \pm 0.17$ |
| SESEMI ASL (ConvNet) | $40.57 \pm 0.20$ | $\mathbf{22.49 \pm 0.15}$ |
| ImageNet-32 Fine-tuned | $\mathbf{32.44 \pm 0.27}$ | $\mathbf{22.22 \pm 0.25}$ |
| Π Model SSL [22] | $39.19 \pm 0.36$ | $26.32 \pm 0.04$ |
| TempEns SSL [22] | $\mathbf{38.65 \pm 0.51}$ | $26.30 \pm 0.15$ |
| SESEMI SSL (ConvNet) | $\mathbf{38.71 \pm 0.11}$ | $\mathbf{22.49 \pm 0.15}$ |
| SESEMI SSL (WRN) | $\mathbf{38.69 \pm 0.10}$ | $23.42 \pm 0.11$ |

| Method | 50,000 labels Tiny 500,000 | 50,000 labels Tiny 237,203 |
|---|---|---|
| Supervised [22] | $26.42 \pm 0.17$ | $26.42 \pm 0.17$ |
| SESEMI ASL (ConvNet) | $\mathbf{22.49 \pm 0.15}$ | $\mathbf{22.49 \pm 0.15}$ |
| ImageNet-32 Fine-tuned | $\mathbf{22.22 \pm 0.25}$ | $\mathbf{22.22 \pm 0.25}$ |
| Π Model SSL [22] | $25.79 \pm 0.17$ | $25.43 \pm 0.32$ |
| TempEns SSL [22] | $23.62 \pm 0.23$ | $23.79 \pm 0.24$ |
| SESEMI SSL (ConvNet) | $\mathbf{22.52 \pm 0.10}$ | $\mathbf{22.50 \pm 0.26}$ |
| SESEMI SSL (WRN) | $\mathbf{22.65 \pm 0.30}$ | $\mathbf{22.62 \pm 0.24}$ |

Source: Phi Vu Tran
„Exploring Self-Supervised Regularization for Supervised and Semi-Supervised Learning“
Flyreel AI Research
https://arxiv.org/pdf/1906.10343.pdf

# Semi-Supervised Learning

Dataset

MATT OP · UPDATED 6 MONTHS AGO

26 | New Notebook | Download (12 MB)

## Panda or Bear Image Classification

AI Panda or Bear Binary Image Classification

## About Dataset

The dataset contains panda and bear images generated by DALL·E Mini, an AI model that draws images from any prompt. The task for this dataset is binary classification.

All images are scaled 256×256.

Source: https://www.kaggle.com/datasets/mattop/panda-or-bear-image-classification

# Semi-Supervised Learning

Self-supervised Task

Transformation: Rotation

0°

90°

180°

270°

Rotated Image

Neural Network

Target

0

1

2

3

# Semi-Supervised Learning

## SESEMI Architecture

- applies self-supervised task of predicting rotation