COLLISION AVOIDANCE

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OVERVIEW

1. Data Collection
2. Training Data
3. Let's run
4. Trouble shoot

DATA COLLECTION

blocked:

TRAINING DATA

```python
for epoch in range(NUM_EPOCHS):

    for images, labels in iter(train_loader):
        images = images.to(device)
        labels = labels.to(device)
        optimizer.zero_grad()
        outputs = model(images)
        loss = F.cross_entropy(outputs, labels)
        loss.backward()
        optimizer.step()

    test_error_count = 0.0
    for images, labels in iter(test_loader):
        images = images.to(device)
        labels = labels.to(device)
        outputs = model(images)
        test_error_count += float(torch.sum(torch.abs(labels - outputs.argmax(1))))

    test_accuracy = 1.0 - float(test_error_count) / float(len(test_dataset))
    print('%d: %f' % (epoch, test_accuracy))
    if test_accuracy > best_accuracy:
        torch.save(model.state_dict(), BEST_MODEL_PATH)
        best_accuracy = test_accuracy
```
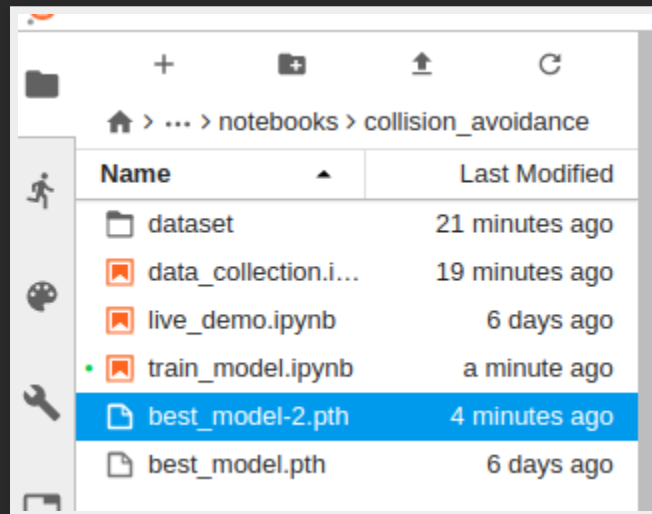
```
0: 1.000000
1: 1.000000
2: 1.000000
3: 1.000000
4: 1.000000
5: 1.000000
6: 1.000000
7: 1.000000
8: 1.000000
```

best_model-1.pth 218MB


```
jetbot@jetbot:~/jetbot/notebooks/collision_avoidance$ ls -alh
total 436M
drwxr-xr-x 4 jetbot jetbot 4.0K Sep 27 04:03 .
drwxr-xr-x 7 jetbot jetbot 4.0K Aug 18 19:12 ..
drwxr-xr-x 2 jetbot jetbot 4.0K Sep  8 21:04 .ipynb_checkpoints
-rw-r--r-- 1 jetbot jetbot 218M Sep 27 04:00 best_model-2.pth
-rw-r--r-- 1 jetbot jetbot 218M Sep 20 20:41 best_model.pth
-rw-r--r-- 1 jetbot jetbot  15K Sep 27 03:45 data_collection.ipynb
drwxr-xr-x 4 jetbot jetbot 4.0K Sep 27 03:43 dataset
-rw-r--r-- 1 jetbot jetbot 9.6K Sep 20 21:17 live_demo.ipynb
-rw-r--r-- 1 jetbot jetbot 8.4K Sep 27 04:03 train_model.ipynb
```

Tooks 40minutes

TRANSFER LEARNING

Motivation:

인간은 어떤 도메인의 지식을 배울때 밑바닥부터 배우지는 않는다 기존에 이와 비슷한 도메인에서 익혔던 지식을 활용한다.

WHAT:

Transfer learning is a machine learning method where a model developed for a task is reused as the starting point for a model on a second task.

tries to see how to leverage knowledge from pre-trained models and use it to solve new problems!

TRANSFER LEARNING

WHY:

Transfer learning is useful when you have insufficient data for a new domain you want handled by a neural network and there is a big pre-existing data pool that can be transferred to your problem.

A simple example would be the ImageNet dataset, which has millions of images pertaining to different categories,
However, getting such a dataset for every domain is tough. Besides, most deep learning models are very specialized to a particular domain or even a specific

task.
, it would be only on very specific datasets and end up suffering a significant loss in performance when used in a new task which might still be similar to the one it was trained on.
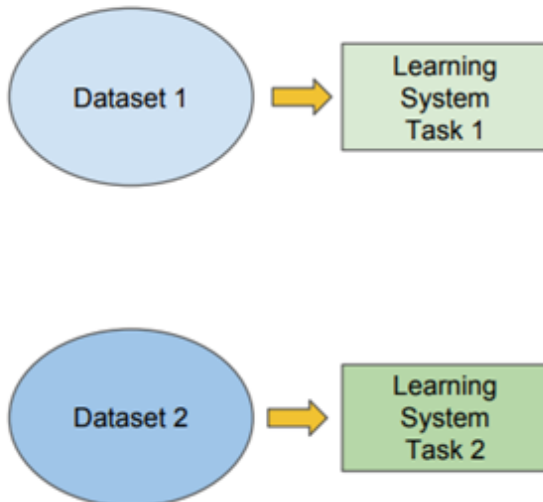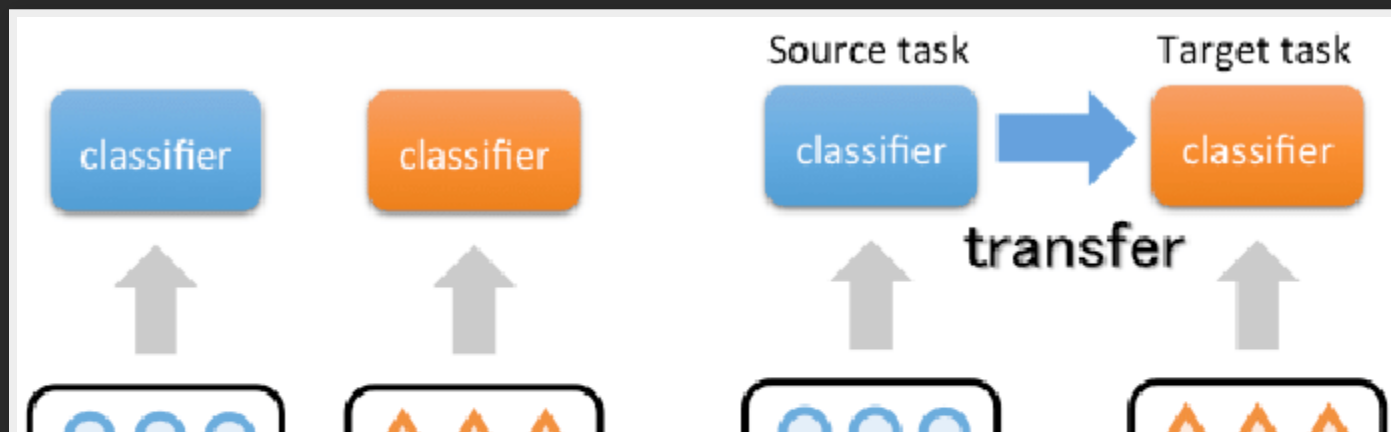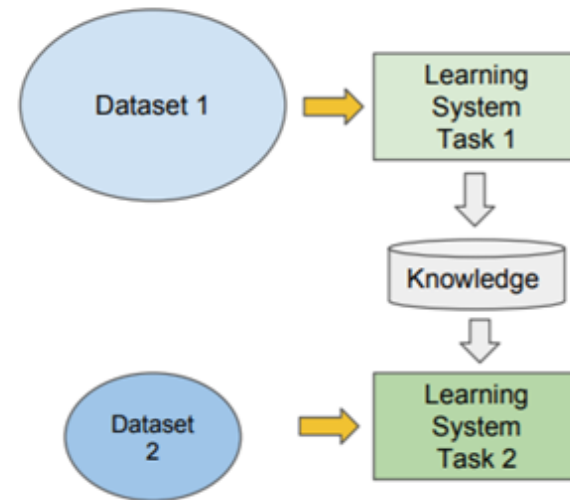
TRANSFER LEARNING

Traditional ML   vs   Transfer Learning

- Isolated, single task learning:
  - Knowledge is not retained or accumulated. Learning is performed w.o. considering past learned knowledge in other tasks
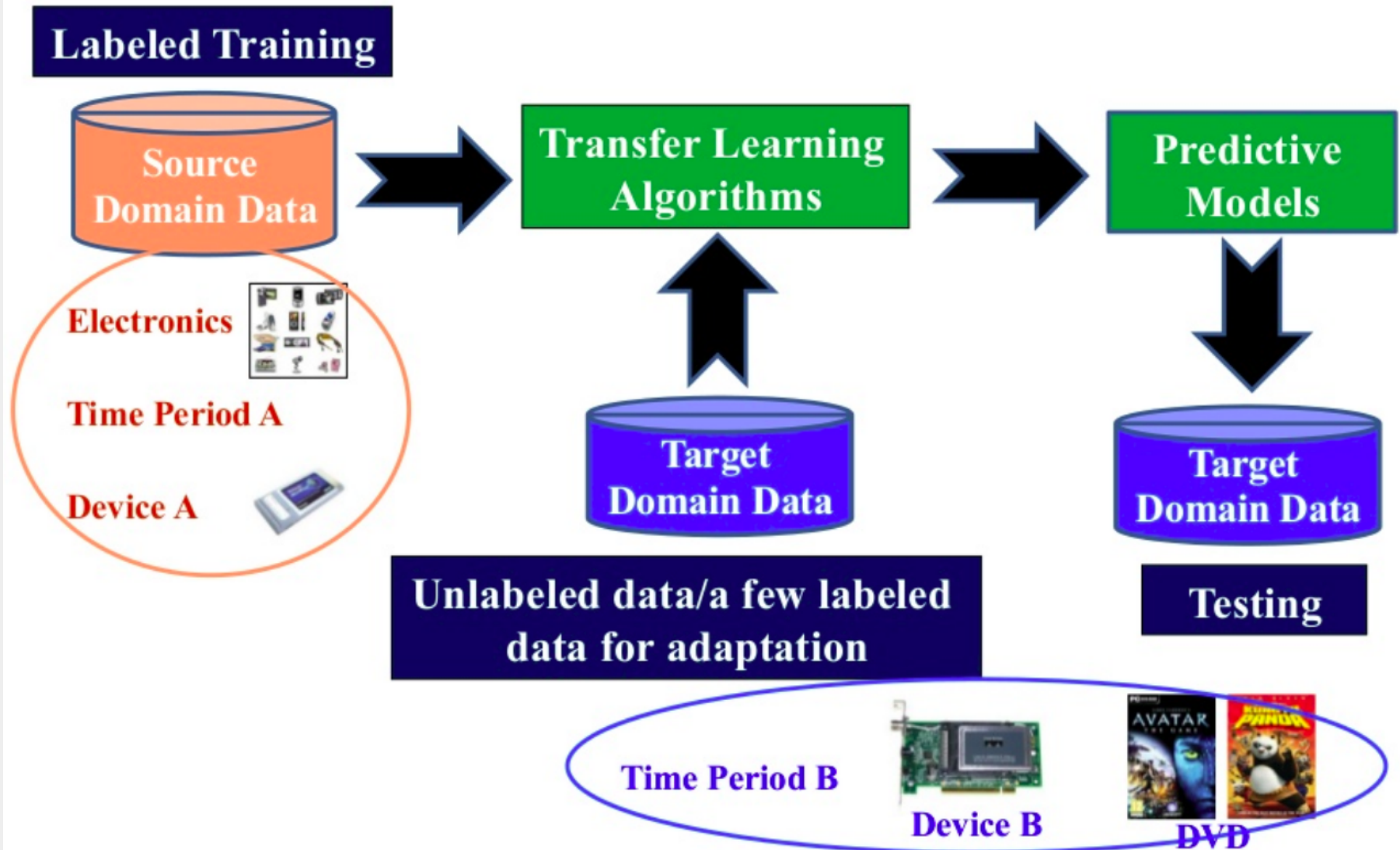
- Learning of a new tasks relies on the previous learned tasks:
  - Learning process can be faster, more accurate and/or need less training data

TRANSFER LEARNING

Why Transfer Learning?

Labeled Training

Source Domain Data → **Transfer Learning Algorithms** → **Predictive Models**

Electronics

Time Period A

Device A

Target Domain Data

Unlabeled data/a few labeled data for adaptation

Target Domain Data

Testing

Time Period B

Device B

DVD

LET'S RUN

Demo

TROUBLE SHOOT

Storage almost full!!

```
jetbot@jetbot:~$ ls -alh /var/log/syslog*
-rw-r----- 1 syslog adm 104K Sep 27 03:57 /var/log/syslog
-rw-r----- 1 syslog adm  27K Sep 27 00:05 /var/log/syslog.1
-rw-r----- 1 syslog adm  46K Sep 26 23:18 /var/log/syslog.2.gz
```