

Welcome to

DS3010:
DS-III: Computational Data Intelligence
Transfer Learning
Prof. Yanhua Li

Time: 11:00am – 12:50pm M & R

Location: HL 114

D-term 2022

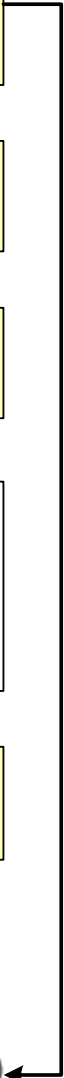
Review Final Exam

- We have graded it.

Project 3 Presentation

- On Monday May 2nd 2022, 11AM-12:50PM
- In person and remote (by zoom)
- Prof. Li's office hour Zoom link (See Canvas)
- 10 teams in total
- Team 1, 4, 5, 8, 9, 10, 11, 12, 13, 14
- Presentation order by Team IDs
- Presentation:
 - up to 6 minutes +
 - 1-2 min Questions

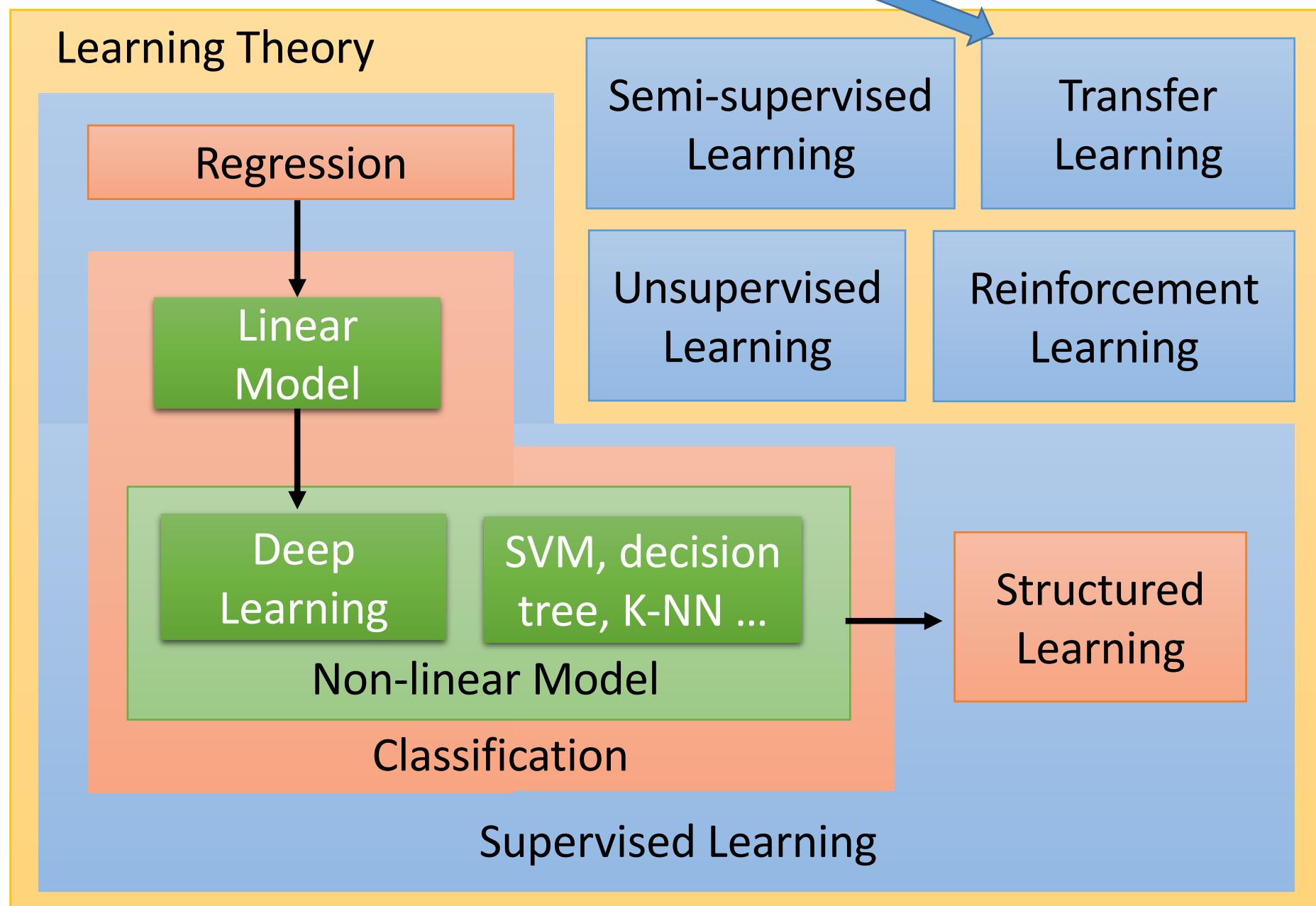




Zheng, Y., et al. *ACM transactions on Intelligent Systems and Technology*.

Learning Map

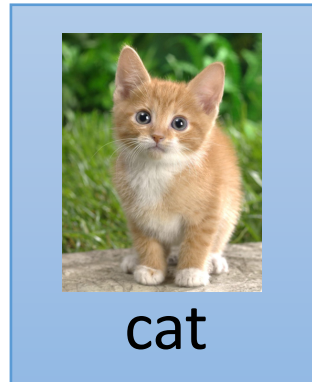
scenario task method



Transfer Learning

Transfer Learning

Dog/Cat
Classifier



Data *not directly related to* the task considered



Similar domain, different tasks

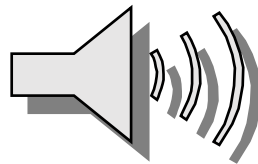
Different domains, same task

Why?

Task Considered

Data not directly related

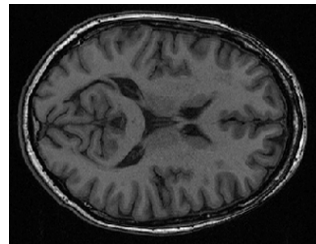
Speech
Recognition



French

YouTube English
Chinese
.....

Image
Recognition



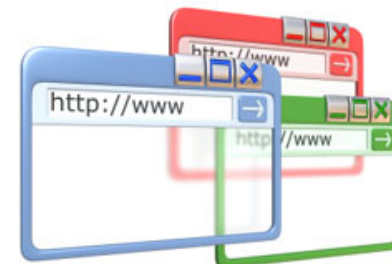
Medical
Images



Text
Analysis



Specific
domain



Webpages

Outline

Model Fine-Tuning

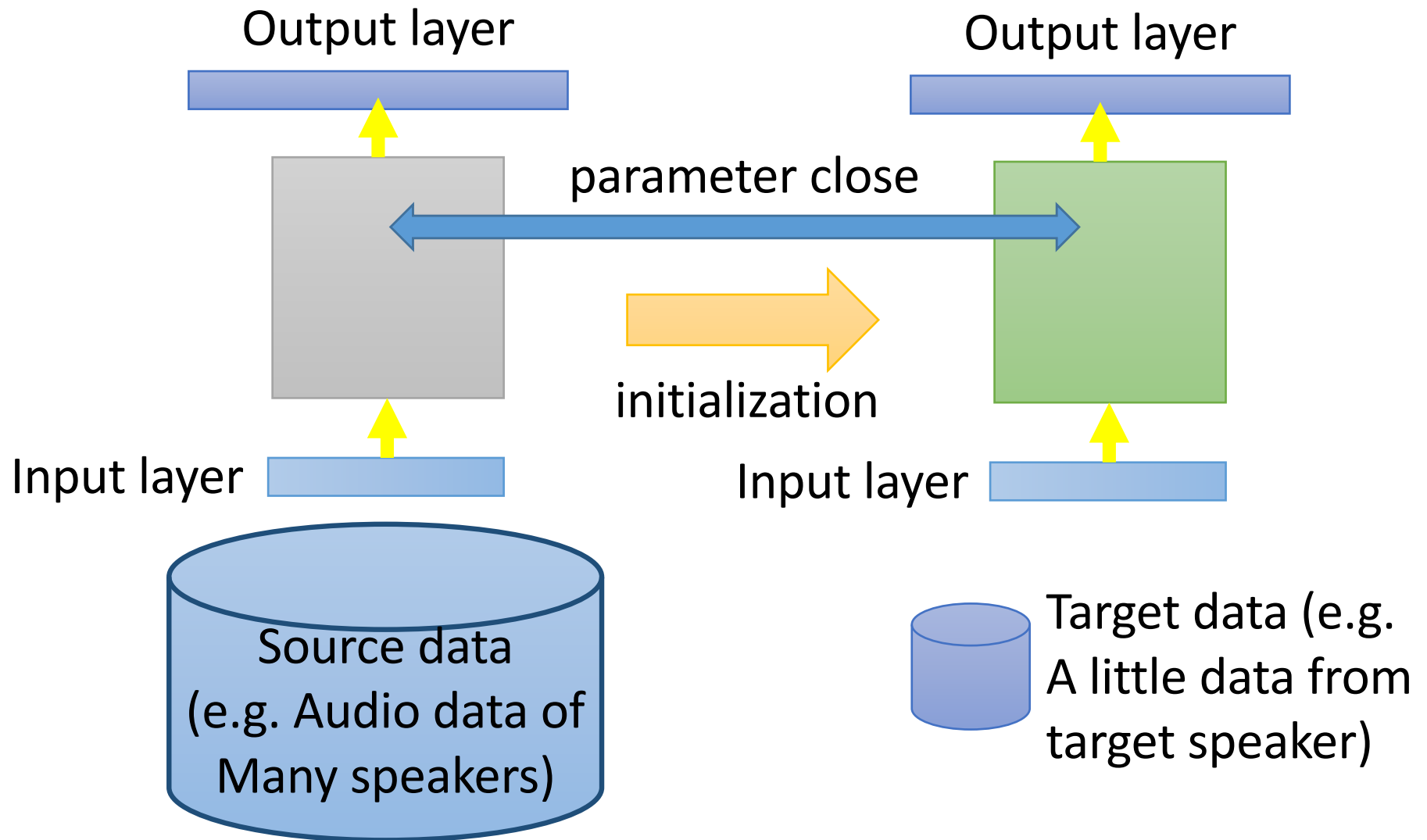
Multi-Task Learning

Model Fine-tuning

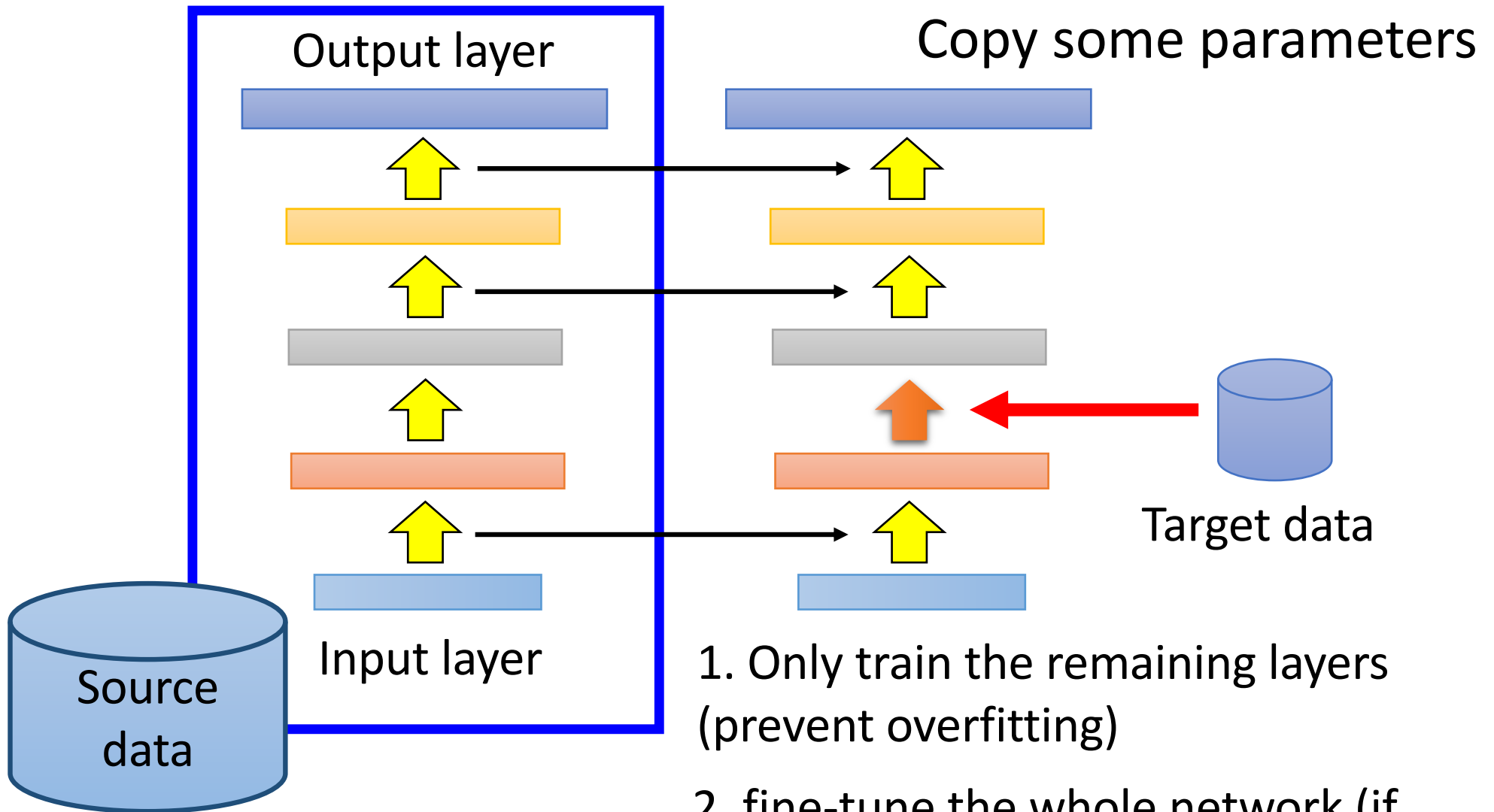
few-shot learning: only a few examples in target domain

- Task description
 - Source data: (x^s, y^s)  A large amount
 - Target data: (x^t, y^t)  Very little
- Example: (supervised) speaker adaption
 - Source data: audio data and transcriptions from many speakers
 - Target data: audio data and its transcriptions of specific user
- Idea: *training a model by source data, then fine-tune the model by target data*
 - Challenge: only limited target data, so be careful about **overfitting**

Conservative Training



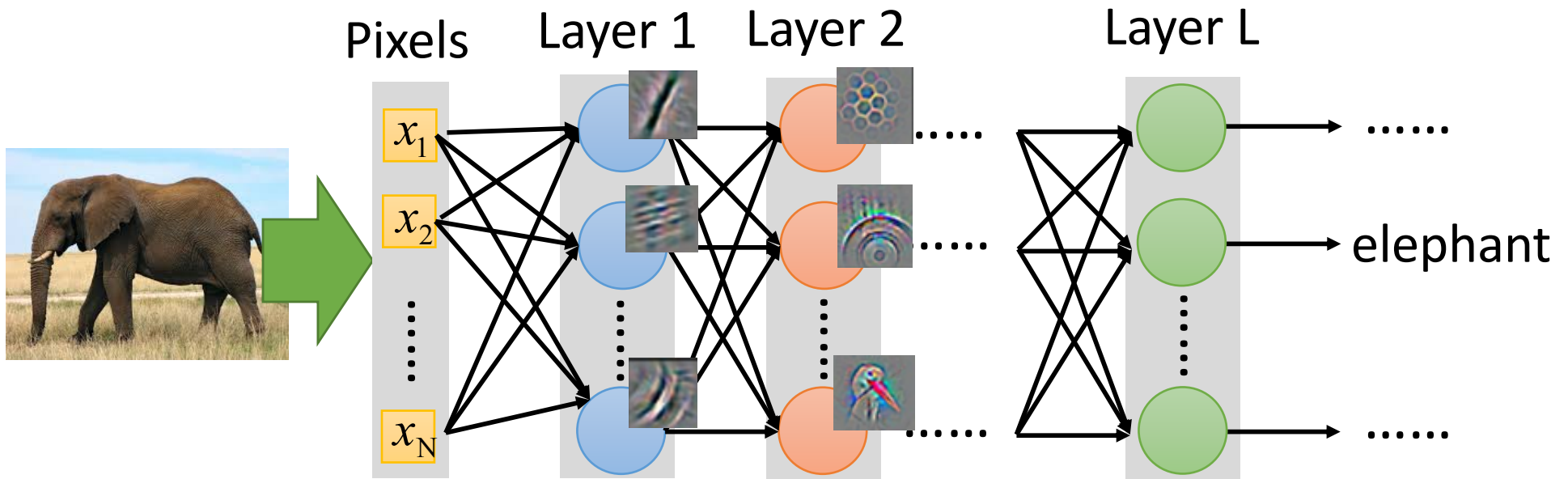
Layer Transfer



1. Only train the remaining layers (prevent overfitting)
2. fine-tune the whole network (if there is sufficient data)

Layer Transfer

- Which layer can be transferred (copied)?
 - *Speech*: usually copy the last few layers
 - *Image*: usually copy the first few layers



Outline

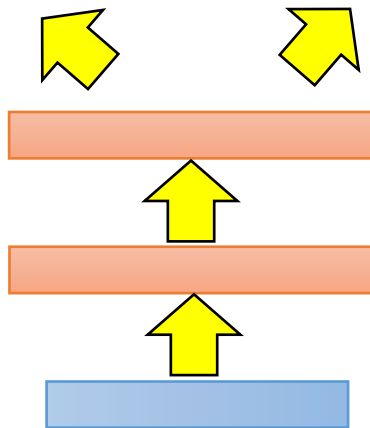
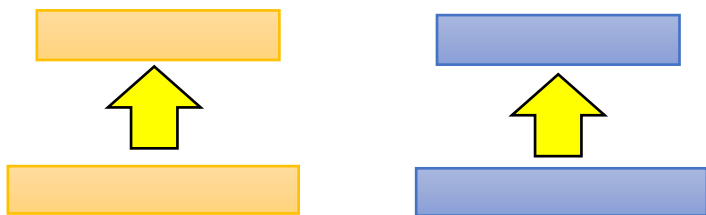
Model Fine-Tuning

Multi-Task Learning

Multitask Learning

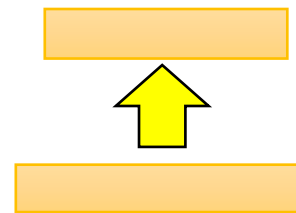
- The multi-layer structure makes NN suitable for multitask learning

e.g., French Task A e.g., German Task B

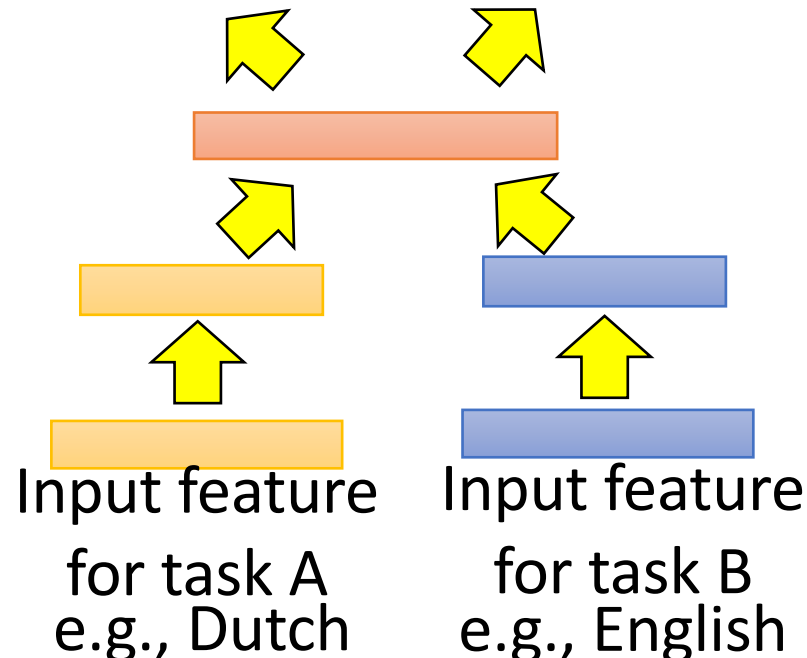
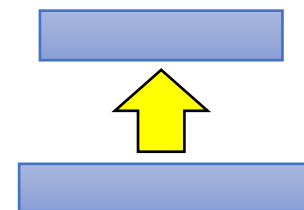


e.g., acoustic features

e.g., French Task A



e.g., German Task B



Questions