Transfer Learning

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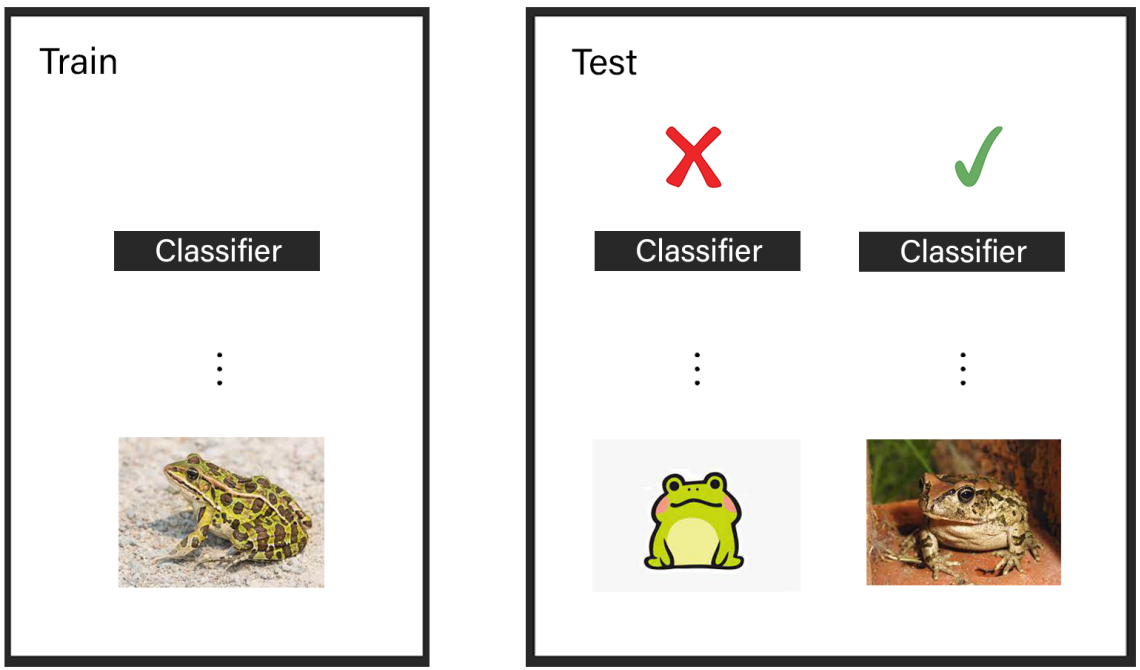
Backgrounds - Distribution shift



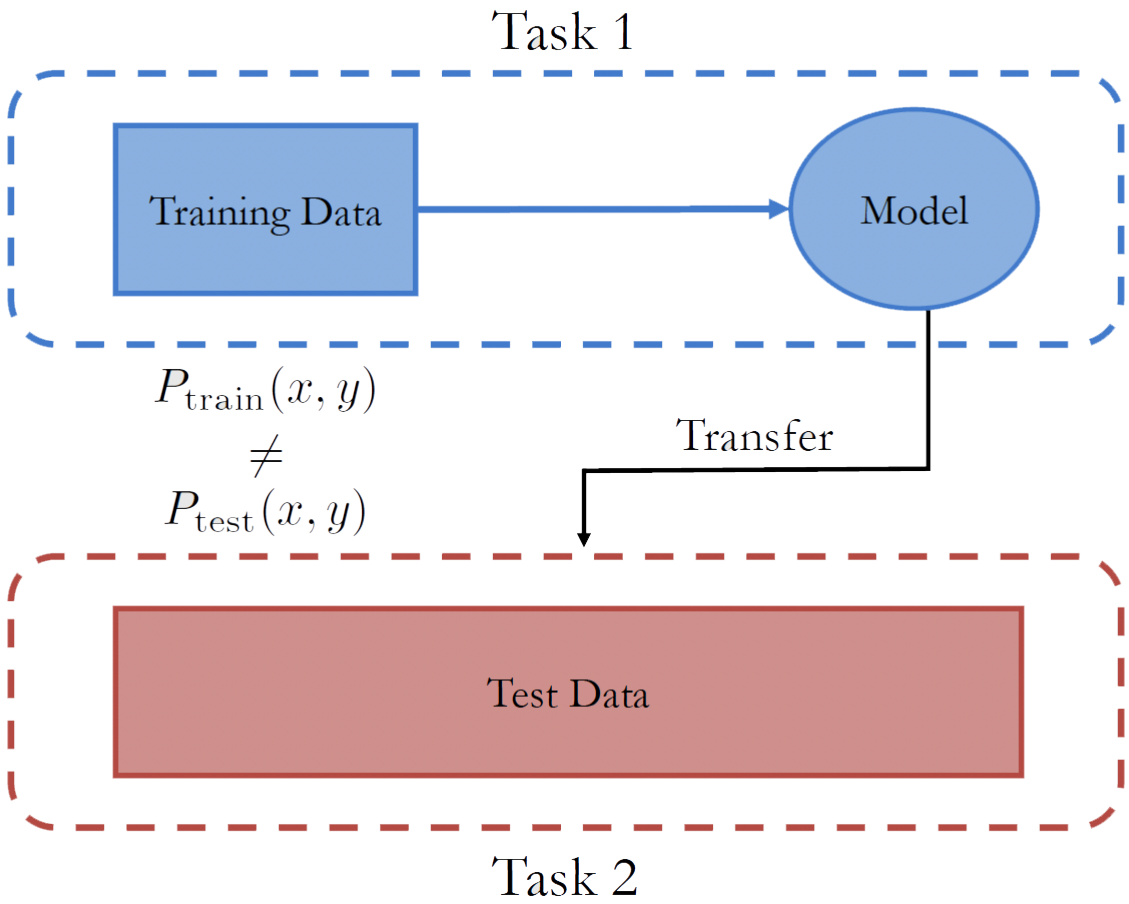
Backgrounds - Distribution shift

With the help of validation set, we can avoid overfitting on ***trainingset***, but we can still overfit on ***training domain***.

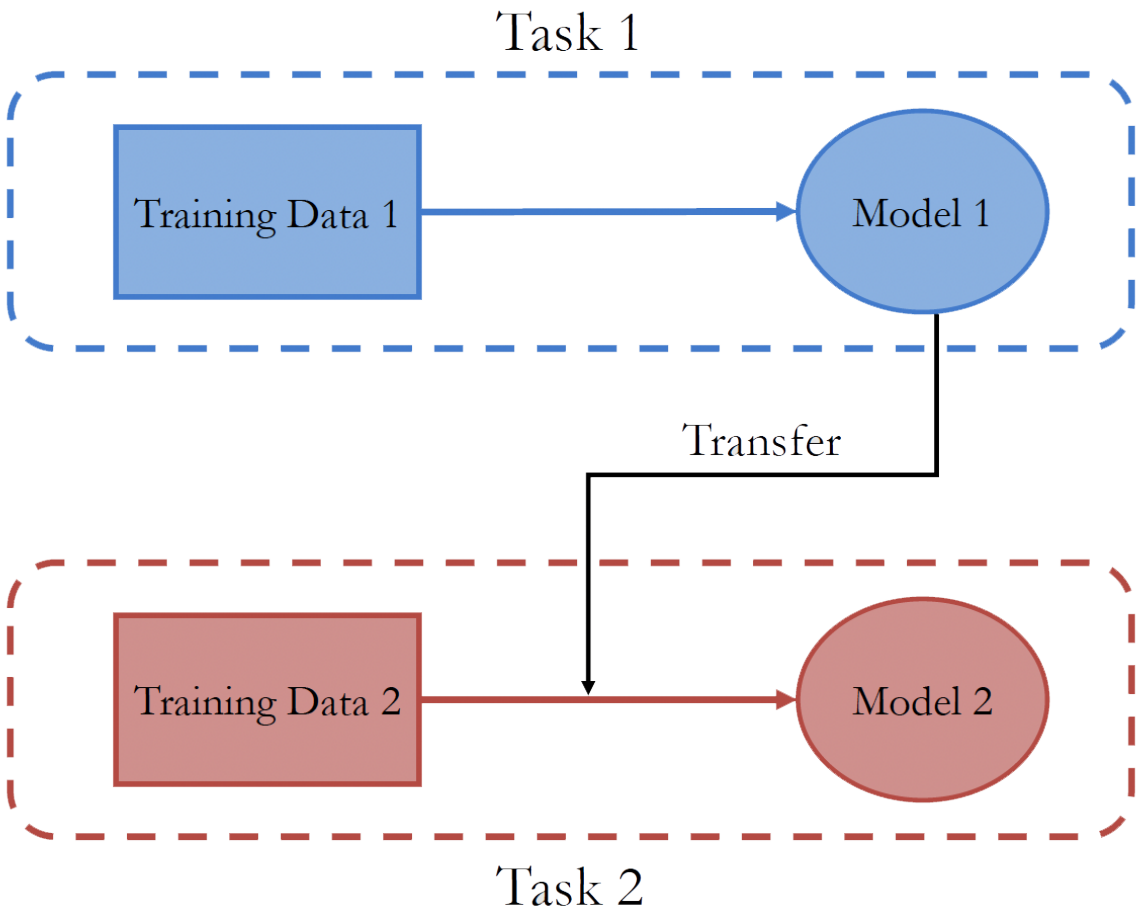
Methods

- Domain Adaption
- Transfer Learning (Today's focus)

Domain Adaptation



Transfer Learning



Transfer Learning

- ConvNet as fixed feature extractor
- Fine-tuning the ConvNet
- Re-use pre-trained models

How and when to choose?

ConvNet as fixed feature extractor

Suitable When:

- New dataset is small and similar to original dataset.
- New dataset is small but very different from the original dataset.

Fine-tuning the ConvNet

Suitable When:

- New dataset is large and similar to the original dataset.
- New dataset is large and very different from the original dataset.

Re-use pre-trained models

Always good to initialize your network from pre-trained models, but make sure it fits your task, i.e. receptive fields.

Show me the code!

Let's go through a Tensorflow official tutorial:
`https://www.tensorflow.org/tutorials/images/transfer_learning`

References

- Stanford cs231n:
  `https://cs231n.github.io/transfer-learning/`
- A Comprehensive Survey on Transfer Learning:
  `https://arxiv.org/pdf/1911.02685.pdf`

Thank you!

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