

# Lecture 10 – CNN Applications and Tricks

Prof. André Gustavo Hochuli

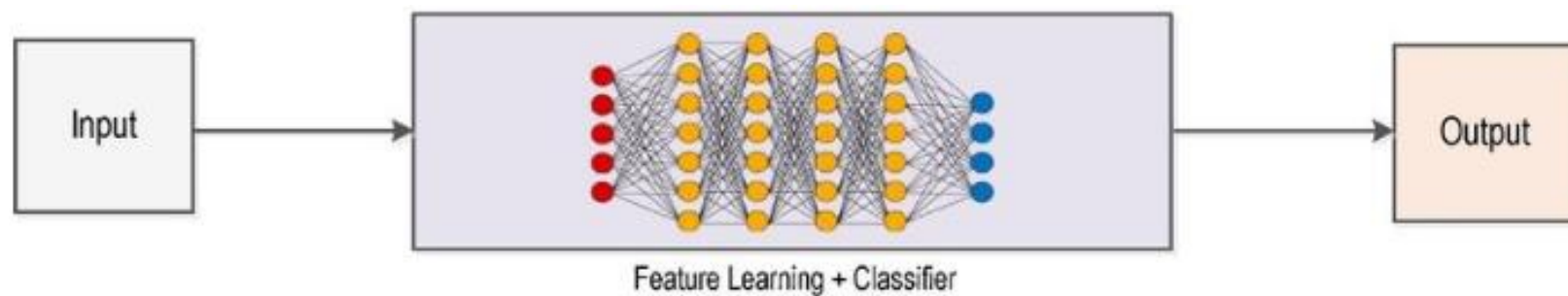
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# Topics

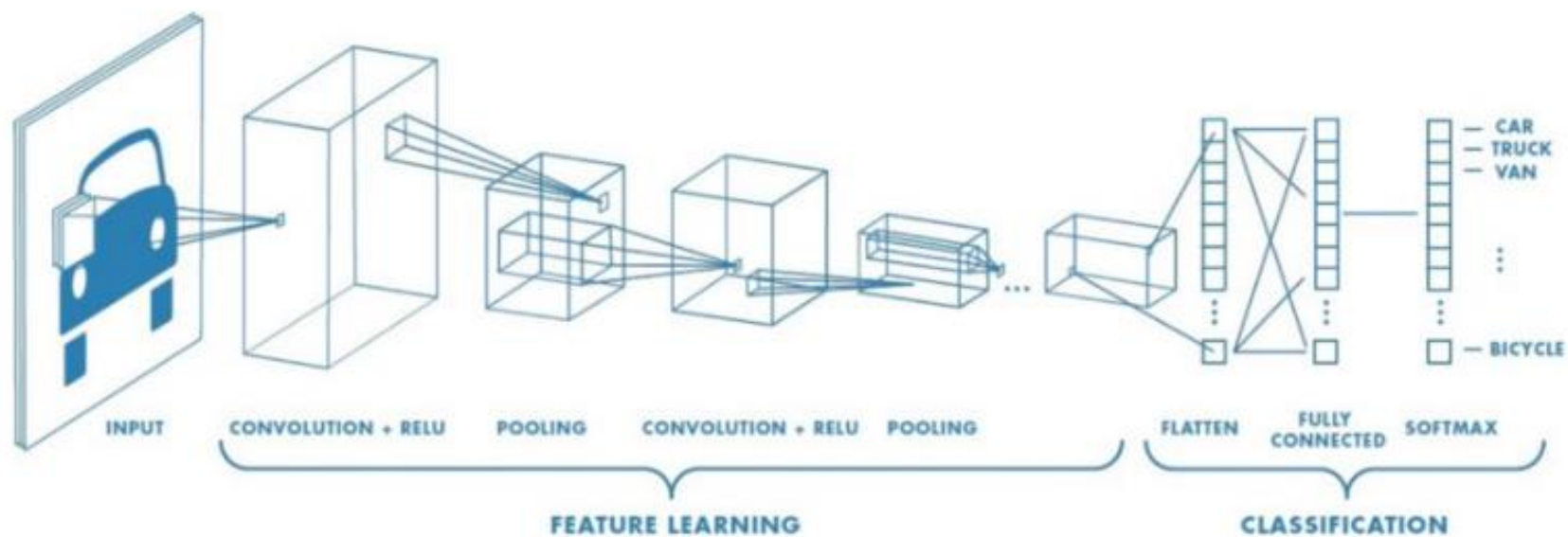
- Review of Lecture 09
- Convolutional Neural Network
  - Basic Concepts
  - Data Augmentation
  - Transfer-Learning
  - Applications
- Practice

# Deep Learning Pipeline



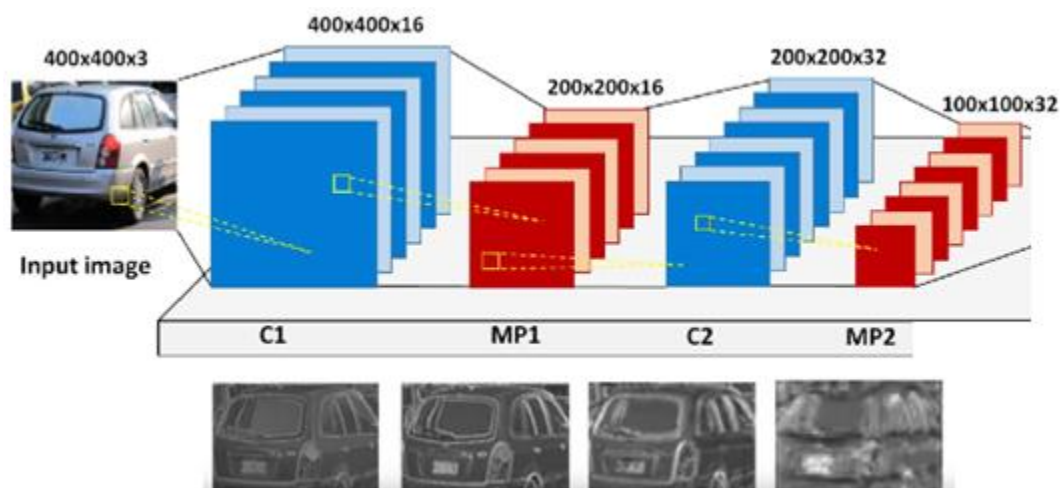
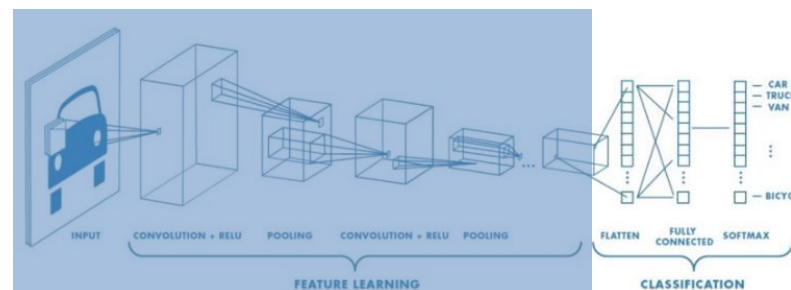
# Convolutional Neural Network

- CNN



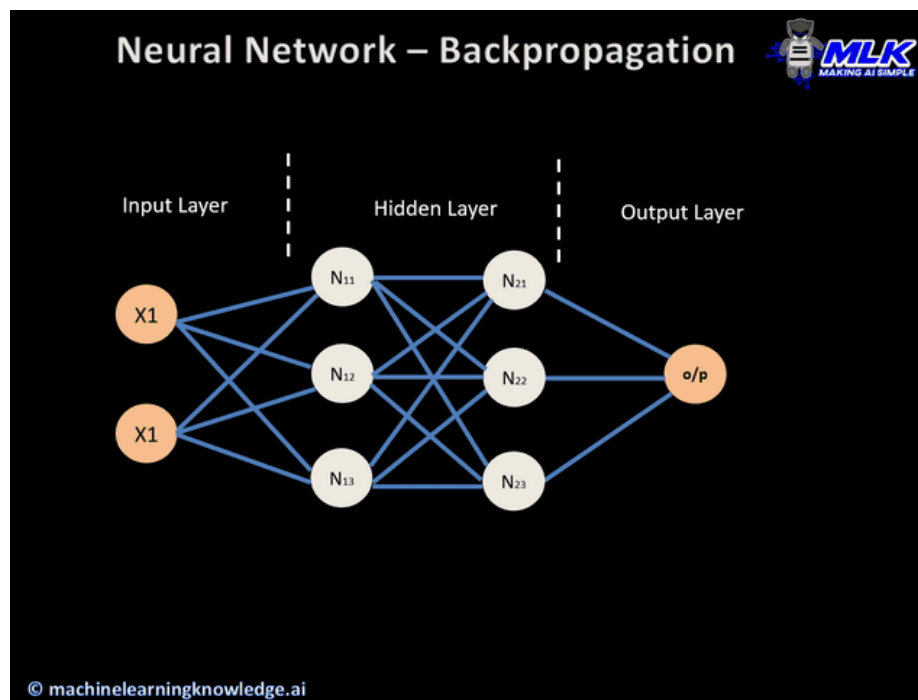
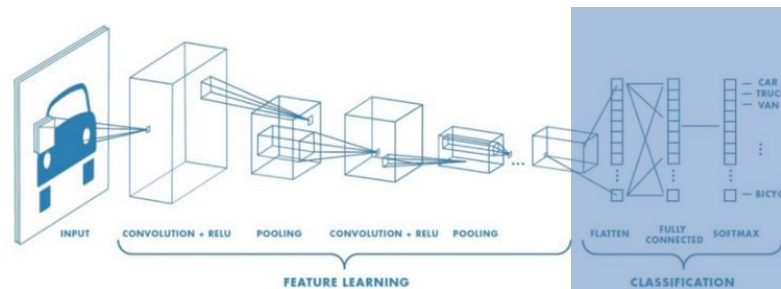
# Convolutional Neural Network

- Feature Extraction



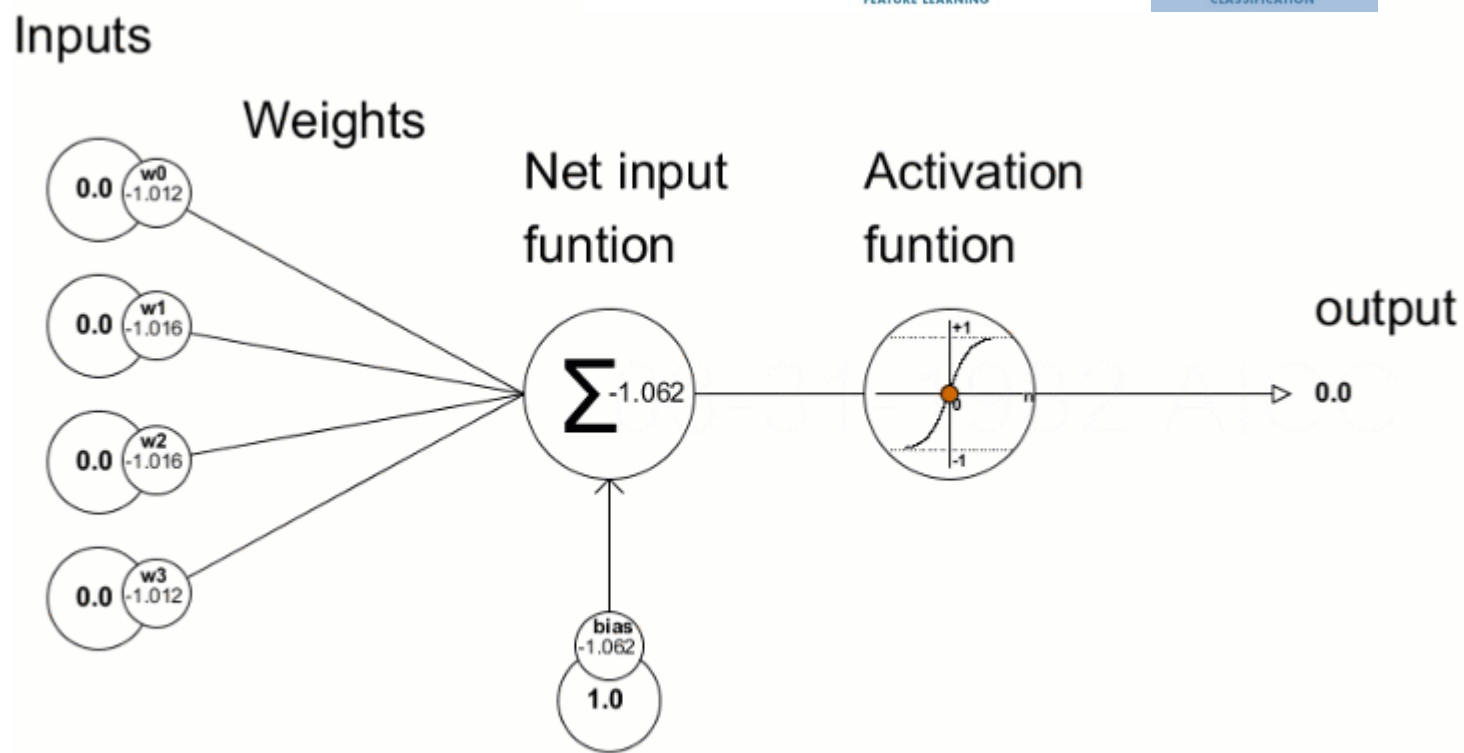
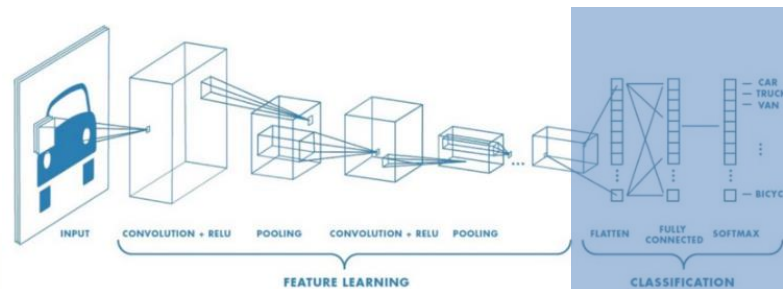
# Convolutional Neural Network

- Classification
- Forward and Back Propagation



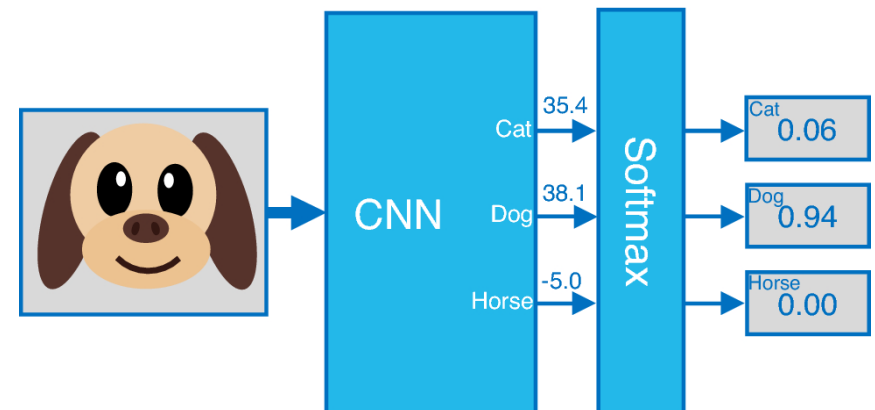
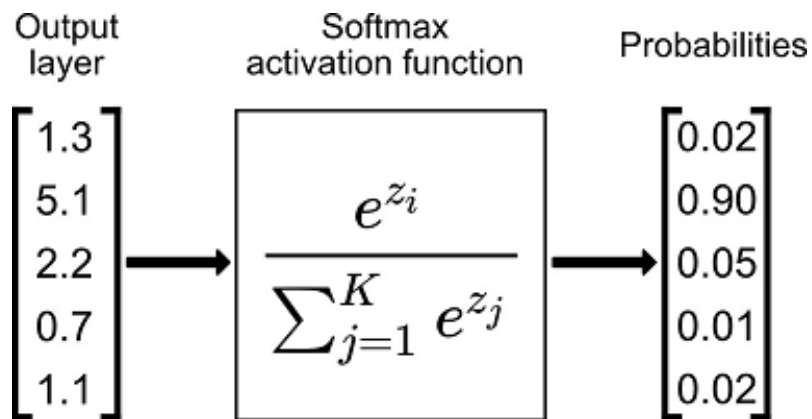
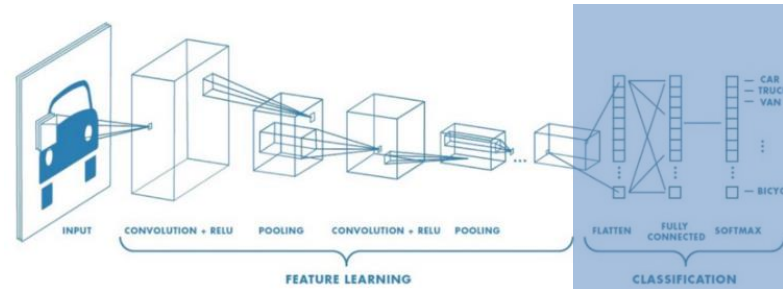
# Convolutional Neural Network

- Forward and Back Propagation



# Convolutional Neural Network

- Softmax

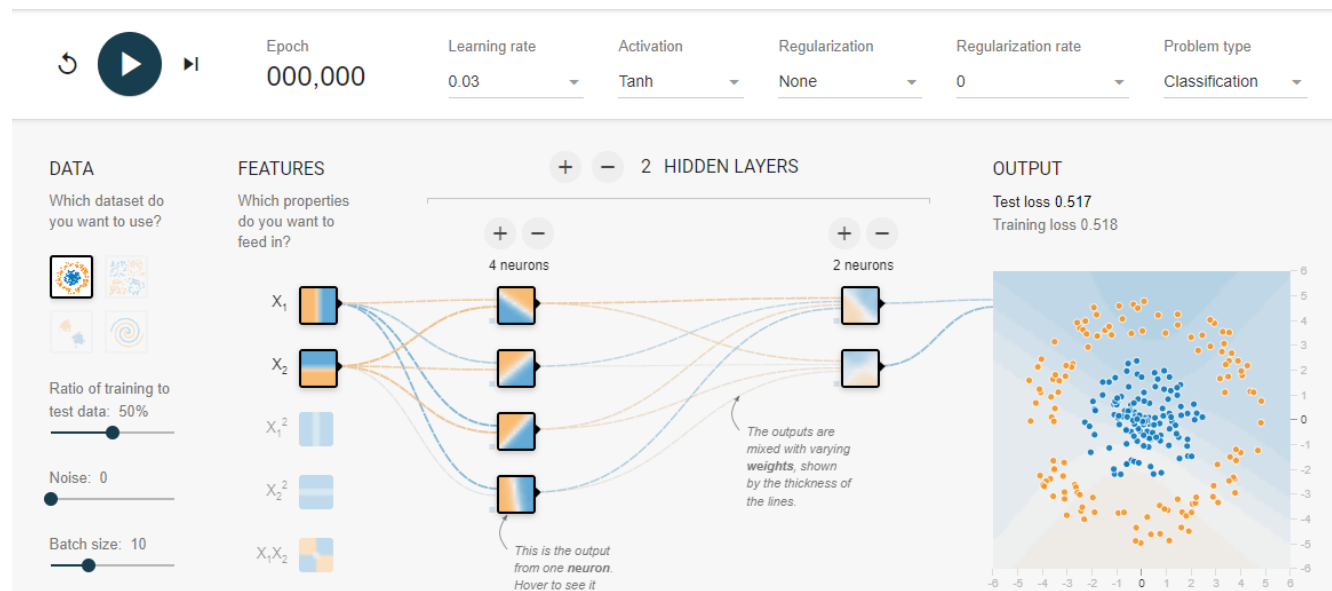




# Convolutional Neural Network

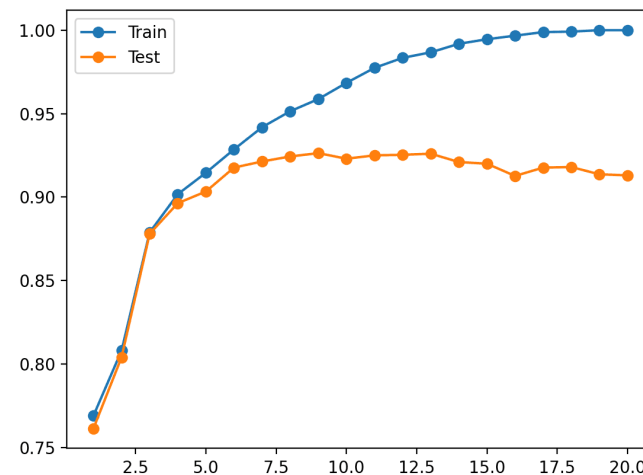
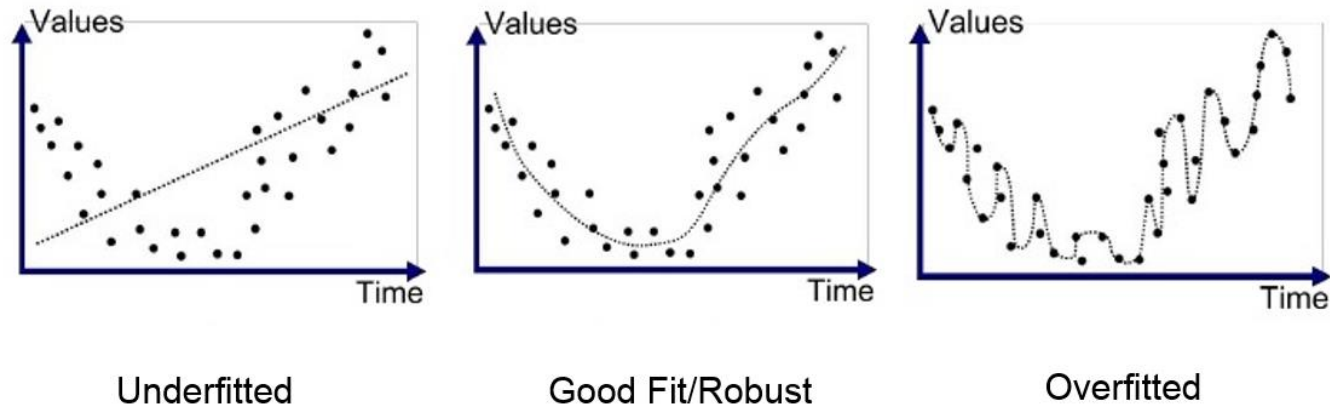
- Tensorflow Playground

<https://playground.tensorflow.org/>



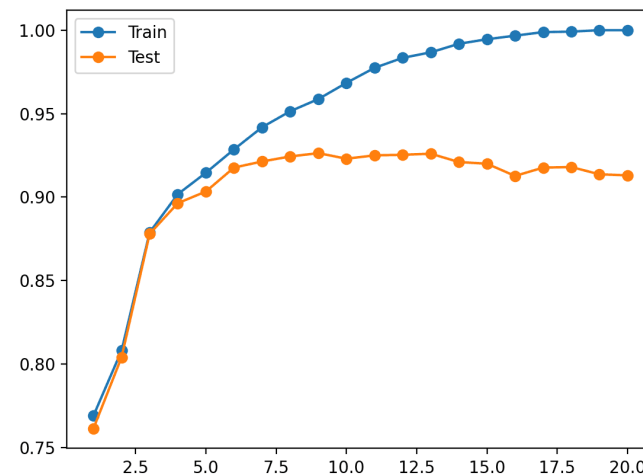
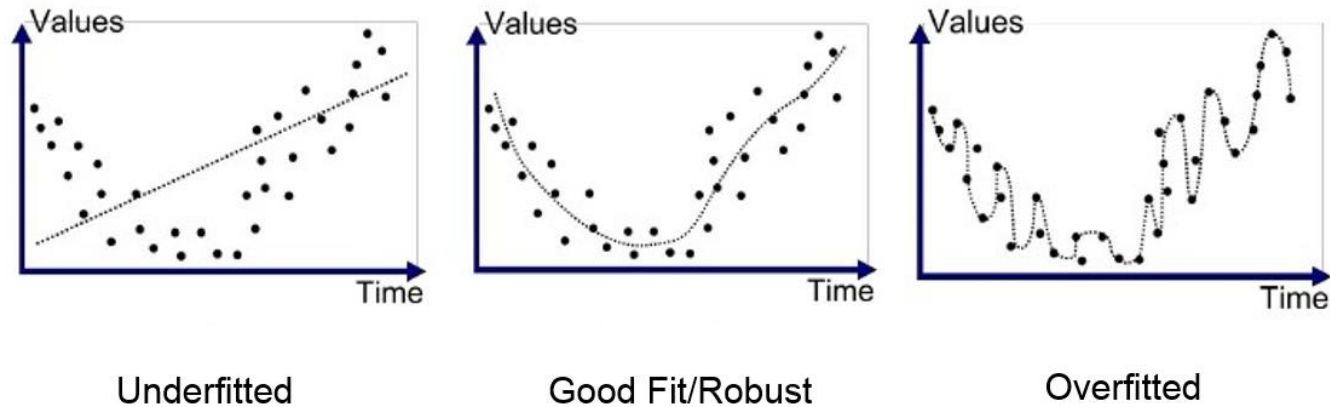
# Overfitting

- Bad generalization



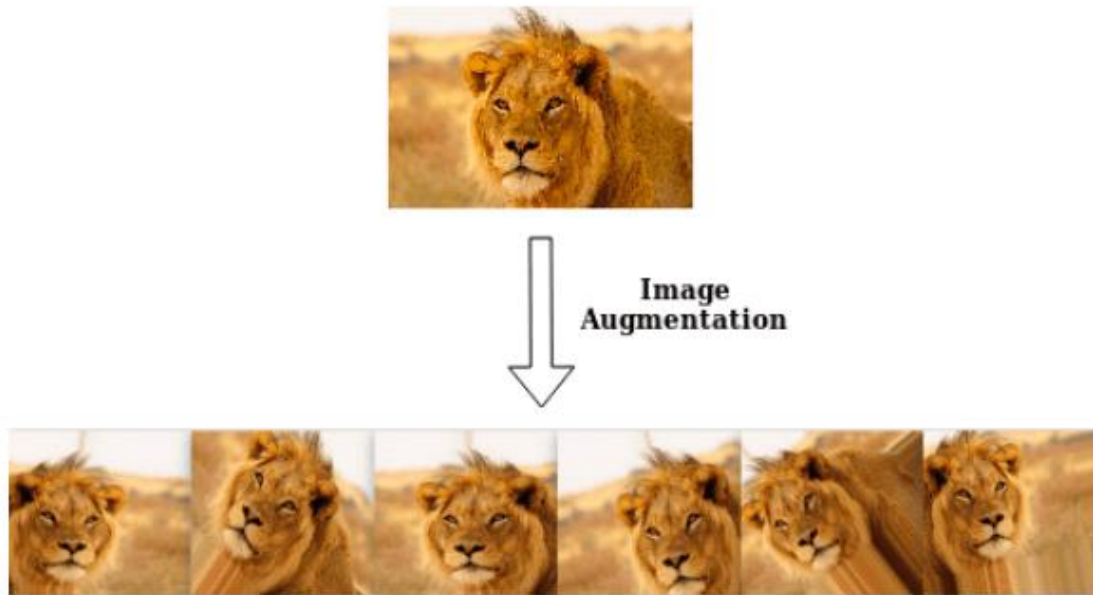
# Overfitting

- Bad generalization



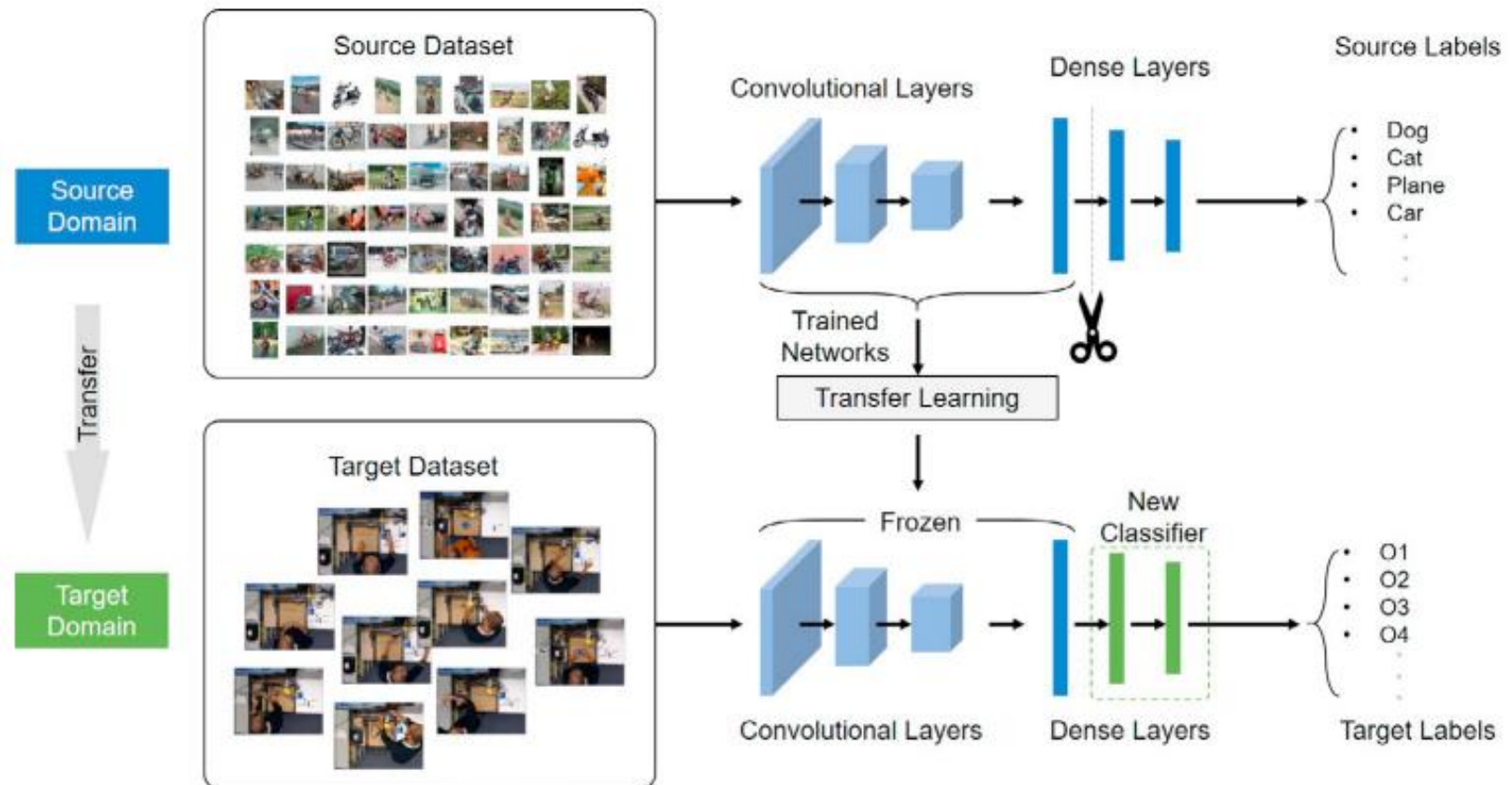
# Data Augmentation

- Enlarge the dataset with synthetic samples



# Transfer Learning

- Weight Sharing
- Feature Extraction weights are frozen (or not...) during learning



# Let's Code

- [\[LINK\]](#)