Classification - Visual Recognition

1. Introduction
2. Supervised learning
3. Perceptrons
4. SVM classifiers
5. Datasets and evaluation
Classification pipeline

Image => vector => class?
Supervised learning

- Loss functions
- Optimization framework: ERM principle
- Constraints for optimization
- Gradient descent formal algo
- Generalization
- Regularization

=> all done in course
Classification pipeline

To summarize:

• Theory: Risk minimization, Regularization, Generalization
• Supervised Learning, Learning from examples: ERM
  – To be explained: training/validation/test sets
• Algos:
  – k Nearest Neighbors
  – \textit{(linear/kernel-based) SVM classifiers}
  – Learning binary / Multiclass classifiers
  – \textit{Neural Nets, Deep architectures}
Basic Classification pipeline

Training

- Training Images
- Image Features
- Classifier Training
- Trained Classifiers

Testing

- Test Image
- Image Features
- Trained Classifier
- Prediction: Monkey

Deep CNN
End-to-end learning
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