Outline

• Lecture 3: Core ideas of CNN
  - Receptive field
  - Pooling
  - Shared weight
  - Derivation of BP in CNN
• Lecture 4: Practical issues
  - Normalized input and initialization of hyperparameters
  - Cross validation
  - Momentum
  - Learning rate
  - Activation functions
  - Pooling strategies
  - Regularization
• Lecture 5: Variants of CNN
  - From LeNet to AlexNet to GoogleNet to VGG to ResNet
• Lecture 6: Implementation
• Lecture 7: Applications of CNN – Binary hashing
• Lecture 8: Applications of CNN – Person re-identification

From NN to deep NN
Receptive field (RF) and shared weight

Feature maps

Max pooling
Output of max pooling invariant to shifts in the inputs

- Not very clear (from Le)
- Translational invariant systems
- Major source of distortions in natural data is typically translation

A simple CNN framework

A more practical framework
Acknowledgement

All figures except the last one are from [Nielsen]