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Homework1 For Selected topics in Machine Learning and Computer Vision

- Read the two paper from ICLR2017 and write a review.
  ICLR 2017 Best Parper: Understanding deep learning requires rethinking generalization
  ICLR 2017:ON LARGE-BATCH TRAINING FOR DEEP LEARNING: GENERALIZATION GAP AND SHARP MINIMA
- **Prove that:** There exists a two-layer neural network with ReLU activations and 2n+d weights that can represent any function on a sample of size n in d dimensions.
- **Programming Project**
  - Try to train a Network to conquer MNIST tasks.(Any Network structure is ok except LeNet.Can you get 99% accuracy?)
- Read the parper "Learning Fast Approximations of Sparse Coding" by LeCun (ICML 2010) and write a Review. There is also a similar paper in ICLR2017 called"Learning to Optmize", read it and write a review.
- (**Optional**: you can read the paper:"Maximal Sparsity with Deep Networks?"(NIPS2016))
- Some other similar papers you can choose:
  - Learning Proximal Operators: Using Denoising Networks for Regularizing Inverse Imaging Problems
  - DESIGNING NEURAL NETWORK ARCHITECTURES USING REINFORCEMENT LEARNING (ICLR2017)
  - NEURAL ARCHITECTURE SEARCH WITH REINFORCEMENT LEARNING (ICLR2017)
  - Deep Convolutional Neural Network for Inverse Problems in Imaging
  - Deep ADMM-Net for Compressive Sensing MRI(NIPS2016)
- (**Optional**)Find the proof of No Free Lunch Theorem.
- Prove that ALM is the algorithm to apply proximal gradient at dual problem.

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