

CS533R Course Note

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1. Sence to image (CG) vs image to scene (CV)
2. Possible project ideas:
3. Pytorch: Number, Channel, Heigher, Weight; different for other
4. Permute to get better performance to plot image
5. Well-known datasets:
6. Pytorch parallelism: train and load in parallel
7. nn.Sequential: concatenate all
8. Pytorch criterion: same as loss
9. Cross-entropy loss
10. Softmax
11. Logsumexp
12. Exp normalize
13. L1 more robust than L2 because gives enough probability to outliers
14. Train validation test
- 15.

2 NN architecture

1. Minibatch
2. SGD
3. Adam

4. Auto-diff
5. Jacobian
6. Efficient computation
7. Gradient vanishing
8. Relu
9. Normalize input and output
10. Initialization
11. Xavier initialization (2010)
12. He initialization
13. batch normalization
14. Pytorch: evaluation mode
15. Regularization
16. Dropout
17. Weight decay
18. Prior
19. Self-normalizing (2017)
20. ResNet (2015): default
21. DenseNet (2016): higher memory demand, slower
22. Randomly wired network
23. UNet: Conv+Max pool; one way: spatial dimension compressed, more channels; another way spatial dimension; network receives low level and higher level information
24. Spatial down vs up sampling
- 25.

3 NN theory

- 1.

4 2D representation

- 1.

5 3D representation

- 1.

6 Shapes

1. Voxel representation
2. Surface mesh
3. Graph convolution
4. Spiral convolution
5. Mesh Laplacian
- 6.

7 Graph Lapacian

- 1.
- 2.

8 Convolution

- 1.
- 2.