

Part V: Conclusion

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Conclusion

what is model complexity

- Definition of deep learning model complexity
- Factors affecting deep learning model complexity
- Two dimensions

expressive capacity

- Depth efficiency
- Width efficiency
- Expressible functional space
- VC dimension and Rademacher complexity

effective complexity

- Measure of effective complexity
- High-capacity low-reality phenomenon

application

- Model complexity in generalization
- Model complexity in optimization
- Model complexity in model selection and design

Potential Directions

- What expressive capacity is sufficient for a given task?
 - Can we find a lower bound of expressive capacity that is sufficient for a given task
 - Measure metric

Potential Directions

- Bottleneck of expressive capacity
 - Bottleneck of model size
 - Will a very narrow layer limit the expressive capacity?

Potential Directions

- Effective complexity measure is still a largely unexplored problem
 - Different types of models
 - Different measure metrics

Potential Directions

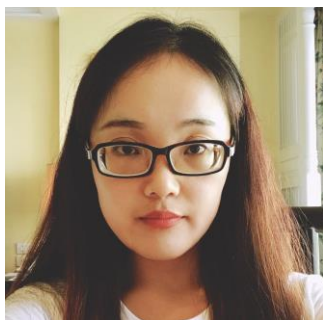
- Cross-model complexity comparison
 - Can we compare expressive capacity of different frameworks (CNNs, RNNs, ResNet, etc.) and different sizes?
 - Can measure of model complexity help search for good architectures?

Find our survey paper

Model Complexity of Deep Learning: a Survey

at <https://arxiv.org/abs/2103.05127>

Tutorial website: http://www.sfu.ca/~huxiah/sdm21_tutorial.html



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Thank You!