Interesting posters at ICML'19

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Interesting papers from ICML 2019 held in Long Beach, CA, USA. This selection reflects my interests and accounts for roughly 12% of all papers presented. I created the section headings arbitrarily - several papers could fall under multiple headings.

Novel methods

1. State-Reification Networks: Improving Generalization by Modeling the Distribution of Hidden Representations
2. Variational Laplace Autoencoders
3. Unreproducible research is reproducible
4. SelectiveNet: A Deep Neural Network with an Integrated Reject Option*
5. Processing Megapixel Images with Deep Attention-Sampling Models*
6. Combating Label Noise in Deep Learning using Abstention*
7. SATNet: Bridging deep learning and logical reasoning using a differentiable satisfiability solver
8. Area Attention
9. Stochastic Deep Networks
10. Topological Data Analysis of Decision Boundaries with Application to Model Selection
11. AUC μ: A Performance Metric for Multi-Class Machine Learning Models
12. Invertible Residual Networks
13. Do ImageNet Classifiers Generalize to ImageNet?
14. Multi objective training of GANs with multiple discriminators
15. Graphite – iterative generative modelling of graphs

Representation Learning - General

16. Analyzing and improving representations with soft nearest neighbor loss**
17. Similarity of neural network representations revisited **
18. Cross-Domain 3D Equivariant Image Embeddings
19. Hierarchical Importance Weighted Autoencoders*
20. Analogies Explained: Towards Understanding Word Embeddings
21. Learning Dependency Structures for Weak Supervision Models**
22. Adaptive and Safe Bayesian Optimization in High Dimensions via One-Dimensional Subspaces
23. A Theoretical Analysis of Contrastive Unsupervised Representation Learning
24. Concrete Autoencoders: Differentiable Feature Selection and Reconstruction
25. Manifold Mixup: Better Representations by Interpolating Hidden States*
26. DeepMDP: Learning Continuous Latent Space Models for Representation Learning
27. Co-Representation Network for Generalized Zero-Shot Learning
28. Correlated Variational Auto-Encoders
29. Active Manifolds: A non-linear analogue to Active Subspaces
30. Disentangling Disentanglement in Variational Autoencoders
31. Discriminative Regularization for Latent Variable Models with Applications to Electrocardiography
32. Hierarchical Decompositional Mixtures of Variational Autoencoders
33. Sparse Multi-Channel Variational Autoencoder for the Joint Analysis of Heterogeneous Data
34. Adversarially Learned Representations for Information Obfuscation and Inference
35. Connectivity-Optimized Representation Learning via Persistent Homology
36. Invariant-Equivariant Representation Learning for Multi-Class Data*
37. A Multitask Multiple Kernel Learning Algorithm for Survival Analysis with Application to Cancer Biology
38. Co-manifold learning with missing data

Meta learning, Transfer learning

39. The information-theoretic value of unlabeled data in semi-supervised learning
40. Classification from Positive, Unlabeled and Biased Negative Data
41. Hierarchically Structured Meta-learning
42. Transfer Learning for Related Reinforcement Learning Tasks via Image-to-Image Translation
43. Learning What and Where to Transfer
44. TapNet: Neural Network Augmented with Task-Adaptive Projection for Few-Shot Learning**
45. Overcoming Multi-model Forgetting
46. Infinite Mixture Prototypes for Few-shot Learning**

Domain adaptation

47. Robust inference via generative classifiers for handling noisy data
48. Noise2Self: Blind Denoising by Self-Supervision
49. Domain Adaptation with Asymmetrically-Relaxed Distribution Alignment
50. Unsupervised Label Noise Modeling and Loss Correction
51. Bridging Theory and Algorithm for Domain Adaptation**
52. On Learning Invariant Representations for Domain Adaptation
53. Feature-Critic Networks for Heterogeneous Domain Generalization* Instead of auxiliary loss, can also use covariance matrix per meta dataset
54. Large-Scale Sparse Kernel Canonical Correlation Analysis
55. A Kernel Theory of Modern Data Augmentation
56. Understanding and Utilizing Deep Neural Networks Trained with Noisy Labels
57. Domain Agnostic Learning with Disentangled Representations
58. Transferability vs. Discriminability: Batch Spectral Penalization for Adversarial Domain Adaptation*

59. Towards Accurate Model Selection in Deep Unsupervised Domain Adaptation
60. Wasserstein of Wasserstein Loss for Learning Generative Models*
61. Non-Parametric Priors For Generative Adversarial Networks

Graph Neural Networks

62. Geometric scattering for graph data analysis
63. Distributed, Egocentric Representations of Graphs for Detecting Critical Structures
64. LatentGNN: Learning Efficient Non-local Relations for Visual Recognition
65. Learning to Exploit Long-term Relational Dependencies in Knowledge Graphs
66. Gromov-Wasserstein Learning for Graph Matching and Node Embedding
67. Partially Linear Additive Gaussian Graphical Models
68. DAG-GNN: DAG Structure Learning with Graph Neural Networks
69. Random Walks on Hypergraphs with Edge-Dependent Vertex Weights
70. GMNN: Graph Markov Neural Networks
71. Self-Attention Graph Pooling
72. Graph U-Nets
73. A Persistent Weisfeiler-Lehman Procedure for Graph Classification
74. Molecular Hypergraph Grammar with Its Application to Molecular Optimization
75. Active Manifolds: A non-linear analogue to Active Subspaces
76. Graph Element Networks: adaptive, structured computation and memory
77. Position-aware Graph Neural Networks
78. Relational Pooling for Graph Representations

Disentanglement, Causal Analysis

79. Robustly Disentangled Causal Mechanisms: Validating Deep Representations for Interventional Robustness
80. Neural Network Attributions: A Causal Perspective
81. Challenging Common Assumptions in the Unsupervised Learning of Disentangled Representations*
82. Classifying Treatment Responders Under Causal Effect Monotonicity
83. Disentangled Graph Convolutional Networks

Clustering

84. COMIC: Multi-view Clustering Without Parameter Selection
85. Neural Collaborative Subspace Clustering
86. DBSCAN++: Towards fast and scalable density clustering
87. Coresets for Ordered Weighted Clustering
88. Supervised Hierarchical Clustering with Exponential Linkage
89. Sublinear Time Nearest Neighbor Search over Generalized Weighted Space
90. Refined Complexity of PCA with Outliers
91. Fast Rates for a kNN Classifier Robust to Unknown Asymmetric Label Noise
92. Toward Understanding the Importance of Noise in Training Neural Networks
93. Learning to Route in Similarity Graphs**

Reference

94. Demystifying dropout
95. What is the effect of importance weighting in deep neural networks
96. On the Connection Between Adversarial Robustness and Saliency Map Interpretability
97. Learning and Data Selection in Big Datasets
98. Gradient Descent Finds Global Minima of Deep Neural Networks
99. Interpreting Adversarially Trained Convolutional Neural Networks

Emerging areas of research

1. Flows, Optimal transport [14+ papers]
    - Learning discrete and continuous factors of data via alternating disentanglement
    - On scalable and efficient computation of large scale optimal transport
    - Sliced-Wasserstein Flows: Nonparametric Generative Modeling via Optimal Transport and Diffusions
    - Optimal Transport for structured data with application on graphs
2. Adversarial attacks/robustness [20+ papers]
3. Fairness [18+ papers]
    - Data Shapley: Equitable Valuation of Data for Machine Learning
    - Scalable Fair Clustering
    - Compositional Fairness Constraints for Graph Embeddings
4. Differential privacy [14+ papers]
5. Knowledge distillation [4+ papers]
    - Curiosity-Bottleneck: Exploration By Distilling Task-Specific Novelty
    - Towards Understanding Knowledge Distillation
6. Mutual information for variational inference [2+ papers]
    - On variational bounds of mutual information