

机器学习与深度学习经典论文整理

原创： AI人工智能平台

SIGAI推荐

[SIGAI 资源大汇总](#)

这篇文章整理出了机器学习、深度学习领域的经典论文。为了减轻大家的阅读负担，只列出了最经典的一批，如有需要，可以自己根据实际情况补充。

机器学习理论

[1] L. Valiant. A theory of the learnable. Communications of the ACM, 27, 1984.

[1] Blumer, A., Ehrenfeucht, A., Haussler, D., Warmuth, M. K. Learnability and the Vapnik - Chervonenkis dimension. Journal of the ACM. 36 (4): 929 - 865, 1989.

[2] Natarajan, B.K. On Learning sets and functions. Machine Learning. 4: 67 - 97, 1989.

[3] Karpinski, Marek; Macintyre, Angus. Polynomial Bounds for VC Dimension of Sigmoidal and General Pfaffian Neural Networks. Journal of Computer and System Sciences. 54 (1): 169 - 176, 1997.

- [1] Wolpert, D.H., Macready, W.G. No Free Lunch Theorems for Optimization. IEEE Transactions on Evolutionary Computation 1, 67, 1997.
- [2] Wolpert, David. The Lack of A Priori Distinctions between Learning Algorithms. Neural Computation, pp. 1341–1390, 1996.
- [3] Wolpert, D.H., and Macready, W.G. Coevolutionary free lunches. IEEE Transactions on Evolutionary Computation, 9(6): 721–735, 2005.
- [4] Whitley, Darrell, and Jean Paul Watson. Complexity theory and the no free lunch theorem. In Search Methodologies, pp. 317–339. Springer, Boston, MA, 2005.
- [5] Kawaguchi, K., Kaelbling, L.P, and Bengio. Generalization in deep learning. 2017.
- [6] Chiyuan Zhang, Samy Bengio, Moritz Hardt, Benjamin Recht, Oriol Vinyals. Understanding deep learning requires rethinking generalization. international conference on learning representations, 2017.

最优化理论和方法

- [1] L. Bottou. Stochastic Gradient Descent Tricks. Neural Networks: Tricks of the Trade. Springer, 2012.
- [2] I. Sutskever, J. Martens, G. Dahl, and G. Hinton. On the Importance of Initialization and Momentum in Deep Learning. Proceedings of the 30th International Conference on Machine Learning, 2013.

- [3] Duchi, E. Hazan, and Y. Singer. Adaptive Subgradient Methods for Online Learning and Stochastic Optimization. The Journal of Machine Learning Research, 2011.
- [4] M. Zeiler. ADADELTA: An Adaptive Learning Rate Method. arXiv preprint, 2012.
- [5] T. Tieleman, and G. Hinton. RMSProp: Divide the gradient by a running average of its recent magnitude. COURSE: Neural Networks for Machine Learning. Technical report, 2012.
- [6] D. Kingma, J. Ba. Adam: A Method for Stochastic Optimization. International Conference for Learning Representations, 2015.
- [7] Hardt, Moritz, Ben Recht, and Yoram Singer. Train faster, generalize better: Stability of stochastic gradient descent. Proceedings of The 33rd International Conference on Machine Learning. 2016.

决策树

- [1] Breiman, L., Friedman, J. Olshen, R. and Stone C. Classification and Regression Trees, Wadsworth, 1984.
- [2] J. Ross Quinlan. Induction of decision trees. Machine Learning, 1(1): 81-106, 1986.
- [3] J. Ross Quinlan. Learning efficient classification procedures and their application to chess end games. 1993.
- [4] J. Ross Quinlan. C4.5: Programs for Machine Learning. Morgan Kaufmann, San Francisco, CA, 1993.

贝叶斯分类器

[1] Rish, Irina. An empirical study of the naive Bayes classifier. IJCAI Workshop on Empirical Methods in Artificial Intelligence, 2001.

数据降维

[1] Pearson, K. On Lines and Planes of Closest Fit to Systems of Points in Space. Philosophical Magazine. 2 (11): 559 - 572. 1901.

[2] Ian T. Jolliffe. Principal Component Analysis. Springer Verlag, New York, 1986.

[3] Scholkopf, B., Smola, A., Muller, K.-P. Nonlinear component analysis as a kernel eigenvalue problem. Neural Computation, 10(5), 1299-1319, 1998.

[4] Sebastian Mika, Bernhard Scholkopf, Alexander J Smola, Klaus Robert Muller, Matthias Scholz Gun. Kernel PCA and de-noising in feature spaces. neural information processing systems, 1999.

[1] Roweis, Sam T and Saul, Lawrence K. Nonlinear dimensionality reduction by locally linear embedding. Science, 290(5500). 2000: 2323-2326.

[2] Belkin, Mikhail and Niyogi, Partha. Laplacian eigenmaps for dimensionality reduction and data representation. Neural computation. 15(6). 2003:1373-1396.

[3] He Xiaofei and Niyogi, Partha. Locality preserving projections. NIPS. 2003:234–241.

[4] Tenenbaum, Joshua B and De Silva, Vin and Langford, John C. A global geometric framework for nonlinear dimensionality reduction. Science, 290(5500). 2000: 2319–2323.

[5] Laurens Van Der Maaten, Geoffrey E Hinton. Visualizing Data using t-SNE. 2008, Journal of Machine Learning Research.

[1] Ronald A. Fisher. The use of multiple measurements in taxonomic problems. Annals of Eugenics, 7 Part 2: 179–188, 1936.

[2] Geoffrey J. McLachlan. Discriminant Analysis and Statistical Pattern Recognition. Wiley, New York, 1992.

logistic回归

[1] Cox, DR. The regression analysis of binary sequences (with discussion). J Roy Stat Soc B. 20 (2): 215 – 242, 1958.

[2] David W Hosmer, Stanley Lemeshow. Applied logistic regression. Technometrics. 2000.

[3] Thomas P. Minka. A comparison of numerical optimizers for logistic regression, 2003.

[4] Kwangmoo Koh, Seung-Jean Kim, and Stephen Boyd. An interior-point method for large scale l_1 -regularized logistic regression. Journal of Machine Learning

Research, 8:1519–1555, 2007.

[5] Chih-Jen Lin, Ruby C. Weng, S. Sathya Keerthi. Trust Region Newton Method for Large-Scale Logistic Regression. *Journal of Machine Learning Research*, 9, 627–650, 2008.

[6] Rong-En Fan, Kai-Wei Chang, Cho-Jui Hsieh, Xiang-Rui Wang, Chih-Jen Lin. LIBLINEAR: A Library for Large Linear Classification. *Journal of Machine Learning Research*, 9, 1871–1874, 2008.

支持向量机 (SVM)

[1] B. E. Boser, I. Guyon, and V. Vapnik. A training algorithm for optimal margin classifiers. In *Proceedings of the Fifth Annual Workshop on Computational Learning Theory*, pages 144–152. ACM Press, 1992.

[2] Cortes, C. and Vapnik, V. Support vector networks. *Machine Learning*, 20, 273–297, 1995.

[3] Bernhard Scholkopf, Christopher J. C. Burges, and Vladimir Vapnik. Extracting support data for a given task. 1995.

[4] Burges JC. A tutorial on support vector machines for pattern recognition. Bell Laboratories, Lucent Technologies, 1997.

[5] Scholkopf, Christopher J. C. Burges, and Alexander J. Smola, editor. *Advances in Kernel Methods – Support Vector Learning*, Cambridge, MA, MIT Press. 1998.

[6] John C. Platt. Fast training of support vector machines using sequential minimal optimization. 1998.

[7] C.-C. Chang and C.-J. Lin. LIBSVM: a Library for Support Vector Machines. ACM TIST, 2:27:1-27:27, 2011.

距离度量学习

[1] S. Chopra, R. Hadsell, Y. LeCun. Learning a similarity metric discriminatively, with application to face verification. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2005), pages 349-356, San Diego, CA, 2005.

[2] Kilian Q Weinberger, Lawrence K Saul. Distance Metric Learning for Large Margin Nearest Neighbor Classification. Journal of Machine Learning Research, 2009.

集成学习

[1] Breiman, Leo. Random Forests. Machine Learning 45 (1), 5-32, 2001.

[1] Freund, Y. Boosting a weak learning algorithm by majority. Information and Computation, 1995.

[2] Yoav Freund, Robert E Schapire. A decision-theoretic generalization of on-line learning and an application to boosting. computational learning theory. 1995.

- [3] Freund, Y. An adaptive version of the boost by majority algorithm. In Proceedings of the Twelfth Annual Conference on Computational Learning Theory, 1999.
- [4] R. Schapire. The boosting approach to machine learning: An overview. In MSRI Workshop on Nonlinear Estimation and Classification, Berkeley, CA, 2001.
- [5] Freund Y, Schapire RE. A short introduction to boosting. Journal of Japanese Society for Artificial Intelligence, 14(5):771-780. 1999.
- [7] Jerome Friedman, Trevor Hastie and Robert Tibshirani. Additive logistic regression: a statistical view of boosting. Annals of Statistics 28(2), 337 - 407. 2000.
- [8] Jerome H Friedman. Greedy function approximation: A gradient boosting machine. Annals of Statistics, 2001.
- [9] Tianqi Chen, Carlos Guestrin. XGBoost: A Scalable Tree Boosting System. knowledge discovery and data mining, 2016.
- [10] Guolin Ke, Qi Meng, Thomas Finley, Taifeng Wang, Wei Chen, Weidong Ma, Qiwei Ye, Tieyan Liu. LightGBM: A Highly Efficient Gradient Boosting Decision Tree. neural information processing systems, 2017.

概率图模型

- [1] Nir Friedman, Dan Geiger, Moises Goldszmidt. Bayesian Network Classifiers. Machine Learning. 1997.

[1] Baum, L. E., Petrie, T. Statistical Inference for Probabilistic Functions of Finite State Markov Chains. The Annals of Mathematical Statistics. 37 (6): 1554 - 1563. 1966.

[2] Baum, L. E., Eagon, J. A. An inequality with applications to statistical estimation for probabilistic functions of Markov processes and to a model for ecology. Bulletin of the American Mathematical Society. 73 (3): 360. 1967.

[3] Baum, L. E., Petrie, T., Soules, G., Weiss, N. A Maximization Technique Occurring in the Statistical Analysis of Probabilistic Functions of Markov Chains. The Annals of Mathematical Statistics. 41: 164. 1970

[4] Baum, L.E. An Inequality and Associated Maximization Technique in Statistical Estimation of Probabilistic Functions of a Markov Process. Inequalities. 3: 1 - 8. 1972.

[5] Lawrence R. Rabiner. A tutorial on Hidden Markov Models and selected applications in speech recognition. Proceedings of the IEEE. 77 (2): 257 - 286. 1989.

[1] Lafferty, J., McCallum, A., Pereira, F. Conditional random fields: Probabilistic models for segmenting and labeling sequence data. Proc. 18th International Conf. on Machine Learning. Morgan Kaufmann. pp. 282 - 289. 2001.

- [1] Anil K. Jain, Jianchang Mao, and K. Moidin Mohiuddin. Artificial neural networks: A tutorial. *Computer*, 29(3):31-44, 1996.
- [2] Richard Lippmann. An introduction to computing with neural nets. *IEEE ASSP Magazine*, page 4-22, April 1987.
- [3] David E. Rumelhart, Geoffrey E. Hinton, and Ronald J. Williams. Learning internal representations by back-propagating errors. *Nature*, 323(99): 533-536, 1986.
- [4] Robert Hecht-Nielsen. Theory of the backpropagation neural network. In *Proceeding of the International Joint Conference on Neural Networks(IJCNN)*, volume 1, 593-605. IEEE, New York, 1989.
- [5] Kurt Hornik. Approximation capabilities of multilayer feedforward networks. *Neural Networks*.1991.
- [6] Hava T Siegelmann, Eduardo D Sontag. On the computational power of neural nets. *conference on learning theory*. 1992.
- [7] Hornik, K., Stinchcombe, M., and White, H. Multilayer feedforward networks are universal approximators. *Neural Networks*, 2, 359-366, 1989.
- [8] Cybenko, G. Approximation by superpositions of a sigmoid function. *Mathematics of Control, Signals, and Systems*, 2, 303-314, 1989.
- [9] Hornik, K., Stinchcombe, M., and White, H. Universal approximation of an unknown mapping and its derivatives using multilayer feedforward networks. *Neural networks*, 3(5), 551-560, 1990.
- [10] Leshno, M., Lin, V. Y., Pinkus, A., and Schocken, S. Multilayer feedforward networks with a nonpolynomial activation function can approximate any function. *Neural Networks*, 6, 861-867, 1993.

- [11] Barron, A. E. Universal approximation bounds for superpositions of a sigmoid function. *IEEE Transactions on Information Theory*, 39, 930–945, 1993.
- [12] Raman Arora, Amitabh Basu, Poorya Mianjy, Anirbit Mukherjee. Understanding Deep Neural Networks with Rectified Linear Units. *Electronic Colloquium on Computational Complexity*. 2016.
- [13] Xavier Glorot, Yoshua Bengio. Understanding the difficulty of training deep feedforward neural networks. *Journal of Machine Learning Research*. 2010.
- [14] M. Riedmiller and H. Braun, A Direct Adaptive Method for Faster Backpropagation Learning: The RPROP Algorithm, *Proc. ICNN, San Francisco* (1993).
- [15] Choromanska A, Henaff M, Mathieu M, Ben Arous G, Le Cun Y. The loss surfaces of multilayer networks. *arXiv:1412.0233*. 2014.
- [16] Gori, M, Tesi, A. On the problem of local minima in backpropagation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 14(1), 76–86. 1992.
- [17] Saxe, A. M., McClelland, J. L., Ganguli, S. Exact solutions to the nonlinear dynamics of learning in deep linear neural networks. *ICLR*. 2013.
- [18] Dauphin, Y., Pascanu, R., Gulcehre, C., Cho, K., Ganguli, S., Bengio, Y. 2014. Identifying and attacking the saddle point problem in high-dimensional non-convex optimization. *NIPS* 2014.
- [19] Goodfellow, I. J., Vinyals, O., Saxe, A. M. Qualitatively characterizing neural network optimization problems. *International Conference on Learning Representations*. 2015.

- [1] LeCun, B. Boser, J. S. Denker, D. Henderson, R. E. Howard, W. Hubbard, and L. D. Jackel. Backpropagation applied to handwritten zip code recognition. *Neural Computation*, 1989.
- [2] Y. LeCun, B. Boser, J. S. Denker, D. Henderson, R. E. Howard, W. Hubbard, and L. D. Jackel. Handwritten digit recognition with a back-propagation network. In David Touretzky, editor, *Advances in Neural Information Processing Systems 2 (NIPS*89)*, Denver, CO, Morgan Kaufman, 1990.
- [3] Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner. Gradient-based learning applied to document recognition. *Proceedings of the IEEE*, november 1998.
- [4] Alex Krizhevsky, Ilya Sutskever, Geoffrey E. Hinton. *ImageNet Classification with Deep Convolutional Neural Networks*. 2012.
- [5] Zeiler M D, Fergus R. Visualizing and Understanding Convolutional Networks. *European Conference on Computer Vision*, 2013.
- [6] Christian Szegedy, Wei Liu, Yangqing Jia, Pierre Sermanet, Scott Reed, Dragomir Anguelov, Dumitru Erhan, Vincent Vanhoucke, Andrew Rabinovich, Going Deeper with Convolutions, Arxiv Link: <http://arxiv.org/abs/1409.4842>.
- [7] K. Simonyan and A. Zisserman. Very Deep Convolutional Networks for Large-Scale Image Recognition. *international conference on learning representations*. 2015.
- [8] Kaiming He, Xiangyu Zhang, Shaoqing Ren, Jian Sun. Deep Residual Learning for Image Recognition. *computer vision and pattern recognition*, 2015.
- [9] Andreas Veit, Michael J Wilber, Serge J Belongie. Residual Networks Behave Like Ensembles of Relatively Shallow Networks. *neural information processing systems*, 2016.
- [10] Long J, Shelhamer E, Darrell T, et al. Fully convolutional networks for semantic segmentation. *Computer Vision and Pattern Recognition*, 2015.

循环神经网络

- [1] Ronald J Williams, David Zipser. A learning algorithm for continually running fully recurrent neural networks. Neural Computation. 1989.
- [2] Mikael Boden. A guide to recurrent neural networks and backpropagation. 2001.
- [3] Razvan Pascanu, Caglar Gulcehre, Kyunghyun Cho, Yoshua Bengio. How to Construct Deep Recurrent Neural Networks. international conference on learning representations. 2014.
- [4] Fernando J Pineda. Generalization of back-propagation to recurrent neural networks. Physical Review Letters. 1987.
- [5] Paul J Werbos. Backpropagation through time: what it does and how to do it. Proceedings of the IEEE. 1990.
- [6] Xavier Glorot, Yoshua Bengio. On the difficulty of training recurrent neural networks. international conference on machine learning. 2013.
- [7] Y. Bengio, P. Simard, P. Frasconi. Learning long-term dependencies with gradient descent is difficult. IEEE Transactions on Neural Networks, 5(2):157-166, 1994.
- [8] S. Hochreiter, J. Schmidhuber. Long short-term memory. Neural computation, 9(8): 1735-1780, 1997.
- [9] M. Schuster and K. K. Paliwal. Bidirectional recurrent neural networks. IEEE Transactions on Signal Processing, 45(11):2673-2681, 1997.
- [10] Alex Graves. Supervised Sequence Labelling with Recurrent Neural Networks. 2012.

- [11] Junyoung Chung, Caglar Gulcehre, Kyunghyun Cho, Yoshua Bengio. Gated Feedback Recurrent Neural Networks. international conference on machine learning. 2015.
- [12] Alex Graves, Santiago Fernandez, Faustino J Gomez, Jurgen Schmidhuber. Connectionist temporal classification: labelling unsegmented sequence data with recurrent neural networks. international conference on machine learning. 2006.
- [13] A. Graves, A. Mohamed, G. Hinton, Speech Recognition with Deep Recurrent Neural Networks, ICASSP 2013.
- [14] Ilya Sutskever, Oriol Vinyals, Quoc V Le. Sequence to Sequence Learning with Neural Networks. neural information processing systems. 2014.
- [15] Tomas Mikolov, Martin Karafiat, Lukas Burget, Jan Cernocký, Sanjeev Khudanpur. Recurrent neural network based language model. 2010, conference of the international speech communication association.
- [16] Graves, Alex. Generating sequences with recurrent neural networks. arXiv preprint arXiv:1308.0850 (2013).

自动编码器

- [1] J. Deng, Z. X. Zhang, M. Erik. Sparse auto-encoder based feature transfer learning for speech emotion recognition[J]. Proc. of Humaine Association Conference on Affective Computing and Intelligent Interaction, 511-516, 2013.
- [2] J. Gehring, Y. J. Miao, F. Metze. Extracting deep bottleneck features using stacked auto-encoders[J]. Proc. of the 26th IEEE International Conference on Acoustics, Speech and Signal Processing, 2013: 3377-3381.
- [3] Salah Rifai, Pascal Vincent, Xavier Muller, Xavier Glorot, Yoshua Bengio. Contractive Auto-Encoders: Explicit Invariance During Feature Extraction.

international conference on machine learning, 2011.

[4] Pascal Vincent, Hugo Larochelle, Yoshua Bengio, Pierreantoine Manzagol. Extracting and composing robust features with denoising auto encoders. international conference on machine learning, 2008.

[5] Junbo Jake Zhao, Michael Mathieu, Ross Goroshin, Yann Lecun. Stacked What-Where Auto-encoders. arXiv: Machine Learning, 2015.

[6] Pascal Vincent, Hugo Larochelle, Isabelle Lajoie, Yoshua Bengio, Pierreantoine Manzagol. Stacked Denoising Autoencoders: Learning Useful Representations in a Deep Network with a Local Denoising Criterion. Journal of Machine Learning Research, 2010.

[7] G. E. Hinton, A. Krizhevsky, S. D. Wang. Transforming Auto-encoders. international conference on artificial neural networks, 2011.

[8] G. E. Hinton, et al. Reducing the Dimensionality of Data with Neural Networks, Science 313, 504, 2006.

受限玻尔兹曼机

[1] Nicolas Le Roux, Yoshua Bengio. Representational power of Restricted Boltzmann Machines and deep belief networks. Neural Computation., 2008.

[2] Geoffrey E Hinton. A Practical Guide to Training Restricted Boltzmann Machines. 2012.

[3] Ruslan Salakhutdinov, Geoffrey E Hinton. Deep Boltzmann Machines. international conference on artificial intelligence and statistics, 2009.

[4] Ruslan Salakhutdinov, Andriy Mnih, Geoffrey E Hinton. Restricted Boltzmann machines for collaborative filtering. international conference on machine

learning, 2007.

生成对抗网络

[1] Goodfellow Ian, Pouget-Abadie J, Mirza M, et al. Generative adversarial nets. *Advances in Neural Information Processing Systems*, 2672–2680, 2014.

[2] Mirza M, Osindero S. Conditional Generative Adversarial Nets. *Computer Science*, 2672–2680, 2014.

[3] Radford A, Metz L, Chintala S. Unsupervised representation learning with deep convolutional generative adversarial networks. *arXiv preprint arXiv:1511.06434*, 2015.

[4] Denton E L, Chintala S, Fergus R. Deep Generative Image Models using a Laplacian Pyramid of Adversarial Networks. *Advances in neural information processing systems*. 1486–1494, 2015.

[5] S Reed, Zeynep Akata, Xincheng Yan, Lajanugen Logeswaran, Bernt Schiele, Honglak Lee. Generative Adversarial Text to Image

Synthesis. *international conference on machine learning*, 2016.

[6] Christian Ledig, Lucas Theis, Ferenc Huszar, Jose Caballero, Andrew Aitken, Alykhan Tejani, Johannes Totz, Zehan Wang, Wenzhe Shi. Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network. *Computer Vision and Pattern Recognition*, 2016.

[7] Chen X, Duan Y, Houthoofd R, et al. InfoGAN: Interpretable Representation Learning by Information Maximizing Generative Adversarial Nets[J]. *arXiv preprint arXiv:1606.03657*, 2016.

[8] Martin Arjovsky, Leon Bottou. Towards Principled Methods for Training Generative Adversarial Networks. ICLR 2017.

变分自动编码器

[1] Diederik P Kingma, Max Welling. Auto-Encoding Variational Bayes. international conference on learning representations, 2014.

深度模型压缩与优化

[1] Song Han, Huizi Mao, William J Dally. Deep Compression: Compressing Deep Neural Networks with Pruning, Trained Quantization and Huffman Coding. international conference on learning representations, 2016.

[2] Mohammad Rastegari, Vicente Ordonez, Joseph Redmon, Ali Farhadi. XNOR-Net: ImageNet Classification Using Binary Convolutional Neural Networks. european conference on computer vision, 2016.

[3] Matthieu Courbariaux, Itay Hubara, Daniel Soudry, Ran Elyaniv, Yoshua Bengio. Binarized Neural Networks: Training Deep Neural Networks with Weights and Activations Constrained to +1 or -1. arXiv: Learning, 2016.

[4] Han, Song, Pool, Jeff, Tran, John, and Dally, William J. Learning both weights and connections for efficient neural networks. In Advances in Neural Information Processing Systems, 2015.

[5] Denton, E.L, Zaremba, W, Bruna, J, LeCun, Y, Fergus, R. Exploiting linear structure within convolutional networks for efficient evaluation. In Advances in Neural Information Processing Systems. 1269–1277, 2014.

- [6] Jaderberg. M, Vedaldi, A. Zisserman, A. Speeding up convolutional neural networks with low rank expansions. arXiv: 1405.3866, 2014.
- [7] Shuchang Zhou, Yuxin Wu, Zekun Ni, Xinyu Zhou, He Wen, Yuheng Zou. DoReFa-Net: Training Low Bitwidth Convolutional Neural Networks with Low Bitwidth Gradients.
- [8] Andrew G, Howard, Menglong Zhu, Bo Chen, Dmitry Kalenichenko, Weijun Wang, Tobias Weyand, Marco Andreetto, Hartwig Adam. MobileNets: Efficient Convolutional Neural Networks for Mobile Vision Applications. 2017.

聚类算法

- [1] MacQueen, J. B. Some Methods for classification and Analysis of Multivariate Observations. Proceedings of 5th Berkeley Symposium on Mathematical Statistics and Probability. 1. University of California Press. pp. 281 - 297, 1967
- [2] Martin Ester, Hanspeter Kriegel, Jorg Sander, Xu Xiaowei. A density-based algorithm for discovering clusters in large spatial databases with noise. Proceedings of the Second International Conference on Knowledge Discovery and Data Mining, pp. 226 - 231, 1996.
- [3] Mihael Ankerst, Markus M Breunig, Hanspeter Kriegel, Jorg Sander. OPTICS: Ordering Points To Identify the Clustering Structure. ACM SIGMOD international conference on Management of data. ACM Press. pp. 49 - 60, 1999.
- [4] Yizong Cheng. Mean Shift, Mode Seeking, and Clustering. IEEE Transactions on Pattern Analysis and Machine Intelligence, 1995.
- [5] J C Dunn. A Fuzzy Relative of the ISODATA Process and Its Use in Detecting Compact Well-Separated Clusters. Cybernetics and Systems, 1973.

- [6] Charles Elkan. Using the triangle inequality to accelerate k-means. international conference on machine learning, 2003.
- [7] Arthur P Dempster, Nan M Laird, Donald B Rubin. Maximum Likelihood from Incomplete Data via the EM Algorithm. Journal of the royal statistical society series b-methodological, 1976.
- [8] Dan Pelleg, Andrew W Moore. X-means: Extending K-means with Efficient Estimation of the Number of Clusters. In ICML (Vol. 1), 2000.
- [9] Greg Hamerly, Charles Elkan. Learning the k in k-means. Advances in neural information processing systems, 2004.
- [10] M Emre Celebi, Hassan A Kingravi, Patricio A Vela. A comparative study of efficient initialization methods for the k-means clustering algorithm. Expert Systems With Applications, 2013.
- [11] Andrew Y Ng, Michael I Jordan, Yair Weiss. On Spectral Clustering: Analysis and an algorithm. neural information processing systems, 2002.
- [12] Ulrike Von Luxburg. A tutorial on spectral clustering. Statistics and Computing, 2007.
- [13] Dorin Comaniciu, Peter Meer. Mean shift: a robust approach toward feature space analysis. IEEE Transactions on Pattern Analysis and Machine Intelligence, 2002.

半监督学习

- [1] Olivier Chapelle, Bernhard Scholkopf, Alexander Zien. Semi-supervised learning. Cambridge. Mass: MIT Press. ISBN 978-0-262-03358-9.

- [2] Isaac Triguero, Salvador Garcia, Francisco Herrera. Self-labeled techniques for semi-supervised learning: taxonomy, software and empirical study. Knowledge and Information Systems, 2015.
- [3] Zhu, Xiaojin. Semi-supervised learning literature survey. Computer Sciences, University of Wisconsin-Madison, 2008.
- [6] Antti Rasmus, Harri Valpola, Mikko Honkela, Mathias Berglund, Tapani Raiko. Semi-supervised learning with Ladder networks. neural information processing systems, 2015.
- [7] M. Belkin, P. Niyogi. Semi-supervised Learning on Riemannian Manifolds. Machine Learning. 56 (Special Issue on Clustering): 209 - 239, 2004.
- [8] Diederik P Kingma, Shakir Mohamed, Danilo Jimenez Rezende, Max Welling. Semi-supervised Learning with Deep Generative Models. neural information processing systems, 2014.
- [9] Thorsten Joachims. Transductive inference for text classification using support vector machines. international conference on machine learning, 1999.

强化学习

- [1] Kaelbling, Leslie P., Littman, Michael L., Moore, Andrew W. Reinforcement Learning: A Survey. Journal of Artificial Intelligence Research. 4: 237-285, 1996.
- [2] Richard Sutton. Learning to predict by the methods of temporal differences. Machine Learning. 3 (1): 9-44. 1988.

- [3] Volodymyr Mnih, Koray Kavukcuoglu, David Silver, Alex Graves, Ioannis Antonoglou. Playing Atari with Deep Reinforcement Learning. NIPS 2013.
- [4] Mnih, Volodymyr, et al. Human-level control through deep reinforcement learning. *Nature*. 518 (7540): 529–533, 2015.
- [5] John N Tsitsiklis, B Van Roy. An analysis of temporal-difference learning with function approximation. *IEEE Transactions on Automatic Control*, 1997.
- [6] Richard S Sutton, David A Mcallester, Satinder P Singh, Yishay Mansour. Policy Gradient methods for reinforcement learning with function approximation. *neural information processing systems*, 2000.
- [7] Timothy P Lillicrap, Jonathan J Hunt, Alexander Pritzel, Nicolas Heess, Tom Erez, Yuval Tassa. Continuous Control With Deep Reinforcement Learning. *international conference on learning representations*, 2016.
- [8] Volodymyr Mnih, Adria Puigdomenech Badia, Mehdi Mirza, Alex Graves, Tim Harley, Timothy P Lill. Asynchronous methods for deep reinforcement learning. *international conference on machine learning*, 2016.
- [9] Yuxi Li. Deep Reinforcement Learning: An Overview. 2017.
- [10] David Silver, et al. Mastering the Game of Go with Deep Neural Networks and Tree Search. *Nature*, 2016.
- [11] David Silver, Thomas Hubert, Julian Schrittwieser, Ioannis Antonoglou, Matthew Lai, Arthur Guez. AlphaZero: Mastering Chess and Shogi by Self-Play with a General Reinforcement Learning Algorithm. *arXiv: Artificial Intelligence*, 2017.
- [12] Christopher JCH Watkins and Peter Dayan. Q-learning. *Machine learning*, 8(3–4):279 – 292, 1992.

[13] Gerald Tesauro. Temporal difference learning and TD-gammon. *Communications of the ACM*, 38(3):58 – 68, 1995.

SIGAI会持续维护并扩充本份论文列表！更多请关注SIGAI官网：

www.sigai.cn