高级机器学习课程术语表

历史版本：[机器学习课程术语表 | AMiner](https://www.aminer.cn/ml_taxonomy)

2024版本：杜晋华、陈健、魏晨天、张沛东、武文静、高博文、刘家祥（共建同学请在此补足）

# **Language Model Basics**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Tokenization | 分词 | Gregory Grefenstette | [Tokenization](https://link.springer.com/content/pdf/10.1007/978-94-015-9273-4_9?pdf=chapter%20toc) |
| Byte Pair Encoding (BPE) | 字节对编码 | Rico Sennrich, Barry Haddow, Alexandra Birch | [Neural Machine Translation of Rare Words with Subword ...](https://arxiv.org/abs/1508.07909) |
| N-gram | n元语法 | Brown, Peter F., Vincent J. Della Pietra, Peter V. Desouza, Jennifer C. Lai, and Robert L. Mercer. | [Class-based n-gram models of natural language](https://aclanthology.org/J92-4003.pdf) |

# **General LLM**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| LLM（Large language model） | 大语言模型 | Wayne Xin Zhao | [A survey of large language models](https://arxiv.org/abs/2303.18223) |
| AGI (Artificial General Intelligence) | 通用人工智能 | Ben Goertzel | [Artificial general intelligence](https://link.springer.com/content/pdf/10.1007/978-3-540-68677-4.pdf) |
| Transformer | 变换器（一种网络架构） | Ashish Vaswani,  Noam Shazeer,  Niki Parmar,  Jakob Uszkoreit,  Llion Jones,  Aidan N. Gomez,  Lukasz Kaiser,  Illia Polosukhin | [Attention is All You Need](https://www.aminer.cn/pub/599c7987601a182cd2648373/attention-is-all-you-need) |
| Pretraining Models | 预训练模型 | Ruslan Salakhutdinov | [Exploring the limits of weakly supervised pretraining](http://openaccess.thecvf.com/content_ECCV_2018/html/Dhruv_Mahajan_Exploring_the_Limits_ECCV_2018_paper.html) |
| Self-learning | 自训练学习（一种半监督方法） | Jie Tang | [Self-supervised learning: Generative or contrastive](https://ieeexplore.ieee.org/abstract/document/9462394/) |
| GLM (General Language Model) | 通用语言模型 | Zhengxiao Du,  Yujie Qian,  Xiao Liu,  Ming Ding,  Jiezhong Qiu,  Zhilin Yang,  Jie Tang | [GLM: General Language Model Pretraining with Autoregressive Blank Infilling](https://www.aminer.cn/pub/6054872891e0116f82f2d766/glm-general-language-model-pretraining-with-autoregressive-blank-infilling) |
| GPT (Generative Pre-trained Transformer) | 生成式预训练变换器 | Xiao Liu,  Yanan Zheng,  Zhengxiao Du,  Ming Ding,  Yujie Qian,  Zhilin Yang,  Jie Tang | [GPT Understands, Too](https://www.aminer.cn/pub/6054886a91e0116f82f2d77f/gpt-understands-too) |
| DFN (Deep Feedforward Network) | 深度前馈网络 | Ashish Vaswani,  Noam Shazeer,  Niki Parmar,  Jakob Uszkoreit,  Llion Jones,  Aidan N. Gomez,  Lukasz Kaiser,  Illia Polosukhin | [Attention is All You Need](https://www.aminer.cn/pub/599c7987601a182cd2648373/attention-is-all-you-need) |
| ANN (Artificial Neural Network) | 人工神经网络 | Rahul Mishra,  Hari Prabhat Gupta,  Tanima Dutta | [A Survey on Deep Neural Network Compression: Challenges, Overview, and Solutions.](https://www.aminer.cn/pub/645647c3d68f896efae41d46/a-survey-on-deep-neural-network-compression-challenges-overview-and-solutions) |
| DNN (Deep Neural Network) | 深度神经网络 | Rahul Mishra,  Hari Prabhat Gupta,  Tanima Dutta | [A Survey on Deep Neural Network Compression: Challenges, Overview, and Solutions.](https://www.aminer.cn/pub/645647c3d68f896efae41d46/a-survey-on-deep-neural-network-compression-challenges-overview-and-solutions) |
| RNN (Recurrent Neural Network) | 循环神经网络 | Schmidt Robin M. | [Recurrent Neural Networks (RNNs): A gentle Introduction and Overview](https://www.aminer.cn/pub/5df371db3a55acfd20674b15/recurrent-neural-networks-rnns-a-gentle-introduction-and-overview) |
| CNN (Convolutional Neural Network) | 卷积神经网络 | Keiron O’Shea,  Ryan Nash | [An Introduction to Convolutional Neural Networks](https://www.aminer.cn/pub/573696126e3b12023e524bf6/an-introduction-to-convolutional-neural-networks) |
| MLP (Multi-layer Perceptron) | 多层感知器 | Keiron O’Shea,  Ryan Nash | [An Introduction to Convolutional Neural Networks](https://www.aminer.cn/pub/573696126e3b12023e524bf6/an-introduction-to-convolutional-neural-networks) |
| Feedforward Neural Network | 前馈神经网络 | Keiron O’Shea,  Ryan Nash | [An Introduction to Convolutional Neural Networks](https://www.aminer.cn/pub/573696126e3b12023e524bf6/an-introduction-to-convolutional-neural-networks) |
| Attention block | 注意力块 | Ashish Vaswani,  Noam Shazeer,  Niki Parmar,  Jakob Uszkoreit,  Llion Jones,  Aidan N. Gomez,  Lukasz Kaiser,  Illia Polosukhin | [Attention is All You Need](https://www.aminer.cn/pub/599c7987601a182cd2648373/attention-is-all-you-need) |
| AlexNet | 早期一种深度学习模型 | Alex Krizhevsky,  Ilya Sutskever,  Geoffrey E. Hinton | [ImageNet Classification with Deep Convolutional Neural Networks](https://www.aminer.cn/pub/53e9a281b7602d9702b88a98/imagenet-classification-with-deep-convolutional-neural-networks) |
| ResNet (Residual Neural Network) | 残差神经网络 | Muhammad Shafiq,  Zhaoquan Gu | [Deep residual learning for image recognition.](https://www.aminer.cn/pub/6352795390e50fcafdc5a1ed/deep-residual-learning-for-image-recognition-a-survey) |
| U-Net | 一种用于生物医学图像分割的深度学习模型 | O Ronneberger,  P Fischer,  T Brox | [U-net: Convolutional networks for biomedical image segmentation.](https://www.aminer.cn/pub/619cb6986750f86487ed2025/u-net-convolutional-networks-for-biomedical-image-segmentation-corr-abs) |
| DenseNet | 一种密集连接的卷积神经网络 | Gao Huang,  Zhuang Liu,  Laurens van der Maaten,  Kilian Q. Weinberger; | [Densely Connected Convolutional Networks](https://openaccess.thecvf.com/content_cvpr_2017/html/Huang_Densely_Connected_Convolutional_CVPR_2017_paper.html) |
| LSTM (Long Short-Term Memory) | 长短期记忆网络 | Sepp Hochreiter,  Fakultät für Informatik | [Long Short-Term Memory](https://ieeexplore.ieee.org/abstract/document/6795963) |
| word2Vec | word2Vec（一种词嵌入技术） | Tomás Mikolov,  Kai Chen,  Greg Corrado,  Jeffrey Dean | [Efficient Estimation of Word Representations in Vector Space](https://www.aminer.cn/pub/5e8d8fca9fced0a24b5ddad3/efficient-estimation-of-word-representations-in-vector-space) |
| Deepwalk | Deepwalk（一种网络嵌入技术） | Bryan Perozzi,  Rami Al-Rfou,  Steven Skiena | [DeepWalk: Online Learning of Social Representations](https://www.aminer.cn/pub/53e9b253b7602d9703cf4028/deepwalk-online-learning-of-social-representations) |
| Glove | Glove（一种词嵌入技术） | Jeffrey Pennington,  Richard Socher,  Christopher D. Manning | [GloVe: Global Vectors for Word Representation](https://www.aminer.cn/pub/5550456245ce0a409eb55cee/glove-global-vectors-for-word-representation) |
| ELMo | ELMo（一种动态词嵌入技术） | Matthew E. Peters,  Mark Neumann,  Mohit Iyyer,  Matt Gardner,  Christopher Clark,  Kenton Lee,  Luke Zettlemoyer | [Deep contextualized word representations.](https://www.aminer.cn/pub/5a9cb66717c44a376ffb8ac1/Deep%20contextualized%20word%20representations.) |
| Hopfield Network | Hopfield网络（一种用于模式识别的神经网络） | J J Hopfield | [Neural networks and physical systems with emergent collective computational abilities.](https://www.pnas.org/doi/10.1073/pnas.79.8.2554) |
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| Multi-Head Attention | 多头注意力机制 | Ashish Vaswani,  Noam Shazeer,  Niki Parmar,  Jakob Uszkoreit,  Llion Jones,  Aidan N. Gomez,  Lukasz Kaiser,  Illia Polosukhin | [Attention is All You Need](https://www.aminer.cn/pub/599c7987601a182cd2648373/attention-is-all-you-need) |
| BERT | 一种基于Transformer的语言模型 | Jacob Devlin,  Ming-Wei Chang,  Kenton Lee,  Kristina Toutanova | [BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding](https://www.aminer.cn/pub/5bdc31b417c44a1f58a0b8c2/bert-pre-training-of-deep-bidirectional-transformers-for-language-understanding) |
| XLNet | 一种基于Transformer的语言模型 | Zhilin Yang,  Zihang Dai,  Yiming Yang,  Jaime Carbonell,  Ruslan Salakhutdinov,  Quoc V. Le | [XLNet: Generalized Autoregressive Pretraining for Language Understanding](https://www.aminer.cn/pub/5d0b595b3a55acccec78565e/Xlnet:%20Generalized%20Autoregressive%20Pretraining%20For%20Language%20Understanding) |
| T5 | 一种基于Transformer的语言模型 | Colin Raffel,  Noam Shazeer,  Adam Roberts,  Katherine Lee,  Sharan Narang,  Michael Matena,  Yanqi Zhou,  Wei Li,  Peter J. Liu | [Exploring the Limits of Transfer Learning with a Unified Text-to-Text Transformer](https://www.aminer.cn/pub/5db1765a3a55ac101c887e97/exploring-the-limits-of-transfer-learning-with-a-unified-text-to-text) |
| MoE（Mixture of Experts) | 混合专家模型 |  |  |
| Nucleus Sampling | 核采样 | Ari Holtzman,  Jan Buys,  Li Du,  Maxwell Forbes,  Yejin Choi | [The Curious Case of Neural Text Degeneration.](https://www.aminer.cn/pub/5cbee64de1cd8ebd2b5e786a/The%20Curious%20Case%20of%20Neural%20Text%20Degeneration) |
| ViViT |  | Anurag Arnab, Mostafa Dehghani, Georg Heigold, Chen Sun, Mario Lučić, Cordelia Schmid | [ViViT: A Video Vision Transformer](https://arxiv.org/abs/2103.15691) |
| PaLI |  | Xi Chen, Xiao Wang, Soravit Changpinyo, AJ Piergiovanni, Piotr Padlewski, Daniel Salz, Sebastian Goodman, Adam Grycner, Basil Mustafa, Lucas Beyer, Alexander Kolesnikov, Joan Puigcerver, Nan Ding, Keran Rong, Hassan Akbari, Gaurav Mishra, Linting Xue, Ashish Thapliyal, James Bradbury, Weicheng Kuo, Mojtaba Seyedhosseini, Chao Jia, Burcu Karagol Ayan, Carlos Riquelme, Andreas Steiner, Anelia Angelova, Xiaohua Zhai, Neil Houlsby, Radu Soricut | [PaLI: A Jointly-Scaled Multilingual Language-Image Model](https://arxiv.org/abs/2209.06794) |
| CogVLM |  | Weihan Wang, Qingsong Lv, Wenmeng Yu, Wenyi Hong, Ji Qi, Yan Wang, Junhui Ji, Zhuoyi Yang, Lei Zhao, Xixuan Song, Jiazheng Xu, Bin Xu, Juanzi Li, Yuxiao Dong, Ming Ding, Jie Tang | [CogVLM: Visual Expert for Pretrained Language Models](https://arxiv.org/abs/2311.03079) |
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# **Pretrain**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| In-context Learning | 上下文学习 | Tom B. Brown,  Benjamin Mann，Ilya utskever,  Dario Amodei | [Language Models Are Few-Shot Learners](https://www.aminer.cn/pub/5ed0e04291e011915d9e43ee/Language%20Models%20are%20Few-Shot%20Learners) |
| Transfer Learning | 迁移学习 | Qiang Yang | [A survey on transfer learning](https://ieeexplore.ieee.org/abstract/document/5288526/) |
| Representation Learning | 表征学习 | Yoshua Bengio | [Representation learning: A review and new perspectives](https://ieeexplore.ieee.org/abstract/document/6472238/) |
| Moore's Law | 摩尔定律 | Gordon Moore | [Cramming more components onto integrated circuits](http://www.computer-architecture.org/textual/Moore-Cramming-More-Components-1965.pdf) |
| FLOPs (Floating-point operations per second) | 每秒浮点运算次数 | Jierun Chen | [Run, don't walk: chasing higher FLOPS for faster neural networks](http://openaccess.thecvf.com/content/CVPR2023/html/Chen_Run_Dont_Walk_Chasing_Higher_FLOPS_for_Faster_Neural_Networks_CVPR_2023_paper.html) |
| GPU (Graphics Processing Unit) | 图形处理单元 | John Owens | [GPU computing](https://ieeexplore.ieee.org/abstract/document/4490127/) |
| TPU (Tensor Processing Unit) | 张量处理单元 | Norman Jouppi | [In-datacenter performance analysis of a tensor processing unit](https://dl.acm.org/doi/abs/10.1145/3079856.3080246) |
| ZeRO Optimizer | ZeRO优化器 | Samyam Rajbhandari | [Zero: Memory optimizations toward training trillion parameter models](https://ieeexplore.ieee.org/abstract/document/9355301/) |
| Data Parallelism | 数据并行 | David Tarditi | [Accelerator: using data parallelism to program GPUs for general-purpose uses](https://dl.acm.org/doi/abs/10.1145/1168918.1168898) |
| Pipeline Parallelism | 流水线并行 | Yanping Huang | [Gpipe: Efficient training of giant neural networks using pipeline parallelism](https://proceedings.neurips.cc/paper/8305-gpipe-efficient-training-of-giant-neural-networks-using-pipeline-parallelism) |
| Mixed Precision Training | 混合精度训练 | Paulius Micikevicius,  Sharan Narang,  Jonah Alben,  Gregory Diamos,  Erich Elsen,  David Garcia,  Boris Ginsburg,  Michael Houston,  Oleksii Kuchaiev,  Ganesh Venkatesh,  Hao Wu | [Mixed Precision Training.](https://www.aminer.cn/pub/5a260c8417c44a4ba8a314e3/mixed-precision-training) |
| Rematerialization | 再具体化（一种编译器优化技术） | Preston Briggs | [Rematerialization](https://dl.acm.org/doi/abs/10.1145/143095.143143) |
| Data statements | 数据声明 | Emily M. Bender,  Batya Friedman | [Data Statements for Natural Language Processing: Toward Mitigating System Bias and Enabling Better Science.](https://www.aminer.cn/pub/5cede12ada5629837890ab9f/data-statements-for-natural-language-processing-toward-mitigating-system-bias-and-enabling) |
| Contrastive Language-Image Pre-training | CLIP模型 | Alec Radford | [Learning transferable visual models from natural language supervision](http://proceedings.mlr.press/v139/radford21a) |
| MIM (Masked Image Modeling) | 掩码图像建模 | Vlad Hondru, Florinel Alin Croitoru, Shervin Minaee, Radu Tudor Ionescu, Nicu Sebe | [Masked Image Modeling: A Survey](https://arxiv.org/abs/2408.06687) |
| BEiT | BEiT模型 | Hangbo Bao, Li Dong, Songhao Piao, Furu Wei | [BEiT: BERT Pre-Training of Image Transformers](https://arxiv.org/abs/2106.08254) |

# **CoT**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| CoT (Chain-of-thought) | 思维链 | Jason Wei,  Xuezhi Wang,  Dale Schuurmans,  Maarten Bosma,  Brian Ichter,  Fei Xia,  Ed H. Chi,  Quoc V. Le,  Denny Zhou | [Chain of Thought Prompting Elicits Reasoning in Large Language Models](https://www.aminer.cn/pub/61f753205aee126c0f9c20e3/chain-of-thought-prompting-elicits-reasoning-in-large-language-models) |
| LogiCoT | 逻辑思维链 | Hanmeng Liu, Zhiyang Teng, Leyang Cui, Chaoli Zhang, Qiji Zhou, Yue Zhang | [LogiCoT: Logical Chain-of-Thought Instruction-Tuning](https://arxiv.org/abs/2305.12147) |
| ToT（Tree of Thoughts） | 思维树 | Shunyu Yao, Dian Yu, Jeffrey Zhao, Izhak Shafran, Thomas L. Griffiths, Yuan Cao, Karthik Narasimhan | [Tree of Thoughts: Deliberate Problem Solving with Large Language Models](https://arxiv.org/abs/2305.10601) |
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# **Post-training**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Finetuning | 微调 | Jacob Devlin,  Ming-Wei Chang,  Kenton Lee,  Kristina Toutanova | [BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding](https://www.aminer.cn/pub/5bdc31b417c44a1f58a0b8c2/bert-pre-training-of-deep-bidirectional-transformers-for-language-understanding) |
| Adapter Tuning | 适配器微调 | Neil Houlsby,  Andrei Giurgiu,  Stanislaw Jastrzebski,  Bruna Morrone,  Quentin de Laroussilhe,  Andrea Gesmundo,  Mona Attariyan,  Sylvain Gelly | [Parameter-Efficient Transfer Learning for NLP.](https://www.aminer.cn/pub/5c61606ae1cd8eae1501e0f5/Parameter-Efficient%20Transfer%20Learning%20for%20NLP.) |
| Low-rank Adaptation (LoRA) | 低秩适应 | Edward J. Hu,  Yelong Shen,  Phillip Wallis,  Zeyuan Allen-Zhu,  Yuanzhi Li,  Shean Wang,  Weizhu Chen | [LoRA: Low-Rank Adaptation of Large Language Models](https://www.aminer.cn/pub/60cdafae91e011329faa2589/LoRA:%20Low-Rank%20Adaptation%20of%20Large%20Language%20Models) |
| QLoRA | 量化LoRA | Tim Dettmers,  Artidoro Pagnoni,  Ari Holtzman,  Luke Zettlemoyer | [QLoRA: Efficient Finetuning of Quantized LLMs](https://www.aminer.cn/pub/646d8643d68f896efa0a326e/QLoRA:%20Efficient%20Finetuning%20of%20Quantized%20LLMs) |
| Prefix Tuning | 前缀微调 | Xiang Lisa Li,  Percy Liang | [Prefix-Tuning: Optimizing Continuous Prompts for Generation](https://www.aminer.cn/pub/5ff4336291e01130648dc2f4/Prefix-Tuning:%20Optimizing%20Continuous%20Prompts%20for%20Generation) |
| P-tuning | P-微调 | Xiao Liu,  Yanan Zheng,  Zhengxiao Du,  Ming Ding,  Yujie Qian,  Zhilin Yang,  Jie Tang | [GPT Understands, Too](https://www.aminer.cn/pub/6054886a91e0116f82f2d77f/gpt-understands-too) |
| Prompt Tuning | 提示微调 | Brian Lester,  Rami Al-Rfou,  Noah Constant | [The Power of Scale for Parameter-Efficient Prompt Tuning](https://www.aminer.cn/pub/63bff36690e50fcafdeea51e/the-power-of-scale-for-parameter-efficient-prompt-tuning) |
| Soft Prompts | 软提示 | Tingwei Zhang,  Collin Zhang,  John X. Morris,  Eugene Bagdasarian,  Vitaly Shmatikov | [Soft Prompts Go Hard: Steering Visual Language Models with Hidden Meta-Instructions](https://www.aminer.cn/pub/6694828f01d2a3fbfc865474/Soft%20Prompts%20Go%20Hard:%20Steering%20Visual%20Language%20Models%20with%20Hidden%20%20Meta-Instructions) |
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| Multitask Prompted Training | 多任务提示训练 | Victor Sanh,  Albert Webson，  Thomas Wolf,  Alexander M. Rush | [Multitask Prompted Training Enables Zero-Shot Task Generalization](https://www.aminer.cn/pub/616ce5a55244ab9dcbacff30/Multitask%20Prompted%20Training%20Enables%20Zero-Shot%20Task%20Generalization) |
| Zero-shot Learning | 零样本学习 | Takeshi Kojima | [Large language models are zero-shot reasoners](https://proceedings.neurips.cc/paper_files/paper/2022/hash/8bb0d291acd4acf06ef112099c16f326-Abstract-Conference.html) |
| Few-shot Learning | 少样本学习 | Chan Hee Song | [Llm-planner: Few-shot grounded planning for embodied agents with large language models](http://openaccess.thecvf.com/content/ICCV2023/html/Song_LLM-Planner_Few-Shot_Grounded_Planning_for_Embodied_Agents_with_Large_Language_ICCV_2023_paper.html) |

# **RLHF**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Reinforcement Learning (RL) | 强化学习 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| MDP (Markov Decision Process) | 马尔可夫决策过程 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| Q-learning | Q-learning算法 | C. J. C. H. Watkins | [Learning from delayed rewards](https://www.aminer.cn/pub/53e99a8cb7602d970230184f/learning-from-delayed-rewards) |
| Double Q-learning | Double Q-learning算法 | Hado Van Hasselt | [Double Q-Learning](https://www.aminer.cn/pub/53e99813b7602d970202935d/double-q-learning) |
| Sarsa | Sarsa（State-Action-Reward-State-Action）算法 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| Policy Learning | 策略学习 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| Bellman Equation | 贝尔曼方程 | Richar Bellman | [THE THEORY OF DYNAMIC PROGRAMMING](https://www.ams.org/journals/bull/1954-60-06/S0002-9904-1954-09848-8/S0002-9904-1954-09848-8.pdf) |
| Policy Gradient Theorem | 策略梯度定理 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| REINFORCE | REINFORCE算法 | Ronald J. Williams | [Simple Statistical Gradient-Following Algorithms for Connectionist Reinforcement Learning](https://www.aminer.cn/pub/539087aa20f70186a0d4b18c/simple-statistical-gradient-following-algorithms-for-connectionist-reinforcement-learning) |
| Actor-Critic Methods | 演员-评论家算法 | Vijay Konda,  John Tsitsiklis | [Actor-Critic Algorithms](https://proceedings.neurips.cc/paper/1999/hash/6449f44a102fde848669bdd9eb6b76fa-Abstract.html) |
| Monte Carlo Methods | 蒙特卡洛方法 | N METROPOLIS,  S ULAM | [The Monte Carlo Method.](https://www.aminer.cn/pub/55a44be0c91b587b097670a3/the-monte-carlo-method) |
| Policy Evaluation | 策略评估 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| Policy Improvement | 策略改进 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| Policy Iteration | 策略迭代 | Richard S. Sutton,  Andrew G. BartoKresimir Josic | [Reinforcement Learning: An Introduction.](https://www.aminer.cn/pub/5390b68720f70186a0f1af2e/reinforcement-learning-an-introduction) |
| RLHF (Reinforcement Learning from Human Feedback) | 基于人类反馈的强化学习 | Long Ouyang,  Jeff Wu,  Xu Jiang,  Diogo Almeida,  Carroll L. Wainwright,  Pamela Mishkin,  Chong Zhang,  Sandhini Agarwal,  Katarina Slama,  Alex Ray,  John Schulman,  Jacob Hilton,  Fraser Kelton,  Luke Miller,  Maddie Simens,  Amanda Askell,  Peter Welinder,  Paul Christiano | [Training Language Models to Follow Instructions with Human Feedback](https://www.aminer.cn/pub/61f50e3ad18a2b03dd0e7489/Training%20language%20models%20to%20follow%20instructions%20with%20human%20feedback) |
| Instruction Tuning | 指令微调 | Long Ouyang,  Jeff Wu,  Xu Jiang,  Diogo Almeida,  Carroll L. Wainwright,  Pamela Mishkin,  Chong Zhang,  Sandhini Agarwal,  Katarina Slama,  Alex Ray,  John Schulman,  Jacob Hilton,  Fraser Kelton,  Luke Miller,  Maddie Simens,  Amanda Askell,  Peter Welinder,  Paul Christiano | [Training Language Models to Follow Instructions with Human Feedback](https://www.aminer.cn/pub/61f50e3ad18a2b03dd0e7489/Training%20language%20models%20to%20follow%20instructions%20with%20human%20feedback) |
| Supervised Fine-Tuning (SFT) | 监督微调 | Long Ouyang,  Jeff Wu,  Xu Jiang,  Diogo Almeida,  Carroll L. Wainwright,  Pamela Mishkin,  Chong Zhang,  Sandhini Agarwal,  Katarina Slama,  Alex Ray,  John Schulman,  Jacob Hilton,  Fraser Kelton,  Luke Miller,  Maddie Simens,  Amanda Askell,  Peter Welinder,  Paul Christiano | [Training Language Models to Follow Instructions with Human Feedback](https://www.aminer.cn/pub/61f50e3ad18a2b03dd0e7489/Training%20language%20models%20to%20follow%20instructions%20with%20human%20feedback) |
| Reward Model (RM) | 奖励模型 | Long Ouyang,  Jeff Wu,  Xu Jiang,  Diogo Almeida,  Carroll L. Wainwright,  Pamela Mishkin,  Chong Zhang,  Sandhini Agarwal,  Katarina Slama,  Alex Ray,  John Schulman,  Jacob Hilton,  Fraser Kelton,  Luke Miller,  Maddie Simens,  Amanda Askell,  Peter Welinder,  Paul Christiano | [Training Language Models to Follow Instructions with Human Feedback](https://www.aminer.cn/pub/61f50e3ad18a2b03dd0e7489/Training%20language%20models%20to%20follow%20instructions%20with%20human%20feedback) |
| PPO (Proximal Policy Optimization) | 近端策略优化 | John Schulman,  Filip Wolski,  Prafulla Dhariwal,  Alec Radford,  Oleg Klimov | [Proximal Policy Optimization Algorithms.](https://www.aminer.cn/pub/59ae3bf12bbe271c4c71bc64/proximal-policy-optimization-algorithms) |
| DPO(Direct Preference Optimization） | 直接偏好优化 | Rafael Rafailov,  Archit Sharma,  Eric Mitchell,  Christopher D Manning,  Stefano Ermon,  Chelsea Finn | [Direct Preference Optimization: Your Language Model is Secretly a Reward Model](https://www.aminer.cn/pub/647572e0d68f896efa7b79a5/direct-preference-optimization-your-language-model-is-secretly-a-reward-model) |
| Kahneman-Tversky Optimization (KTO) | 卡尼曼-特沃斯基优化 | Kawin Ethayarajh,  Winnie Xu,  Niklas Muennighoff,  Dan Jurafsky,  Douwe Kiela | [KTO: Model Alignment As Prospect Theoretic Optimization](https://www.aminer.cn/pub/65c042f7939a5f4082eabb19/kto-model-alignment-as-prospect-theoretic-optimization) |

# **Agent**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Jailbroken | 越狱 | Alexander Wei,  Nika Haghtalab,  Jacob Steinhardt | [Jailbroken: How Does LLM Safety Training Fail?](https://www.aminer.cn/pub/66b4635c01d2a3fbfc72d81e/jailbroken-how-does-llm-safety-training-fail) |
| CogAgent |  | Wenyi Hong, Weihan Wang, Qingsong Lv, Jiazheng Xu, Wenmeng Yu, Junhui Ji, Yan Wang, Zihan Wang, Yuxuan Zhang, Juanzi Li, Bin Xu, Yuxiao Dong, Ming Ding, Jie Tang | [CogAgent: A Visual Language Model for GUI Agents](https://arxiv.org/abs/2312.08914) |
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# **RAG**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Retrieval-Augmented Generation | 检索增强生成 | Lewis, P., Perez, E., Piktus, A., Petroni, F., Karpukhin, V., Goyal, N., Küttler, H., Lewis, M., Yih, W.T., Rocktäschel, T. and Riedel, S | [Retrieval-augmented generation for knowledge-intensive nlp tasks](https://proceedings.neurips.cc/paper/2020/hash/6b493230205f780e1bc26945df7481e5-Abstract.html) |
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# **Evaluation**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| Self-Consistency | 自洽性 | Xuezhi Wang | [Self-consistency improves chain of thought reasoning in language models](https://arxiv.org/abs/2203.11171) |
| Factuality Hallucination | 事实幻觉 | Junyi Li | [The dawn after the dark: An empirical study on factuality hallucination in large language models](https://arxiv.org/abs/2401.03205) |
| Faithfulness Hallucination | 忠诚幻觉 | Liqiang Jing | [Faithscore: Evaluating hallucinations in large vision-language models](https://arxiv.org/abs/2311.01477) |
| Instruction Following | 指令跟随 | Ouyang Long | [Training language models to follow instructions with human feedback](https://proceedings.neurips.cc/paper_files/paper/2022/hash/b1efde53be364a73914f58805a001731-Abstract-Conference.html) |
| Perplexity | 困惑度 | Jelinek, Fred, Robert L. Mercer, Lalit R. Bahl, and James K. Baker | [Perplexity—a measure of the difficulty of speech recognition tasks](https://pubs.aip.org/asa/jasa/article-abstract/62/S1/S63/642598) |
| BLEU score | BLEU分数 | Kishore Pvapineni | [Bleu: a method for automatic evaluation of machine translation](https://aclanthology.org/P02-1040.pdf) |
| ROUGE score | ROUGE分数 | Chin-Yew Lin | [Rouge: A package for automatic evaluation of summaries](https://aclanthology.org/W04-1013.pdf) |
| InstructScore | 可解释的文本生成评估 | Lei Li | [INSTRUCTSCORE: Explainable Text Generation Evaluation with Finegrained Feedback](https://arxiv.org/abs/2305.14282) |
| KaRR (Knowledge Assessment Risk Ratio) | 知识评估风险比 | Lei Li | [Statistical knowledge assessment for large language models](https://proceedings.neurips.cc/paper_files/paper/2023/hash/5f0a4cd23e1c6eedd3edebba674ab877-Abstract-Conference.html) |
| CodeBLEU | CodeBLEU代码评估指标 | Shuo Ren | [Codebleu: a method for automatic evaluation of code synthesis](https://arxiv.org/abs/2009.10297) |

# **New Model Archs**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| RWKV | RWKV模型 | Bo Peng | [Rwkv: Reinventing rnns for the transformer era](https://arxiv.org/abs/2305.13048) |
| Mamba | Mamba模型 | Albert Gu | [Mamba: Linear-time sequence modeling with selective state spaces](https://arxiv.org/abs/2312.00752) |
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# **Robotics**

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| **英文** | **中文** | **相关学者** | **相关论文** |
| SayCan | SayCan模型 | Michael Ahn, | [Do as i can, not as i say: Grounding language in robotic affordances](https://arxiv.org/abs/2204.01691) |
| PaLM-E | PaLM-E模型 | Danny Driess | [Palm-e: An embodied multimodal language model](https://arxiv.org/abs/2303.03378) |
| RT-1 | RT-1机器人模型 | Anthony Brohan | [Rt-1: Robotics transformer for real-world control at scale](https://arxiv.org/abs/2212.06817) |
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