

# AI Related Papers in *Nature & Science*

## 《Nature》 & 《Science》 发表的 AI 相关文章

(2015.01~2021.08; incomplete survey)

Collected by Xian Zhang, 2021/8/26

Naval University of Engineering, Wuhan, China. tomtomzx@foxmail.com

<https://github.com/TOM-ZXian/AI-Related-Papers-Published-in-Nature-or-Science>

0. Hinton G E, Salakhutdinov R R. Reducing the dimensionality of data with neural networks[J]. Science, 2006, 313(5786): 504-507. doi:10.1126/science.1127647

\* 深度学习里程碑之作，掀起 AI 热浪

1. Mnih V, Kavukcuoglu K, Silver D, et al. Human-level control through deep reinforcement learning[J]. Nature, 2015, 518(7540): 529-533. <https://doi.org/10.1038/nature14236>

\* AI 玩游戏达到人类水准 Nature 【Cover】 2015.02.26

\* 深度强化学习(DQN)+Atari 游戏- 【DeepMind】

2. Cully A, Clune J, Tarapore D, et al. Robots that can adapt like animals[J]. Nature, 2015, 521(7553): 503-507. <https://doi.org/10.1038/nature14422>

\* 机器人适应“残障” Nature 【Cover】 -2015.05.28

3. Ghahramani Z. Probabilistic machine learning and artificial intelligence[J]. Nature, 2015, 521(7553): 452-459. doi:10.1038/nature14541

\* 概率机器学习与人工智能 【综述】

4. LeCun Y, Bengio Y, Hinton G. Deep learning[J]. Nature, 2015, 521(7553): 436-444. <https://doi.org/10.1038/nature14539>

\* 深度学习 【综述】

5. Jordan M I, Mitchell T M. Machine learning: Trends, perspectives, and prospects[J]. Science, 2015, 349(6245): 255-260. doi:10.1126/science.aaa8415

\* 机器学习 【综述】

6. Hirschberg J, Manning C D. Advances in natural language processing[J]. Science, 2015, 349(6245): 261-266. doi:10.1126/science.aaa8685

\* 自然语言处理 【综述】

7. Lake B M, Salakhutdinov R, Tenenbaum J B. Human-level concept learning through probabilistic program induction[J]. Science, 2015, 350(6266): 1332-1338. doi:10.1126/science.aab3050

\* Human-level 概念学习 Science 【Cover】 2015.12.11

8. Silver D, Huang A, Maddison C J, et al. Mastering the game of Go with deep neural networks and tree search[J]. Nature, 2016, 529(7587): 484-489. doi:10.1038/nature16961

\* AlphaGo 轰动全球 Nature 【Cover】 2016.01.28

\* AI 击败人类围棋冠军 【DeepMind】

9. Huth A G , Heer W D , Griffiths T L , et al. Natural speech reveals the semantic maps that tile human cerebral cortex[J]. Nature, 2016, 532(7600):453-458. <https://doi.org/10.1038/nature17637>

\* 大脑语义地图 Nature 【Cover】 2016.04.28

10. Raccuglia P, Elbert K C, Adler P D F, et al. Machine-learning-assisted materials discovery using failed experiments[J]. Nature, 2016, 533(7601): 73-76. <https://doi.org/10.1038/nature17439>

\* 利用“废弃”数据成功预测新材料的合成 Nature 【Cover】 2016.05.05

11. Jean N, Burke M, Xie M, et al. Combining satellite imagery and machine learning to predict poverty[J]. Science, 2016, 353(6301): 790-794. doi:10.1126/science.aaf7894

\* AI 贫困预测

12. Graves A, Wayne G, Reynolds M, et al. Hybrid computing using a neural network with dynamic external memory[J]. Nature, 2016, 538(7626): 471-476. doi:10.1038/nature20101

\* 可微分神经计算机(DNC) - 【DeepMind】

13. Capogrosso M, Milekovic T, Borton D, et al. A brain–spine interface alleviating gait deficits after spinal cord injury in primates[J]. Nature, 2016, 539(7628): 284-288. <https://doi.org/10.1038/nature20118>

\* 脑脊柱接口，瘫痪猴子重新行走

14. Esteva A, Kuprel B, Novoa R A, et al. Dermatologist-level classification of skin cancer with deep neural networks[J]. Nature, 2017, 542(7639): 115-118. doi:10.1038/nature21056

\* AI 皮肤癌诊断达专家水平 Nature 【Cover】 2017.02.02

15. Carleo G, Troyer M. Solving the quantum many-body problem with artificial neural networks[J]. Science, 2017, 355(6325): 602-606. doi:10.1126/science.aag2302

\* 神经网络解决量子多体问题

16. Hazlett H C, Gu H, Munsell B C, et al. Early brain development in infants at high risk for autism spectrum disorder[J]. Nature, 2017, 542(7641):348. doi:10.1038/nature21369

\* 深度学习助力自闭症发现

17. Keller A, Gerkin R C, Guan Y, et al. Predicting human olfactory perception from chemical features of odor molecules[J]. Science, 2017, 355(6327): 820-826. doi:10.1126/science.aal2014

\* “AI 鼻子”，从气味分子的化学特征预测人的嗅觉

18. Caliskan A, Bryson J J, Narayanan A. Semantics derived automatically from language corpora contain human-like biases[J]. Science, 2017, 356(6334):183-186. doi:10.1126/science.aal4230

\* 语料库语义偏见发现与研究

19. Moravčík M, Schmid M, Burch N, et al. Deepstack: Expert-level artificial intelligence in heads-up no-limit poker[J]. Science, 2017, 356(6337): 508-513. doi:10.1126/science.aam6960

\* AI 拿下德州扑克 Science 【Cover】 2017.05.05

20. Shirado H, Christakis N A. Locally noisy autonomous agents improve global human coordination in network experiments[J]. Nature, 2017, 545(7654): 370-374. <https://doi.org/10.1038/nature22332>

\* AI 有助于群体控制 Nature 【Cover】 2017.05.18

21. Hezaveh Y D, Levasseur L P, Marshall P J. Fast automated analysis of strong gravitational lenses with convolutional neural networks[J]. Nature, 2017, 548(7669): 555. doi:10.1038/nature23463

\* 强引力透镜的快速分析

22. Biamonte J, Wittek P, Pancotti N, et al. Quantum machine learning[J]. Nature, 2017, 549(7671): 195-202. doi:10.1038/nature23474

\* 量子机器学习 【综述】

23. Silver D, Schrittwieser J, Simonyan K, et al. Mastering the game of go without human knowledge[J]. Nature, 2017, 550(7676): 354.. doi:10.1038/nature24270

\* AlphaGo Zero 横空出世，无师自通- 【DeepMind】

24. Dasgupta S, Stevens C F, Navlakha S. A neural algorithm for a fundamental computing problem[J]. Science, 2017, 358(6364):793-796. doi:10.1126/science.aam9868

\* “果蝇哈希”相似性搜索算法

25. D George, Lehrach W, Kansky K, et al. A generative vision model that trains with high data efficiency and breaks text-based CAPTCHAs[J]. Science, 2017, 358(6368):eaag2612. doi:10.1126/science.aag2612

\* 概率生成模型超越 DL，突破验证码测试

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\* 冷扑大师 Libratus，AI 在德州扑克战胜人类职业玩家

27. Capper D, Jones D, Sill M, et al. DNA methylation-based classification of central nervous system tumours[J]. Nature, 2018, 555(7697):469-474. <https://doi.org/10.1038/nature26000>

\* 超级 AI 精准诊断近 100 种脑癌

28. Banino A , Barry C , Uria B , et al. Vector-based navigation using grid-like representations in artificial agents[J]. Nature, 2018 , 557(7704): 429-433. <https://doi.org/10.1038/s41586-018-0102-6>

\* Agent 导航特征新发现，与人脑“网格细胞”高度一致的空间导航能力-【DeepMind】

29. Ambrogio S, Narayanan P, Tsai H, et al. Equivalent-accuracy accelerated neural-network training using analogue memory[J]. Nature, 2018, 558(7708): 60-67. <https://doi.org/10.1038/s41586-018-0180-5>

\* IBM 新型 AI 芯片

30. Eslami S M A, Rezende D J, Besse F, et al. Neural scene representation and rendering[J]. Science, 2018, 360(6394): 1204-1210. doi:10.1126/science.aar6170

\* 让 AI 具备空间推理能力，自动「脑补」3D 环境-【DeepMind】

31. Cherry K M, Qian L. Scaling up molecular pattern recognition with DNA-based winner-take-all neural networks[J]. Nature, 2018, 559(7714): 370-376. <https://doi.org/10.1038/s41586-018-0289-6>

\* 基于 DNA 的神经网络 Nature【Cover】 2018.07.04

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\* 白血病预测

33. DeVries P M R, Viégas F, Wattenberg M, et al. Deep learning of aftershock patterns following large earthquakes[J]. Nature, 2018, 560(7720): 632-634. <https://doi.org/10.1038/s41586-018-0438-y>

\* AI 余震预测。“目标泄露”曾遭质疑

34. Lin X, Rivenson Y, Yardimci N T, et al. All-optical machine learning using diffractive deep neural networks[J]. Science, 2018, 361(6406): 1004-1008. doi:10.1126/science.aat8084

\* 全光学人工神经网络

35. Karásek M, Muijres F T, De Wagter C, et al. A tailless aerial robotic flapper reveals that flies use torque coupling in rapid banked turns[J]. Science, 2018, 361(6407): 1089-1094. doi:10.1126/science.aat0350

\* “果蝇”机器人 Science【Cover】 2018.09.14

36. Awad E , Dsouza S , Kim R , et al. The Moral Machine Experiment[J]. Nature, 2018, 563(7729). <https://doi.org/10.1038/s41586-018-0637-6>

\* 机器道德研究，不同国家的道德偏好存在显著差异

37. Silver D, Hubert T, Schrittwieser J, et al. A general reinforcement learning algorithm that masters chess, shogi, and Go through self-play[J]. Science, 2018, 362(6419): 1140-1144. doi:10.1126/science.aar6404

AlphaZero Science【Cover】 2018.12.07

\* 最强棋类 AI 通杀三大棋-【DeepMind】

38. Gao R , Asano S M , Upadhyayula S , et al. Cortical column and whole-brain imaging with molecular contrast and nanoscale resolution[J]. Science, 2019, 363(6424):eaau8302. doi:10.1126/science.aau8302

\* 果蝇大脑纳米级成像 Science【Cover】 2019.01.18

39. Havlíček V, Córcoles A D, Temme K, et al. Supervised learning with quantum-enhanced feature spaces[J]. Nature, 2019, 567(7747): 209-212. <https://doi.org/10.1038/s41586-019-0980-2>

\* 量子机器学习算法，量子态空间作为特征空间进行数据分类 Nature【Cover】 2019.03.13

40. Li S, Batra R, Brown D, et al. Particle robotics based on statistical mechanics of loosely coupled components[J]. Nature, 2019, 567(7748): 361-365. <https://doi.org/10.1038/s41586-019-1022-9>

\* 仿生群体机器人 Nature【Cover】 2019.03.20

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\* 机器行为学【综述】 Nature 2019.04.24

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\* 语音合成，脑机接口

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\* 动物神经元控制，用 AI 控制动物大脑活动

44. Feldmann J , Youngblood N , Wright C D , et al. All-optical spiking neurosynaptic networks with self-learning capabilities[J]. Nature, 2019, 569(7755):208-214. <https://doi.org/10.1038/s41586-019-1157-8>

\* 全光脉冲神经突触网络

45. Fuller E J, Keene S T, Melianas A, et al. Parallel programming of an ionic floating-gate memory array for scalable neuromorphic computing[J]. Science, 2019, 364(6440): 570-574. doi:10.1126/science.aaw5581

\* 类脑“人造突触”实现运算存储同步

46. Jaderberg M , Czarnecki W M , Dunning I , et al. Human-level performance in 3D multiplayer games with population-based reinforcement learning[J]. Science, 2019, 364 (6443): 859-865. doi:10.1126/science.aau6249

\* AI 拿下 3D 多人游戏，AI 在雷神之锤 III 超越人类玩家-【DeepMind】

47. Jafferis N T, Helbling E F, Karpelson M, et al. Untethered flight of an insect-sized flapping-wing

microscale aerial vehicle[J]. Nature, 2019, 570(7762): 491-495. <https://doi.org/10.1038/s41586-019-1322-0>

\* “蜜蜂”机器人，自重仅 259 毫克 Nature 【Cover】 2019.06.26

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\* AI 学会「搞」科研？无监督词嵌入捕获材料科学潜在知识

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\* 三条腿的“蚂蚁”机器人

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\* AI 预测急性肾损伤，可提前 48 小时向医生发出警告- 【DeepMind】

52. Brown N, Sandholm T. Superhuman AI for multiplayer poker[J]. Science, 2019, 365(6456): 885-890. doi:10.1126/science.aay2400

\* 多人德州扑克 Pluribus 成功战胜五名专家级人类玩家 Science 【Cover】 2019.08.30

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\* 星际争霸 AI AlphaStar- 【DeepMind】

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\* 高分辨率重建 89 个神经元 Science 【Cover】 2019.11.29

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\* 乳腺癌诊断 AI 超越人类专家 Google Health+ 【DeepMind】

58. Dabney W , Kurth-Nelson Z , N Uchida, et al. A distributional code for value in dopamine-based reinforcement learning[J]. Nature, 2020, 577(7792):671-675. <https://doi.org/10.1038/s41586-019-1924-6>

\* 大脑也在用分布式强化学习？新发现验证了分布式强化学习的潜力- 【DeepMind】

59. Senior A W, Evans R, Jumper J, et al. Improved protein structure prediction using potentials from deep learning[J]. Nature, 2020, 577(7792): 706-710. <https://doi.org/10.1038/s41586-019-1923-7>

\* AlphaFold 蛋白质结构预测- 【DeepMind】

60. Mennel L , Symonowicz J , Wachter S , et al. Ultrafast machine vision with 2D material neural network image sensors[J]. Nature, 2020, 579(7797):62-66. <https://doi.org/10.1038/s41586-020-2038-x>

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61. Miskin M Z , Cortese A J , Dorsey K , et al. Electronically integrated, mass-manufactured, microscopic robots[J]. Nature, 2020, 584(7822): 557-561. <https://doi.org/10.1038/s41586-020-2626-9>

\* “微生物”机器人

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\* 用「环境智能」来改善医疗环境

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\* 清华大学首次提出“类脑计算完备性”

64. Bellemare M G, Candido S, Castro P S, et al. Autonomous navigation of stratospheric balloons using reinforcement learning[J]. Nature, 2020, 588(7836): 77-82. <https://doi.org/10.1038/s41586-020-2939-8>

\* AI 助力全自动环境监测

65. Deringer V L, Bernstein N, Csányi G, et al. Origins of structural and electronic transitions in disordered silicon[J]. Nature, 2021, 589(7840): 59-64. <https://doi.org/10.1038/s41586-020-03072-z>

\* AI 助力非晶结构材料研究 Nature 【Cover】 2021.01.06

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\* 光张量核

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\* AI 预测病毒变异规则，可助力疫苗研发

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\* 浙大软体机器人成功挑战马里亚纳海沟 Nature 【Cover】 2021.03.03

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\* 脑机接口「意念手写」 Nature 【Cover】 2021.05.12

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73. Warnat-Herresthal S, Schultze H, Shastry K L, et al. Swarm Learning for decentralized and confidential clinical machine learning[J]. Nature, 2021, 594(7862): 265-270. <https://doi.org/10.1038/s41586-021-03583-3>

\* 新算法 Swarm Learning，利于保护数据隐私 Nature 【Cover】 2021.05.26

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\* 揭秘动物超大环境的多尺度表示，揭示了一种新的感知空间的神经编码

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\* 深度强化学习设计芯片布局

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\* AlphaFold2 蛋白质结构预测-【DeepMind】

77. Baek M, DiMaio F, Anishchenko I, et al. Accurate prediction of protein structures and interactions using a three-track neural network[J]. Science, 2021, 373(6557): 871-876. doi:10.1126/science.abj8754

\* RoseTTAFold 蛋白质结构预测- Science【Cover】

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\* 重燃反向传播算法。1974 年，哈佛大学的 Paul Werbos 发明了反向传播算法（ Back Propagation, BP），但当时未受到应有的重视。Werbos P. Beyond regression: New tools for prediction and analysis in the behavioral sciences[D]. Harvard University, 1974.

1. Hinton G E, Dayan P, Frey B J, et al. The "wake-sleep" algorithm for unsupervised neural networks[J]. Science, 1995, 268(5214): 1158-1161. doi:10.1126/science.7761831

\* “wake-sleep”算法

2. Machine Intelligence 【Special Issue】

<https://www.nature.com/nature/volumes/521/issues/7553>

\* Nature “专栏”连载多篇 AI 综述 2015.05.28

3. AI 【Special Issue】 <https://science.sciencemag.org/content/349/6245>

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\* Science【Cover】 2017.02.03

5. AI 【Special Issue】 <https://science.sciencemag.org/content/357/6346>

\* Science【Cover】 2017.07.07

6. Facing facts（NEWS | FEATURE） <https://www.nature.com/nature/volumes/587/issues/7834>

\* 人脸识别偏见问题 Nature【Cover】 2020.11.18

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\* AI 画作登上 Science 武大 125 周年庆 Custom Publishing 【Cover】 2018.12.28