

СПИСОК ЛІТЕРАТУРИ

- 1) “AI Platforms”, [Електронний ресурс]. – 2021. – Режим доступу: <https://www.predictiveanalyticstoday.com/category/reviews/ai-platforms>
- 2) “Awash in “AI Platforms”, [Електронний ресурс]. – 2021. – Режим доступу: <https://c3.ai/what-is-enterprise-ai/awash-in-ai-platforms>
- 3) “Microsoft Azure AI Platform”, [Електронний ресурс]. – 2021. – Режим доступу: <https://azure.microsoft.com/en-us/overview/ai-platform>
- 4) “AI Platform”, [Електронний ресурс]. – 2021. – Режим доступу: <https://cloud.google.com/ai-platform>
- 5) “Amazon SageMaker”, [Електронний ресурс]. – 2021. – Режим доступу: <https://aws.amazon.com/sagemaker>
- 6) “IBM Watson”, [Електронний ресурс]. – 2021. – Режим доступу: <https://www.ibm.com/watson>
- 7) “Lionbridge AI”, [Електронний ресурс]. – 2020. – Режим доступу: <https://lionbridge.ai/>
- 8) “TensorFlow”, [Електронний ресурс]. – 2021. – Режим доступу: <https://www.tensorflow.org>
- 9) “PyTorch”, [Електронний ресурс]. – 2021. – Режим доступу: <https://pytorch.org>
- 10) “Scikit-learn”, [Електронний ресурс]. – 2021. – Режим доступу: <https://scikit-learn.org/stable>
- 11) “Machine learning attacks against Asirra Captcha”, [Електронний ресурс]. – 2008. – Режим доступу: <https://crypto.stanford.edu/~pgolle/papers/dogcat.pdf>
- 12) Dogs versus cats Kaggle competition on Asirra dataset [Електронний ресурс]. – 2019. – Режим доступу: <https://www.kaggle.com/c/dogs-vs-cats>

- 13) P. F. Felzenszwalb, R. B. Girshick, D. Mcallester, and D. Ramanan, “Object detection with discriminatively trained part-based models,” *IEEE Trans. Pattern Anal. Mach. Intell.*, vol. 32, no. 9, p. 1627, 2010
- 14) K. K. Sung and T. Poggio, “Example-based learning for view-based human face detection,” *IEEE Trans. Pattern Anal. Mach. Intell.*, vol. 20, no. 1, pp. 39–51, 2002
- 15) C. Wojek, P. Dollar, B. Schiele, and P. Perona, “Pedestrian detection: An evaluation of the state of the art,” *IEEE Trans. Pattern Anal. Mach. Intell.*, vol. 34, no. 4, p. 743, 2012
- 16) H. Kobatake and Y. Yoshinaga, “Detection of spicules on mammogram based on skeleton analysis.” *IEEE Trans. Med. Imag.*, vol. 15, no. 3, pp. 235–245, 1996
- 17) Y. Jia, E. Shelhamer, J. Donahue, S. Karayev, J. Long, R. Girshick, S. Guadarrama, and T. Darrell, “Caffe: Convolutional architecture for fast feature embedding,” in *ACM MM*, 2014
- 18) Krizhevsky, I. Sutskever, and G. E. Hinton, “Imagenet classification with deep convolutional neural networks,” in *NIPS*, 2012
- 19) Z. Cao, T. Simon, S.-E. Wei, and Y. Sheikh, “Realtime multi-person 2d pose estimation using part affinity fields,” in *CVPR*, 2017
- 20) Z. Yang and R. Nevatia, “A multi-scale cascade fully convolutional network face detector,” in *ICPR*, 2016
- 21) C. Chen, A. Seff, A. L. Kornhauser, and J. Xiao, “Deepdriving: Learning affordance for direct perception in autonomous driving,” in *ICCV*, 2015
- 22) X. Chen, H. Ma, J. Wan, B. Li, and T. Xia, “Multi-view 3d object detection network for autonomous driving,” in *CVPR*, 2017
- 23) Dundar, J. Jin, B. Martini, and E. Culurciello, “Embedded streaming deep neural networks accelerator with applications,” *IEEE Trans. Neural Netw. & Learning Syst.*, vol. 28, no. 7, pp. 1572–1583, 2017

- 24) R. J. Cintra, S. Duffner, C. Garcia, and A. Leite, “Low-complexity approximate convolutional neural networks,” *IEEE Trans. Neural Netw. & Learning Syst.*, vol. PP, no. 99, pp. 1–12, 2018
- 25) Ziniu Wu, Rong Zhu, Andreas Pfadler, Yuxing Han, Jiangneng Li, Zhengping Qian, Kai Zeng, Jingren Zhou. “FSPN: A New Class of Probabilistic Graphical Model”. [Электронный ресурс]. – 2020. – <https://arxiv.org/abs/2011.09020>
- 26) S. H. Khan, M. Hayat, M. Bennamoun, F. A. Sohel, and R. Togneri, “Cost-sensitive learning of deep feature representations from imbalanced data. *IEEE Trans. Neural Netw. & Learning Syst.*, vol. PP, no. 99, pp. 1–15, 2017
- 27) Jifeng Dai, Yi Li, Kaiming He, and Jian Sun. R-FCN: object detection via region-based fully convolutional networks. In *NIPS*, pages 379–387, 2016
- 28) Tsung-Yi Lin, Piotr Dollar, Ross B. Girshick, Kaiming He, Bharath Hariharan, and Serge J. Belongie. Feature pyramid networks for object detection. In *CVPR*, pages 936–944, 2017
- 29) Zhaowei Cai and Nuno Vasconcelos. Cascade r-cnn: Delving into high quality object detection. In *IEEE Conference on Computer Vision and Pattern Recognition*, 2018
- 30) Kaiming He, Georgia Gkioxari, Piotr Dollar, and Ross B. Girshick. ‘Mask R-CNN. In *ICCV*, pages 2980–2988, 2017
- 31) Mark Everingham, Luc J. Van Gool, Christopher K. I. Williams, John M. Winn, and Andrew Zisserman. The pascal visual object classes (VOC) challenge. *International Journal of Computer Vision*, 88(2):303–338, 2010
- 32) Tsung-Yi Lin, Michael Maire, Serge J. Belongie, James Hays, Pietro Perona, Deva Ramanan, Piotr Dollar, and C. Lawrence Zitnick. Microsoft COCO: common objects in context. In *ECCV*, pages 740–755, 2014
- 33) R. Girshick, J. Donahue, T. Darrell, and J. Malik, “Rich feature hierarchies for accurate object detection and semantic segmentation,” in *CVPR*, 2014
- 34) R. Girshick, “Fast r-cnn,” in *ICCV*, 2015

- 35) J. Redmon, S. Divvala, R. Girshick, and A. Farhadi, “You only look once: Unified, real-time object detection,” in CVPR, 2016
- 36) S. Ren, K. He, R. Girshick, and J. Sun, “Faster r-cnn: Towards realtime object detection with region proposal networks,” in NIPS, 2015, pp. 91–99
- 37) Dim P. Papadopoulos, Jasper R. R. Uijlings, Frank Keller, and Vittorio Ferrari. We don’t need no bounding-boxes: Training object class detectors using only human verification. In CVPR, pages 854–863, 2016
- 38) Dim P. Papadopoulos, Jasper R. R. Uijlings, Frank Keller, and Vittorio Ferrari. Extreme clicking for efficient object annotation. In ICCV, pages 4940–4949, 2017
- 39) “How Much Do Image Annotation Services Cost?”, [Электронный ресурс]. – 2019. – Режим доступа: <https://lionbridge.ai/articles/how-much-do-image-annotation-services-cost/>
- 40) “Что такое аннотация изображений: 5 основных видов”, [Электронный ресурс]. – 2020. – Режим доступа: <https://senior.ua/articles/chto-takoe-annotaciya-izobrazheniy-5-osnovnyh-vidov>
- 41) “Lionbridge AI”, [Электронный ресурс]. – 2020. – Режим доступа: <https://lionbridge.ai/>
- 42) “Pricing | Data Labelling Service”, [Электронный ресурс]. – 2020. – Режим доступа: <https://cloud.google.com/ai-platform/data-labeling/pricing>
- 43) “Как работает разметка данных”, [Электронный ресурс]. – 2020. – Режим доступа: <https://data.korusconsulting.ru/press-center/blog/kak-rabotaet-razmetka-dannykh/>
- 44) “Data Engineering, Preparation, and Labeling for AI 2019”, [Электронный ресурс]. – 2019. – Режим доступа: <https://www.cognilytica.com/2019/03/06/report-data-engineering-preparation-and-labeling-for-ai-2019/>
- 45) “Разметка данных”, [Электронный ресурс]. – 2019. – Режим доступа: <https://www.tadviser.ru/index.php/%D0%A1%D1%82%D0%B0%D1%82%D1%8C%D1%8>

F:%D0%A0%D0%B0%D0%B7%D0%BC%D0%B5%D1%82%D0%BA%D0%B0_%D0%B4%D0%B0%D0%BD%D0%BD%D1%8B%D1%85_(data_labeling)

46) “Best Practices for Managing Data Annotation Projects”, [Электронный ресурс]. – 2020. – Режим доступа: <https://arxiv.org/pdf/2009.11654.pdf>

47) “5 Approaches to Data Labeling for Machine Learning Projects”, [Электронный ресурс]. – 2020. – Режим доступа: <https://lionbridge.ai/articles/5-approaches-to-data-labeling-for-machine-learning-projects/>

48) “Як навчити машину бачити: розмітка зображень для штучного інтелекту (AI)”, [Электронный ресурс]. – 2020. – Режим доступа: <https://evergreens.com.ua/ua/articles/image-annotation.html>

49) “Computer Vision Annotation Tool: универсальный подход к разметке данных”, [Электронный ресурс]. – 2020. – Режим доступа: <https://habr.com/ru/company/intel/blog/433772/>

50) “Darwin”, [Электронный ресурс]. – 2021. – Режим доступа: <https://www.v7labs.com/darwin>

51) “Штучний інтелект, машинне навчання та нейронні мережі: в чому різниця і для чого їх використовують”, [Электронный ресурс]. – 2019. – Режим доступа: <https://evergreens.com.ua/ua/articles/machine-learning-overview.html>

52) “Wine Quality Data Set” [Электронный ресурс]. – 2009. – Режим доступа: <https://archive.ics.uci.edu/ml/datasets/Wine+Quality>

53) “Вступ до машинного навчання” [Электронный ресурс]. – 2009. – Режим доступа: <http://specials.kunsht.com.ua/machinelearning2>

54) McCloskey, M. & Cohen, N. (1989) Catastrophic interference in connectionist networks: The sequential learning problem. In G. H. Bower (ed.) *The Psychology of Learning and Motivation*, 24, 109-164

55) Ratcliff, R. (1990) Connectionist models of recognition memory: Constraints imposed by learning and forgetting functions. *Psychological Review*, 97, 285-308

- 56) Hebb, D.O. (1949). "Organization of Behaviour". New York: Wiley
- 57) Caroebterm G., & Grossberg, S. (1987) ART 2: Self-organization of stable category recognition codes for analog input patterns. "Applied Optics, 26", 4919-4930
- 58) French, R. M. (1997) Pseudo-recurrent connectionist networks: an approach to the 'sensitivity-stability' dilemma. *Connection Science*, 9(4), 353–379
- 59) I. J. Goodfellow, M. Mirza, D. Xiao, A. Courville, and Y. Bengio. An empirical investigation of catastrophic forgetting in gradient-based neural networks. In *International Conference on Learning Representations (ICLR)*, 2014
- 60) K. Shmelkov, C. Schmid, and K. Alahari. Incremental learning of object detectors without catastrophic forgetting. In *Computer Vision (ICCV), 2017 IEEE International Conference on*. IEEE, 2017
- 61) J. Kirkpatrick, R. Pascanu, N. Rabinowitz, J. Veness, G. Desjardins, A. A. Rusu, K. Milan, J. Quan, T. Ramalho, A. Grabska-Barwinska, et al. Overcoming catastrophic forgetting in neural networks. *Proceedings of the national academy of sciences*, page 201611835, 2017
- 62) A. Chaudhry, P. K. Dokania, T. Ajanthan, and P. H. S. Torr. Riemannian walk for incremental learning: Understanding forgetting and intransigence. In *The European Conference on Computer Vision (ECCV)*, September 2018
- 63) J. Schwarz, J. Luketina, W. M. Czarnecki, A. GrabskaBarwinska, Y. W. Teh, R. Pascanu, and R. Hadsell. Progress & compress: A scalable framework for continual learning. *Proceedings of the 35th International Conference on Machine Learning*, 2018
- 64) R. Aljundi, F. Babiloni, M. Elhoseiny, M. Rohrbach, and T. Tuytelaars. Memory aware synapses: Learning what (not) to forget. In *Proceedings of the European Conference on Computer Vision (ECCV)*, pages 139–154, 2018
- 65) F. Zenke, B. Poole, and S. Ganguli. Continual learning through synaptic intelligence. In *Proceedings of the 34th International Conference on Machine Learning-Volume 70*, pages 3987–3995. JMLR. org, 2017

- 66) Z. Li and D. Hoiem. Learning without forgetting. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2017
- 67) G. Hinton, O. Vinyals, and J. Dean. Distilling the knowledge in a neural network. In *NIPS Deep Learning and Representation Learning Workshop*, 2014
- 68) A. Mallya, D. Davis, and S. Lazebnik. Piggyback: Adapting a single network to multiple tasks by learning to mask weights. In *Proceedings of the European Conference on Computer Vision (ECCV)*, pages 67–82, 2018
- 69) A. Mallya and S. Lazebnik. Packnet: Adding multiple tasks to a single network by iterative pruning. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 7765–7773, 2018
- 70) J. Serra, D. Surís, M. Miron, and A. Karatzoglou. Overcoming catastrophic forgetting with hard attention to the task. In *Proceedings of the International Conference on Machine Learning (ICML)*, pages 4548–4557, 2018
- 71) J. Yoon, E. Yang, J. Lee, and S. J. Hwang. Lifelong learning with dynamically expandable networks. In *Proceedings of the International Conference on Learning Representations (ICLR)*, 2018
- 72) F. M. Castro, M. J. Marin-Jimenez, N. Guil, C. Schmid, and K. Alahari. End-to-end incremental learning. In *The European Conference on Computer Vision (ECCV)*, September 2018
- 73) A. Chaudhry, M. Ranzato, M. Rohrbach, and M. Elhoseiny. Efficient lifelong learning with a-gem. In *Proceedings of the International Conference on Learning Representations (ICLR)*, 2019
- 74) K. Javed and F. Shafait. Revisiting distillation and incremental classifier learning. *Asian Conference on Computer Vision (ACCV)*, 2018
- 75) D. Lopez-Paz et al. Gradient episodic memory for continual learning. In *Advances in Neural Information Processing Systems*, pages 6467–6476, 2017

- 76) C. V. Nguyen, Y. Li, T. D. Bui, and R. E. Turner. Variational continual learning. In Proceedings of the International Conference on Learning Representations (ICLR), 2018
- 77) S.-A. Rebuffi, A. Kolesnikov, G. Sperl, and C. H. Lampert. icarl: Incremental classifier and representation learning. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2017
- 78) A. Robins. Catastrophic forgetting, rehearsal and pseudorehearsal. Connection Science, 7(2):123–146, 1995
- 79) R. Kemker and C. Kanan. Fearnert: Brain-inspired model for incremental learning. In International Conference on Learning Representations, 2018
- 80) H. Shin, J. K. Lee, J. Kim, and J. Kim. Continual learning with deep generative replay. In Advances in Neural Information Processing Systems, pages 2990–2999, 2017
- 81) Eden Belouadah, Adrian Popescu, Umang Aggarwal, Léo Saci. Active Class Incremental Learning for Imbalanced Datasets. Arxiv preprint, 2020
- 82) Belouadah, E., Popescu, A.: Il2m: Class incremental learning with dual memory. In: Proceedings of the IEEE International Conference on Computer Vision. pp. 583–592 (2019)
- 83) Hou, S., Pan, X., Loy, C.C., Wang, Z., Lin, D.: Learning a unified classifier incrementally via rebalancing. In: IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2019, Long Beach, CA, USA, June 16-20, 2019. pp. 831–839 (2019)
- 84) Rebuffi, S., Kolesnikov, A., Sperl, G., Lampert, C.H.: icarl: Incremental classifier and representation learning. In: Conference on Computer Vision and Pattern Recognition. CVPR (2017)
- 85) Quazi Marufur Rahman, Niko Sünderhauf, Feras Dayoub. Performance Monitoring of Object Detection During Deployment. arXiv:2009.08650, 2020
- 86) Kai Chen, Jiaqi Wang, Jiangmiao Pang, Yuhang Cao, Yu Xiong, Xiaoxiao Li, Shuyang Sun, Wansen Feng, Ziwei Liu, Jiarui Xu, Zheng Zhang, Dazhi Cheng, Chenchen Zhu, Tianheng Cheng, Qijie Zhao, Buyu Li, Xin Lu, Rui Zhu, Yue Wu, Jifeng Dai, Jingdong Wang,

Jianping Shi, Wanli Ouyang, Chen Change Loy, Dahua Lin. “MMDetection: Open MMLab Detection Toolbox and Benchmark”, [Электронный ресурс]. – 2019. – Режим доступа: <https://arxiv.org/abs/1906.07155>

87) Shuai Shao, Zeming Li, Tianyuan Zhang, Chao Peng, Gang Yu, Jing Li, Xiangyu Zhang, Jian Sun. “Objects365: A Large-Scale, High-Quality Dataset for Object Detection”, [Электронный ресурс]. – 2019. – Режим доступа: <https://www.objects365.org/overview.html>

88) Saining Xie, Ross Girshick, Piotr Dollár, Zhuowen Tu, Kaiming He. “Aggregated Residual Transformations for Deep Neural Networks”, [Электронный ресурс]. – 2016. – Режим доступа: <https://arxiv.org/abs/1611.05431>

89) I. Zeki Yalniz, Hervé Jégou, Kan Chen, Manohar Paluri, Dhruv Mahajan. “Billion-scale semi-supervised learning for image classification”, [Электронный ресурс]. – 2019. – <https://arxiv.org/abs/1905.00546>

90) Jiaqi Wang, Kai Chen, Shuo Yang, Chen Change Loy, Dahua Lin. “Region Proposal by Guided Anchoring”, [Электронный ресурс]. – 2019. – <https://arxiv.org/abs/1901.03278>

91) Michael R. Zhang, James Lucas, Geoffrey Hinton, Jimmy Ba. “Lookahead Optimizer: k steps forward, 1 step back”, [Электронный ресурс]. – 2019. – <https://arxiv.org/abs/1907.08610>