

REFERENCES

- [1] D. Hanahan and R. Weinberg, "Hallmarks of cancer: The next generation," *Cell*, vol. 144, no. 5, pp. 646–674, 2011. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0092867411001279>
- [2] L. M DeAngelis, "Brain Tumors," *The New England Journal of Medicine*, pp. 344:114–23, 2001.
- [3] K. Abolanle Aa, S. Amina, A. Muhammad, A. Hina, K. Omowumi T, A. Omowumi O, and O. Sunday O, "Brain Tumor: An overview of the basic clinical manifestations and treatment," *Global Journal of Cancer Therapy*, pp. 038–041, Oct. 2020.
- [4] Globocan, "The global cancer observatory," pp. 1–2, 2020. [Online]. Available: <https://gco.iarc.fr/>
- [5] M. I. Razzak, M. Imran, and G. Xu, "Efficient brain tumor segmentation with multiscale two-pathway-group conventional neural networks," *IEEE Journal of Biomedical and Health Informatics*, vol. 23, no. 5, pp. 1911–1919, 2019.
- [6] M. Havaei, A. Davy, D. Warde-Farley, A. Biard, A. C. Courville, Y. Bengio, C. Pal, P. Jodoin, and H. Larochelle, "Brain tumor segmentation with deep neural networks," *CoRR*, vol. abs/1505.03540, 2015. [Online]. Available: <http://arxiv.org/abs/1505.03540>
- [7] H. Dong, G. Yang, F. Liu, Y. Mo, and Y. Guo, "Automatic brain tumor detection and segmentation using U-Net based fully convolutional networks," in *Medical Image Understanding and Analysis - 21st Annual Conference, MIUA 2017, Edinburgh, UK, July 11-13, 2017, Proceedings*, ser. Communications in Computer and Information Science, M. del C. Valdés Hernández and V. González-Castro, Eds., vol. 723. Springer, 2017, pp. 506–517. [Online]. Available: https://doi.org/10.1007/978-3-319-60964-5_44
- [8] G. P. Mazzara, R. P. Velthuizen, J. L. Pearlman, H. M. Greenberg, and H. Wagner, "Brain tumor target volume determination for radiation treatment planning through automated mri segmentation," *International Journal of Radiation Oncology*Biology*Physics*, vol. 59, no. 1, pp. 300–312, 2004. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0360301604001294>
- [9] P. Mlynarski, "Deep learning for segmentation of brain tumors and organs at risk in radiotherapy planning," Theses, COMUE Université Côte d'Azur (2015 - 2019), Nov. 2019. [Online]. Available: <https://inria.hal.science/tel-02358374>
- [10] U. Baid, S. Ghodasara, M. Bilello, S. Mohan, E. Calabrese, E. Colak, K. Farahani, J. Kalpathy-Cramer, F. C. Kitamura, S. Pati, L. M. Prevedello,

- J. D. Rudie, C. Sako, R. T. Shinohara, T. Bergquist, R. Chai, J. A. Eddy, J. Elliott, W. Reade, T. Schaffter, T. Yu, J. Zheng, B. Annotators, C. Davatzikos, J. Mongan, C. Hess, S. Cha, J. E. Villanueva-Meyer, J. B. Freymann, J. S. Kirby, B. Wiestler, P. Crivellaro, R. R. Colen, A. Kotrotsou, D. S. Marcus, M. Milchenko, A. Nazeri, H. M. Fathallah-Shaykh, R. Wiest, A. Jakab, M. Weber, A. Mahajan, B. H. Menze, A. E. Flanders, and S. Bakas, "The RSNA-ASNR-MICCAI BraTS 2021 benchmark on brain tumor segmentation and radiogenomic classification," *CoRR*, vol. abs/2107.02314, 2021. [Online]. Available: <https://arxiv.org/abs/2107.02314>
- [11] O. Ronneberger, P. Fischer, and T. Brox, "U-Net: Convolutional networks for biomedical image segmentation," in *Medical Image Computing and Computer-Assisted Intervention - MICCAI 2015 - 18th International Conference Munich, Germany, October 5 - 9, 2015, Proceedings, Part III*, ser. Lecture Notes in Computer Science, N. Navab, J. Hornegger, W. M. W. III, and A. F. Frangi, Eds., vol. 9351. Springer, 2015, pp. 234–241. [Online]. Available: https://doi.org/10.1007/978-3-319-24574-4_28
- [12] Ö. Çiçek, A. Abdulkadir, S. S. Lienkamp, T. Brox, and O. Ronneberger, "3D U-Net: Learning dense volumetric segmentation from sparse annotation," in *Medical Image Computing and Computer-Assisted Intervention - MICCAI 2016 - 19th International Conference, Athens, Greece, October 17-21, 2016, Proceedings, Part II*, ser. Lecture Notes in Computer Science, S. Ourselin, L. J. Joskowicz, M. R. Sabuncu, G. B. Ünal, and W. M. W. III, Eds., vol. 9901, 2016, pp. 424–432. [Online]. Available: https://doi.org/10.1007/978-3-319-46723-8_49
- [13] W. Wang, C. Chen, M. Ding, H. Yu, S. Zha, and J. Li, "TransBTS: Multimodal brain tumor segmentation using transformer," in *Medical Image Computing and Computer Assisted Intervention - MICCAI 2021 - 24th International Conference, Strasbourg, France, September 27 - October 1, 2021, Proceedings, Part I*, ser. Lecture Notes in Computer Science, M. de Bruijne, P. C. Cattin, S. Cotin, N. Padoy, S. Speidel, Y. Zheng, and C. Essert, Eds., vol. 12901. Springer, 2021, pp. 109–119. [Online]. Available: https://doi.org/10.1007/978-3-030-87193-2_11
- [14] A. Hatamizadeh, V. Nath, Y. Tang, D. Yang, H. R. Roth, and D. Xu, "Swin UNETR: swin transformers for semantic segmentation of brain tumors in MRI images," in *Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries - 7th International Workshop, BrainLes 2021, Held in Conjunction with MICCAI 2021, Virtual Event, September 27, 2021, Revised Selected Papers, Part I*, ser. Lecture Notes in Computer Science, A. Crimi and S. Bakas, Eds., vol. 12962. Springer, 2021, pp. 272–284. [Online]. Available: https://doi.org/10.1007/978-3-031-08999-2_22

- [15] Y. Jiang, Y. Zhang, X. Lin, J. Dong, T. Cheng, and J. Liang, “SwinBTS: A method for 3D multimodal brain tumor segmentation using swin transformer,” *Brain Sciences*, vol. 12, no. 6, 2022.
- [16] R. Mehta and T. Arbel, “3d u-net for brain tumour segmentation,” in *Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries - 4th International Workshop, BrainLes 2018, Held in Conjunction with MICCAI 2018, Granada, Spain, September 16, 2018, Revised Selected Papers, Part II*, ser. Lecture Notes in Computer Science, A. Crimi, S. Bakas, H. J. Kuijf, F. Keyvan, M. Reyes, and T. van Walsum, Eds., vol. 11384. Springer, 2018, pp. 254–266. [Online]. Available: https://doi.org/10.1007/978-3-030-11726-9_23
- [17] A. Dosovitskiy, L. Beyer, A. Kolesnikov, D. Weissenborn, X. Zhai, T. Unterthiner, M. Dehghani, M. Minderer, G. Heigold, S. Gelly, J. Uszkoreit, and N. Houlsby, “An image is worth 16x16 words: Transformers for image recognition at scale,” in *9th International Conference on Learning Representations, ICLR 2021, Virtual Event, Austria, May 3-7, 2021*. OpenReview.net, 2021. [Online]. Available: <https://openreview.net/forum?id=YicbFdNTTy>
- [18] Z. Liu, Y. Lin, Y. Cao, H. Hu, Y. Wei, Z. Zhang, S. Lin, and B. Guo, “Swin transformer: Hierarchical vision transformer using shifted windows,” in *2021 IEEE/CVF International Conference on Computer Vision, ICCV 2021, Montreal, QC, Canada, October 10-17, 2021*. IEEE, 2021, pp. 9992–10 002. [Online]. Available: <https://doi.org/10.1109/ICCV48922.2021.00986>
- [19] K. Han, Y. Wang, Q. Tian, J. Guo, C. Xu, and C. Xu, “Ghostnet: More features from cheap operations,” in *2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition, CVPR 2020, Seattle, WA, USA, June 13-19, 2020*. Computer Vision Foundation / IEEE, 2020, pp. 1577–1586. [Online]. Available: https://openaccess.thecvf.com/content_CVPR_2020/html/Han_GhostNet_More_Features_From_Cheap_Operations_CVPR_2020_paper.html
- [20] “Grades of brain tumours — cancerresearchuk.org,” <https://www.cancerresearchuk.org/about-cancer/brain-tumours/grades>, [Accessed 12-11-2023].
- [21] C. McKinnon, M. Nandhabalan, S. A. Murray, and P. Plaha, “Glioblastoma: clinical presentation, diagnosis, and management,” *BMJ*, vol. 374, p. n1560, Jul. 2021.
- [22] “Glioma - Symptoms and causes — mayoclinic.org,” <https://www.mayoclinic.org/diseases-conditions/glioma/symptoms-causes/syc-20350251>, [Accessed 12-11-2023].

- [23] A. Perkins and G. Liu, “Primary brain tumors in adults: Diagnosis and treatment,” *Amerian Family Physician*, vol. 93, no. 3, pp. 211–217, 2016.
- [24] A. Işın, C. Direkoğlu, and M. Şah, “Review of mri-based brain tumor image segmentation using deep learning methods,” *Procedia Computer Science*, vol. 102, pp. 317–324, 2016, 12th International Conference on Application of Fuzzy Systems and Soft Computing, ICAFS 2016, 29-30 August 2016, Vienna, Austria. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S187705091632587X>
- [25] I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. MIT Press, 2016, <http://www.deeplearningbook.org>.
- [26] “Google Image Result for rgb channels separation — images.app.goo.gl,” <https://images.app.goo.gl/acPkCd5RiQJYB57SA>, [Accessed 19-11-2023].
- [27] “Google Image Result for https://miro.medium.com/v2/resize:fit:1358/1*XbuW8WuRrAY5pC4t-9DZAQ.jpeg — images.app.goo.gl,” <https://images.app.goo.gl/MaFJPQkfnWAYuBt86>, [Accessed 19-11-2023].
- [28] Y. Lecun, L. Bottou, Y. Bengio, and P. Haffner, “Gradient-based learning applied to document recognition,” *Proceedings of the IEEE*, vol. 86, no. 11, pp. 2278–2324, 1998.
- [29] F. Chollet, “Xception: Deep learning with depthwise separable convolutions,” in *2017 IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2017, Honolulu, HI, USA, July 21-26, 2017*. IEEE Computer Society, 2017, pp. 1800–1807. [Online]. Available: <https://doi.org/10.1109/CVPR.2017.195>
- [30] S. Ioffe and C. Szegedy, “Batch normalization: Accelerating deep network training by reducing internal covariate shift,” *CoRR*, vol. abs/1502.03167, 2015. [Online]. Available: <http://arxiv.org/abs/1502.03167>
- [31] L. J. Ba, J. R. Kiros, and G. E. Hinton, “Layer normalization,” *CoRR*, vol. abs/1607.06450, 2016. [Online]. Available: <http://arxiv.org/abs/1607.06450>
- [32] Y. Wu and K. He, “Group normalization,” in *Computer Vision - ECCV 2018 - 15th European Conference, Munich, Germany, September 8-14, 2018, Proceedings, Part XIII*, ser. Lecture Notes in Computer Science, V. Ferrari, M. Hebert, C. Sminchisescu, and Y. Weiss, Eds., vol. 11217. Springer, 2018, pp. 3–19. [Online]. Available: https://doi.org/10.1007/978-3-030-01261-8_1
- [33] D. Ulyanov, A. Vedaldi, and V. S. Lempitsky, “Instance normalization: The missing ingredient for fast stylization,” *CoRR*, vol. abs/1607.08022, 2016. [Online]. Available: <http://arxiv.org/abs/1607.08022>
- [34] K. He, X. Zhang, S. Ren, and J. Sun, “Deep residual learning for image recognition,” in *2016 IEEE Conference on Computer Vision and*

- Pattern Recognition, CVPR 2016, Las Vegas, NV, USA, June 27-30, 2016.* IEEE Computer Society, 2016, pp. 770–778. [Online]. Available: <https://doi.org/10.1109/CVPR.2016.90>
- [35] L. R. Dice, “Measures of the amount of ecologic association between species,” *Ecology*, vol. 26, no. 3, pp. 297–302, 1945.
- [36] D. M. W. Powers, “Evaluation: from precision, recall and f-measure to roc, informedness, markedness and correlation,” *CoRR*, vol. abs/2010.16061, 2020. [Online]. Available: <https://arxiv.org/abs/2010.16061>
- [37] M. Tan and Q. V. Le, “Efficientnet: Rethinking model scaling for convolutional neural networks,” in *Proceedings of the 36th International Conference on Machine Learning, ICML 2019, 9-15 June 2019, Long Beach, California, USA*, ser. Proceedings of Machine Learning Research, K. Chaudhuri and R. Salakhutdinov, Eds., vol. 97. PMLR, 2019, pp. 6105–6114. [Online]. Available: <http://proceedings.mlr.press/v97/tan19a.html>
- [38] M. Sandler, A. G. Howard, M. Zhu, A. Zhmoginov, and L. Chen, “Mobilenetv2: Inverted residuals and linear bottlenecks,” in *2018 IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2018, Salt Lake City, UT, USA, June 18-22, 2018.* Computer Vision Foundation / IEEE Computer Society, 2018, pp. 4510–4520. [Online]. Available: http://openaccess.thecvf.com/content_cvpr_2018/html/Sandler_MobileNetV2_Inverted_Residuals_CVPR_2018_paper.html
- [39] F. Milletari, N. Navab, and S.-A. Ahmadi, “V-Net: Fully Convolutional Neural Networks for Volumetric Medical Image Segmentation,” *arXiv:1606.04797 [cs]*, Jun. 2016, arXiv: 1606.04797. [Online]. Available: <http://arxiv.org/abs/1606.04797>
- [40] C. Szegedy, V. Vanhoucke, S. Ioffe, J. Shlens, and Z. Wojna, “Rethinking the inception architecture for computer vision,” in *2016 IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2016, Las Vegas, NV, USA, June 27-30, 2016.* IEEE Computer Society, 2016, pp. 2818–2826. [Online]. Available: <https://doi.org/10.1109/CVPR.2016.308>
- [41] D. P. Kingma and J. Ba, “Adam: A method for stochastic optimization,” in *3rd International Conference on Learning Representations, ICLR 2015, San Diego, CA, USA, May 7-9, 2015, Conference Track Proceedings*, Y. Bengio and Y. LeCun, Eds., 2015. [Online]. Available: <http://arxiv.org/abs/1412.6980>
- [42] P. Goyal, P. Dollár, R. B. Girshick, P. Noordhuis, L. Wesolowski, A. Kyrola, A. Tulloch, Y. Jia, and K. He, “Accurate, large minibatch SGD: training imagenet in 1 hour,” *CoRR*, vol. abs/1706.02677, 2017. [Online]. Available: <http://arxiv.org/abs/1706.02677>

- [43] “Google Image Result for <https://static.javatpoint.com/tutorial/machine-learning/images/gradient-descent-in-machine-learning2.png> — images.app.goo.gl,” <https://images.app.goo.gl/peZH1QUiQ7BLpbHM6>, [Accessed 19-11-2023].
- [44] O. Oktay, J. Schlemper, L. L. Folgoc, M. C. H. Lee, M. P. Heinrich, K. Misawa, K. Mori, S. G. McDonagh, N. Y. Hammerla, B. Kainz, B. Glocker, and D. Rueckert, “Attention u-net: Learning where to look for the pancreas,” *CoRR*, vol. abs/1804.03999, 2018. [Online]. Available: <http://arxiv.org/abs/1804.03999>
- [45] A. S. Akbar, C. Fatichah, and N. Suciati, “Single level unet3d with multipath residual attention block for brain tumor segmentation,” *J. King Saud Univ. Comput. Inf. Sci.*, vol. 34, no. 6 Part B, pp. 3247–3258, 2022. [Online]. Available: <https://doi.org/10.1016/j.jksuci.2022.03.022>
- [46] Y. Chang, Z. Zheng, Y. Sun, M. Zhao, Y. Lu, and Y. Zhang, “Dpafnet: A residual dual-path attention-fusion convolutional neural network for multimodal brain tumor segmentation,” *Biomed. Signal Process. Control.*, vol. 79, no. Part, p. 104037, 2023. [Online]. Available: <https://doi.org/10.1016/j.bspc.2022.104037>
- [47] K. Kamnitsas, W. Bai, E. Ferrante, S. G. McDonagh, M. Sinclair, N. Pawlowski, M. Rajchl, M. C. H. Lee, B. Kainz, D. Rueckert, and B. Glocker, “Ensembles of multiple models and architectures for robust brain tumour segmentation,” in *Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries - Third International Workshop, BrainLes 2017, Held in Conjunction with MICCAI 2017, Quebec City, QC, Canada, September 14, 2017, Revised Selected Papers*, ser. Lecture Notes in Computer Science, A. Crimi, S. Bakas, H. J. Kuijf, B. H. Menze, and M. Reyes, Eds., vol. 10670. Springer, 2017, pp. 450–462. [Online]. Available: https://doi.org/10.1007/978-3-319-75238-9_38
- [48] J. Long, E. Shelhamer, and T. Darrell, “Fully convolutional networks for semantic segmentation,” in *IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2015, Boston, MA, USA, June 7-12, 2015*. IEEE Computer Society, 2015, pp. 3431–3440. [Online]. Available: <https://doi.org/10.1109/CVPR.2015.7298965>
- [49] K. Kamnitsas, C. Ledig, V. F. J. Newcombe, J. P. Simpson, A. D. Kane, D. K. Menon, D. Rueckert, and B. Glocker, “Efficient multi-scale 3d CNN with fully connected CRF for accurate brain lesion segmentation,” *Medical Image Analysis*, vol. 36, pp. 61–78, 2017. [Online]. Available: <https://doi.org/10.1016/j.media.2016.10.004>
- [50] F. Isensee, P. F. Jäger, P. M. Full, P. Vollmuth, and K. H. Maier-Hein, “nnU-Net for brain tumor segmentation,” in *Brainlesion: Glioma, Multiple*

- Sclerosis, Stroke and Traumatic Brain Injuries - 6th International Workshop, BrainLes 2020, Held in Conjunction with MICCAI 2020, Lima, Peru, October 4, 2020, Revised Selected Papers, Part II*, ser. Lecture Notes in Computer Science, A. Crimi and S. Bakas, Eds., vol. 12659. Springer, 2020, pp. 118–132. [Online]. Available: https://doi.org/10.1007/978-3-030-72087-2_11
- [51] W. Wang, E. Xie, X. Li, D. Fan, K. Song, D. Liang, T. Lu, P. Luo, and L. Shao, “Pyramid vision transformer: A versatile backbone for dense prediction without convolutions,” in *2021 IEEE/CVF International Conference on Computer Vision, ICCV 2021, Montreal, QC, Canada, October 10-17, 2021*. IEEE, 2021, pp. 548–558. [Online]. Available: <https://doi.org/10.1109/ICCV48922.2021.00061>
- [52] J. Chen, Y. Lu, Q. Yu, X. Luo, E. Adeli, Y. Wang, L. Lu, A. L. Yuille, and Y. Zhou, “Transunet: Transformers make strong encoders for medical image segmentation,” *CoRR*, vol. abs/2102.04306, 2021. [Online]. Available: <https://arxiv.org/abs/2102.04306>
- [53] A. Hatamizadeh, Y. Tang, V. Nath, D. Yang, A. Myronenko, B. A. Landman, H. R. Roth, and D. Xu, “UNETR: transformers for 3D medical image segmentation,” in *IEEE/CVF Winter Conference on Applications of Computer Vision, WACV 2022, Waikoloa, HI, USA, January 3-8, 2022*. IEEE, 2022, pp. 1748–1758. [Online]. Available: <https://doi.org/10.1109/WACV51458.2022.00181>
- [54] J. Li, W. Wang, C. Chen, T. Zhang, S. Zha, H. Yu, and J. Wang, “Transbtsv2: Wider instead of deeper transformer for medical image segmentation,” *CoRR*, vol. abs/2201.12785, 2022. [Online]. Available: <https://arxiv.org/abs/2201.12785>
- [55] Q. Jia and H. Shu, “Bitr-unet: A cnn-transformer combined network for MRI brain tumor segmentation,” in *Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries - 7th International Workshop, BrainLes 2021, Held in Conjunction with MICCAI 2021, Virtual Event, September 27, 2021, Revised Selected Papers, Part II*, ser. Lecture Notes in Computer Science, A. Crimi and S. Bakas, Eds., vol. 12963. Springer, 2021, pp. 3–14. [Online]. Available: https://doi.org/10.1007/978-3-031-09002-8_1
- [56] I. Loshchilov and F. Hutter, “Decoupled weight decay regularization,” in *7th International Conference on Learning Representations, ICLR 2019, New Orleans, LA, USA, May 6-9, 2019*. OpenReview.net, 2019. [Online]. Available: <https://openreview.net/forum?id=Bkg6RiCqY7>
- [57] M. Futrega, A. Milesi, M. Marcinkiewicz, and P. Ribalta, “Optimized u-net for brain tumor segmentation,” pp. 15–29, 2021. [Online]. Available: https://doi.org/10.1007/978-3-031-09002-8_2

- [58] A. Mao, M. Mohri, and Y. Zhong, “Cross-entropy loss functions: Theoretical analysis and applications,” in *International Conference on Machine Learning, ICML 2023, 23-29 July 2023, Honolulu, Hawaii, USA*, ser. Proceedings of Machine Learning Research, A. Krause, E. Brunskill, K. Cho, B. Engelhardt, S. Sabato, and J. Scarlett, Eds., vol. 202. PMLR, 2023, pp. 23 803–23 828. [Online]. Available: <https://proceedings.mlr.press/v202/mao23b.html>
- [59] R. R. Shamir, Y. Duchin, J. Kim, G. Sapiro, and N. Harel, “Continuous dice coefficient: a method for evaluating probabilistic segmentations,” *CoRR*, vol. abs/1906.11031, 2019. [Online]. Available: <http://arxiv.org/abs/1906.11031>
- [60] R. W. Cox, J. Ashburner, H. Breman, K. Fissell, C. Haselgrove, C. J. Holmes, J. L. Lancaster, D. E. Rex, S. M. Smith, J. B. Woodward, and S. C. Strother, “A (sort of) new image data format standard: NiFTI-1,” in *Proceedings of the 10th Annual Meeting of the Organization for Human Brain Mapping*, vol. 22, 2004.
- [61] F. Isensee, P. F. Jaeger, S. A. A. Kohl, J. Petersen, and K. H. Maier-Hein, “nnu-net: a self-configuring method for deep learning-based biomedical image segmentation,” *Nature Methods*, vol. 18, no. 2, p. 203–211, Dec. 2020. [Online]. Available: <http://dx.doi.org/10.1038/s41592-020-01008-z>
- [62] Q. Wang, B. Wu, P. Zhu, P. Li, W. Zuo, and Q. Hu, “Eca-net: Efficient channel attention for deep convolutional neural networks,” in *2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition, CVPR 2020, Seattle, WA, USA, June 13-19, 2020*. Computer Vision Foundation / IEEE, 2020, pp. 11 531–11 539. [Online]. Available: https://openaccess.thecvf.com/content_CVPR_2020/html/Wang_ECA-Net_Efficient_Channel_Attention_for_Deep_Convolutional_Neural_Networks_CVPR_2020_paper.html
- [63] J. Hu, L. Shen, S. Albanie, G. Sun, and E. Wu, “Squeeze-and-excitation networks,” *IEEE Trans. Pattern Anal. Mach. Intell.*, vol. 42, no. 8, pp. 2011–2023, 2020. [Online]. Available: <https://doi.org/10.1109/TPAMI.2019.2913372>