

## References

- [1] 99 HEALTH IDEAS, *Tooth discoloration*. <https://www.99healthideas.com/9-harmful-side-effects-of-antibiotics-and-ways-to-minimize-them/>.
- [2] M. S. M. ABDLHMED, *Developmental disturbance of teeth*, in Faculty of Basic Medical Science-Libyan International Medical University, 2018.
- [3] BIO MIN, *What are white spots on teeth? / what are white marks on teeth?* <https://www.biomintoothpaste.com.au/biomin-learning-articles-centre/white-spot-repair/>.
- [4] H. BLUM, *A transformation for extracting new descriptors of shape*, vol. 43, MIT press, Cambridge, MA, 1967.
- [5] T. BROX, J. WEICKERT, B. BURGETH, AND P. MRÁZEK, *Nonlinear structure tensors*, Image and Vision Computing, 24 (2006), pp. 41–55.
- [6] V. CASELLES, R. KIMMEL, AND G. SAPIRO, *Geodesic active contours*, International Journal of Computer Vision, 22 (1997), pp. 61–79.
- [7] T. F. CHAN AND L. A. VESE, *Active contours without edges*, IEEE Transactions on Image Processing, 10 (2001), pp. 266–277.
- [8] CHARLES PATRICK DAVIS, *Mouth problems: TMJ, canker sores, painful gums and more*. [https://www.medicinenet.com/top\\_problems\\_in\\_your\\_mouth\\_pictures\\_slideshow/article.htm](https://www.medicinenet.com/top_problems_in_your_mouth_pictures_slideshow/article.htm).
- [9] L. D. COHEN, *On active contour models and balloons*, CVGIP: Image Understanding, 53 (1991), pp. 211–218.
- [10] CROSS-POLAR, *The polarizing effect*. <https://cross-polar.com/about/>.
- [11] DENTISTRY FOR MADISON, *8 health problems caused by crooked teeth*. <https://www.dentistryformadison.com/8-health-problems-caused-by-crooked-teeth/>.
- [12] P. DOLLAR, Z. TU, AND S. BELONGIE, *Supervised learning of edges and object boundaries*, in 2006 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR’06), 2006, pp. 1964–1971.
- [13] DOZENIST, *Photo of teeth, 2006*. [https://en.wikipedia.org/wiki/Human\\_tooth#/media/File:06-10-06smile.jpg](https://en.wikipedia.org/wiki/Human_tooth#/media/File:06-10-06smile.jpg).
- [14] H. FREEMAN, *On the encoding of arbitrary geometric configurations*, IRE Transactions on Electronic Computers, EC-10 (1961), pp. 260–268.
- [15] R. GIRSHICK, I. RADOSAVOVIC, G. GKIOXARI, P. DOLLÁR, AND K. HE, *Detectron*. <https://github.com/facebookresearch/detectron>, 2018.
- [16] J. GUO, Z. ZHOU, AND L. WANG, *Single image highlight removal with a sparse and low-rank reflection model*, in Proceedings of the European Conference on Computer Vision (ECCV), 2018, pp. 268–283.
- [17] J. HAHN AND C.-O. LEE, *Highly accurate segmentation using geometric attraction-driven flow in edge-regions*, in IMA Preprints Series # 2125, 2006.

- [18] ———, *A nonlinear structure tensor with the diffusivity matrix composed of the image gradient*, Journal of Mathematical Imaging and Vision, 34 (2009), pp. 137–151.
- [19] ———, *Geometric attraction-driven flow for image segmentation and boundary detection*, Journal of Visual Communication and Image Representation, 21 (2010), pp. 56–66.
- [20] K. HE, G. GKIOXARI, P. DOLLAR, AND R. GIRSHICK, *Mask R-CNN*, in Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2017, pp. 2961–2969.
- [21] K. HE, X. ZHANG, S. REN, AND J. SUN, *Deep residual learning for image recognition*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016, pp. 770–778.
- [22] T. HE, Z. ZHANG, H. ZHANG, Z. ZHANG, J. XIE, AND M. LI, *Bag of tricks for image classification with convolutional neural networks*, in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2019, pp. 558–567.
- [23] HEALTH JADE, *Fluorosis*. <https://healthjade.net/fluorosis/>.
- [24] J. HU, L. SHEN, AND G. SUN, *Squeeze-and-excitation networks*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018, pp. 7132–7141.
- [25] P. P. JONKER, *Morphological image processing: Architecture and VLSI design*, Springer, Boston, MA, 1992.
- [26] M. KASS, A. WITKIN, AND D. TERZOPOULOS, *Snakes: Active contour models*, International Journal of Computer Vision, 1 (1988), pp. 321–331.
- [27] S. KIM, S.-M. HEO, S. YANG, Y. KIM, J. HAN, AND S. JUNG, *Instance segmentation guided by weight map with application to tooth boundary detection*, Quantitative Bio-Science, 39 (2020), pp. 159–167.
- [28] D. P. KINGMA AND J. BA, *Adam: A method for stochastic optimization*, in arXiv preprint, arXiv: 1412.6980, 2014.
- [29] KRAUSE, *Smile makeovers*. <https://www.kcdcmontville.com/gallery.html>.
- [30] A. KRIZHEVSKY, I. SUTSKEVER, AND G. E. HINTON, *ImageNet classification with deep convolutional neural networks*, Communications of the ACM, 60 (2012), pp. 84–90.
- [31] S.-T. LEE, T.-H. YOON, K.-S. KIM, K.-D. KIM, AND W. PARK, *Removal of specular reflections in tooth color image by perceptron neural nets*, in 2010 2nd International Conference on Signal Processing Systems, 2010, pp. V1–285–V1–289.
- [32] R. LI, J. PAN, Y. SI, B. YAN, Y. HU, AND H. QIN, *Specular reflections removal for endoscopic image sequences with adaptive-RPCA decomposition*, IEEE Transactions on Medical Imaging, 39 (2020), pp. 328–340.
- [33] X. LI, W. WANG, X. HU, AND J. YANG, *Selective kernel networks*, in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2019, pp. 510–519.
- [34] Y. LIANG, W. SONG, J. YANG, L. QIU, K. WANG, AND L. HE, *X2Teeth: 3D teeth reconstruction from a single panoramic radiograph*, International Conference on Medical Image Computing and Computer-Assisted Intervention, LNCS, 12262 (2020), pp. 400–409.

- [35] LISTERIN, *Do you have enamel erosion?* <https://www.listerine.com.au/cavities-strong-teeth/do-you-have-enamel-erosion>.
- [36] J. MARTOS, A. GEWEHR, AND E. PAIM, *Aesthetic approach for anterior teeth with enamel hypoplasia*, in Contemporary clinical dentistry, 3 (2012), Suppl1: S82.
- [37] MATTHEW FERGUSON 57, *Dental fluorosis (mild)*. [https://en.wikipedia.org/wiki/Dental\\_fluorosis#/media/File:Dental\\_fluorosis\\_\(mild\).png](https://en.wikipedia.org/wiki/Dental_fluorosis#/media/File:Dental_fluorosis_(mild).png).
- [38] MIKAEYA KALANTARI, *How to get rid of white spots on your front teeth easily and pain free*. <https://www.sunshinesmilesoc.com/blog/get-rid-white-spots-front-teeth-pain-free/13541>.
- [39] S. D. NA, G. LEE, J. H. LEE, AND M. N. KIM, *Individual tooth region segmentation using modified watershed algorithm with morphological characteristic*, Bio-Medical Materials and Engineering, 24 (2014), pp. 3303–3309.
- [40] NAPELONI DENTAL. [http://www.napelonidental.com/wp-content/uploads/2011/08/IMG\\_1984-1024x682.jpg](http://www.napelonidental.com/wp-content/uploads/2011/08/IMG_1984-1024x682.jpg).
- [41] S. S. NAUMOVICH, S. A. NAUMOVICH, AND V. G. GONCHARENKO, *Three-dimensional reconstruction of teeth and jaws based on segmentation of CT images using watershed transformation*, in Dentomaxillofacial Radiology, 44 (2015), 20140313.
- [42] A. ORTHODONTICS, *How to close space between front teeth?* <https://www.angelorthodontics.co.uk/close-gap-between-front-teeth/>.
- [43] S. OSHER AND J. A. SETHIAN, *Fronts propagating with curvature-dependent speed: Algorithms based on hamilton-jacobi formulations*, Journal of Computational Physics, 79 (1988), pp. 12–49.
- [44] S. H. PARK, C.-O. LEE, AND J. HAHN, *Image segmentation based on the statistical variational formulation using the local region information*, Journal of the Korean Society for Industrial and Applied Mathematics, 18 (2014), pp. 129–142.
- [45] PHOTOMED, *polar\_eyes cross polarization filter*. [https://www.photomed.net/polar\\_eyes.htm](https://www.photomed.net/polar_eyes.htm).
- [46] POLARIS. <https://filtropolaris.com/>.
- [47] PRANITA KADAM, *What is it specifically about Julia Roberts’s smile that makes it so noteworthy?* <https://www.quora.com/What-is-it-specifically-about-Julia-Robertss-smile-that-makes-it-so-noteworthy>.
- [48] I. PRETTY AND D. SWEET, *A look at forensic dentistry–Part 1: The role of teeth in the determination of human identity*, British Dental Journal, 190 (2001), pp. 359–366.
- [49] QUIRKE DENTAL SURGEONS, *No drilling dentistry*. <https://qds.ie/resin-infiltration/>.
- [50] O. RONNEBERGER, P. FISCHER, AND T. BROX, *U-net: Convolutional networks for biomedical image segmentation*, in International Conference on Medical image computing and computer-assisted intervention, 2015, pp. 234–241.

- [51] M. ROUSSON, T. BROX, AND R. DERICHE, *Active unsupervised texture segmentation on a diffusion based feature space*, 2003 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2003. Proceedings., 2 (2003), pp. II–699.
- [52] B. C. RUSSELL, A. TORRALBA, K. P. MURPHY, AND W. T. FREEMAN, *LabelMe: a database and web-based tool for image annotation*, International Journal of Computer Vision, 77 (2008), pp. 157–173.
- [53] E. H. SAID, D. E. M. NASSAR, G. FAHMY, AND H. H. AMMAR, *Teeth segmentation in digitized dental X-ray films using mathematical morphology*, IEEE Transactions on Information Forensics and Security, 1 (2006), pp. 178–189.
- [54] S. A. SHAFER, *Using color to separate reflection components*, Color Research and Application, 10 (1985), pp. 210–218.
- [55] S. SHAH, A. ABAZA, A. ROSS, AND H. AMMAR, *Automatic tooth segmentation using active contour without edges*, in 2006 Biometrics Symposium: Special Session on Research at the Biometric Consortium Conference, 2006, pp. 1–6.
- [56] D. SHANKBONE, *Teeth of a model, 2007*. [https://en.wikipedia.org/wiki/Permanent\\_teeth#/media/File:Teeth\\_by\\_David\\_Shankbone.jpg](https://en.wikipedia.org/wiki/Permanent_teeth#/media/File:Teeth_by_David_Shankbone.jpg).
- [57] SHUAYB, *Smile gallery*. <https://www.shuaybdental.com/smile-gallery>.
- [58] J. H. SON, B. HUR, H. KIM, AND J. PARK, *Management of white spots: resin infiltration technique and microabrasion*, The Journal of Korean Academy of Conservative Dentistry, 36 (2011), pp. 66–71.
- [59] SOUTHWEST NEBRASKA DENTAL CENTER, *ICON resin infiltration treatment*. <https://www.swnebraskadental.com/smile-gallery/icon-resin-infiltration-treatment/14607>.
- [60] SPEAR EDUCATION, *A conservative, effective approach to white spot lesions*. <https://www.speareducation.com/spear-review/2017/07/a-conservative-effective-approach-to-white-spot-lesions>.
- [61] STERLING DENTAL DDS, *What are those dark spots between your teeth?* <https://sterlingdentaldds.com/what-are-those-dark-spots-between-your-teeth>.
- [62] STUDIO DENTALE, *Raiz do dente exposta: Conheça as causas, sintomas e saiba como tratar*. <https://studiodentale.com.br/raiz-dente-exposta/>.
- [63] K. SUN, B. XIAO, D. LIU, AND J. WANG, *Deep high-resolution representation learning for human pose estimation*, in CVPR, 2019.
- [64] J. SUO, D. AN, X. JI, H. WANG, AND Q. DAI, *Fast and high quality highlight removal from a single image*, IEEE Transactions on Image Processing, 25 (2016), pp. 5441–5454.
- [65] M. SUSSMAN, P. SMEREKA, AND S. OSHER, *A level set approach for computing solutions to incompressible two-phase flow*, Journal of Computational Physics, 114 (1994), pp. 146–159.
- [66] C. SZEGEDY, W. LIU, Y. JIA, P. SERMANET, S. REED, D. ANGUELOV, D. ERHAN, V. VANHOUCHE, AND A. RABINOVICH, *Going deeper with convolutions*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.

- [67] C. SZEGEDY, V. VANHOUCKE, S. IOFFE, J. SHLENS, AND Z. WOJNA, *Rethinking the inception architecture for computer vision*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.
- [68] VAN DYK CASTRO DDS, *Smile gallery*. <https://www.vandykcastro.com/smile>.
- [69] T. VAN PHAM, Y. LUCAS, S. TREUILLET, AND L. DEBRAUX, *Object contour refinement using instance segmentation in dental images*, Advanced Concepts for Intelligent Vision Systems, LNCS, 12002 (2020), pp. 99–107.
- [70] A. VASWANI, N. SHAZEER, N. PARMAR, J. USZKOREIT, L. JONES, A. N. GOMEZ, L. KAISER, AND I. POLOSUKHIN, *Attention is all you need*, in Advances in neural information processing systems, 2017, pp. 5998–6008.
- [71] L. VINCENT AND P. SOILLE, *Watersheds in digital spaces: an efficient algorithm based on immersion simulations*, IEEE Transactions on Pattern Analysis and Machine Intelligence, 13 (1991), pp. 583–598.
- [72] J. WANG, K. SUN, T. CHENG, B. JIANG, C. DENG, Y. ZHAO, D. LIU, Y. MU, M. TAN, X. WANG, W. LIU, AND B. XIAO, *Deep high-resolution representation learning for visual recognition*, IEEE Transactions on Pattern Analysis and Machine Intelligence, 43 (2021), pp. 3349–3364.
- [73] ———, *Deep high-resolution representation learning for visual recognition*, IEEE Transactions on Pattern Analysis and Machine Intelligence, 43 (2021), pp. 3349–3364.
- [74] WEDGWOOD DENTAL CLINIC, *Procedures*. [http://www.drengdds.com/Wedgwood\\_Dental\\_Clinic/Procedures.html](http://www.drengdds.com/Wedgwood_Dental_Clinic/Procedures.html).
- [75] J. WEICKERT, *Coherence-enhancing diffusion filtering*, International Journal of Computer Vision, 31 (2004), pp. 111–127.
- [76] C. WU, D. BRADLEY, P. GARRIDO, M. ZOLLHÖFER, C. THEOBALT, M. GROSS, AND T. BEELER, *Model-based teeth reconstruction*, in ACM Transactions on Graphics, ACM, 35 (2016), 220.
- [77] S. XIE, R. GIRSHICK, P. DOLLAR, Z. TU, AND K. HE, *Aggregated residual transformations for deep neural networks*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), (2017), pp. 1492–1500.
- [78] C. XU AND J. L. PRINCE, *Gradient vector flow: a new external force for snakes*, in Proceedings of IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 1997, pp. 66–71.
- [79] C. XU, A. YEZZI, AND J. L. PRINCE, *On the relationship between parametric and geometric active contours*, Conference Record of the Thirty-Fourth Asilomar Conference on Signals, Systems and Computers, 1 (2000), pp. 483–489.
- [80] Q. YANG, J. TANG, AND N. AHUJA, *Efficient and robust specular highlight removal*, IEEE Transactions on Pattern Analysis and Machine Intelligence, 37 (2015), pp. 1304–1311.
- [81] A. ZEILEIS, K. HORNIK, AND P. MURRELL, *Escaping RGBland: selecting colors for statistical graphics*, Computational Statistics & Data Analysis, 53 (2009), pp. 3259–3270.

- [82] A. ZEILEIS, K. HORNIK, AND P. MURRELL, *Escaping rgbland: Selecting colors for statistical graphics*, Computational Statistics and Data Analysis, 53 (2009), pp. 3259–3270.
- [83] H. ZHANG, C. WU, Z. ZHANG, Y. ZHU, H. LIN, Z. ZHANG, Y. SUN, T. HE, J. MUELLER, R. MANMATHA, M. LI, AND A. SMOLA, *ResNeSt: Split-attention networks*, in arXiv preprint, arXiv: 2004.08955, 2020.
- [84] T. Y. ZHANG AND C. Y. SUEN, *A fast parallel algorithm for thinning digital patterns*, Communications of the ACM, 27 (1984), pp. 236–239.
- [85] Z. ZHANG AND M. R. SABUNCU, *Generalized cross entropy loss for training deep neural networks with noisy labels*, Advances in Neural Information Processing Systems, 31 (2018).
- [86] G. ZHU, Z. PIAO, AND S. C. KIM, *Tooth detection and segmentation with mask R-CNN*, in 2020 International Conference on Artificial Intelligence in Information and Communication (ICAIIIC), 2020, pp. 70–72.
- [87] S. C. ZHU AND A. YUILLE, *Region competition: unifying snakes, region growing, and Bayes/MDL for multiband image segmentation*, IEEE Transactions on Pattern Analysis and Machine Intelligence, 18 (1996), pp. 884–900.