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DAFTAR PUSTAKA

Abu-Srhan, A., Abushariah, M. A., & Al-Kadi, O. S. (2022). The effect of loss function on conditional generative adversarial networks. *Journal of King Saud University-Computer and Information Sciences, 34*(9), 6977-6988.

Adhikary, A., Bhandari, N., Markou, E., & Sachan, S. (2021). ArtGAN: Artwork Restoration using Generative Adversarial Networks. *2021 13th International Conference on Advanced Computational Intelligence (ICACI)*, 199-206. https://doi.org/10.1109/ICACI52617.2021.9435888.

Amari, S-I. (2016). *Information Geometry and Its Applications*. Jepang: Springer Tokyo.

Arjovsky, M. & Bottou, L. (2017). Towards Principled Methods for Training Generative Adversarial Networks. https://doi.org/10.48550/arXiv.1701.04862.

Arjovsky, M., Chintala, S. & Bottou, L. (2017). Wasserstein Generative Adversarial Networks. *Proceedings of the 34th International Conference on Machine Learning, 70*, 214-223. https://proceedings.mlr.press/v70/arjovsky17a.html.

Aubert, M., Setiawan, P., Oktaviana, A. A., Brumm, A., Sulistyarto, P. H., Saptomo, E. W., ... & Brand, H. E. (2018). Palaeolithic cave art in Borneo. *Nature, 564*(7735), 254-257.

Bain, L. J., & Engelhardt, M. (1992). *Introduction to Probability and Mathematical Statistics: Second Edition*. USA: Duxbury Thomson Learning.

Baldi, P. (2012). Autoencoders, unsupervised learning, and deep architectures. In *Proceedings of ICML workshop on unsupervised and transfer learning*, 37-49. https://proceedings.mlr.press/v27/baldi12a.html.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Balduzzi, D., McWilliams, B., and Butler-Yeoman, T. (2017). Neural taylor approximations: Convergence and exploration in rectifier networks. *Journal of Machine Learning Research 70*, 351–360.

Bank, D., Koenigstein, N., & Giryes, R. (2021). Autoencoders. *Deep Learning in Science*.

Bank, D., Koenigstein, N., & Giryes, R. (2021). Autoencoders [Ilustrasi grafis]. *Deep Learning in Science*.

Barnhart, R. M., Yang, X., Nie, C., Cahill, J., Lang, S., & Wu, H. (1997). *Three thousand years of Chinese painting*. USA: Yale University Press.

Basseville, M. (2013). Divergence measures for statistical data processing—An annotated bibliography. *Signal Processing, 93*(4), 621-633. https://doi.org/10.1016/j.sigpro.2012.09.003.

Basha, S. H. S., Dubey, S. R., Pulabaigari, V., & Mukherjee, S. (2020). Impact of fully connected layers on performance of convolutional neural networks for image classification. *Neurocomputing, 378*, 112-119. https://doi.org/10.1016/j.neucom.2019.10.008.

Bergson, H. (1911). *Creative evolution*. USA: Dover.

Bertalmio, M., Sapiro, G., Caselles, V., & Ballester, C. (2000). Image inpainting. In: *Proceedings of the 27th Annual Conference on Computer Graphics and Interactive Techniques*, 417–424.

Bertalmio, M., Bertozzi, A.L., Sapiro, G. (2001). Navier-stokes, fluid dynamics, and image and video inpainting. *2001 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*.

Boureau, Y.L., Ponce, J., & LeCun, Y. (2010). A theoretical analysis of feature pooling in visual recognition. *Proceedings of the 27th International Conference on Machine Learning*, 111–118.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Boyd, D. W. (2000). *Systems Analysis and Modeling: A Macro-to-Micro Approach with Multidisciplinary Applications*. USA: Academic Press.

Braman, K. (2010). Third-order tensors as linear operators on a space of matrices. *Linear Algebra and its Applications, 433*, 1241–1253. https://doi.org/10.1016/j.laa.2010.05.025

Briët, J., & Harremoës, P. (2009). Properties of Classical and Quantum Jensen-Shannon Divergence. *Physical Review A, 79*(5). https://doi.org/10.1103/PhysRevA.79.052311.

Britannica, T. Editors of Encyclopaedia (2024, October 31). *mural*. *Encyclopedia Britannica*. https://www.britannica.com/art/mural-painting.

Bulat, A., & Tzimiropoulos, G. (2017). Super-FAN: Integrated Facial Landmark Localization and Super-Resolution of Real-World Low Resolution Faces in Arbitrary Poses with GANs. *2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 109-117.

Cao, J., Zhang, Z., Zhao, A., Cui, H., & Zhang, Q. (2020). Ancient mural restoration based on a modified generative adversarial network. *Heritage Science, 8*(7). https://doi.org/10.1186/s40494-020-0355-x.

Cass, C., & Leighton, T. (1988). *Grand illusions: contemporary interior murals*. UK: Phaidon Press.

Cauchy, A.-L. (1847). Méthode générale pour la résolution des systèmes d'équations simultanées. *Comptes Rendus Hebd. Seances Acad. Sci., 25*, 536–538. https://gallica.bnf.fr/ark:/12148/bpt6k2982c.image.f540.pagination.langEN.

Chen, L., Papandreou, G., Kokkinos, I., Murphy, K.P., & Yuille, A.L. (2014). Semantic Image Segmentation with Deep Convolutional Nets and Fully Connected CRFs. *CoRR, abs/1412.7062*.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Chen, L., Yang, Y., Wang, J., Xu, W., & Yuille, A.L. (2015). Attention to Scale: Scale-Aware Semantic Image Segmentation. *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 3640-3649.

Chen, Y., & Hu, H. (2019). An improved method for semantic image inpainting with gans: Progressive inpainting. *Neural Processing Letters, 49*(3), 1355-1367. https://doi.org/10.1007/s11063-018-9877-6.

Chen, H. (2021). Challenges and corresponding solutions of generative adversarial networks (GANs): a survey study. *Journal of Physics: Conference Series 1827*(1), 12066.

Clark, R. J., Hark, R. R., Salvadó, N., Butí, S., & Pradell, T. (2010). Spectroscopy study of mural paintings from the Pyrenean Church of Saint Eulàlia of Unha. *Journal of Raman Spectroscopy, 41*(11), 1418-1424.

Coletti, C. (2024). Climate Change Threats to Stone Cultural Heritage: State of the Art of Quantitative Damage Functions and New Challenges for a Sustainable Future. *Heritage, 7*(6), 3276-3290. https://doi.org/10.3390/heritage7060154.

Criminisi A, Pérez P, & Toyama K. (2004). Region filling and object removal by exemplar-based image inpainting. *IEEE Transactions on image processing, 13*(9), 1200-1212.

Curry, H. B. (1944). The method of steepest descent for non-linear minimization problems. *Quarterly of Applied Mathematics, 2*, 258-261. https://doi.org/10.1090/qam/10667.

Damelin, S. & Miller, W. (2011). *The Mathematics of Signal Processing*. UK: Cambridge University Press.

Damle, A., Minden, V., & Ying, L. (2019). Simple, direct and efficient multi-way spectral clustering. *Information and Inference: A Journal of the IMA, 8*(1), 181-203. https://doi.org/10.1093/imaiai/iay008.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Deisenroth, M., Faisal, A., & Ong, C. (2020). *Mathematics for Machine Learning*. UK: Cambridge University Press.

Deng, X., & Yu, Y. (2023). Ancient mural inpainting via structure information guided two-branch model. *Heritage Science, 11*, 131. https://doi.org/10.1186/s40494-023-00972-x.

Dubey, S. R., Singh, S. K., & Chaudhuri, B. B. (2022). Activation functions in deep learning: A comprehensive survey and benchmark. *Neurocomputing, 503*, 92-108. https://doi.org/10.1016/j.neucom.2022.06.111.

Duchi, J., Hazan, E., & Singer, Y. (2011). Adaptive Subgradient Methods for Online Learning and Stochastic Optimization. *Journal of Machine Learning Research, 12*(61), 2121-2159. http://jmlr.org/papers/v12/duchi11a.html.

Dumont, V., Ju, X., & Mueller, J. (2022). Hyperparameter optimization of generative adversarial network models for high-energy physics simulations. *ArXiv, abs/2208.07715*.

Dumoulin, V., & Visin, F. (2016). A guide to convolution arithmetic for deep learning. *ArXiv, abs/1603.07285*. 10.48550/arXiv.1603.07285.

Dunhuang Academy. (n.d.). *Digital Dunhuang - Cave List*. https://www.e-dunhuang.com/section.htm?.

Elharrouss, O., Almaadeed, N., Al-Maadeed, S., & Akbari, Y. (2019). Image Inpainting: A Review. *Neural Processing Letters, 51*(5), 2007-2028. https://doi.org/10.1007/s11063-019-10163-0.

Eloriby, R., Dawi, S., & Mostafa, M. (2019). Study of the effect of various damage factors on the damage of the glass artifacts kept in historical stores and the methodology of treatment and conservation appliedon the glass artefact kept in Museum of Islamic Art in Cairo. *Journal of Architecture, Art & Humanistic Science, 4*(17), 214–232. https://doi.org/10.21608/mjaf.2019.10319.1014.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Engin, D., Genç, A., & Ekenel, H.K. (2018). Cycle-Dehaze: Enhanced CycleGAN for Single Image Dehazing. *2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 825-833.

Federal Agencies Digital Guideline Initiatives. (n.d.). Color channels. In *FADGI Guidelines Glossary*. Diakses 9 November 2024, dari https://www.digitizationguidelines.gov/term.php?term=colorchannel.

Fontenla-Romero, O., Guijarro-Berdiñas, B., Martinez, D., Pérez Sánchez, B., & Peteiro-Barral, D. (2013). Online Machine Learning. *Efficiency and Scalability Methods for Computational Intellect*, 27-54. https://doi.org/10.4018/978-1-4666-3942-3.ch002.

Fréchet, M. (1957). Sur la distance de deux lois de probabilité. *Annales de l'ISUP, 6*(3), 183-198. https://hal.science/hal-04093677/document.

Fukushima, K. (1969). Visual feature extraction by a multilayered network of analog threshold elements. *IEEE Transactions on Systems Science and Cybernetics*, *5*(4), 322–333. https://doi.org/10.1109/TSSC.1969.300225.

Furusho, Y. & Ikeda, K. (2020). Theoretical analysis of skip connections and batch normalization from generalization and optimization perspectives. *APSIPA Transactions on Signal and Information Processing, 9*. https://doi.org/10.1017/ATSIP.2020.7.

Gatys, L. A., Ecker, A. S., & Bethge, M. (2016). Image style transfer using convolutional neural networks. *IEEE Conf. Comput. Vision. Pattern. Recognit.*, 2414–2423.

Gemp, I.M. (2019). *The Unreasonable Effectiveness of Adam on Cycles*.

Genc, B., & Tunc, H. (2019). Optimal training and test sets design for machine learning. *Turkish Journal of Electrical Engineering and Computer Sciences, 27*(2), 1534-1545.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

George, A.P., & Powell, W.B. (2006). Adaptive stepsizes for recursive estimation with applications in approximate dynamic programming. *Machine Learning, 65*, 167-198.

Gholamalinezhad, H., & Khosravi, H. (2020). Pooling Methods in Deep Neural Networks, a Review. *ArXiv, abs/2009.07485.*

Gonzales, R. C., & Woods, R. E. (2013). *Digital Image Processing*. USA: Pearson International Edition.

Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., Courville, A., & Bengio, Y. (2014). Generative Adversarial Networks. *Advances in Neural Information Processing Systems, 3*(11).

Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. USA: MIT Press. http://www.deeplearningbook.org.

Grossi, E., & Buscema, M. (2008). Introduction to artificial neural networks. *European Journal of Gastroenterology & Hepatology, 19*(12), 1046-1054. https://doi.org/10.1097/MEG.0b013e3282f198a0.

Gulrajani, I., Ahmed, F., Arjovsky, M., Dumoulin, V., & Courville, A.C. (2017). Improved Training of Wasserstein GANs. *Neural Information Processing Systems*.

Guo, X. (2023). Researches Advanced in Generative Adversarial Networks and Their Applications for Image-Generating NFT [Ilustrasi grafis]. *Highlights in Science, Engineering and Technology, 39*, 419-428.

Gurney, K. (1997). *An introduction to neural networks*. UK: UCL Press.

Hastie, T., Tibshirani, R., & Friedman, J. (2017). *The elements of statistical learning: data mining, inference, and prediction*.

Hargrave, M. (2024, Agustus 5). *Standard Deviation Formula and Uses vs. Variance*. Investopedia. https://www.investopedia.com/terms/s/standarddeviation.asp.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Harmand, S., Lewis, J., Feibel, C., et al. (2015). 3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya. *Nature, 521*(7552), 310-315. https://doi.org/10.1038/nature14464.

Hayes, A. (2024, 27 Juni). *Descriptive Statistics: Definition, Overview, Types, and Examples*. Investopedia. https://www.investopedia.com/terms/d/descriptive_statistics.asp.

Hayes, A. (2024, 20 September). *What Is Variance in Statistics? Definition, Formula, and Example*. Investopedia. https://www.investopedia.com/terms/v/variance.asp.

Heersmink, R. (2022). Human uniqueness in using tools and artifacts: flexibility, variety, complexity. *Synthese, 200*(442). https://doi.org/10.1007/s11229-022-03892-8.

Heusel, M., Ramsauer, H., Unterthiner, T., Nessler, B., & Hochreiter, S. (2017). GANs trained by a two time-scale update rule converge to a local nash equilibrium. In *Proceedings of the 31st International Conference on Neural Information Processing Systems (NIPS'17)*, 6629–6640. https://dl.acm.org/doi/10.5555/3295222.3295408.

Hoeniger, C. (2024). The Protection of Monuments and Immoveable Works of Art from War Damage: A Comparison of Italy in World War II and Ukraine during the Russian Invasion. *Arts, 13*(2), 65. https://doi.org/10.3390/arts13020065.

Horn, R. A., & Johnson, C. R. (2013). Matrix Analysis Second Edition. USA: Cambridge University Press.

Hosna, A., Merry, E., Gyalmo, J., Alom, Z., Aung, Z., & Azim, M. A. (2022). Transfer learning: a friendly introduction. *Journal of Big Data, 9*(1), 102. https://doi.org/10.1186/s40537-022-00652-w.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Hua, P., Liu, X., Liu, M., Dong, L., Hui, M., & Zhao, Y. (2018). Image inpainting using Wasserstein Generative Adversarial Network. *Optical Engineering + Applications*.

Hubel, D. H. & Wiesel, T. N. (1959). Receptive fields of single neurones in the cat's striate cortex. *J. Physiol*, *148*(3), 574–591. https://doi.org/10.1113/jphysiol.1959.sp006308.

Huyge, D. (2014). The Painted Tomb, rock art and the recycling of Predynastic Egyptian imagery. *Archeo-nil, 24*(1), 93-102. http://dx.doi.org/10.3406/arnil.2014.1072.

Iizuka, S., Simo-Serra, E., Ishikawa, H. (2017). Globally and locally consistent image completion. *ACM Transactions on Graphics (ToG), 36*(4), 1-14.

Irianto, S. Y. (2016). *Analisa citra digital dan content based image retrieval*. Bandar Lampung: AURA.

Isogawa, M., Mikami, D., Iwai, D., Kimata, H., & Sato, K. (2018). Mask Optimization for Image Inpainting. *IEEE Access, 6*. https://doi.org/10.1109/ACCESS.2018.2877401.

Itskov, M. (2019). *Tensor Algebra and Tensor Analysis for Engineers With Applications to Continuum Mechanics Fifth Edition*. Swiss: Springer Nature Switzerland AG.

Jaiswal, A., AbdAlmageed, W., Wu, Y., & Natarajan, P. (2019). Bidirectional conditional generative adversarial networks. In: Jawahar, C., Li, H., Mori, G., Schindler, K. (eds) *Computer Vision – ACCV 2018*, 216-232.

Jam, J., Kendrick, C., Drouard, V., Walker, K., Hsu, G. S., & Yap, M. H. (2021). Symmetric Skip Connection Wasserstein GAN for High-resolution Facial Image Inpainting. *Proceedings of the 16th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications VISIGRAPP, 4*, 35-44. https://doi.org/10.5220/0010188700350044.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Janocha, K., & Czarnecki, W.M. (2017). On Loss Functions for Deep Neural Networks in Classification. *Schedae Informaticae, 25*, 49-59. https://doi.org/10.4467/20838476SI.16.004.6185.

Karpathy, A., & Fei-Fei, L. (2014). Deep visual-semantic alignments for generating image descriptions. *2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 3128-3137.

Karsoliya, S. (2012). Approximating Number of Hidden layer neurons in Multiple Hidden Layer BPNN Architecture. *International Journal of Engineering Trends and Technology, 3*(6), 714-717.

Kenjo, T. (1986). Certain deterioration factors for works of art and simple devices to monitor them. *International Journal of Museum Management and Curatorship, 5*(3), 295-300.

Keskar, N.S., Mudigere, D., Nocedal, J., Smelyanskiy, M., & Tang, P.T. (2016). On Large-Batch Training for Deep Learning: Generalization Gap and Sharp Minima. *ArXiv, abs/1609.04836*.

Khan, S., Yin, P., Guo, Y., Asim, M., & Abd El-Latif, A. A. (2024). Heterogeneous transfer learning: recent developments, applications, and challenges. *Multimedia Tools and Applications*, 1-37.

Kingma, D.P., & Ba, J. (2014). Adam: A Method for Stochastic Optimization. *CoRR, abs/1412.6980*.

Knox, K.T., Easton, R.L., & Christens-Barry, W.A. (2008). Image restoration of damaged or erased manuscripts. *2008 16th European Signal Processing Conference*, 1-5.

Koentjoroningrat. (1990). *Manusia dan Kebudayaan di Indonesia*. Jakarta: Djambatan.

Köhler, R., Schuler, C.J., Scholkopf, B., & Harmeling, S. (2014). Mask-Specific

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Inpainting with Deep Neural Networks. *German Conference on Pattern Recognition*.

Kolda, T. G., & Bader, B. W. (2009). Tensor decompositions and applications. *SIAM review, 51*(3), 455-500. https://doi.org/10.1137/07070111X.

Kolmogorov, A. N. (1950). *Foundations of The Theory of Probability* (N. Morrison, Trans.). USA: Chelsea Publishing Company. (Karya orisinal dipubilkasikan pada 1933)

Korakki, V. K. (2020). *Mathematics in Transposed convolution explained* [Ilustrasi grafis]. Medium. https://vigneshkumarkorakki.medium.com/mathematics-in-transposed-convolution-explained-vignesh-kumar-kor

Kullback, S., & Leibler, R. A. (1951). On Information and Sufficiency. *The Annals of Mathematical Statistics, 22*(1), 79-86.

Lafferriere, B., Lafferriere, G., & Nguyen, M. N. (2022). *Introduction to Mathematical Analysis I - 3rd Edition*. USA: PDXOpen: Open Educational Resources. https://pdxscholar.library.pdx.edu/pdxopen/43.

Lavesson, N., & Davidsson, P. (2006). Quantifying the Impact of Learning Algorithm Parameter Tuning. *Proceedings of the 21st National Conference on Artificial Intelligence, 1*, 395–400.

LeCun, Y., Boser, B.E., Denker, J.S., Henderson, D., Howard, R.E., Hubbard, W.E., & Jackel, L.D. (1989). Handwritten Digit Recognition with a Back-Propagation Network. *Neural Information Processing Systems*.

LeCun, Y., Bottou, L., Bengio, Y., & Haffner, P. (1998). Gradient-based learning applied to document recognition. *Proc. IEEE, 86*, 2278-2324.

Le Huy Hien, N., Huy, L., & Nguyen Van, H. (2021). Artwork Style Transfer Model using Deep Learning Approach. *Cybernetics and Physics, 10*, 127-137. https://doi.org/10.35470/2226-4116-2021-10-3-127-137.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Lei, Z., Tantchave-Burdge, E., & Cheung, V. (2021). Investigation into the colours of the DunHuang murals from the Tang Dynasty. In *Proceedings of the 14th International Colour Association (AIC) Congress*, 1059-1064.

Li, Y., Ogura, D., Hokoi, S., & Ishizaki, T. (2012). Effects of emergency preservation measures following excavation of mural paintings in Takamatsuzuka Tumulus. *Journal of Building Physics, 36*(2), 117-139.

Li, H., Xu, Z., Taylor, G., & Goldstein, T. (2018). Visualizing the Loss Landscape of Neural Nets. *Proceedings of the 32nd International Conference on Neural Information Processing Systems*, 6391–6401.

Lichtner-Bajjaoui, A. (2021). *A Mathematical Introduction to Neural Networks* [Master's thesis, Universitat de Barcelona]. Dipòsit Digital de la Universitat de Barcelona. https://diposit.ub.edu/dspace/handle/2445/180441.

Liu, G., Reda, F.A., Shih, K.J., Wang, TC., Tao, A., & Catanzaro, B. (2018). Image Inpainting for Irregular Holes Using Partial Convolutions. In: Ferrari, V., Hebert, M., Sminchisescu, C., Weiss, Y. (eds) *Computer Vision – ECCV 2018, 11215*. https://doi.org/10.1007/978-3-030-01252-6_6.

Ledig, C., Theis, L., Huszár, F., Caballero, J., Cunningham, A., Acosta, A., Aitken, A., Tejani, A., Totz, J., Wang, Z., & Shi, W.Z. (2017). Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network. *IEEE Conf. Comput. Vision. Pattern. Recognit.*, 4681-4690. https://doi.org/10.1109/CVPR.2017.19.

Luo, R., Luo, R., Liang, G., & Hong, Y. (2022). An Ancient Chinese Painting Restoration Method Based on Improved Generative Adversarial Network. *Journal of Physics: Conference Series (JPCS), 2400*. https://doi.org/10.1088/1742-6596/2400/1/012005.

Luxburg, U. (2004). A Tutorial on Spectral Clustering. *Statistics and*

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Computing, 17(4), 395-416. http://dx.doi.org/10.1007/s11222-007-9033-z.

MacDuffee, C. C. (1933). *The theory of matrices*. Jerman: Springer-Verlag Berlin Heidelberg.

Mahesh, B. (2020). Machine learning algorithms-a review. *International Journal of Science and Research (IJSR), 9*(1), 381-386. https://doi.org/10.21275/ART20203995.

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). *"Artificial Intelligence Index Report 2024"*. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University. https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf.

Mechrez, R., Talmi, I., & Zelnik-Manor, L. (2018). The Contextual Loss for Image Transformation with Non-aligned Data. In *Computer Vision – ECCV 2018: 15th European Conference*, 800–815. https://doi.org/10.1007/978-3-030-01264-9_47.

Mechrez, R., Talmi, I., Shama, F., & Zelnik-Manor, L. (2019). Maintaining Natural Image Statistics with the Contextual Loss. In: Jawahar, C., Li, H., Mori, G., Schindler, K. (eds) *Computer Vision – ACCV 2018, 11363*. https://doi.org/10.1007/978-3-030-20893-6_27.

Mescheder, L.M., Nowozin, S., & Geiger, A. (2017). The Numerics of GANs. *ArXiv, abs/1705.10461.*

Mnih, V., Badia, A.P., Mirza, M., Graves, A., Lillicrap, T., Harley, T., Silver, D. & Kavukcuoglu, K.. (2016). *Asynchronous Methods for Deep Reinforcement Learning. Proceedings of Machine Learning Research*, *48*, 1928-1937. https://proceedings.mlr.press/v48/mniha16.html.

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Millar, L. A. (2010). *Archives: Principles and Practices*. UK: Facet Publishing.

Mo, S., Cho, M., & Shin, J. (2020). Freeze the discriminator: a simple baseline for fine-tuning gans. *ArXiv, 2002.10964*.

Moses, R. P. (2005). *A Glossary of Archival and Records Management Terminology*. USA: The Society of American Archivists.

Mukkamala, M. C., & Hein, M. (2017). Variants of rmsprop and adagrad with logarithmic regret bounds. In *International conference on machine learning*, 2545-2553.

Murphy, K. P. (2012). *Machine learning: a probabilistic perspective*. USA: MIT Press.

Mustapha, A., Mohamed, L., & Ali, K. (2021). Comparative study of optimization techniques in deep learning: Application in the ophthalmology field. *Journal of Physics: Conference Series, 1743*. https://doi.org/10.1088/1742-6596/1743/1/012002.

Ng, A., Jordan, M., & Weiss, Y. (2002). On Spectral Clustering: Analysis and an algorithm. *ADVANCES IN NEURAL INFORMATION PROCESSING SYSTEMS*, 849-856.

Pan, S. J., & Yang, Q. (2009). A survey on transfer learning. *IEEE Transactions on knowledge and data engineering, 22*(10), 1345-1359.

Pan, Z., Yu, W., Wang, B., Xie, H., Sheng, V. S., & Lei, J. (2020). Loss Functions of Generative Adversarial Networks (GANs): Opportunities and Challenges. *IEEE Transactions on Emerging Topics in Computational Intelligence, 4*(4), 500-522. https://doi.org/10.1109/TETCI.2020.2991774.

Pantone USA. (2007, 13 September). *What are the different color models?*. https://www.pantone.com/articles/color-fundamentals/color-models-explained.

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Parikh, D., & Aggarwal, S. (2020). Similarity-Based Clustering for Enhancing Image Classification Architectures. http://dx.doi.org/10.36227/techrxiv.13186478.v1.

Park, S. W., Kim, J. Y., Park, J., Jung, S. H., & Sim, C. B. (2023). How to train your pre-trained GAN models. *Applied Intelligence, 53*(22), 27001-27026.

Paul, A., Basu, A., Mahmud, M., Kaiser, M. S., & Sarkar, R. (2022). Inverted bell-curve-based ensemble of deep learning models for detection of COVID-19 from chest X-rays. *Neural Computing and Applications, 35*. https://doi.org/10.1007/s00521-021-06737-6.

Phutke, S. S., Kulkarni, A., Vipparthi, S. K., & Murala, S. (2023). Blind Image Inpainting via Omni-dimensional Gated Attention and Wavelet Queries. *2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 1251-1260. https://doi.org/10.1109/CVPRW59228.2023.00132.

Pickard, J., Chen, C., Stansbury, C., Surana, A., Bloch, A. M., & Rajapakse, I. (2024). Kronecker product of tensors and hypergraphs: structure and dynamics. *SIAM Journal on Matrix Analysis and Applications, 45*(3), 1621-1642.

Polyak, B. T. (1987). *Introduction to Optimization*. USA: Optimization Software.

Probst, P., Boulesteix, A.-L., & Bischl, B. (2019). Tunability: Importance of Hyperparameters of Machine Learning Algorithms. *Journal of Machine Learning Research, 20*(53), 1-32.

Purkait, P., & Chanda, B. (2012). Digital restoration of damaged mural images. *ICVGIP '12: Proceedings of the Eighth Indian Conference on Computer Vision, Graphics and Image Processing*. https://doi.org/10.1145/2425333.2425382.

Qin, Y., Mitra, N., & Wonka, P. (2020). How Does Lipschitz Regularization Influence GAN Training?. In: Vedaldi, A., Bischof, H., Brox, T., Frahm, JM. (eds)

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Computer Vision – ECCV 2020. ECCV 2020, *12361*. https://doi.org/10.1007/978-3-030-58517-4_19.

Qing, B., Wan, W., & Leonov, I. (2024). Image Inpainting by Machine Learning Algorithms. *Pattern Recognition and Image Analysis, 34*(2), 237-243. http://dx.doi.org/10.1134/S1054661824700032.

Qiu, Z., Yuan, L., Liu, L., & Yuan, Z. (2021). Generative Image Inpainting with Dilated Deformable Convolution. *Journal of Circuits Systems and Computers, 31*(6). https://doi.org/10.1142/S0218126622501146.

Radford, A., Metz, L., & Chintala, S. (2015). Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks. *CoRR, abs/1511.06434*.

Radiuk, P. M. (2017). Impact of Training Set Batch Size on the Performance of Convolutional Neural Networks for Diverse Datasets. *Information Technology and Management Science, 20*(1), 20-24. https://doi.org/10.1515/itms-2017-0003.

Rahman, N. A., Ismail, A. R., & Rahim, R. A. (2020). Revolutions of Mural Painting. *International Journal of Academic Research in Business and Social Sciences, 10*(10), 1195–1200.

Reeves, S. J. (2014). Chapter 6 - Image Restoration: Fundamentals of Image Restoration. *Academic Press Library in Signal Processing, 4*, 165-192. https://doi.org/10.1016/B978-0-12-396501-1.00006-6.

Ren, H., Sun, K., Zhao, F., & Zhu, X. (2024). Dunhuang murals image restoration method based on generative adversarial network. *Heritage Science, 12*(39). https://doi.org/10.1186/s40494-024-01159-8.

Ren, H., Zhang, C., Sun, K., & Ye, C. (2024). Dunhuang murals image inpainting method based on fusion classification pre-training model. *2024 International Conference on Culture-Oriented Science & Technology (CoST)*, 18-21. https://doi.org/10.1109/CoST64302.2024.00013.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Rolf, J., Gerhard, D., & Kosic, P. (2024). Clustering Visual Similar Objects for Enhanced Synthetic Image Data for Object Detection. *Information, 15*(12), 761. https://doi.org/10.3390/info15120761.

Ronneberger, O., Fischer, P., & Brox, T. (2015). U-Net: Convolutional Networks for Biomedical Image Segmentation. In: Navab, N., Hornegger, J., Wells, W., Frangi, A. (eds) *Medical Image Computing and Computer-Assisted Intervention – MICCAI 2015*. https://doi.org/10.1007/978-3-319-24574-4_28.

Roth, D. (2016). *Neural Networks* [PDF]. University of Pennsylvania CS446 Machine Learning Fall 2016: https://www.cis.upenn.edu/~danroth/Teaching/CS446-17/lectures.html.

Ruder, S. (2016). An overview of gradient descent optimization algorithms. *ArXiv, abs/1609.04747*.

Rumelhart, D. E., Hinton, G. E., & Williams, R. J. (1986). Learning internal representations by error propagation. *Biometrika, 71*(6), 599-607.

Ružic, T. & Pižurica, A. (2015). Context-aware patch-based image inpainting using markov random field modeling. *IEEE Transactions on Image Processing, 24*(1), 444–456.

Sadier, B., Delannoy, J. J., Benedetti, L., Bourlès, D. L., Jaillet, S., Geneste, J. M., ... & Arnold, M. (2012). Further constraints on the Chauvet cave artwork elaboration. *Proceedings of the National Academy of Sciences, 109*(21), 8002-8006.

Saladin, K. (2011). *Human anatomy (3rd ed.)*. USA: McGraw-Hill.

Sallam, A., Hemeda, S., Toprak, M., Muhammed, M., Hassan, M., & Uheida, A. (2019). CT Scanning and MATLAB Calculations for Preservation of Coptic Mural Paintings in Historic Egyptian Monasteries. *Sci Rep 9*, 3903. https://doi.org/10.1038/s41598-019-40297-z.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Salem, N. M., Mahdi, H. M. K., & Abbas, H. M. (2019). Random-Shaped Image Inpainting using Dilated Convolution. *International Journal of Engineering and Advanced Technology*, *8*(6), 641-647. https://doi.org/10.35940/ijeat.F8089.088619.

Salimans, T., Goodfellow, I., Zaremba, W., Cheung, V., Radford, A., & Chen, X. (2016). Improved Techniques for Training GANs. *NIPS'16: Proceedings of the 30th International Conference on Neural Information Processing Systems*, 2234-2242.

Sarker, I. H. (2021). Machine learning: Algorithms, real-world applications and research directions. *SN Computer Science, 2*(3), 160. https://doi.org/10.1007/s42979-021-00592-x.

Saxena, D., & Cao, J. (2021). Generative adversarial networks (GANs) challenges, solutions, and future directions. *ACM Computing Surveys (CSUR), 54*(3), 1-42.

Serre, D. (2007). *Matrices: Theory and Applications*. USA: Springer New York.

Shapiro, L., & Stockman, G. (2000). *Computer Vision*.

Sharma, S., Sharma, S., & Athaiya, A. (2020). Activation Functions in Neural Networks. *International Journal of Engineering Applied Sciences and Technology, 4*(12), 310-316. https://doi.org/10.33564/IJEAST.2020.v04i12.054.

Shi, J., & Malik, J. (2000). Normalized Cuts and Image Segmentation. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 22*(8), 888-905. https://doi.org/10.1109/34.868688.

Shi, J., Dang, J., Cui, M., Zuo, R., Shimizu, K., Tsunoda, A., & Suzuki, Y. (2021). Improvement of Damage Segmentation Based on Pixel-Level Data Balance Using VGG-Unet. *Applied Sciences, 11*(2). https://doi.org/10.3390/app11020518.

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Shih, T. K., Chang, R. C., Chou, S. M., Chen, Y. P., & Huang, H. C. (2008). Digital Inpainting. In: Furht, B. (eds) *Encyclopedia of Multimedia*. https://doi.org/10.1007/978-0-387-78414-4_301.

Shin, Y. G., Sagong, M. C., Yeo, Y. J., Kim, S. W., & Ko, S. J. (2021). PEPSI++: Fast and Lightweight Network for Image Inpainting. *IEEE Transactions on Neural Networks and Learning Systems, 32*, 252-265. https://doi.org/10.1109/TNNLS.2020.2978501.

Shulga, D., Morozov, O., Roth, V., Friedrich, F., & Hunziker, P.R. (2019). Tensor B-Spline Numerical Methods for PDEs: a High-Performance Alternative to FEM [Ilustrasi grafis]. *ArXiv, abs/1904.03057*.

Simonyan, K., & Zisserman, A. (2014). Very Deep Convolutional Networks for Large-Scale Image Recognition. *CoRR, abs/1409.1556*.

Sizyakin, R., Voronin, V., & Pižurica, A. (2022). Virtual restoration of paintings based on deep learning. *Fourteenth International Conference on Machine Vision (ICMV 2021)*. https://doi.org/10.1117/12.2624371.

Sohrab, H. H. (2014). *Basic Real Analysis*. Springer. https://doi.org/10.1007/978-1-4939-1841-6.

Somawirata, I. K., Soetedjo, A., Sotyohadi, S., Utaminingrum, F., & Mel, M. (2020). Image Restoration using Mirroring Method Which Based on the Gradient Direction. *E3S Web Conf., 188*. https://doi.org/10.1051/e3sconf/202018800011.

Srihari, S. N. (2020). *GAN Mode Collapse* [PDF]. University at Buffalo Deep Learning: https://cedar.buffalo.edu/~srihari/CSE676.

Sun, M., Zhang, D., Wang, Z., Ren, J., Chai, B., & Sun, J. (2015). What's Wrong with the Murals at the Mogao Grottoes: A Near Infrared Hyperspectral Imaging Method. *Scientific Reports, 5*, 14371. https://doi.org/10.1038/srep14371.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Szegedy, C., Ioffe, S., & Vanhoucke, V. (2016). Inception-v4, inception-resnet and the impact of residual connections on learning. *ICLR*.

Szegedy, C., Vanhoucke, V., Ioffe, S., Shlens, J., & Wojna, Z. Rethinking the inception architecture for computer vision. *CVPR*.

Tieleman, T., & Hinton, G. (2012). *Neural Networks for Machine Learning: Lecture 6* [PDF]. https://www.cs.toronto.edu/~tijmen/csc321/slides/lecture_slides_lec6.pdf.

Theodorus, A. (2020). *Restoration of Damaged Face Statues Using Deep Generative Inpainting Model* [Master's thesis, University of Twente]. University of Twente Student Theses. https://essay.utwente.nl/82706/.

Theis, L., Oord, A., & Bethge, M. (2016). A note on the evaluation of generative models. *CoRR, abs/1511.01844*. https://api.semanticscholar.org/CorpusID:2187805.

Tringham, S., & Rickerby, S. (2020). Challenges of Conserving Wall Paintings: A 30-Year Perspective. *Studies in Conservation, 65*, 327-332. https://doi.org/10.1080/00393630.2020.1770418.

Uhrig, R.E. (1995). Introduction to artificial neural networks. *Proceedings of IECON '95 - 21st Annual Conference on IEEE Industrial Electronics, 1*, 33-37. https://doi.org/10.1109/IECON.1995.483329.

UNESCO. (n.d.). *Mogao Caves*. https://whc.unesco.org/en/list/440/.

Vašata, D., Halama, T., & Friedjungová, M. (2021). Image Inpainting Using Wasserstein Generative Adversarial Imputation Network. In: Farkaš, I., Masulli, P., Otte, S., Wermter, S. (eds) *Artificial Neural Networks and Machine Learning – ICANN 2021*. https://doi.org/10.1007/978-3-030-86340-1_46.

Villani, C. (2008). *Optimal transport, old and new*. Springer.

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Vitoria, P., Sintes, J., & Ballester, C. (2019). Semantic Image Inpainting through Improved Wasserstein Generative Adversarial Networks. *Proceedings of the 14th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications VISIGRAPP, 4*, 249-260. http://dx.doi.org/10.5220/0007367902490260.

Wahyuni, M. (2020). *Statistik Deskriptif untuk Penelitian oleh Data Manual dan SPSS Versi 25*. Yogyakarta: Bintang Pustaka Madani.

Wan, Z., Zhang, B., Chen, D., Zhang, P., Chen, D., Liao, J., & Wen, F. (2023). Old Photo Restoration via Deep Latent Space Translation. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 45*(2), 2071-2087. https://doi.org/10.1109/TPAMI.2022.3163183.

Wang, Z., Bovik, A.C., Sheikh, H.R., & Simoncelli, E.P. (2004). Image quality assessment: from error visibility to structural similarity. *IEEE Transactions on Image Processing, 13*, 600-612. https://doi.org/10.1109/TIP.2003.819861.

Wang, X., Yu, K., Dong, C., & Loy, C.C. (2018). Recovering Realistic Texture in Image Super-Resolution by Deep Spatial Feature Transform. *2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 606-615.

Wang, H., Jiao, L., Wu, H., & Bie, R. (2019). New inpainting algorithm based on simplified context encoders and multi-scale adversarial network. *Procedia Computer Science, 147*, 254-263. http://dx.doi.org/10.1016/j.procs.2019.01.250.

Wang, Q., Ma, Y., Zhao, K., & Tian, Y. (2020). A comprehensive survey of loss functions in machine learning. *Annals of Data Science*, 1-26.

Wang, Y., & Wu, X. (2023). Current progress on murals: distribution, conservation and utilization. *Heritage Science, 11*(1), 61.

Weerts, H.J., Mueller, A., & Vanschoren, J. (2020). Importance of Tuning Hyperparameters of Machine Learning Algorithms. *ArXiv, abs/2007.07588*.

UNIVERSITAS
GADJAH MADA
**Implementasi Teknik Digital Inpainting dengan Wasserstein Generative Adversarial Networks (WGAN)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Westberg, S. (2021). Investigating the Learning Behavior of Generative Adversarial Networks [Master's thesis, KTH Royal Institute of Technology School of Electrical Engineering and Computer Science]. Digitala Vetenskapliga Arkivet. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1591962&dswid=7846.

Wildenstein Plattner Institute. (2024). *The WPI Digital Archives: Art Historical Research for the Digital Future*. https://wpi.art/2024/01/01/the-wpi-digital-archives-art-historical-research-for-the-digital-

Wilson, A.C., Roelofs, R., Stern, M., Srebro, N., & Recht, B. (2017). The Marginal Value of Adaptive Gradient Methods in Machine Learning. *Neural Information Processing Systems*.

Wlodzislaw, D., & Jankowski, N. (1999). Survey of Neural Transfer Functions.

Xie, J., Xu, L., & Chen, E. (2012). Image Denoising and Inpainting with Deep Neural Networks. *Advances in Neural Information Processing Systems, 25*, 341-349.

Xu, Y., & Goodacre, R. (2018). On splitting training and validation set: a comparative study of cross-validation, bootstrap and systematic sampling for estimating the generalization performance of supervised learning. *Journal of analysis and testing, 2*(3), 249-262.

Xu, Y., Li, Y., & Li, Z. (2019). Some results on the Hadamard product of tensors. *Bulletin of the Iranian Mathematical Society, 45*, 1193-1219.

Xu, Z., Yang, Y., Fang, Q., Chen, W., Xu, T., Liu, J., & Wang, Z. (2024). A comprehensive dataset for digital restoration of Dunhuang murals. *Scientific Data, 11*(955). https://doi.org/10.1038/s41597-024-03785-0.

Xu, Z., Yang, Y., Fang, Q., Chen, W., Xu, T., Liu, J., & Wang, Z. (2024). *MuralDH* [Data set]. https://datadryad.org/stash/landing/show?id=doi%3A10.5061%2Fdryad.bnzs7h4jd.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Yang, J., & Ruhaiyem, N. I. R. (2024). Review of Deep Learning-Based Image Inpainting Techniques. *IEEE Access*.

Yeh, R. A., Chen, C., Lim, T. Y., Schwing, A. G., Hasegawa-Johnson, M., & Do, M. N. (2017). Semantic Image Inpainting with Deep Generative Models. *2017 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 6882-6890. http://dx.doi.org/10.1109/CVPR.2017.728.

Yu, F., Seff, A., Zhang, Y., Song, S., Funkhouser, T., & Xiao, J. (2015). LSUN: Construction of a Large-scale Image Dataset using Deep Learning with Humans in the Loop. *arXiv:1506.03365*. https://doi.org/10.48550/arXiv.1506.03365.

Yu, F. & Koltun, V. (2016). Multi-Scale Context Aggregation by Dilated Convolutions. *CoRR, abs/1511.07122*.

Yu, J., Zhe, L., Yang, J., Shen, X., Lu, X., & Huang, T. S. (2018). Generative Image Inpainting with Contextual Attention. *2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 5505-5514. https://doi.org/10.1109/CVPR.2018.00577.

Zeiler, M.D., Krishnan, D., Taylor, G.W., & Fergus, R. (2010). Deconvolutional networks. *2010 IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, 2528-2535.

Zeiler, M.D., Taylor, G.W., & Fergus, R. (2011). Adaptive deconvolutional networks for mid and high level feature learning. *2011 International Conference on Computer Vision*, 2018-2025.

Zhang, Y., & An, M. (2017). Deep learning-and transfer learning-based super resolution reconstruction from single medical image. *Journal of healthcare engineering, 2017*(1), 5859727.

Zhang, Y., Ding, J., & Yu, J. (2024). Art image inpainting via embedding multiple attention dilated convolutions. *Multimedia Tools and Application, 83*, 36455–36468. https://doi.org/10.1007/s11042-023-15285-1.

UNIVERSITAS
GADJAH MADA
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Zhao, H., Gallo, O., Frosio, I., & Kautz, J. (2016). Loss functions for image restoration with neural networks. *IEEE Transactions on computational imaging, 3*(1), 47-57.

Zhao, F., Ren, H., Sun, K., & Zhu, X. (2024). GAN-based heterogeneous network for ancient mural restoration. *Heritage Science, 12*, 418. https://doi.org/10.1186/s40494-024-01517-6.

Zhu, L., Han, Y., Xi, X., Li, L., & Yan, B. (2021). Completion of Metal-Damaged Traces Based on Deep Learning in Sinogram Domain for Metal Artifacts Reduction in CT Images. *Sensors, 21*(24). https://doi.org/10.3390/s21248164.

Zhuang, F., Qi, Z., Duan, K., Xi, D., Zhu, Y., Zhu, H., Xiong, H., & He, Q. (2020). A comprehensive survey on transfer learning. *Proceedings of the IEEE, 109*(1), 43-76.

Zorich, V. A. (2015). *Mathematical Analysis I*. Jerman: Springer-Verlag Berlin Heideberg. https://doi.org/10.1007/978-3-662-48792-1.