UNIVERSITAS
GADJAH MADA
PENERAPAN PIPELINE FOR ADVANCED CONTRAST ENHANCEMENT (PACE) 2.0 UNTUK PENINGKATAN KUALITAS CITRA
RADIOGRAFI DIGITAL PADA SISTEM DIRECT DIGITAL RADIOGRAPHY (DDR) MADEENA
Arif Tia Diva, Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

# DAFTAR PUSTAKA

Bhuiyan, S. M. A., Adhami, R. R., & Khan, J. F. (2008a). A novel approach of fast and adaptive bidimensional empirical mode decomposition. *2008 IEEE International Conference on Acoustics, Speech and Signal Processing*, 1313–1316. https://doi.org/10.1109/ICASSP.2008.4517859

Bhuiyan, S. M. A., Adhami, R. R., & Khan, J. F. (2008b). A novel approach of fast and adaptive bidimensional empirical mode decomposition. *2008 IEEE International Conference on Acoustics, Speech and Signal Processing*, 1313–1316. https://doi.org/10.1109/ICASSP.2008.4517859

Boita, J., van Engen, R. E., Mackenzie, A., Tingberg, A., Bosmans, H., Bolejko, A., Zackrisson, S., Wallis, M. G., Ikeda, D. M., Van Ongeval, C., Pijnappel, R., Broeders, M., Sechopoulos, I., & VISUAL group. (2021). How does image quality affect radiologists' perceived ability for image interpretation and lesion detection in digital mammography? *European Radiology*, *31*(7), 5335–5343. https://doi.org/10.1007/s00330-020-07679-8

Buades, A., Coll, B., & Morel, J.-M. (2005a). A Non-Local Algorithm for Image Denoising. *2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)*, *2*, 60–65. https://doi.org/10.1109/CVPR.2005.38

Buades, A., Coll, B., & Morel, J.-M. (2005b). A non-local algorithm for image denoising. *2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)*, *2*, 60–65 vol. 2. https://doi.org/10.1109/CVPR.2005.38

Bushberg, J. T., Seibert, J. A., Leidholdt, E. M. J., & Boone, J. M. (with Ovid Technologies, Inc). (2012). *The essential physics of medical imaging* (3rd edition). Wolters Kluwer Health/Lippincott Williams & Wilkins.

Bushong, S. C. (2021). *RADIOLOGIC SCIENCE FOR TECHNOLOGISTS: PHYSICS, BIOLOGY, AND PROTECTION* (12th ed.). Elsevier Inc.

Chand, S., & Wagner, M. (2015). Evolutionary many-objective optimization: A quick-start guide. *Surveys in Operations Research and Management Science*, *20*(2), 35–42. https://doi.org/10.1016/j.sorms.2015.08.001

UNIVERSITAS
GADJAH MADA
**PENERAPAN PIPELINE FOR ADVANCED CONTRAST ENHANCEMENT (PACE) 2.0 UNTUK PENINGKATAN KUALITAS CITRA RADIOGRAFI DIGITAL PADA SISTEM DIRECT DIGITAL RADIOGRAPHY (DDR) MADEENA**
Arif Tia Diva, Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.
**Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/**

Flandrin, P., Gonçalvès, P., & Rilling, G. (2014). EMD EQUIVALENT FILTER BANKS, FROM INTERPRETATION TO APPLICATIONS. In N. E. Huang & S. S. P. Shen, *Interdisciplinary Mathematical Sciences* (2nd ed., Vol. 16, pp. 99–116). WORLD SCIENTIFIC. https://doi.org/10.1142/9789814508247_0005

Hendee, W. R., & Ritenour, E. R. (2002). *Medical imaging physics* (Fourth edition). Wiley-Liss. https://doi.org/10.1002/0471221155

Kruger, R. P., Hall, E. L., Dwyer, S. J., & Lodwick, G. S. (1971). Digital techniques for image enhancement of radiographs. *International Journal of Bio-Medical Computing*, *2*(3), 215–238. https://doi.org/10.1016/0020-7101(71)90013-4

Kwan, A. L. C., Seibert, J. A., & Boone, J. M. (2006). An improved method for flat-field correction of flat panel x-ray detector. *Medical Physics*, *33*(2), 391–393. https://doi.org/10.1118/1.2163388

Louk, A. C., & Suparta, G. B. (2014). Pengukuran Kualitas Sistem Pencitraan Radiografi Digital Sinar-X. *Berkala Ilmiah MIPA*, *24*(2), 241506.

Mirza, M. W., Siddiq, A., & Khan, I. R. (2023). A comparative study of medical image enhancement algorithms and quality assessment metrics on COVID-19 CT images. *Signal, Image and Video Processing*, *17*(4), 915–924. https://doi.org/10.1007/s11760-022-02214-2

Mittal, A., Moorthy, A. K., & Bovik, A. C. (2012). No-Reference Image Quality Assessment in the Spatial Domain. *IEEE Transactions on Image Processing*, *21*(12), 4695–4708. https://doi.org/10.1109/TIP.2012.2214050

Omarova, G., Aitkozha, Z., Sadirmekova, Z., Zhidekulova, G., Kazimova, D., Muratkhan, R., Takuadina, A., & Abdykeshova, D. (2022). Devising a methodology for X-ray image contrast enhancement by combining CLAHE and gamma correction. *Eastern-European Journal of Enterprise Technologies*, *3*(2 (117)), 18–29. https://doi.org/10.15587/1729-4061.2022.258092

Panetta, K., Samani, A., & Agaian, S. (2014). Choosing the Optimal Spatial Domain Measure of Enhancement for Mammogram Images. *International Journal of Biomedical Imaging*, *2014*(1), 937849. https://doi.org/10.1155/2014/937849

UNIVERSITAS
GADJAH MADA
**PENERAPAN PIPELINE FOR ADVANCED CONTRAST ENHANCEMENT (PACE) 2.0 UNTUK PENINGKATAN KUALITAS CITRA RADIOGRAFI DIGITAL PADA SISTEM DIRECT DIGITAL RADIOGRAPHY (DDR) MADEENA**
Arif Tia Diva, Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.
**Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/**

Pizer, S. M., Amburn, E. P., Austin, J. D., Cromartie, R., Geselowitz, A., Greer, T., Ter Haar Romeny, B., Zimmerman, J. B., & Zuiderveld, K. (1987). Adaptive histogram equalization and its variations. *Computer Vision, Graphics, and Image Processing*, *39*(3), 355–368. https://doi.org/10.1016/S0734-189X(87)80186-X

Pizer, S. M., Austin, J. D., Perry., J. R., Safrit, H. D., & Zimmerman, J. B. (1986). *Adaptive Histogram Equalization For Automatic Contrast Enhancement Of Medical Images* (S. J. Dwyer Iii & R. H. Schneider, Eds.; p. 242). https://doi.org/10.1117/12.975399

Rahman, S., Rahman, M. M., Abdullah-Al-Wadud, M., Al-Quaderi, G. D., & Shoyaib, M. (2016). An adaptive gamma correction for image enhancement. *EURASIP Journal on Image and Video Processing*, *2016*(1), 35. https://doi.org/10.1186/s13640-016-0138-1

Renieblas, G. P., Nogués, A. T., González, A. M., Gómez-Leon, N., & Del Castillo, E. G. (2017). Structural similarity index family for image quality assessment in radiological images. *Journal of Medical Imaging*, *4*(3), 035501. https://doi.org/10.1117/1.JMI.4.3.035501

Rossmann, K. (1968). The Spatial Frequency Spectrum: A Means for Studying the Quality of Radiographic Imaging Systems. *Radiology*, *90*(1), 1–13. https://doi.org/10.1148/90.1.1

Seeram, E. (2019). *Digital Radiography: Physical Principles and Quality Control* (2nd ed. 2019). Springer Singapore : Imprint: Springer. https://doi.org/10.1007/978-981-13-3244-9

Seibert, J. A., & Boone, J. M. (2005). X-ray imaging physics for nuclear medicine technologists. Part 2: X-ray interactions and image formation. *Journal of Nuclear Medicine Technology*, *33*(1), 3–18.

Seibert, J. A., Boone, J. M., & Lindfors, K. K. (1998). Flat-field correction technique for digital detectors. *Medical Imaging 1998: Physics of Medical Imaging*, *3336*, 348. https://doi.org/10.1117/12.317034

Siracusano, G., La Corte, A., Gaeta, M., Cicero, G., Chiappini, M., & Finocchio, G. (2020). Pipeline for Advanced Contrast Enhancement (PACE) of Chest X-ray in Evaluating COVID-19 Patients by Combining Bidimensional Empirical Mode Decomposition and Contrast Limited Adaptive Histogram Equalization (CLAHE). *Sustainability*, *12*(20), 8573. https://doi.org/10.3390/su12208573

UNIVERSITAS
GADJAH MADA
**PENERAPAN PIPELINE FOR ADVANCED CONTRAST ENHANCEMENT (PACE) 2.0 UNTUK PENINGKATAN KUALITAS CITRA RADIOGRAFI DIGITAL PADA SISTEM DIRECT DIGITAL RADIOGRAPHY (DDR) MADEENA**
Arif Tia Diva, Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.
**Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/**

Siracusano, G., La Corte, A., Nucera, A. G., Gaeta, M., Chiappini, M., & Finocchio, G. (2023). Effective processing pipeline PACE 2.0 for enhancing chest x-ray contrast and diagnostic interpretability. *Scientific Reports*, *13*(1), 22471. https://doi.org/10.1038/s41598-023-49534-y

Sprawls, P. (1987). *Physical principles of medical imaging*. Aspen Publishers.

Van Nieuwenhove, V., De Beenhouwer, J., De Carlo, F., Mancini, L., Marone, F., & Sijbers, J. (2015). Dynamic intensity normalization using eigen flat fields in X-ray imaging. *Optics Express*, *23*(21), 27975. https://doi.org/10.1364/OE.23.027975

Vijayalakshmi, D., & Malaya Kumar Nath. (2020). Taxonomy of Performance Measures for Contrast Enhancement. *Pattern Recognition and Image Analysis*, *30*(4), 691–701. https://doi.org/10.1134/S1054661820040240

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*(4), 600–612. https://doi.org/10.1109/TIP.2003.819861

Wang, Z., Zhuang, J., Ye, S., Xu, N., Xiao, J., & Peng, C. (2023). Image Restoration Quality Assessment Based on Regional Differential Information Entropy. *Entropy*, *25*(1), 144. https://doi.org/10.3390/e25010144

Wen, H., Qi, W., & Shuang, L. (2016). Medical X-Ray Image Enhancement Based on Wavelet Domain Homomorphic Filtering and CLAHE. *2016 International Conference on Robots & Intelligent System (ICRIS)*, 249–254. https://doi.org/10.1109/ICRIS.2016.50

Weng, J., Xu, W., Wiaderek, K. M., Borkiewicz, O. J., Chen, J., Von Dreele, R. B., Gallington, L. C., & Ruett, U. (2023). *In situ* X-ray area detector flat-field correction at an operating photon energy without flat illumination. Corrigendum. *Journal of Synchrotron Radiation*, *30*(4), 855–855. https://doi.org/10.1107/S1600577523004320

Wu, Y., Tan, D., Hai, C., Yang, M., Zhang, H., & Liu, J. (2024). An enhancement algorithm based on multi-grayscale fusion and edge-weight for low contrast X-ray image. *NDT & E International*, *143*, 103051. https://doi.org/10.1016/j.ndteint.2024.103051

Yu, Y., & Wang, J. (2012). Beam hardening-respecting flat field correction of digital X-ray detectors. *2012 19th IEEE International Conference on Image Processing*, 2085–2088. https://doi.org/10.1109/ICIP.2012.6467302

UNIVERSITAS
GADJAH MADA
**PENERAPAN PIPELINE FOR ADVANCED CONTRAST ENHANCEMENT (PACE) 2.0 UNTUK PENINGKATAN KUALITAS CITRA RADIOGRAFI DIGITAL PADA SISTEM DIRECT DIGITAL RADIOGRAPHY (DDR) MADEENA**
Arif Tia Diva, Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.
**Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/**

Zhang, Z. (2000). A flexible new technique for camera calibration. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *22*(11), 1330–1334. https://doi.org/10.1109/34.888718

Zuiderveld, K. (1994). Contrast Limited Adaptive Histogram Equalization. In *Graphics Gems* (pp. 474–485). Elsevier. https://doi.org/10.1016/B978-0-12-336156-1.50061-6