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DAFTAR PUSTAKA

Adadi, A., & Berrada, M. (2018). Peeking inside the black-box: A survey on explainable artificial intelligence (XAI). *IEEE Access*, *6*, 52138–52160. https://doi.org/10.1109/access.2018.2870052

Ahonen, T., Hadid, A., & Pietikäinen, M. (2004). Face recognition with local binary patterns. *Lecture notes in computer science* (pp. 469–481). https://doi.org/10.1007/978-3-540-24670-1_36

Aisyah, D. N., Setiawan, A. H., Lokopessy, A. F., Faradiba, N., Setiaji, S., Manikam, L., & Kozlakidis, Z. (2024). The information and communication technology maturity assessment at primary health care services across 9 provinces in Indonesia: Evaluation study. *JMIR Medical Informatics*, *12*, e55959. https://doi.org/10.2196/55959

Albawi, S., Mohammed, T. A., & Al-Zawi, S. (2017). Understanding of a convolutional neural network. *International Conference of Engineering and Technology (ICET)*, *1–6*. https://doi.org/10.1109/icengtechnol.2017.8308186

Alpaydin, E. (2010). *Introduction to machine learning*. MIT Press (MA).

American Cancer Society. (2020). *What are adult brain and spinal cord tumors?*. Diakses 18 September 2025, dari https://www.cancer.org/cancer/types/brain-spinal-cord-tumors-adults/about/what-are-brain-spinal-tumors.html

Archana, R., & Jeevaraj, P. S. E. (2024). Deep learning models for digital image processing: A review. *Artificial Intelligence Review*, *57*(1). https://doi.org/10.1007/s10462-023-10631-z

Azhar, S., & Chong, L. R. (2022). Clinician's guide to the basic principles of MRI. *Postgraduate Medical Journal*, *99*(1174), 894-903. https://doi.org/10.1136/pmj-2022-141998

Azzeh, M., Elsheikh, Y., Nassif, A. B., & Angelis, L. (2022). Examining the performance of kernel methods for software defect prediction based on support vector machine. *Science of Computer Programming*, *226*, 102916. https://doi.org/10.1016/j.scico.2022.102916

Badillo, S., Banfai, B., Birzele, F., Davydov, I. I., Hutchinson, L., Kam-Thong, T., Siebourg-Polster, J., Steiert, B., & Zhang, J. D. (2020). An introduction to machine learning. *Clinical Pharmacology & Therapeutics*, *107*(4), 871–885. https://doi.org/10.1002/cpt.1796

Basthikodi, M., Chaithrashree, M., Shafeeq, B. M. A., & Gurpur, A. P. (2024). Enhancing multiclass brain tumor diagnosis using SVM and innovative feature extraction techniques. *Scientific Reports*, *14*(1). https://doi.org/10.1038/s41598-024-77243-7

Bhattacharjee, S., Prakash, D., Kim, C., Kim, H., & Choi, H. (2022). Texture, morphology, and statistical analysis to differentiate primary brain tumors on

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GADJAH MADA
**Model Klasifikasi Tumor Otak pada Citra MRI Berbasis Varian Local Binary Pattern dan Support Vector
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two-dimensional magnetic resonance imaging scans using artificial intelligence techniques. *Healthcare Informatics Research*, *28*(1), 46–57. https://doi.org/10.4258/hir.2022.28.1.46

Bhuvaji, S., Kadam, A., Bhumkar, P., Dedge, S., & Kanchan, S. (2025). *Brain tumor classification (MRI)* [Data set]. Kaggle. https://doi.org/10.34740/KAGGLE/ DSV/ 12745533

Bishop, C. M. (2006). *Pattern recognition and machine learning*. Springer Verlag.

Chen, C., Isa, N. A. M., & Liu, X. (2024). A review of convolutional neural network based methods for medical image classification. *Computers in Biology and Medicine*, *185*, 109507. https://doi.org/10.1016/j.compbiomed.2024.109507

Cortes, C., & Vapnik, V. (1995). Support-vector networks. *Machine Learning*, *20*(3), 273–297. https://doi.org/10.1007/bf00994018

Dalal, N., & Triggs, B. (2005). Histograms of oriented gradients for human detection. *2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)* (pp. 886-893 vol. 1).

Defense Advanced Research Project Agency (DARPA). (n.d.). *XAI: Explainable artificial intelligence*. Diakses 14 November 2025, dari https://www.darpa.mil/research/programs/explainable-artificial-intelligence

Dhamara, A. S., Purnama, S. I., & Afandi, M. A. (2025). Implementasi arsitektur u-net untuk segmentasi tumor otak otomatis pada citra MRI dengan data pengujian asli. *e-Proceeding of Engineering*, *12*(4), 4608–4616.

Ehsan, S., Clark, A., Rehman, N., & McDonald-Maier, K. (2015). Integral images: efficient algorithms for their computation and storage in Resource-Constrained embedded vision systems. *Sensors*, 15(7), 16804–16830. https://doi.org/10.3390/s150716804

Ferlay, J., Ervik, M., Lam, F., Laversanne, M., Colombet, M., Mery, L., Piñeros, M., Znaor, A., Soerjomataram, I., & Bray, F. (2024). *Global cancer observatory: Cancer today*. Diakses 20 Juni 2025, dari https://gco.iarc.who.int/today

Gonzalez, R. C., & Woods, R. E. (2018). *Digital image processing, global edition*. Pearson Higher Education.

Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.

Grandini, M., Bagli, E. & Visani, G. (2020). Metrics for multi-class classification: An overview. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2008.05756

Haralick, R. M., Shanmugam, K., & Dinstein, I. (1973). Textural features for image classification. *IEEE Transactions on Systems, Man, and Cybernetics*, *SMC-3*(6), 610-621. https://doi.org/10.1109/tsmc.1973.4309314

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Hafshejani, S. F., & Moaberfard, Z. (2022). A new trigonometric kernel function for support vector machine. *Iran Journal of Computer Science*, *6*(2), 137–145. https://doi.org/10.1007/s42044-022-00130-9

Johns Hopkins Medicine. (n.d.). *Brain tumors and brain cancer*. Diakses 18 September 2025, dari https://www.hopkinsmedicine.org/health/conditions-and-diseases/brain-tumor

Johns Hopkins Medicine. (n.d.). *Magnetic resonance imaging (MRI)*. Diakses 18 September 2025, dari https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/magnetic-resonance-imaging-mri

Jun, Z. (2021). The development and application of support vector machine. *Journal of Physics Conference Series*, *1748*(5), 052006. https://doi.org/10.1088/ 1742-6596/1748/5/052006

Kaplan, K., Kaya, Y., Kuncan, M., & Ertunç, H. M. (2020). Brain tumor classification using modified local binary patterns (LBP) feature extraction methods. *Medical Hypotheses*, *139*, 109696. https://doi.org/10.1016/j.mehy.2020.109696

Liao, S., Zhu, X., Lei, Z., Zhang, L., & Li, S.Z. (2007). Learning multi-scale block local binary patterns for face recognition. *Lecture Notes in Computer Science*, *4642*, 828–837. https://doi.org/10.1007/978-3-540-74549-5_87

Liu, C. (2024). A review of digital image processing techniques and future prospects. *International Journal of Computer Science and Information Technology*, *4*(3), 223–233. https://doi.org/10.62051/ijcsit.v4n3.22

Liu, T. T. (2019). MRI in systems medicine. *WIRES Systems Biology and Medicine*, *12*(1). https://doi.org/10.1002/wsbm.1463

Maggioni, F., & Spinelli, A. (2024). A novel robust optimization model for nonlinear support vector machine. *European Journal of Operational Research*. https://doi.org/10.1016/j.ejor.2024.12.014

Mayo Clinic. (2024). *Brain tumor*. Diakses 16 September 2025, dari https://www.mayoclinic.org/diseases-conditions/brain-tumor/symptoms-causes/syc-20350084

Murdoch, W. J., Singh, C., Kumbier, K., Abbasi-Asl, R., & Yu, B. (2019). Definitions, methods, and applications in interpretable machine learning. *Proceedings of the National Academy of Sciences*, *116*(44), 22071–22080. https://doi.org/10.1073/pnas.1900654116

National Cancer Institute. (2023). *Brain and spine tumor anatomy and functions*. Diakses 16 September 2025, dari https://www.cancer.gov/ rare-brain-spine-tumor/tumors/anatomy

Ojala, T., Pietikainen, M., & Maenpaa, T. (2002). Multiresolution gray-scale and rotation invariant texture classification with local binary patterns. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *24*(7), 971–987. https://doi.org/10.1109/tpami.2002.1017623

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Özkaraca, O., Bağrıaçık, O. İ., Gürüler, H., Khan, F., Hussain, J., Khan, J., & Laila, U. E. (2023). Multiple brain tumor classification with dense CNN architecture using brain MRI images. *Life*, *13*(2), 349. https://doi.org/10.3390/life13020349

Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., Blondel, M., Müller, A., Nothman, J., Louppe, G., Prettenhofer, P., Weiss, R., Dubourg, V., Vanderplas, J., Passos, A., Cournapeau, D., Brucher, M., Perrot, M., & Duchesnay, É. (2012). SciKit-Learn: Machine learning in python. *arXiv* (Cornell University). https://doi.org/10.48550/arxiv.1201.0490

Ribeiro, M. T., Singh, S., & Guestrin, C. (2016d). "Why should i trust you?" Explaining the predictions of any classifier. *Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (pp. 1135–1144). https://doi.org/10.1145/2939672.2939778

Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach, fourth edition, global edition*. Pearson Higher Ed.

Seetha, J., & Raja, S. S. (2018). Brain tumor classification using convolutional neural networks. *Biomedical & Pharmacology Journal*, *11*(3), 1457–1461. https://doi.org/10.13005/bpj/1511

Sinaga, M. R. T., Tampubolon, B., Daulay, N. H., Triana, D., Hani, A., Simanjuntak, F. A., & Arnita, A. (2025). Development of deep learning model based on convolutional neural network (CNN) for brain tumor classification using MRI images. *EduMatika: Jurnal MIPA*, *5*(2), 27–34. https://doi.org/10.56495/ emju.v5i2.1105

Sze, V., Chen, Y., Yang, T., & Emer, J. (2017). Efficient processing of deep neural networks: A tutorial and survey. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.1703.09039

van der Velden, B. H., Kuijf, H. J., Gilhuijs, K. G., & Viergever, M. A. (2022). Explainable artificial intelligence (XAI) in deep learning-based medical image analysis. *Medical Image Analysis*, *79*, 102470. https://doi.org/10.1016/j.media.2022.102470

Vapnik, V. N., & Chervonenkis, A. Y. (1974). Theory of pattern recognition. *Moscow: Nauka*.

Yang, Q., Zhang, H., Xia, J., & Zhang, X. (2021). Evaluation of magnetic resonance image segmentation in brain low-grade gliomas using support vector machine and convolutional neural network. *Quantitative Imaging in Medicine and Surgery*, *11*(1), 300–316. https://doi.org/10.21037/qims-20-783