



## DAFTAR PUSTAKA

- Alghyaline, S. (2024). Optimised CNN Architectures for Handwritten Arabic Character Recognition. *Computers, Materials & Continua*, 79(3), 4905–4924. <https://doi.org/10.32604/cmc.2024.052016>.
- Alhag, A., Chunlin, L., Ahmed, F., Mohammed, H., Jihad, M., Zainab, O., & Mohammed, A. (2024). The Impact of Various Factors on the Convolutional Neural Networks Model on Arabic Handwritten Character Recognition. *International Journal of Advanced Computer Science and Applications*, 15(5). <https://doi.org/10.14569/IJACSA.2024.01505125>.
- Altwaijry, N., & Al-Turaiki, I. (2020). Arabic handwriting recognition system using convolutional neural network. *Neural Computing and Applications*. Retrieved from <https://link.springer.com/article/10.1007/s00521-020-05070-8> [Accessed October 7, 2024].
- An, S., Lee, M., Park, S., Yang, H., & So, J. (2020). An Ensemble of Simple Convolutional Neural Network Models for MNIST Digit Recognition. <https://doi.org/10.48550/arXiv.2008.10400>.
- Dongur, K. R., Tandekar, P., & Purve, S. K. (2022). Digital Image Processing: Its History and Application. *International Journal of Computer Sciences and Engineering*, 11(6).
- Duvvuri, K., Kanisettpalli, H., & Jayan, S. (2022). Detection of Brain Tumor Using CNN and CNN-SVM. In *2022 3rd International Conference for Emerging Technology (INCET)* (pp. 1–7). <https://doi.org/10.1109/INCET54531.2022.9824725>.
- Elagamy, M. N., Khalil, M. M., & Ismail, E. (2023). Hacr-Mdl: Handwritten Arabic Character Recognition Model Using Deep Learning. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, X-1/W1-2023, 123–128. <https://doi.org/10.5194/isprs-annals-X-1-W1-2023-123-2023>.



Evgeniou, T., & Pontil, M. (2001). Support Vector Machines: Theory and Applications. *Studies in Fuzziness and Soft Computing*, 249–257. [https://doi.org/10.1007/3-540-44673-7\\_12](https://doi.org/10.1007/3-540-44673-7_12).

Ghanim, T. M., Khalil, M. I., & Abbas, H. M. (2020). Comparative Study on Deep Convolution Neural Networks DCNN-Based Offline Arabic Handwriting Recognition. *IEEE Access*, 8, 95465–95482. <https://doi.org/10.1109/ACCESS.2020.2994290>.

Haboubi, S., Guesmi, T., Alshammari, B., Alqunun, K., Alshammari, A., Alsaif, H., & Amiri, H. (2022). Improving CNN-BGRU Hybrid Network for Arabic Handwritten Text Recognition. *Computers, Materials & Continua*, 73(3), 5385–5397. <https://doi.org/10.32604/cmc.2022.029198>.

Hochreiter, S., & Schmidhuber, J. (1997). Long Short-term Memory. *Neural Computation*, 9, 1735–80. <https://doi.org/10.1162/neco.1997.9.8.1735>.

Indolia, S., Goswami, A. K., Mishra, S. P., & Asopa, P. (2018). Conceptual Understanding of Convolutional Neural Network- A Deep Learning Approach. *Procedia Computer Science*, 132, 679–688. <https://doi.org/10.1016/j.procs.2018.05.069>.

Jayech, K., Trimech, N., Mahjoub, M. A., & Ben Amara, N. E. (2013). Dynamic hierarchical Bayesian network for Arabic handwritten word recognition. In *Fourth International Conference on Information and Communication Technology and Accessibility (ICTA)* (pp. 1–6). <https://doi.org/10.1109/ICTA.2013.6815309>.

Lamtougui, H., Mouftahij, H. E., Fouadi, H., & Satori, K. (2024). Improving Arabic handwritten text recognition through transfer learning with convolutional neural network-based models. *Bulletin of Electrical Engineering and Informatics*, 13(6), 4294–4305. <https://doi.org/10.11591/eei.v13i6.8178>.

Li, X., Huang, W., Peters, D. K., & Power, D. (2019). Assessment of Synthetic Aperture Radar Image Preprocessing Methods for Iceberg and Ship Recognition with Convolutional Neural Networks. In *2019 IEEE Radar*



UNIVERSITAS  
GADJAH MADA

Eksplorasi Pra-pemrosesan, Filter Konvolusi, SVM, LSTM, dan KAN untuk Rekognisi Karakter

Tulisan

Tangan Huruf Arab

Rahmania, Moh. Edi Wibowo, S.Kom., M.Kom., Ph. D.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Conference (RadarConf) (pp. 1–5).

<https://doi.org/10.1109/RADAR.2019.8835807>.

Liu, Z., Wang, Y., Vaidya, S., Ruehle, F., Halverson, J., Soljačić, M., Hou, T. Y., & Tegmark, M. (2024). KAN: Kolmogorov-Arnold Networks. <https://doi.org/10.48550/arXiv.2404.19756>.

Luo, C., Hao, Y., & Tong, Z. (2018). Research on Digital Image Processing Technology and Its Application. <https://doi.org/10.2991/meici-18.2018.116>.

Madaeni, F., Chokmani, K., Lhissou, R., Homayouni, S., Gauthier, Y., & Tolszczuk-Leclerc, S. (2022). Convolutional neural network and long short-term memory models for ice-jam predictions. *The Cryosphere*, 16(4), 1447–1468. <https://doi.org/10.5194/tc-16-1447-2022>.

May Mowaffaq, A.-T., Sonia Ben Hassen, N., Mondher, F., & Salah Taha, A. (2024). Using Faster R-CNN to Detect and Recognize Arabic Handwritten Words. *International Journal of Intelligent Engineering and Systems*, 17(3), 658–670. <https://doi.org/10.22266/ijies2024.0630.51>.

Mohamed, S., Mohamed, S., Mohamed, S., & Mohamed, S. (2024). Social Media - Opportunities and Risks. <https://doi.org/10.5772/intechopen.100650>.

Owens, J. (Ed.). (2013). *The Oxford Handbook of Arabic Linguistics*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199764136.001.0001>.

Patel, I., Patel, S., & Patel, A. (2018). Analysis of Various Image Preprocessing Techniques for Denoising of Flower Images. *International Journal of Computer Sciences and Engineering*, 6, 1111–1117. <https://doi.org/10.26438/ijcse/v6i5.11111117>.

Pechwitz, M., & Maergner, V. (2003). HMM based approach for handwritten Arabic word recognition using the IFN/ENIT - database. In *Seventh International Conference on Document Analysis and Recognition* (pp. 890–894). <https://doi.org/10.1109/ICDAR.2003.1227788>.



Powers, D. M. W. (2024). Evaluation: From precision, recall and F-measure to ROC, informedness, markedness & correlation. Retrieved from [https://www.researchgate.net/publication/276412348\\_Evaluation\\_From\\_precision\\_recall\\_and\\_F-measure\\_to\\_ROC\\_informedness\\_markedness\\_correlation](https://www.researchgate.net/publication/276412348_Evaluation_From_precision_recall_and_F-measure_to_ROC_informedness_markedness_correlation) [Accessed November 4, 2024].

Sarker, I. H. (2021). Deep Learning: A Comprehensive Overview on Techniques, Taxonomy, Applications and Research Directions. *SN Computer Science*, 2(6), 420. <https://doi.org/10.1007/s42979-021-00815-1>.

Sunil Bhutada, Nakerakanti Yashwanth, Puppala Dheeraj, & Kethavath Shekar. (2022). Opening and closing in morphological image processing. *World Journal of Advanced Research and Reviews*, 14(3), 687–695. <https://doi.org/10.30574/wjarr.2022.14.3.0576>.

Taher, D., Al-dihaymawee, D., Lect, A., Abbas, A., Merzah, Hussein, M., & Ridha. (2024). The Story of Arabic Language.

Tyagi, V. (2018). *Understanding Digital Image Processing*. <https://doi.org/10.1201/9781315123905>.

Wang, J. (2023). A Study of The OCR Development History and Directions of Development. *Highlights in Science, Engineering and Technology*, 72, 409–415. <https://doi.org/10.54097/bm665j77>.

Wu, Y., He, Y., & Wang, Y. (2023). Multi-Class Weed Recognition Using Hybrid CNN-SVM Classifier. *Sensors*, 23, 7153. <https://doi.org/10.3390/s23167153>.