ISSN 2535-1451

Cancer Diagnosis Optimization Using Deep Learning Algorithms and Neural Networks in Medical Imaging

Narcisa Zlatan, Hakan Khan, Najaad OubeBlika

- 1. Polytechnic University of Bucharest, Management Technology department, Romania
- 2. Department of Industrial Technology Engineering, Turkish-German University, Istanbul 34820, Turkey
- 3. Energies Materials and Industrial Engineering Research Center, Faculty of Sciences and Technology, University of Tamanghasset, Tamanrasset, 10034, Algeria

Abstract:

The early and accurate diagnosis of cancer is critical for improving patient outcomes. This study explores the use of deep learning algorithms and neural networks to optimize cancer diagnosis through medical imaging techniques, such as MRI, CT scans, and X-rays. By leveraging advanced image processing methods and convolutional neural networks (CNNs), the model is trained to identify and classify malignant tumors with high accuracy. The neural network analyzes complex imaging data, extracting key features that are often difficult for human clinicians to detect. The system also integrates a feature selection process to enhance diagnostic precision by focusing on the most relevant patterns and characteristics in the medical images. The proposed approach aims to assist healthcare professionals in diagnosing cancer more efficiently and effectively, reducing the time required for diagnosis while maintaining high levels of accuracy. The results highlight the potential of deep learning in revolutionizing cancer diagnosis, offering a reliable tool for clinicians to enhance their decision-making process.

Keywords:

Cancer diagnosis, deep learning, neural networks, medical imaging, tumor detection, convolutional neural networks.

REQUEST FOR FULL TEXT

REFERENCES

- El-Kenawy, E. S. M., Eid, M. M., Saber, M., & Ibrahim, A. (2020). MbGWO-SFS: Modified binary grey wolf optimizer based on stochastic fractal search for feature selection. IEEE Access, 8, 107635-107649.
- [2] El-Kenawy, E. S., & Eid, M. (2020). Hybrid gray wolf and particle swarm optimization for feature selection. Int. J. Innov. Comput. Inf. Control, 16(3), 831-844.
- [3] El-Kenawy, E. S. M., Khodadadi, N., Mirjalili, S., Abdelhamid, A. A., Eid, M. M., & Ibrahim, A. (2024). Greylag goose optimization: nature-inspired optimization algorithm. Expert Systems with Applications, 238, 122147.
- [4] Abdollahzadeh, B., Khodadadi, N., Barshandeh, S., Trojovský, P., Gharehchopogh, F. S., El-kenawy, E. S. M., ... & Mirjalili, S. (2024). Puma optimizer (PO): a novel metaheuristic optimization algorithm and its application in machine learning. Cluster Computing, 27(4), 5235-5283.
- [5] Khodadadi, N., Khodadadi, E., Al-Tashi, Q., El-Kenawy, E. S. M., Abualigah, L., Abdulkadir, S. J., ... & Mirjalili, S. (2023). BAOA: binary arithmetic optimization algorithm with K-nearest neighbor classifier for feature selection. IEEE Access, 11, 94094-94115.
- [6] Khodadadi, N., Abualigah, L., El-Kenawy, E. S. M., Snasel, V., & Mirjalili, S. (2022). An archive-based multi-objective arithmetic optimization algorithm for solving industrial engineering problems. IEEE Access, 10, 106673-106698.
- [7] El-Kenawy, E. S. M. T., & SM, E. (2019). A machine learning model for hemoglobin estimation and anemia classification. International Journal of Computer Science and Information Security (IJCSIS), 17(2), 100-108.
- [8] El-kenawy, E. S. M. T. (2018). Solar radiation machine learning production depend on training neural networks with ant colony optimization algorithms. International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), 7(5), 1-4.
- [9] Hassib, E. M., El-Desouky, A. I., Labib, L. M., & El-Kenawy, E. S. M. (2020). WOA+ BRNN: An imbalanced big data classification framework using Whale optimization and deep neural network. soft computing, 24(8), 5573-5592.
- [10] Kaveh, A., Talatahari, S., & Khodadadi, N. (2019). The hybrid invasive weed optimization-shuffled frog-leaping algorithm applied to optimal design of frame structures. Periodica Polytechnica Civil Engineering, 63(3), 882-897.
- [11] Khodadadi, N., Abualigah, L., & Mirjalili, S. (2022). Multi-objective stochastic paint optimizer (MOSPO). Neural Computing and Applications, 34(20), 18035-18058.
- [12] Kaveh, A., Talatahari, S., & Khodadadi, N. (2022). Stochastic paint optimizer: theory and application in civil engineering. Engineering with Computers, 1-32.
- [13] Khodadadi, N., & Mirjalili, S. (2022). Truss optimization with natural frequency constraints using generalized normal distribution optimization. Applied Intelligence, 52(9), 10384-10397.
- [14] Khodadadi, N., Soleimanian Gharehchopogh, F., & Mirjalili, S. (2022). MOAVOA: a new multi-objective artificial vultures optimization algorithm. Neural Computing and Applications, 34(23), 20791-20829.
- [15] Khodadadi, N., Abualigah, L., Al-Tashi, Q., & Mirjalili, S. (2023). Multi-objective chaos game optimization. Neural Computing and Applications, 35(20), 14973-15004.