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Enhancing Femoral Neck Fracture Detection in X-ray images with a Genetic Algorithm-Optimized Deep Learning Model

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Femoral fractures, a growing threat to the elderly, are predicted to double by 2050. Early diagnosis and intervention are crucial for joint protection, quality of life, and mobility after surgery. However, misdiagnosis triggers a cascade of delayed treatment, prolonged recovery, and spiralling costs, impacting both patients and healthcare systems.

Deep learning is revolutionizing medical image processing, transforming diagnosis and treatment by extracting hidden patterns from medical scans. Its precision in fracture detection minimizes misdiagnosis, reducing unnecessary procedures and hospital stays, leading to significant cost savings for patients and healthcare systems.

The success of a deep learning architecture is tightly dependent on the values of its hyperparameters. It is possible to increase the performance of a current model by selecting hyperparameters with a genetic algorithm. In our study, we achieved a 1.6% performance boost, in terms of accuracy, for an existing CNN model using a genetic algorithm.

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