



AB062. SOH22ABS166. BreastNet: a deep learning neural network model to aid breast cancer diagnosis using mammographic imaging

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Background: Clinical radiology has evolved such that artificial intelligence and deep learning models show potential to improve the robustness of medical diagnostics, particularly in the setting of cancer. In breast cancer, there is limited data supporting these models to inform early diagnosis.

Methods: To train a deep learning neural network capable of detecting malignant changes on mammography. Data on female patients who underwent treatment for unilateral breast cancer in our tertiary referral centre were included. All patients had previously undergone diagnostic mammography and subsequent histopathological confirmation of cancer. Annual follow-up mammography up to 5-year post-treatment confirmed freedom from disease in the contralateral non-malignant breast cohort. Image preprocessing included augmentation to 224×224 pixels in colour format. Mammograms were randomised into training (75%, n=317) and test (25%, n=105) groups. Transfer learning was performed using 'GoogLeNet' (144×1 layer network). Training involved a maximum of 30 Epoch and 60 Iterations at a learning rate of 0.001. Learning analyses was performed using MATLAB (r2021b). Receiver operating characteristic (ROC) analyses were used to determine diagnostic accuracy of the neural network for the test cohort.

Results: Overall, data from 186 patients (mean age: 49.9 years; range, 23–78 years) with median follow-up of 100.6 months were assessed. Training and test cohort accuracy reached 90.62% and 67.62% respectively. ROC analysis area under the curve for the test set was 0.689 [95% confidence interval (CI): 0.587–0.791].

Conclusions: This deep learning neural network can detect malignant changes on mammography compared to non-malignant images. Further training is required to enhance the diagnostic accuracy of this model.

Keywords: Deep neural network; artificial intelligence; breast cancer; radiology; diagnostics

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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