
Radiomics Model Betters Radiologists in Lesions Categorisation



A mammography-based radiomics model, developed by Chinese scientists with the use of machine learning, can distinguish malignant from benign calcifications – with better accuracy than trained radiologists.

The radiomic nomogram has the potential to be used as a diagnostic tool in clinical practice, helping to individualise care at reduced costs, according to the scientists in a report published by the European Journal of Radiology.

Machine learning enabled the new model to extract 8,286 radiomics features from hundreds of mammography images. Six radiomics features and a patient's menopausal state, researchers said, were chosen for inclusion in the final nomogram – which resembles a chart showing the relations between radiomic features.

The Chinese research team found that their radiomics model was effective in differentiating harmful from non-cancerous lesions, with an area under the receiver operating characteristic curve (AUC) of 0.80 in the validation cohort. This finding revealed a "significant difference" from the classifications made by radiologists, the researchers pointed out. In particular, the classification ability of the radiomics model was "very strong" when it comes to breast calcifications that appeared negative on ultrasound, but could be detected using mammography.

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As an imaging modality, mammography is useful identifying calcifications; however its specificity for discriminating benign from malignant findings remains low. AI-based radiomics extracts quantitative features (from imaging data) not visible to the naked eye and analyses the relationships between those features and pathological results to arrive at a conclusion.

"Radiomics not only enables oncologists to provide highly personalised care for tumour diagnosis and identifies phenotypic subtypes, but radiomics also noninvasively provides effective decisions at a low cost," explained the Chinese researchers.

Of note, the current study assessed the value of the new radiomics model for classifying breast imaging reporting and data system (BI-RADS) category 4 calcifications, which are considered the most difficult and suspicious category of lesions. By comparison, BI-RADS 1 to 3 and 5 calcifications have clear benign and malignant features and are "nearly meaningless to explore," the researchers said.

This study demonstrated the radiomics model's better performance compared with radiologists', indicating that "the high-dimensional radiomic features explored more detailed information about the breast calcifications than the naked eye," according to study authors.

Source: European Journal of Radiology; Radiology Business

Image: iStock

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