



Artificial Intelligence – what, how, when?

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Artificial intelligence (AI) is revolutionizing breast radiology, profoundly impacting diagnostics and workflow optimization. This transformation encompasses various facets, including the integration of Computer-Aided Diagnosis (CAD) systems.

Initially designed to aid radiologists in identifying abnormalities in mammograms, CAD systems have evolved significantly over the years. However, their introduction posed challenges, notably an increase in recall rates.

CAD's functionalities can be classified into three primary categories: Computer-Aided Detection (CADe), Computer-Aided Diagnosis (CADx), and Computer-Aided Triage (CADt).

CADe is instrumental in identifying suspicious areas, thereby enhancing sensitivity in mammography, albeit at the cost of higher recall rates. To address this, AI algorithms have been seamlessly integrated into CADe systems, allowing for the prioritization of cases with a reduced likelihood of a positive result and streamlining decision-making with CADx.

CADx merges human-perceived characteristics with AI-detected features, elevating diagnostic precision. In contrast, CADt optimizes radiologists' workflows by prioritizing examinations based on their urgency.

The realm of breast ultrasound, a dynamic, real-time procedure, has posed distinct challenges for CADe. Nonetheless, the standardization of 3D data acquisition in Automated Breast Ultrasound (ABUS) has paved the way for successful CADe algorithm development.

In the context of manual breast ultrasound, CADx systems play a pivotal role in decision-making, surmounting challenges related to lesion differentiation and enhancing performance when integrated with radiologists' evaluations.

AI's scope in breast imaging extends beyond CAD, encompassing workflow support algorithms, data processing algorithms, and risk assessment. This evolution promises transformative advancements in patient diagnostics and radiology practices, utilizing AI for advanced techniques like multiparametric imaging and radiomics.

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