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# A Review of Deep Learning Methods in Computer-Aided Detection and Diagnosis Systems based on Whole Mammogram and Ultrasound Scan Classification

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**Abstract :** Breast cancer remains to be one of the deadliest cancers for women worldwide, with the risk of developing tumors being as high as 50 percent in Sub-Saharan African countries like Kenya. With as many as 42 percent of these cases set to be diagnosed late when cancer has metastasized and or the prognosis has become terminal, Full Field Digital [FFD] Mammography remains an effective screening technique that leads to early detection where in most cases, successful interventions can be made to control or eliminate the tumors altogether. FFD Mammograms have been proven to multiply more effective when used together with Computer-Aided Detection and Diagnosis [CADe] systems, relying on algorithmic implementations of Deep Learning techniques in Computer Vision to carry out deep pattern recognition that is comparable to the level of a human radiologist and decipher whether specific areas of interest in the mammogram scan image portray abnormalities if any and whether these abnormalities are indicative of a benign or malignant tumor. Within this paper, we review emergent Deep Learning techniques that will prove relevant to the development of State-of-The-Art FFD Mammogram CADe systems. These techniques will span self-supervised learning for context-encoded occlusion, self-supervised learning for pre-processing and labeling automation, as well as the creation of a standardized large-scale mammography dataset as a benchmark for CADe systems' evaluation. Finally, comparisons are drawn between existing practices that pre-date these techniques and how the development of CADe systems that incorporate them will be different.

**Keywords :** breast cancer diagnosis, computer aided detection and diagnosis, deep learning, whole mammogram classfication, ultrasound classification, computer vision
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