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(57) Abstract :

A clinical decision support system for detection of breast cancer, comprising of diffusion models 101 to generate high-fidelity synthetic ultrasound and histopathology images, a fusion engine 102 integrates heterogeneous data sources, multiple self-supervised learning models 103 to pre-train the system on vast repositories of unlabeled breast imaging data, a physics-informed deep learning layer that embeds knowledge of ultrasound wave propagation and tissue interaction into the neural network, a reasoning module 104 for integrating clinical guidelines, recurrent transformers or temporal convolutional networks 105 for undertaking temporal progression analysis to track changes in breast lesions, and lifestyle factors, an energy-aware inference engine 108 capable of adaptive resource allocation depending on computing resource availability, a dual-level explainability dashboard 109 designed separately for clinicians and patients, the engines, models, layers, modules, transformers, frameworks are embedded in a memory and executed by a processor for detecting breast cancer.

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