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(57) Abstract :

A breast cancer diagnostic system, comprises of a data acquisition module 101 configured to receive multi-modal breast imaging data from sources including digital mammograms, MRI scans, and histopathology slide images, a data preprocessing unit 102 operatively coupled to the acquisition module 101 and configured to normalize, denoise, augment, and standardize input imaging data, an artificial intelligence-based diagnostic model 103 comprising a feature extractor and a classifier head for extracting diagnostic features and classifying breast lesions into malignant, benign, or non-cancerous categories, a meta-learning engine 104 coupled to the diagnostic model 103 and configured to enable rapid model adaptation to new clinical environments using few annotated samples, an artificial intelligence (XAI) module 105 generating visual explanations and interpretability maps, and a diagnostic interface 106 displaying classification results, confidence scores, and XAI outputs.

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