Highlights

- Novel Defense-Aware Attention Mechanism (DAAM) integrates adversarial robustness into feature extraction

- Medical domain-aware defensive strategy preserves diagnostic features while suppressing attacks

- Unstructured pruning enhances security rather than compromising it in medical imaging

- Achieves 97.52% adversarial accuracy with maintained diagnostic performance

- Comprehensive evaluation on Retinal OCT and Chest X-Ray datasets against multiple attacks