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اولین کنگره بین المللی تحول خدمات سلامت

۲۷ و ۲۸ مهر ماه

Code: 1116

Genetic Algorithm-Driven Independent RNN for Accurate Segmentation and Classification of Lung Nodules in CT Imaging

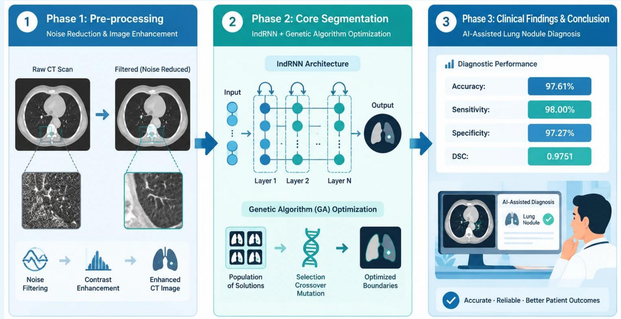




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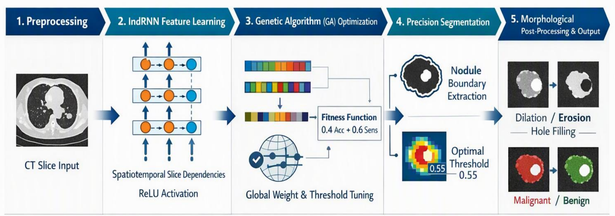
Backgrounds

Early detection of lung nodules in CT imaging is critical for improving patient survival rates. However, state-of-the-art Deep Learning models, such as standard CNNs and Vision Transformers, often face two significant challenges: high computational complexity (large parameter counts) and training instability (gradient vanishing/exploding issues).

To address these limitations, we propose the **Genetic Algorithm-Driven Independent RNN (GA-IndRNN)** framework:

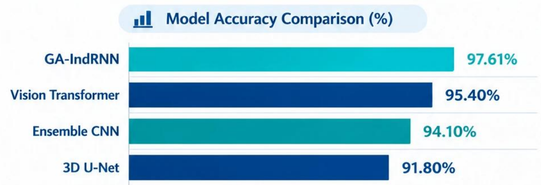
- **Robust Architecture:** We leverage **IndRNN** to effectively capture spatiotemporal dependencies while ensuring stable training and eliminating gradient issues.
- **Optimal Tuning:** A **Genetic Algorithm (GA)** is utilized for global optimization of hyperparameters and precise segmentation boundary adjustments.
- **Clinical Viability:** Our model achieves high performance (**97.61% accuracy**) with a lightweight architecture of only **4.2 million parameters**, making it highly efficient for resource-constrained clinical environments.

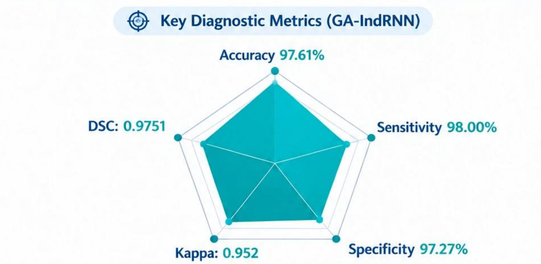
Methods

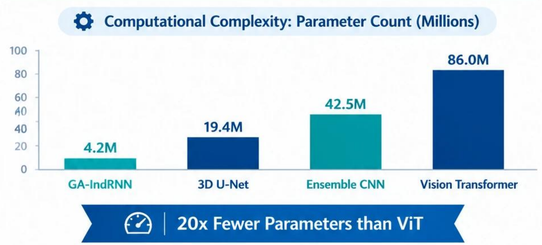


Findings

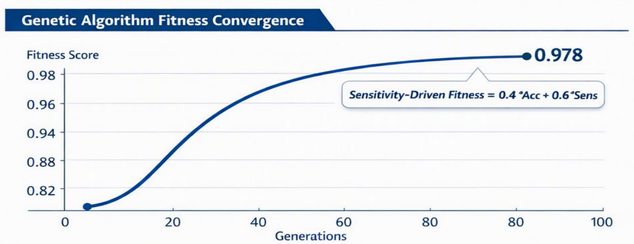
Performance & Efficiency Benchmark

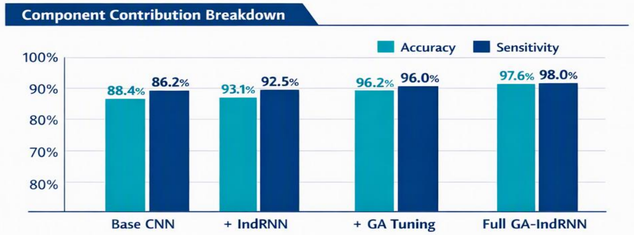


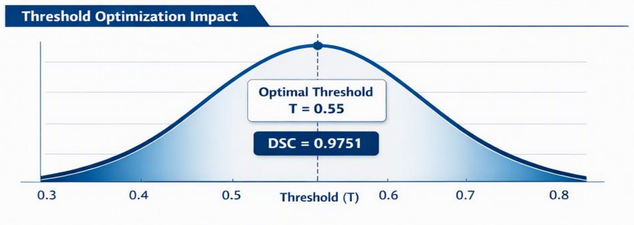




Ablation Study & Evolutionary Optimization

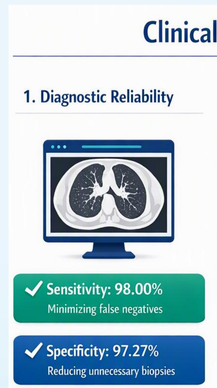






Conclusion

Clinical Impact & Concluding Insights



References

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