PEGCS: PORTABLE EARLY GASTRIC CANCER DIAGNOSIS SYSTEM BASED ON LIGHTWEIGHT MULTIMODAL FRAMEWORK

Liqian Qiu

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A lightweight deep learning framework (FusionWN-Net) was developed for early gastric cancer detection using white light and narrow band endoscopic images, achieving 86.52% diagnostic accuracy on mobile devices.

KEY POINTS

- FusionWN-Net combines two neural networks (WLI-Net and NBI-Net) designed for white light and narrow band imaging modalities, fusing their outputs using the Dempster-Shaffer algorithm.
- The framework was trained and evaluated on gastric endoscopic images from 1,055 patients across six hospitals including Fuzhou University Affiliated Provincial Hospital.
- WLI-Net achieved 83.31% accuracy with 3.182M parameters and 37.04 FPS on mobile devices; NBI-Net achieved 82.85% accuracy with 3.596M parameters and 24.39 FPS.
- The combined FusionWN-Net framework achieved 86.52% diagnostic accuracy with 6.778M parameters and 14.08 FPS, enabling deployment on resource-limited mobile devices.
- A portable early gastric cancer diagnosis system (PEGCS) was developed using Android Studio to implement the framework in clinical settings.

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