

AI-BUS: ARTIFICIAL INTELLIGENCE BOWEL ULTRASOUND SYSTEM

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Presentation

IBD

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A deep-learning model automatically segments bowel wall and measures bowel wall thickness from unprocessed intestinal ultrasound images in IBD with a mean deviation of 0.98 mm from expert consensus.

KEY POINTS

- The model achieved classification accuracy of 0.77, sensitivity of 0.69, specificity of 0.94, and Cohen's Kappa of 0.56 using the 3 mm IBUS threshold on 54 of 55 test images.
- Mean deviation from expert consensus was 0.98 mm (SD 1.1 mm), with 59% of predictions falling within the expert-defined bounds (average distance 0.44 mm, SD 0.89 mm).
- The model was trained on 570 real-world clinical images reflecting realistic conditions including unclear boundaries and artefacts, and tested against multiple IBUS-certified experts.
- Experts achieved 0.89–0.93 accuracy and 0.79–0.83 Kappa in leave-one-out analysis, while the model achieved 0.74–0.80 accuracy and 0.49–0.60 Kappa depending on which expert was excluded.
- The model works on unprocessed clinical data and produces explicit bowel wall thickness measurements for interpretability, addressing limitations of prior models that required manual cropping or ideal training data.

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