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PEER-REVIEW REPORT

Name of journal: *Artificial Intelligence in Gastrointestinal Endoscopy*

Manuscript NO: 108281

Title: Endoscopic image analysis assisted by machine learning: Algorithmic advancements and clinical uses

Provenance and peer review: Invited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 06198464

Position: Peer Reviewer

Academic degree and professional title: MD

Reviewer's Country/Territory: Italy

Author's Country/Territory: China

Manuscript submission date: 2025-04-09

Reviewer chosen by: Shang Wu

Reviewer accepted review: 2025-04-12 08:31

Reviewer performed review: 2025-04-12 08:39

Review time: 1 Hour

Content to be reviewed	Does the manuscript's content fall within the scope of the journal? Yes Is there any Key Word that is not included in the manuscript title? No Do authors' affiliations correspond to the content of the manuscript? Yes Does the Abstract contain the contents of each part of the manuscript (IMRaD)? Yes Are the Key Words complete? Yes
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Is the content of the Introduction adequate? **No**

Is the content of the Materials and Methods complete?
No

Is the description of the experiments clear and complete? **Yes**

Are the experimental data presented in the manuscript's biostatistics content reliable? **Yes**

Are the experimental data of the Results true and reliable? **Yes**

Are the quality and resolution of the images up to standard? **Yes**

Do the selection and design of the figures and tables follow the principles of necessity and clarity? **Yes**

Is there any duplication between various parts of the manuscript and between the main text and the content presented in the figures and tables? **No**

Are the figures and tables numbered consecutively in the order in which they appear in the manuscript? **Yes**

Is the content of the Discussion reasonable? **Yes**

Is the Conclusion reasonable? **Yes**

Are all references necessary and reasonable? **Yes**

Do authors omit important references? **No**

Are all references related to the topic of the manuscript? **Yes**

Do authors only cite their own earlier publications? **No**

Is the manuscript's text correct, concise, and clear? **Yes**

Will the manuscript's content be of interest to readers?
Yes

Are additional experiments needed for the study? **No**

Does the research scope comply with ethics? **Yes**



Scientific quality	Grade C (Good)
Novelty of this manuscript	Grade C (Good)
Creativity or innovation of this manuscript	Grade C (Good)
Scientific significance of the conclusion in this manuscript	Grade C (Good)
Language quality	Grade C (Good)
Does this manuscript describe a study of the existing knowledge system?	Yes
Does this manuscript report a revolutionary innovation?	No
Does this manuscript report an unconventional innovation?	No
Conclusion	Major revision
Re-review	No
Peer-reviewer statements	Peer-Review: Anonymous
	Conflicts-of-Interest: No
Are your review comments generated by AI tools?	

SPECIFIC COMMENTS TO AUTHORS

This manuscript offers a comprehensive and well-structured review of the applications of machine learning (ML)—particularly deep learning models such as CNNs—in gastrointestinal endoscopy. It systematically explores the technological evolution, diagnostic applications for both neoplastic and non-neoplastic diseases, and future research directions in this emerging field. The topic is highly relevant and timely, considering the rapid growth of AI-assisted diagnostics in endoscopy, especially in polyp detection, cancer risk stratification, and quality control. The manuscript



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demonstrates a strong grasp of the literature and underlying technical principles, while also aiming to bridge the gap between engineering advancements and clinical utility. However, several important revisions are necessary to enhance the clarity, critical appraisal, and completeness of the manuscript. Major Comments 1. Need for critical evaluation and structured synthesis. While the manuscript thoroughly reports on numerous ML techniques and studies, it reads as a narrative list of examples rather than a structured review. There is limited critical appraisal of: Which models are most promising in clinical translation? What are the comparative strengths/weaknesses of supervised vs. unsupervised models in endoscopy? How do sensitivity/specificity metrics vary across indications (Barrett's, gastric cancer, UC, etc.)? Consider adding structured summary tables that highlight: Application (e.g., lesion detection, image enhancement); Model type (CNN, hybrid, GAN); Dataset used. Reported accuracy/sensitivity/specificity and Clinical stage (development, validation, deployment). 2. Clinical perspective is underdeveloped. The paper is heavily technical. While this is expected in a methodological review, it underplays the clinical integration challenges, such as: Regulatory issues (AI as medical devices); Real-time integration in existing endoscopy systems; Clinical workflow barriers and resistance from end-users. Expand the discussion with insights into barriers to real-world adoption of AI in GI endoscopy and existing clinical studies or trials that are paving the way for implementation. 3. Overemphasis on select studies. Some sections rely heavily on individual case studies or very specific innovations (e.g., photoacoustic microscopy or dopamine-coated plasma needle sensors) that are fascinating but not broadly validated or clinically implemented. Balance novelty with impact. Focus more on studies with external validation or those with regulatory approval (e.g., CAdE/CAdx in colonoscopy) to reflect translational relevance. 4. Discussion of non-malignant disease is less developed. While the section on malignant conditions is thorough, the portion on



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non-oncologic applications (e.g., IBD, Helicobacter pylori, functional GI diseases) is relatively brief and scattered. Consider developing a separate subsection summarizing ML applications in non-malignant GI diseases, particularly IBD severity scoring and dysplasia detection in colitis-associated cancer. Minor Comments The writing is mostly fluent, but could benefit from minor language polishing, especially to reduce repetition and improve transitions. Abbreviations such as CADe, CADx, GAN, and FOV should be consistently defined upon first use. Consider adding a visual summary or workflow diagram showing how ML integrates into the endoscopic imaging pipeline.