

GASTRONET-5M: A MULTICENTER DATASET FOR FOUNDATION MODELS ADVANCING DEEP LEARNING SYSTEMS IN GASTROINTESTINAL ENDOSCOPY

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Presentation

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GastroNet-5M, a publicly available foundation model pretrained on 4.8 million endoscopic images from 500,000 procedures, outperformed all benchmark models in 8 of 9 classification tasks with an average 6.8% AUC improvement and achieved superior performance across all 9 segmentation tasks with an average 15.4% Dice score gain.

KEY POINTS

- The dataset comprises 4,820,653 anonymized endoscopic images from approximately 500,000 procedures collected from eight Dutch hospitals between 2012 and 2020.
- GastroNet-5M-pretrained models achieved higher AUC scores than all benchmarks in 8 of 9 classification tasks, including Barrett's neoplasia detection (AUC 91.6 on ARGOS, 96.7 on BONSAI CADe), colorectal polyp diagnosis (AUC 92.8 on Maastricht), gastric cancer invasion depth prediction (AUC 95.0), and IBD disease activity assessment (AUC 95.5 on LIMUC).
- For segmentation tasks, GastroNet-5M models outperformed all other models across all 9 tasks with an average Dice score improvement of 15.4%.
- In data efficiency experiments with progressively reduced training sets, GastroNet-5M achieved the highest AUC in 5 of 9 tasks when training data was limited, while no other benchmark model led in more than one task.
- Robustness testing across 12 datasets with heterogeneous conditions (varying endoscope manufacturers, imaging modalities, and image quality) showed GastroNet-5M outperformed other models in 8 of 12 tasks.
- The dataset is publicly accessible for scientific research and development, requiring only an approval request.

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