Highlights:

1. First time 27 GI diseases classified from upper, lower, and combined GI tract area.
2. Innovative preprocessing (CLAHE, erosion, sharpening, and gaussian filters) enhances GastroVision dataset image quality.
3. Novel lightweight PD-CNN: Efficient, compact DL model was proposed for feature extraction.
4. PCC refines significant features, boosting PD-CNN effectiveness in GI disease classification.
5. Novel classifier EELM: Fusion of ELM and RELM integrated with proposed architecture GI diseases.
6. PD-CNN outperforms SOTA TL models in parameters, layers, size, and performance evaluations.
7. XAI methods illuminate PD-CNN-PCC-EELM decision-making process for model’s black box interpretability.