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(57) Abstract :
The present invention provides an advanced system and method for automated image segmentation and object detection, leveraging cutting-edge machine learning techniques to enhance the accuracy and efficiency of image analysis. The system integrates an image acquisition module to capture images from various sources, a preprocessing module to improve image quality through noise reduction, contrast enhancement, and normalization, and a machine learning-based segmentation module utilizing convolutional neural networks (CNNs) to divide images into meaningful regions. It further includes an object detection module employing region-based CNNs (R-CNNs), Single Shot Detectors (SSDs), or You Only Look Once (YOLO) models to identify and locate objects within the segmented regions. The post-processing module refines the results by applying morphological operations, boundary smoothing, and false positive reduction techniques. This comprehensive approach provides a scalable and robust solution for diverse applications, including medical imaging, autonomous driving, and security surveillance, by automating and optimizing both segmentation and detection tasks. Accompanied Drawing [FIGS. 1-2]

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