



Hybrid Image Segmentation for Vision Systems

Project Overview

Comprehensive Image Segmentation for Automated Vision Systems is an R&D initiative by DevBlock Studios that explores the integration of deep learning and classical image processing techniques to improve computer vision capabilities. The project focuses on building a hybrid segmentation pipeline that enhances object detection, scene understanding, and classification for diverse applications in fields like urban planning, healthcare, and industrial automation.

Tools & Technologies

Detectron2, PyTorch, OpenCV, MATLAB, Panoptic Segmentation, Watershed Segmentation, Kirsch Compass Edge Detection

Features

AI-Driven Analysis, Hybrid Architecture, Optimized Performance, Scalable Design

Challenges

Developing a segmentation system that works effectively across different domains was a significant challenge. Deep learning models required extensive training and computational power, while classical methods needed fine-tuning for edge and region precision. Achieving a seamless integration that maintains speed, accuracy, and generalizability pushed the limits of both algorithm design and system optimization.

Solution

We developed a hybrid segmentation framework that smartly leverages the strengths of each method: the robustness of Panoptic Segmentation, the speed of Watershed Segmentation, and the edge precision of the Kirsch Compass operator. This adaptable pipeline allows users to fine-tune the segmentation approach based on use-case requirements, offering both high accuracy and real-time feasibility across industries.