Pros

Traditional image segmentation methods are great because they don't need a lot of computing power, so they work well on simpler devices. They can quickly process images and recognize objects without needing the intense computing that deep learning methods do. These traditional methods are also easier to understand and work with, making it simpler to figure out and fix any issues. Plus, they don't need as much data to learn from and can get started without long training times, which is handy when there's not a lot of data available or the device can't handle heavy computing tasks.

Cons

Traditional image segmentation methods often don't match the high accuracy of neural network methods, especially in complex situations with changing light, blockages, and many kinds of objects. These methods require manually picking and adjusting features and settings, which takes a lot of time and can be rigid, making it hard to handle new or changing situations. Expanding these methods to recognize new objects or handle more complex tasks often means a lot of manual work, showing they don't scale up well. They also tend to be less reliable, having trouble with changes in how objects look, complex environments, and disturbances, leading to uneven performance in different conditions.

Recommendations

By combining traditional image segmentation with machine learning, we can create hybrid methods that are both accurate and don't need too much computing power. Improving how we prepare and select important parts of images before segmentation can make these methods even better. Using smart thresholding methods that adjust to each image can make the system more adaptable and reliable. To deal with high-quality images or complicated scenes quickly, it's important to make the algorithms more efficient and use parallel processing, where many calculations are done at the same time. Also, using simple machine learning models that can learn from new data bit by bit means the system doesn't need to be completely retrained often, making it easier to handle new objects and settings as they come up.

Other applications or domains which could make use of the detection pipeline I proposed.

Traditional image segmentation methods are great for devices with limited computing power, like those in home automation, wearable tech, and IoT devices, because they can recognize basic objects without overloading the system. In cars, these methods help with safety features like spotting obstacles quickly to avoid crashes. In manufacturing, they're used to check products for flaws and ensure quality since they work well with

consistent shapes and lighting. In farming, these techniques help monitor crops and automate picking by spotting signs of plant health and ripeness, all without needing complex systems. In medical imaging, like X-rays or MRI scans, they offer a clear way to see and understand different body parts. For security, these simpler methods are fast and accurate enough for detecting movement or someone's presence. In augmented reality, especially in games or educational apps on phones, they make it possible to blend digital images with the real world smoothly. And in robotics, they help robots navigate and interact with objects by quickly identifying obstacles and targets, all without needing a lot of computing power.