Overview

Andrew Showers

The GrabCut algorithm uses clustering based on color which works well with images that have stark contrast between the foreground and background. However, if the image contains similarly colored objects in both the foreground and background, it can become difficult to segment it out without applying additional masks. Below we can see some results:

Boundary Color Table:

Blue: All points outside the region are considered background
Red: All points within the region are considered background
Green: All points within the region are considered foreground


Original Image


Defined Boundaries


GrabCut Result

Here we can see that GrabCut worked without any additional information beyond the initial rectangle that defines the section of interest. This is because there is a good contrast between the man in middle and the area around him. The color segmentation used here was able to work well without any additional masking. However, this result did suffer from some additional background near his left ear and some jaggedness on his right shoulder where the jacket blended with the background.

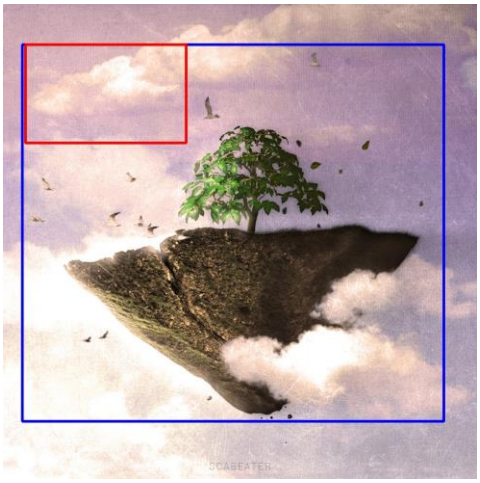

Original Image


Defined Boundaries


GrabCut Result

The original image was an easy case for GrabCut in that there are clear color differences between the foreground and background and well-defined edges. However, the eyes were considered part of the background and a mask was applied defining it as part of the foreground in order to correct the segmentation.

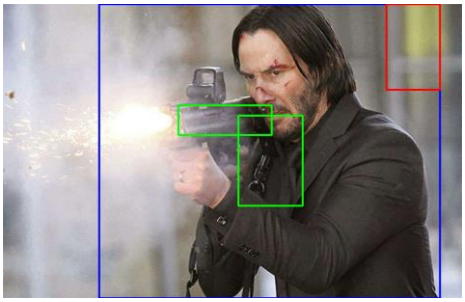

Original Image


Defined Boundaries


GrabCut Result

Here we run into some slightly harder segmentation problems due to the blending between the clouds and light beams with the floating island. This blending makes it difficult to determine when the background switches to the foreground, and provides a resulting image that still has some small portions of the background. However, the resulting image is still a fairly good result in that it segmented out the birds and island away from the surrounding environment. We see that some background portions between the leaves remained present due to the darker shade of sky being similar to the shaded leaves surrounding it.


Original Image


Defined Boundaries


GrabCut Result

This image required a few corrections, the first being the exclusion of the yellow object in the background. Since it is unique to the rest of the scene, it is difficult for GrabCut to determine if it is foreground or background. Furthermore, portions of the gun were lit up due to the gunfire causing the color to be brighter than the rest of the foreground. This required me to manually specify these regions as foreground. The end result is fairly good, with some jaggedness on the man's left shoulder due to lighting causing it to be considered background.