Visual Recognition

Assignment 2
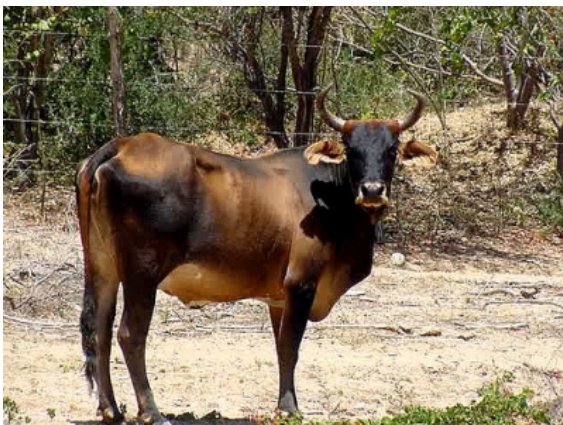
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Introduction

Image segmentation is the process of dividing an image into segments based on pixels having similar attributes.

In this assignment we have to perform the image segmentation on the below three images to extract background and foreground region.

Image1

Image2

Image3

Image Segmentation

To perform image segmentation we need to perform two task

1) **Object Detection:** we need to draw a bounding box around the foreground region(ie Region of Interest incase of image 1 it is ox) such that the region outside the rectangle is sure background and region inside is a combination of foreground and background.

To automate this process ie to get bounding box around the foreground region we need to localise/detect the object in the image. So I have used YOLO V3 to detect the objects and find the bounding box.

YOLO outputs bounding box along with a confidence score that tells us how certain it is that the predicted bounding box actually encloses the object.
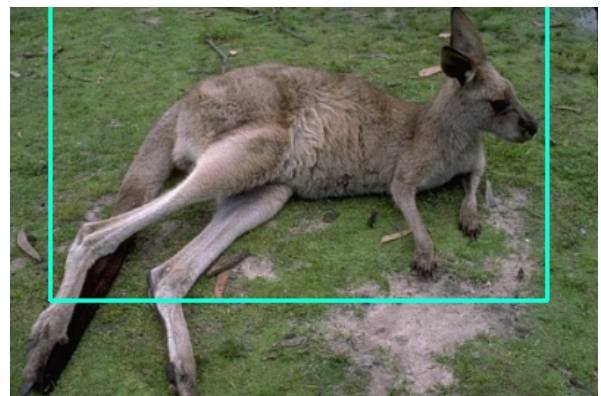
Output from Yolo:

Image1

Image2

Image3

2) Segmentation

Here based on the region provided by Yolo we will extract the foreground and the background region. To do this I have used the OpenCV GrabCut algorithm.

I have initialised the grab cut function with cv2.GC_INIT_WITH_RECT and passed bounding box found in the previous part. I have set the iterCount to 10. This the number of iterations GrabCut will perform to model the foreground vs background.

The output mask of GrabCut is:
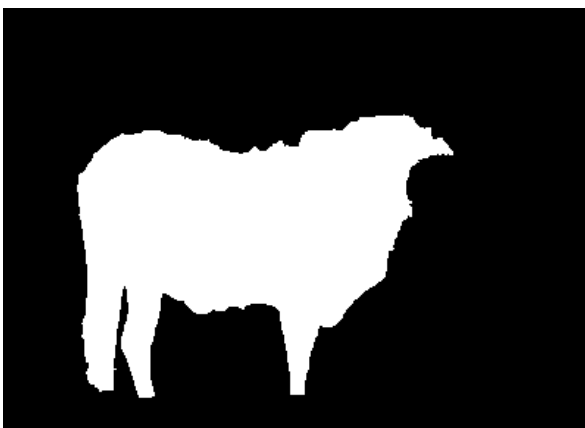
OutputMask1

OutputMask2

OutputMask3