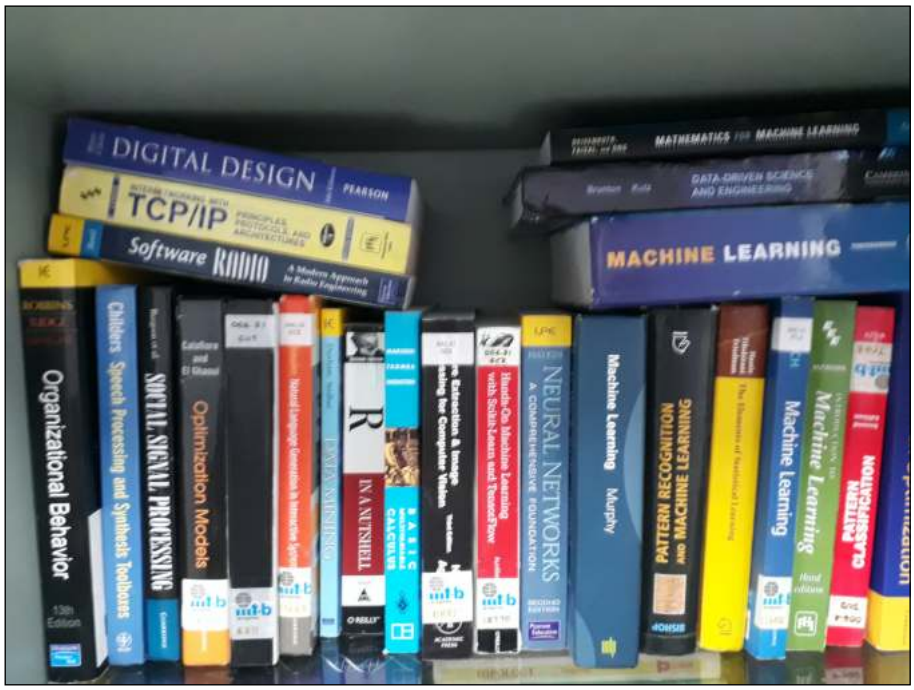
Visual Recognition

Assignment - 1

Ishaan Sachdeva
IMT2018508

1) BOOKSHELF PROBLEM



In this problem we are given the above image and we have to count the number of books using image segmentation techniques ie without object recognition and object detection.

Steps taken are:

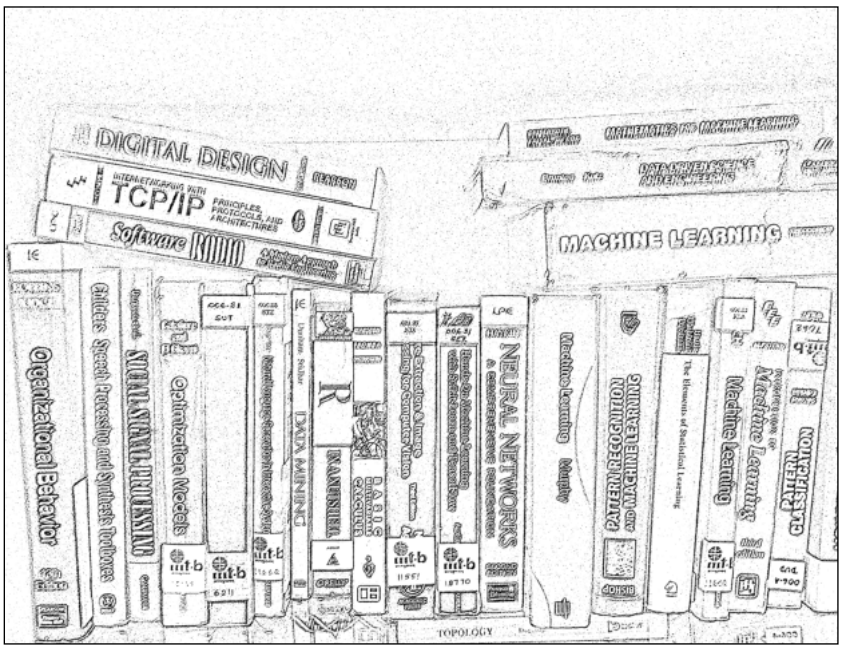
1) Grayscale and Blur:

Have converted the image to grayscale such that it only contains shades of gray. Blurring is done to remove the high frequency noise components

Grayscale and blurred image

2) Thresholding:

Thresholding means to assign a new a value to a pixel above and below a threshold value.It is used to convert a colour or grayscale image to a binary image ie an image with only black and white colours. This makes it easier to analyse image since it helps us identify edges or regions of concern and ignoring the other parts. The below image is formed by adaptive thresholding on the grayscale image.



Adaptive thresholding

3) Final input image

There are some edges which are not clean so to solve it have used the morphologyEx and have masked it with the original image. The final image looks like this.

4) Counting books

To count the number of books we need to count the outlines of the objects in the image. A book is rectangular in shape so I have used the findContours method and counted the no. of rectangles in the image.

Output and Limitations

The books counted by the algorithm are 40.

From the original image we can see there are 25 books. The limitation of this method are:

1) The text is being treated as book as we can see from many places.
2) Change of colour within a book is treated as a rectangular shape and therefore is treated as an image.
3) There are labels on the book which are rectangular in shape and which are being treated as a book.

The other method tried was the canny edge detection.

After grayscaling and blurring I used canny edge detection to find the edges in the images ie boundary between the two books. The issue in this method was the edges of the books which are horizontal were not able to stand the canny edge detection and were removed.

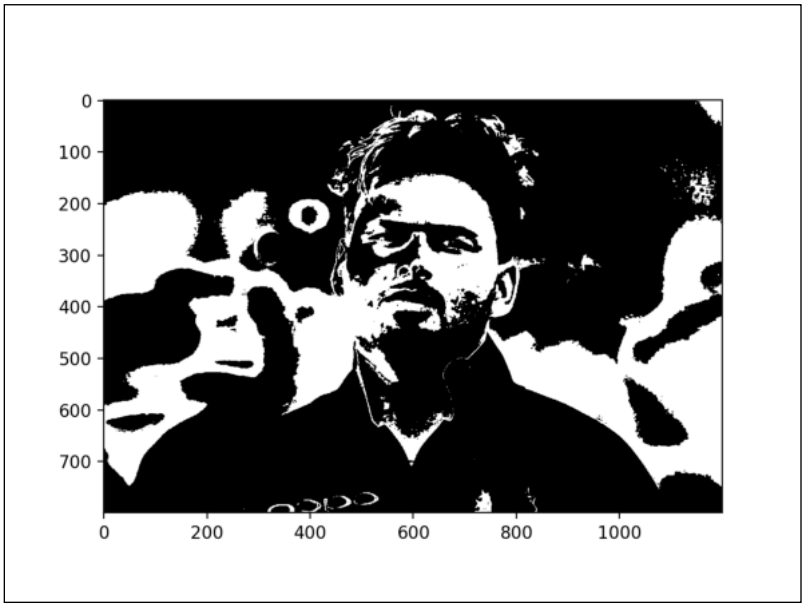
Some of it was fixed by hysteresis thresholding. This method has the same limitation as above for counting the no of books.

Canny Edge detection image

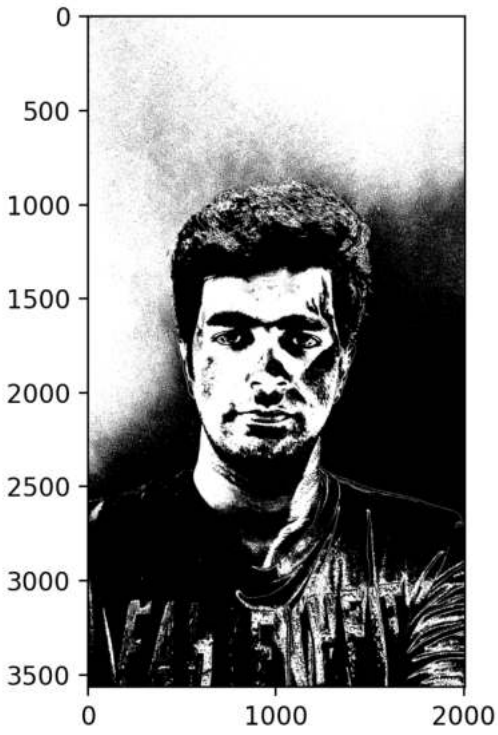
MARK OUT PIXELS OF THE FACE

In this problem we need to mark out pixels of the face in the above image.

To mark out pixels on the face I have picked the colour of skin tone and all the pixels and have thresholded pixels which lie in the range of the above colour.



Selfie



Limitations

The limitations of this method can be seen from above images.

1) It works for a specific colour of skin tone.
2) If other pixels lie in the range of the skin tone are also whiten.