LICENSE PLATE DETECTION

Using Image Processing

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Introduction

License plate detection process is a method which reduces the need of manual labour at places like parking . By making the detection process automatic through the use of functions and algorithms in MATLAB we can generate better result in shorter time as well as we can reduce the labour cost.

PROBLEM STATEMENT:

When we go in a big mall we may forget our vehicle's location in the big and confusing parking area. Or if we manage a parking area, presently it's a quite involving process to collect the parking charges from each car. Similar problems arrive at the toll booths on highways. Hence we tried to make an algorithm to detect the plate number which can be processed further in various ways according to our requirement.

ALGORITHM AND RESULTS

RGB TO GRAY
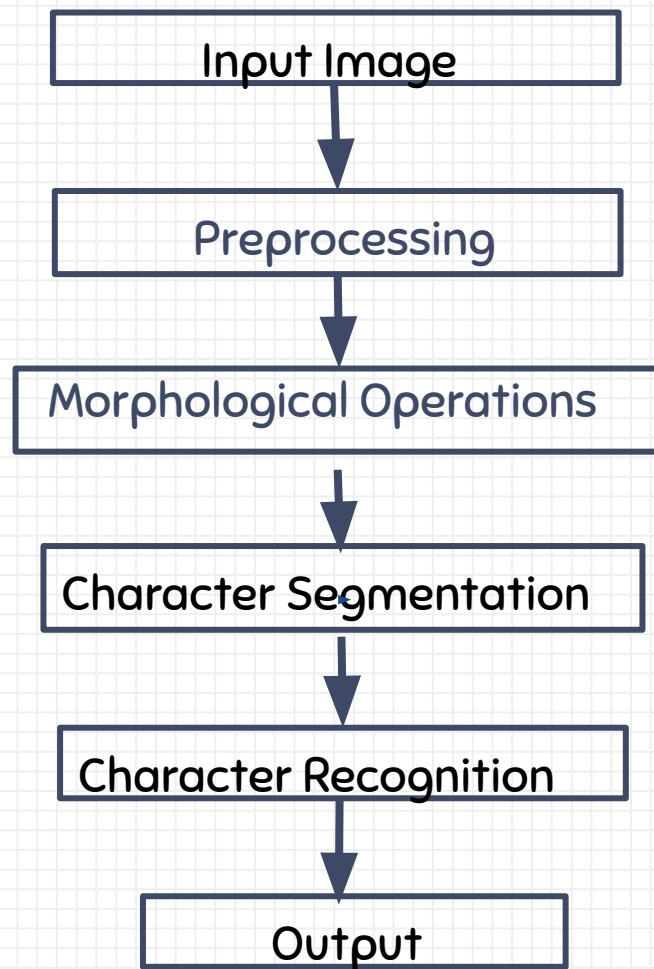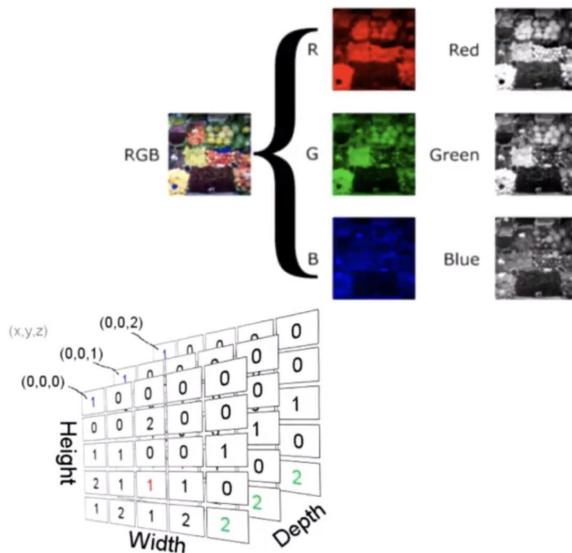
$$I = 0.299*R + 0.587*G + 0.114*B$$

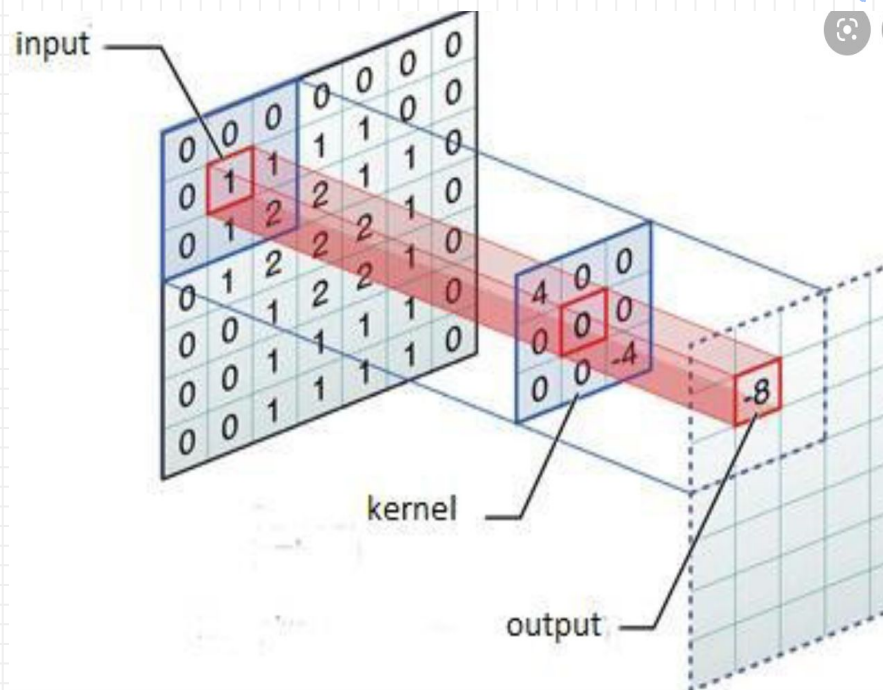# Convolution In 2 –D

Convolution

Bit of theory! Convolution of two functions $f(x)$ and $g(x)$

$$h(x) = f(x) \otimes g(x) = \int_{-\infty}^{+\infty} f(r)g(x-r)dr$$

Discrete image processing 2D form

$$H(x,y) = \sum_{j=1}^{height} \sum_{i=1}^{width} I(i,j)M(x-i,y-j)$$

Compute the convolution where there are valid indices in the kernel

MEDIAN FILTERING

Median filter is a non-linear filter.It is used as a effective noise reduction method for the salt and pepper noise(impulse noise).

Median filtering on a image works by replacing each pixel value in the image with the median value of neighbouring pixels.

10 15 20 23 27 27 30 31 33

10	15	20
23	90	27
33	31	30

10	15	20
23	27	27
33	31	30

MEDIAN FILTERING

It can reduce noise in the image in a better way when compared to the linear filters(Ex:mean filter..) by preserving the edges.(As the filter selects **a sample** from the neighbourhood)

ORIGINAL IMAGE

IMAGE AFTER MEAN
FILTERING
(LINEAR FILTER)

IMAGE AFTER MEDIAN
FILTERING
(NON LINEAR FILTER)

Binarization

Image binarization is the process of taking a grayscale image and converting it to black-and-white, essentially reducing the information contained within the image from 256 shades of gray to 2: black and white, a binary image.

Input Image (RGB)   **Grayscale Image**   **Binarization**

Dilation

Structuring Element

1	①	1

Input Image

1	⓪	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

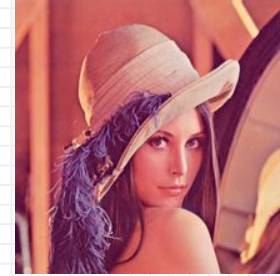Output Image

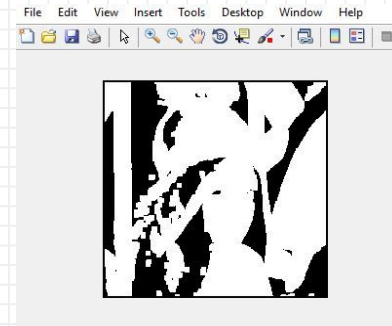|	
1	1
1	
0	
0	
0	
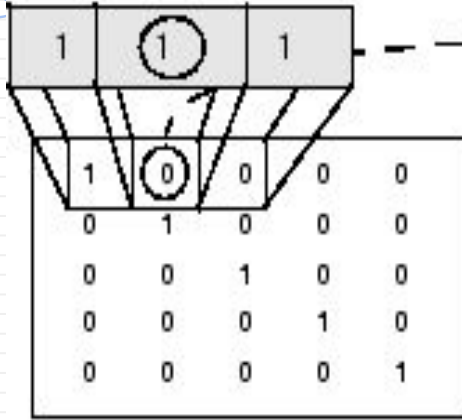
Input Image

Output Image

⟹ We do similar process in erosion.

⟹ Edge Detection = dilation –erosion

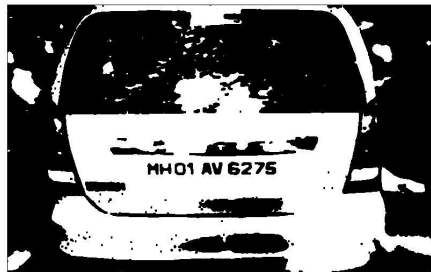# Output Images

Grayscale Conversion

Median filtering

Binarization

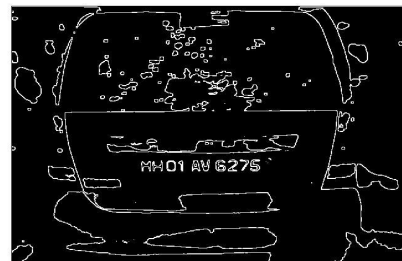**Dilation**

Erosion

Edge Detection

Conclusion:

We couldn't obtain results with accuracy as compared to other algorithms due to less knowledge about other operations and functions available in MATLAB. But the number plate image can be processed using above mentioned algorithms.

Future Scope of project can be seen in Automatic toll plazas construction. This will reduce the human force required and make the process of charging people for over speeding and red-light violation easy by recognising the car and looking through the database and sending an e-ticket. It will also make the process of identifying cars being used for illegal purposes and with invalid numbers.

THANK YOU!