ELL715 : Assignment 2

Deepali Gupta, 2013MT60079

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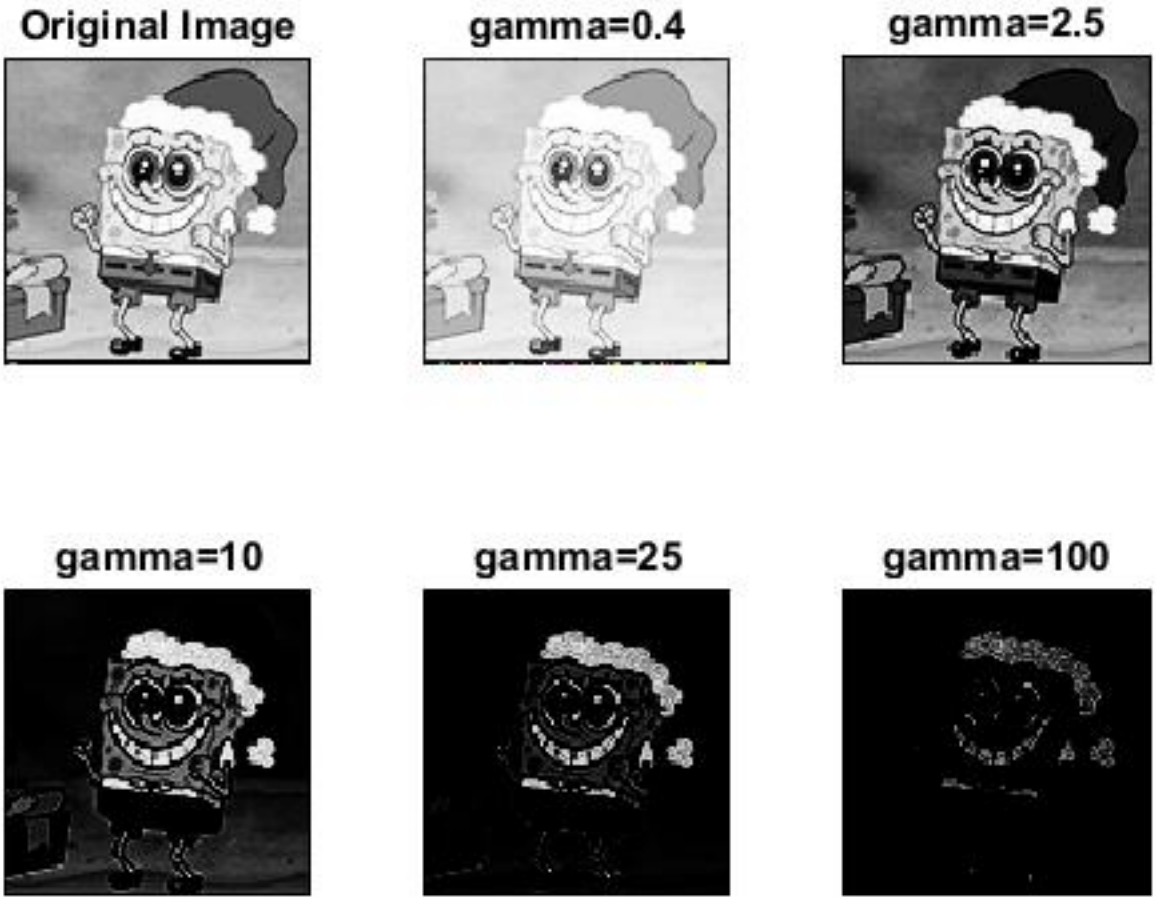
1 Answer 1

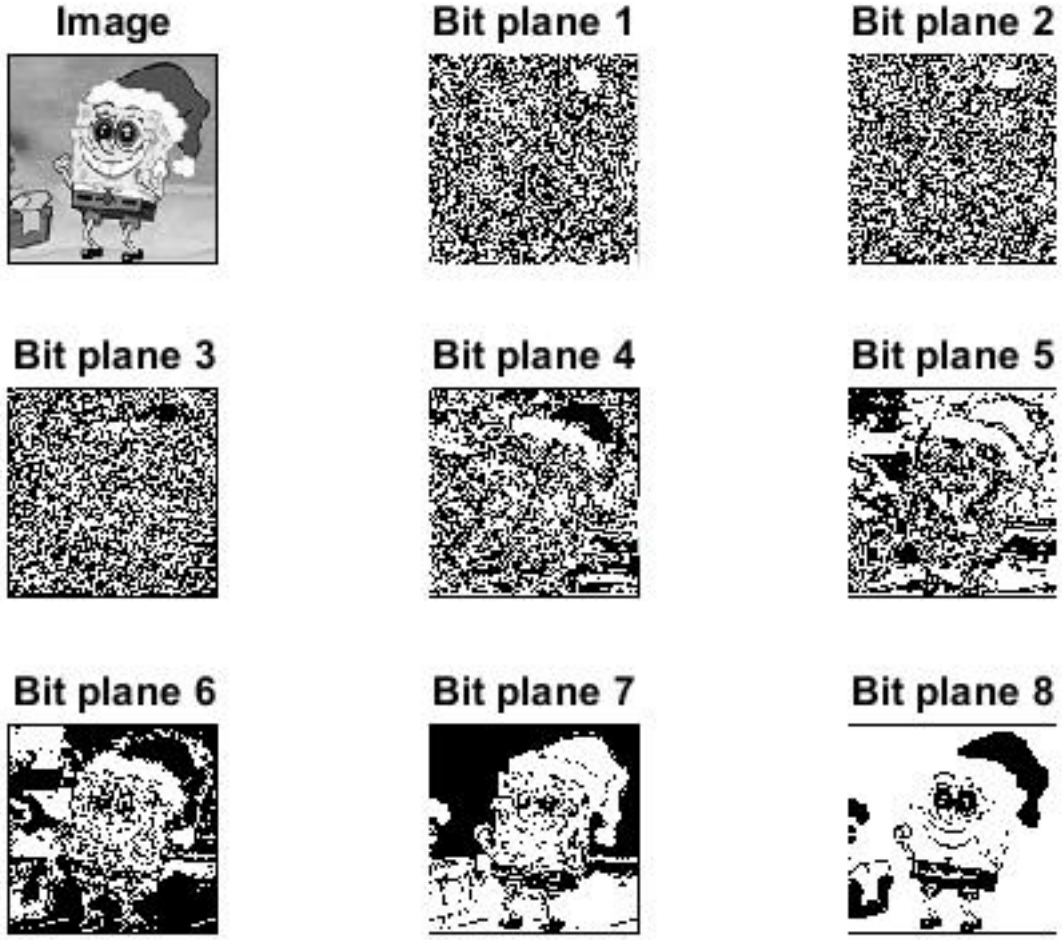
(Code in q1.m)

(a) Complement and log operations

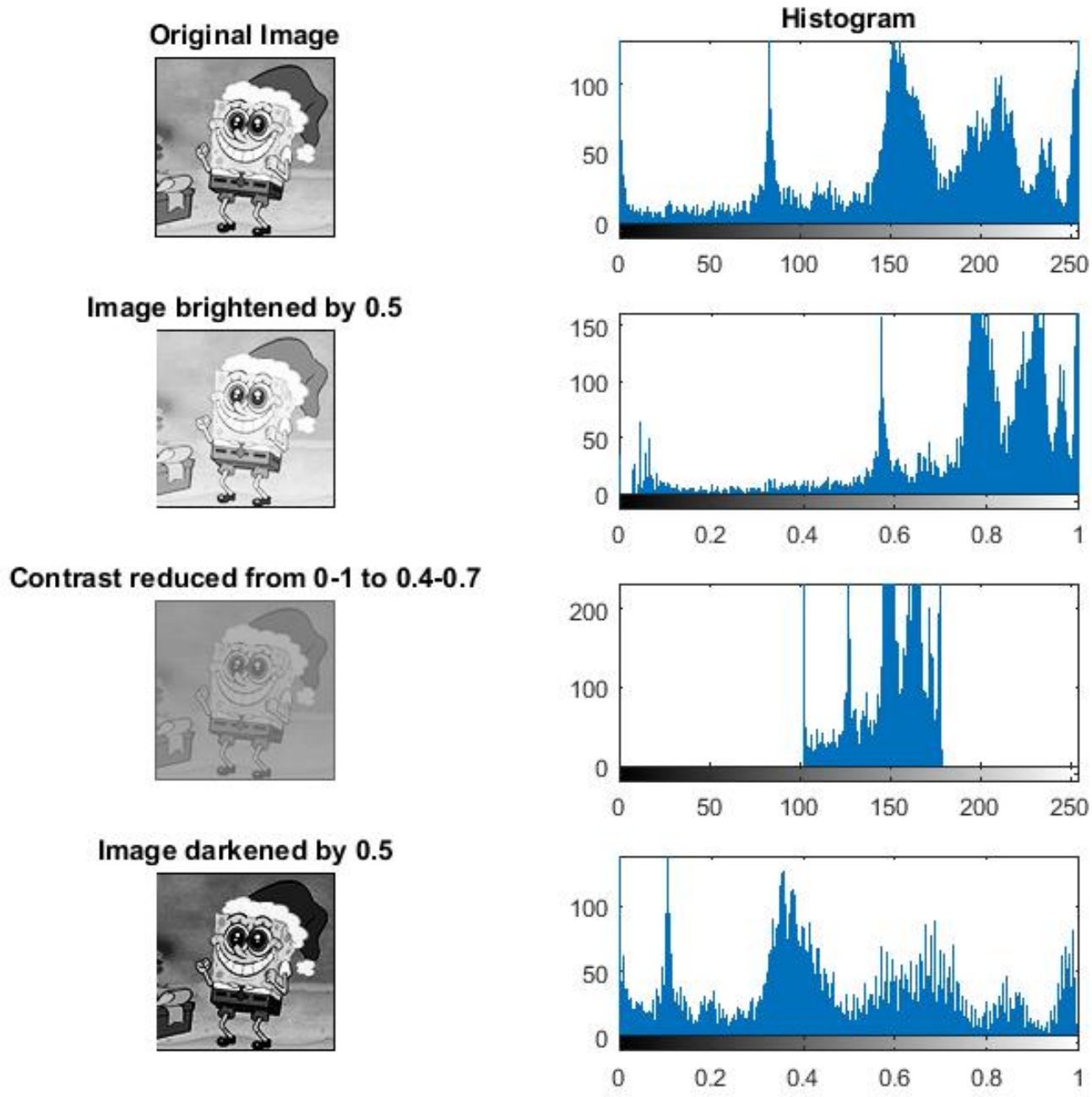
(b) Gamma Correction:



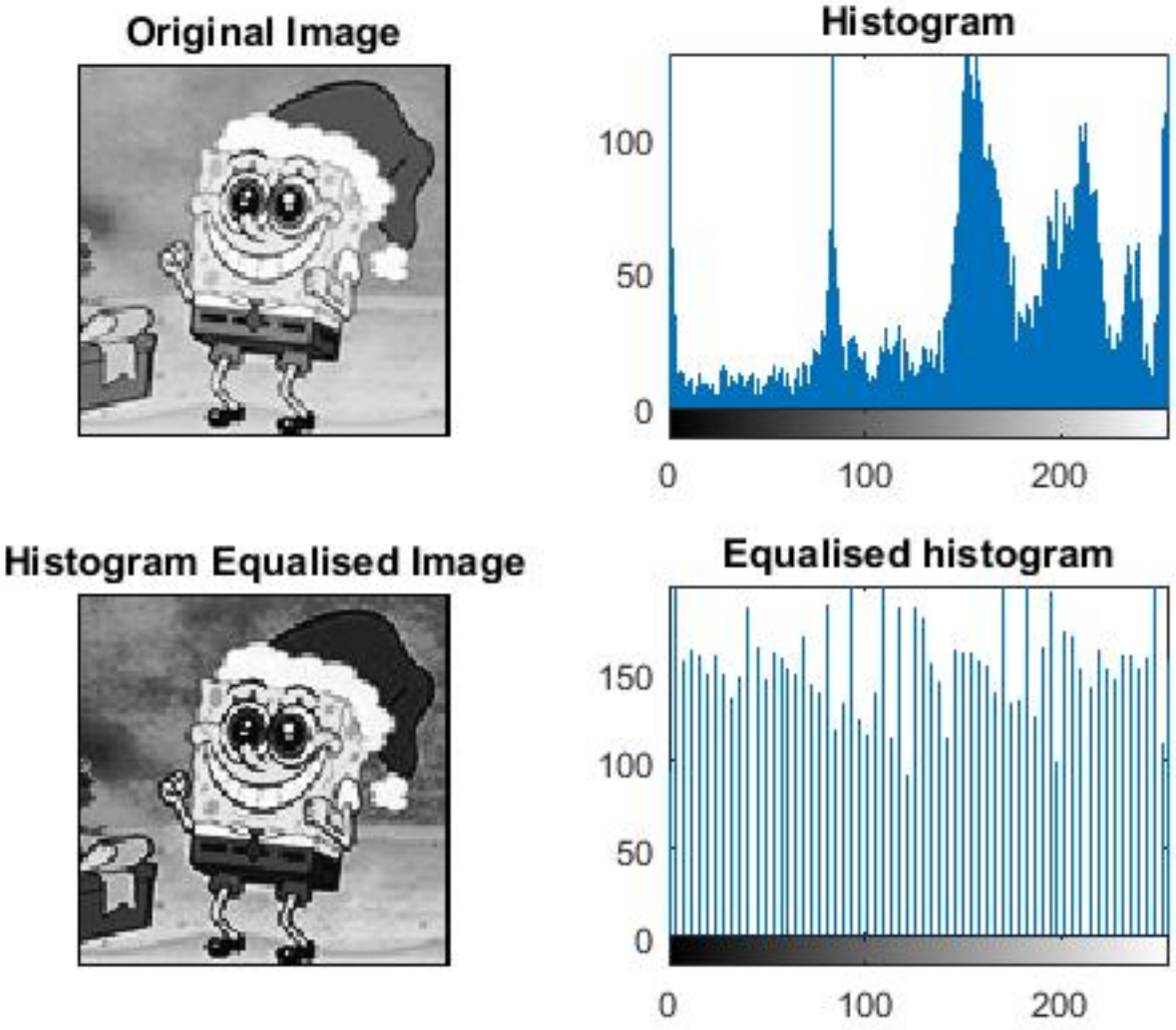
(c) Bit-plane Slicing



(d) Modified images and their histograms:



(e) Histogram Equalisation



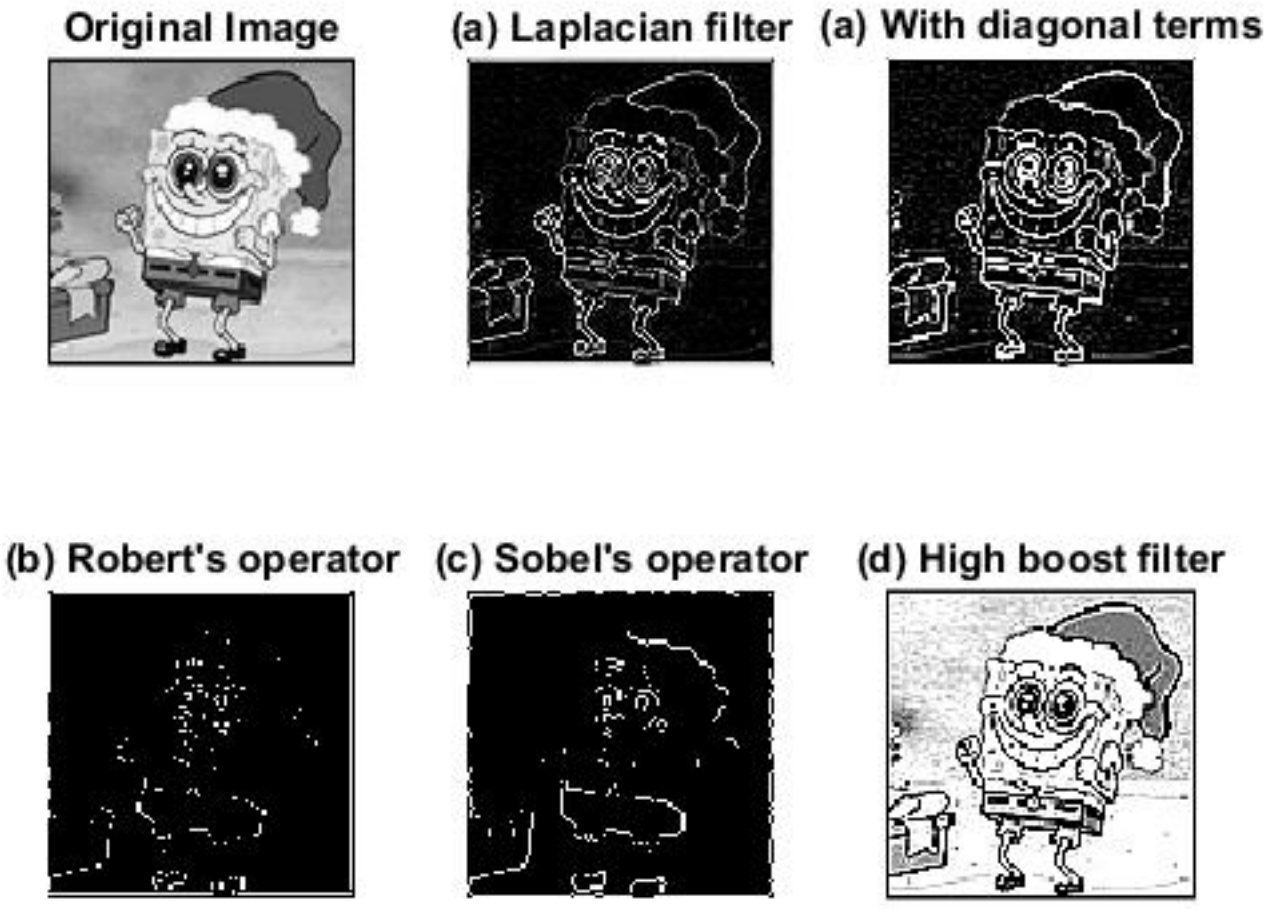
(f) Highlighting

Original Image

Highlighted Image between 120-200

2 Answer 2

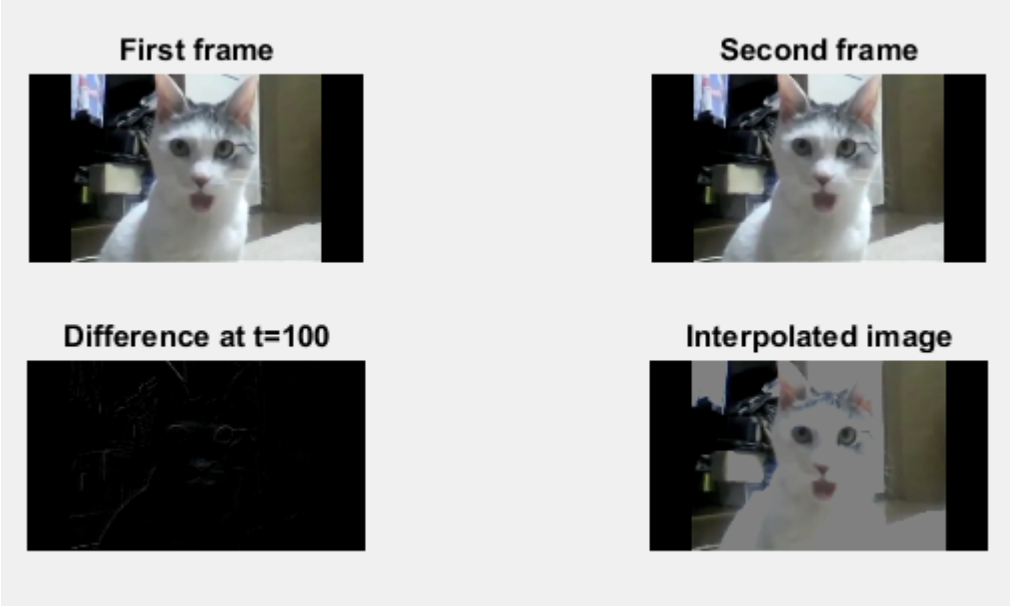
(Code in q2.m)

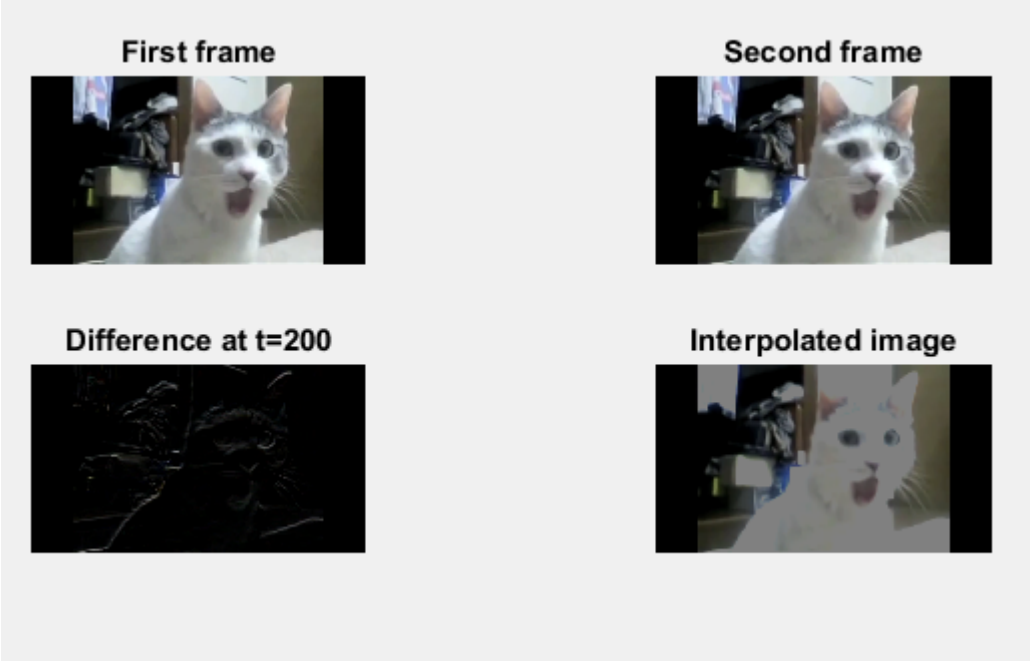


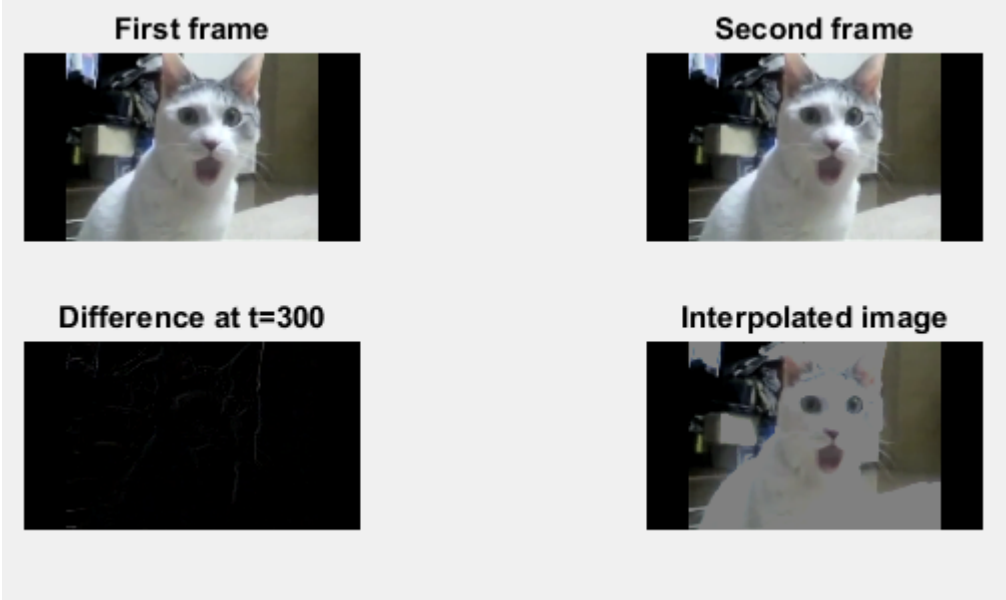
Edge estimation

3 Answer 3

(Code in q3.m)







Changes in video frames over time

4 Answer 4

(Code in q4.m)
The algorithm for object detection in the paper can be summarised as follows:

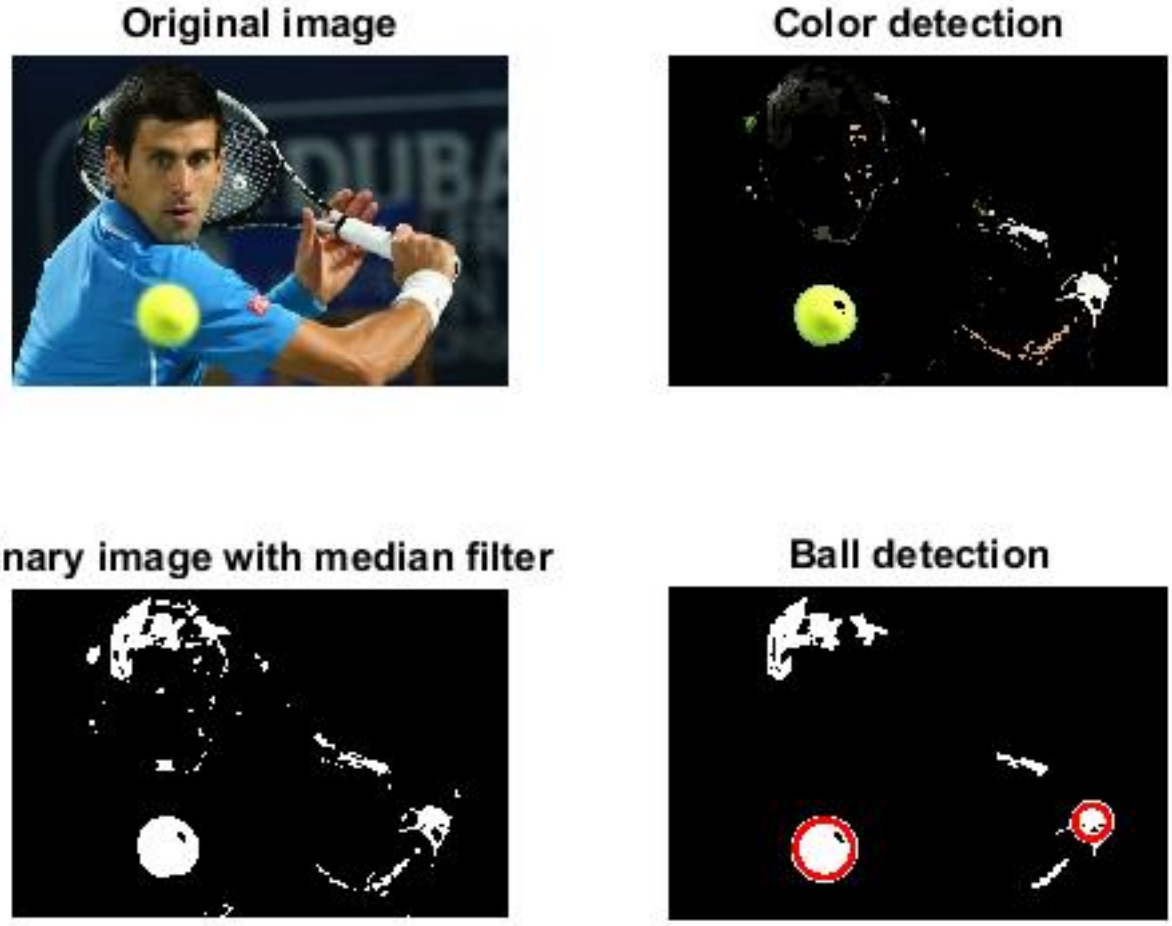
(i) Prepare color images
(ii) Image RGB adjustment
(iii) Detect the color of each pixel and determine whether required color or not
(iv) Delete the unrelated region by replacing the color with all black color
(v) Change image to grayscale
(vi) Perform median filter to eliminate the small pixel and smoothen the image
(vii) Change to binary image and go through another object elimination that eliminates binary objects which is lesser than 200 pixels in a group of objects
(viii) Apply CHT to find the circular patterns within an image

For the purpose of the assignment, the above algorithm was applied to detect a tennis ball in various images of a tennis match. The conditions used for detecting the colors was:

- $Blue \leq Red \leq Green$, or

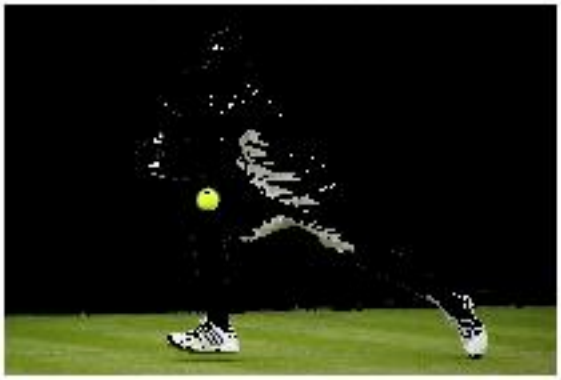
- $R \in (110, 255), G \in (170, 255), B \in (20, 130)$

The results are as follows:



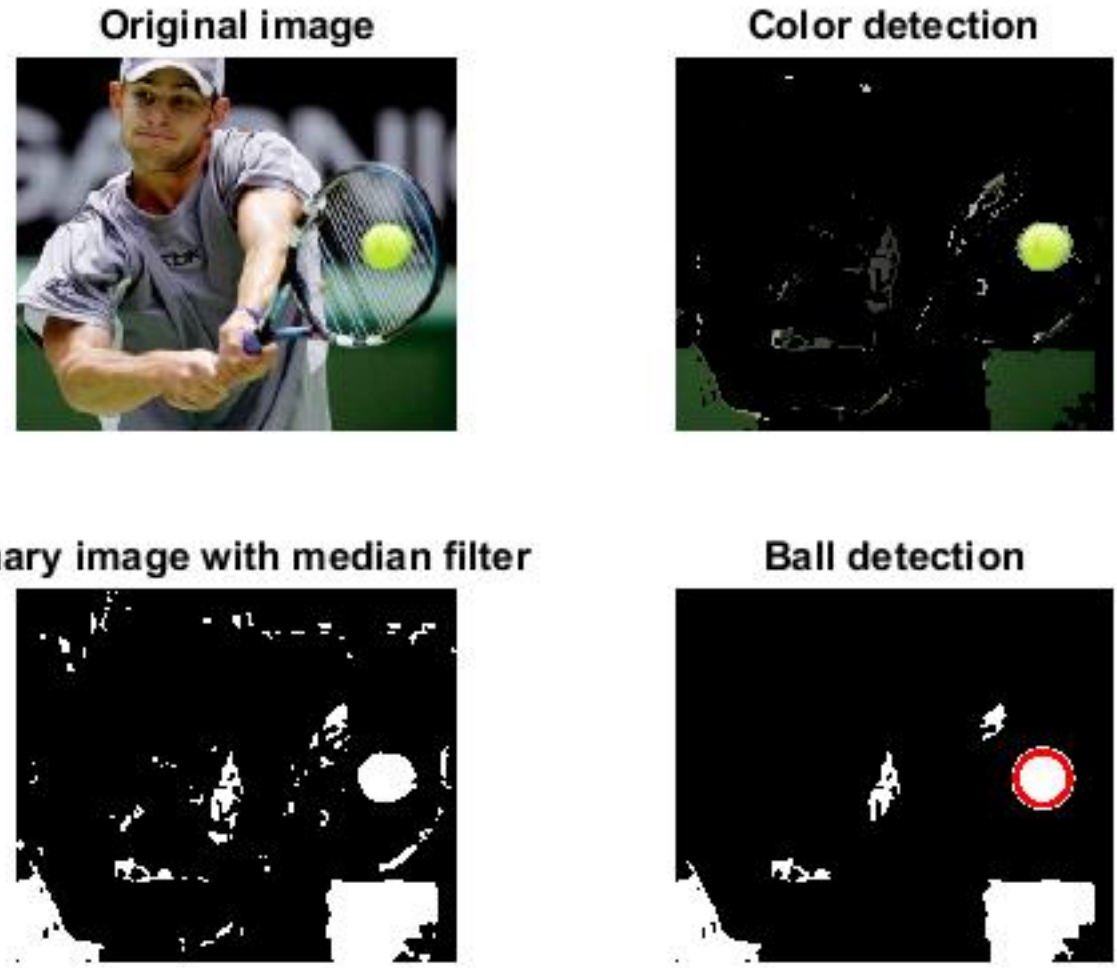
Original image

Color detection



binary image with median filter

Ball detection



Thus, good accuracy levels were observed to detect the ball in various images.