LIST OF CORRECTIONS/MODIFICATIONS INCORPORATED

(a) The basic motivation, scope and contribution of the present thesis has been clearly described is a separate section in the chapter One.

(b) Honouring the valuable suggestion of the Reviewer, Chapter two and Chapter three has been merged.

(c) A comparative results of the different algorithms proposed by the author in the present thesis has been included to have better understanding of the usefulness and novelty of the proposed techniques.

(d) Uniform styling has been done for all the entries in the list of references

(e) The explanation against the point (f) in the report of the Reviewer is as follows

The MATLAB arithmetic operators have been used here for the image enhancement. The arithmetic toolbox has provided the necessary functions where the overflow is handled automatically. The inbuilt function of MATLAB that has been used in this thesis for image enhancement is $Z=\text{imadd}(X, Y)$. It adds each element in array $X$ with the corresponding element in array $Y$ and returns the sum in the corresponding element of the output array $Z$.

Now the result of the image arithmetic can easily overflow the data type allotted for storage. Also the arithmetic operations can result in fractional values which cannot be represented using integer arrays. According to the Image Arithmetic Saturation rules of MathWorks (http://in.mathworks.com/help/images/image-arithmetic-sect1.html#brcvae), MATLAB arithmetic operators and the Image Processing Toolbox arithmetic functions use these rules for integer arithmetic:

- Values that exceed the range of the integer type are saturated to that range.
- Fractional values are rounded.
So the author has no control over handling the overflow of the data type.

(f) Thanks to reviewer for pointing out the anomalies he mentioned in point (g) of his reviews. The proper explanation has been given below and correspondingly incorporated in the present thesis.

The image processing methods in spatial domain are based on direct manipulation of pixels in an image. Intensity transformation and spatial filtering are the two major categories of spatial domain processing. Intensity transformation operates on a single pixel of an image, principally for the purpose of contrast manipulation. Spatial filtering operates in the neighbourhood of every pixel in an image mainly for the purpose of image sharpening.

The spatial domain processing, in general, is expressed by
\[ g(x, y) = T[f(x, y)] \]
where \( f(x, y) \) is the input image, \( g(x, y) \) is the output (processed) image, and \( T \) is an operator on \( f \) defined over a neighbourhood around \((x, y)\). In case of spatial filtering, the nature of filtering process is determined by the type of operation performed in the neighbourhood.

Now the smallest possible neighbourhood size is of 1x1. In this case, the output depends solely on the value of \( f \) at a single point \((x, y)\) and \( T \) becomes the intensity transformation function. Thus for intensity transformation, \( T \) solely depends on the input value and independent of its neighbourhood.

(g) In this thesis, several algorithms have been proposed by the author to reconstruct the biological model under noisy condition. To reduce the effect of the noise at the receivers, multiple illumination approach has been used here in one of the algorithms. The corresponding algorithm has been explained in the section 4.4. Arithmetic mean has been operated over the
noisy input signal to clean the input to some extent before it is used as input.
According to the Reviewer’s suggestion, the Author has also tried some other noise removing preprocessing filter like median to reduce the noise at the receivers. But the corresponding reconstructed model is quite inferior to that of model reconstructed with multiple illuminations. The detailed analysis has been cited in the section 4.4