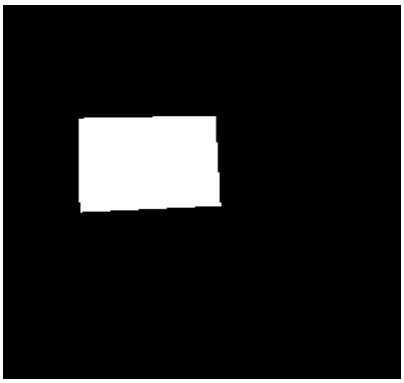
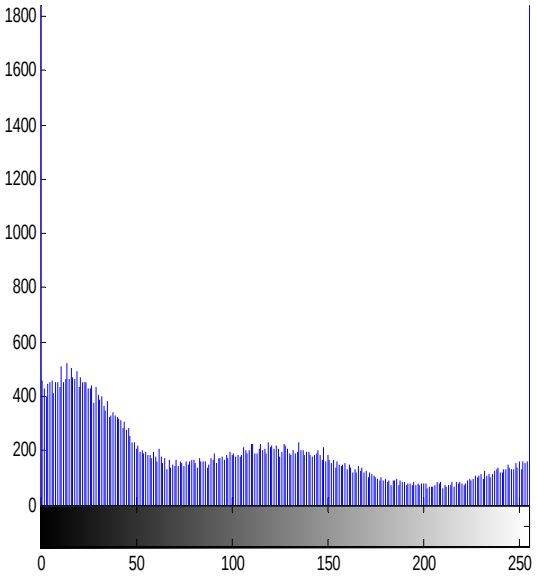
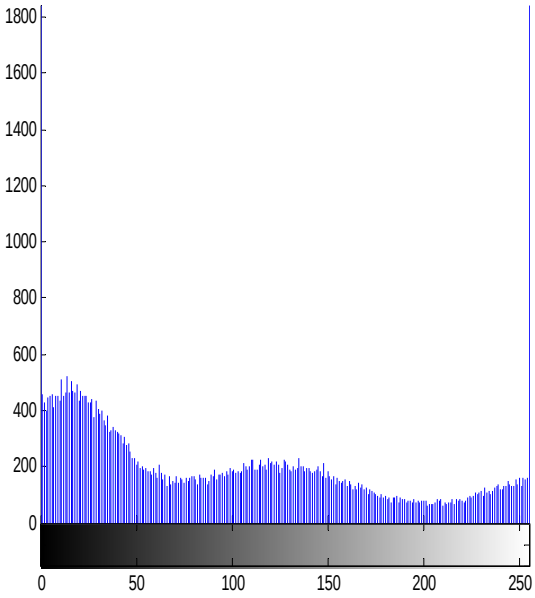
(m) Noisy image (Gaussian noise)



(n) ROI of noisy image



(o) Histogram for the noisy image



(p) histogram for the ROI

Fig 1.1.2 shows the Histogram for the noisy image and histogram for the selected ROI for Gaussian noise

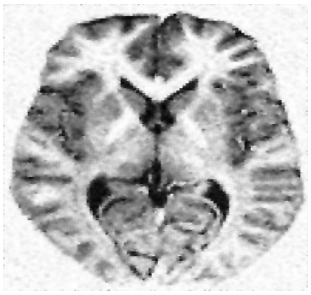
we taken different medical images like MRI, Cancer, X-ray, and Brain and we have calculated standard derivations and mean of all these medical images after finding Gaussian noise and then we have applied adaptive filtering technique for removal of noise.

Table2.1

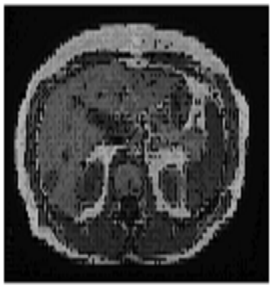
Noise removal using Adaptive Filter for Gaussian Noise.

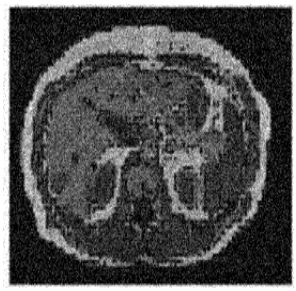
Image	**Original Image**		**Noisy Image**		**Filtered Image**	
	Std	**Mean**	**Std**	**Mean**	**Std**	**Mean**
MRI	70.0623	182.2473	68.2208	185.1690	63.2881	185.0748
Cancer	61.2939	62.4918	62.9288	71.4946	56.4525	71.3725
X-Ray	65.4542	145.4757	67.6951	151.9010	63.1035	151.6546
Brain	91.0872	85.9561	87.8697	94.0962	84.4043	94.0254

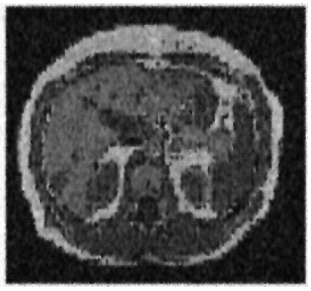

(a)Original MRI image


(b) finding a Gaussian noise

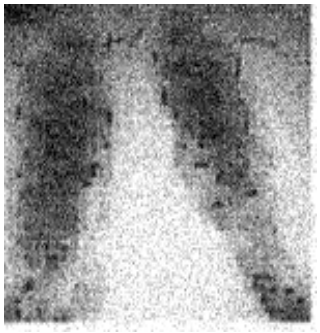

(c) Applying adaptive Filter

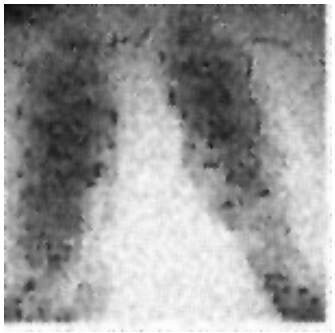

(a) Original image (Cancer image)


(b) Finding a Gaussian noise in cancer image

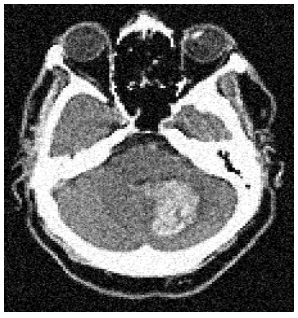

(c) Applying Adaptive Filter


(a)Original x-ray image


(b) finding Gaussian noise


(c) applying adaptive Filter


(a)Original image in cancer image


(b) finding a Gaussian noise Filter


(c) Applying adaptive (Brain image)

Fig2.1.1 Shows finding the Gaussian noise in MRI, Cancer, X-ray, Brain images and applying the adaptive filter on these images.

III. DISCUSSION

As per discussed in chapter4 Different medical images like MRI, Cancer, x-ray and brain images have been studied. After finding the Gaussian noise in MRI image the various filtering techniques like Median filter, Adaptive filter and Average filter have been applied.

We have taken the slandered derivation and mean after filtering the image which is shown in tables. It is found that the Adaptive filter works better for the Gaussian noise because the slandered derivation for the adaptive filter are 63.2881 and the slandered derivation for the Gaussian noise image are 68.2208.

Similarly after finding the Gaussian noise in cancer image the various filtering techniques have been applied and it is found that the adaptive filter works better for the noisy image as the slandered derivation for the noisy image are 62.9288 and standard derivation for the adaptive filtered image are 56.4525.

After finding the Gaussian noise in X-ray image various filtering techniques have been applied and it is found that the adaptive filter works better for the X-ray noisy image. The slandered derivation for the noisy image is 67.6951 and the slandered derivation for the adaptive filtered image is 63.1035.

After finding the Gaussian noise in brain image various filtering techniques have been applied and it is found that the adaptive filter works better for the noisy image. The slandered derivation for the noisy image is 87.8697 and the slandered derivation for the adaptive filtered image is 84.4043.

IV. CONCLUSION

In this work we have taken different medical images like MRI, Cancer, X-ray and Brain for detecting noises. We have detected Gaussian noises. These noises from the above medical images by applying the various filtering techniques like Median Filtering, Adaptive Filtering and Average Filtering. The results are analyzed and compared with standard pattern of noises and also evaluated through the quality metrics like Mean, and Standard deviation.

Through this work we have observed that the choice of filters for de-noising the medical images depends on the type of noise and type of filtering technique, which are used. It is remarkable that this saves the processing time. This experimental analysis will improve the accuracy of MRI, Cancer, X-ray and Brain images for easy diagnosis. The results, which we have achieved, are more useful and they prove to be helpful for general medical practitioners to analyze the symptoms of the patients with ease.

V. REFERENCES:

[1] Rafael C.Gonzalez & Richard E.Woods, “Digital Image Processing”, Second edition, 2005.

[2] Bhausaheb Shinde, Dnyandeo Mhaske, A.R. Dani “Study of Image Processing, Enhancement and Restoration “ IJCSI, Vol. 8, Issue 6, No 3, November 2011

[3] Rafael C.Gonzalez & Richard E.Woods, “Digital Image Processing using MATLAB”, Pearson education 2004.

[4] Bhausaheb Shinde, Dnyandeo Mhaske, Machindra Patare, A.R. Dani,A.R. Dani “Apply Different Filtering Techniques To Remove The Speckle Noise Using Medical Images” International Journal of Engineering Research and Applications, Vol. 2, Issue 1,Jan-Feb 2012, pp.1071-1079

[5] Bhausaheb Shivajirao Shinde, A.R. Dani “ The Origins of Digital Image Processing & Application areas in Digital Image Processing Medical Images” IOSR Journal of Engineering Vol. 1, Issue 1, pp.066-071

[6] S.S.Gornale et.al,”Evaluation & selection of wavelet filters for de-noising medical images using Stationary wavelet Transform (SWT)”International conference on systemic, cybernetics and informatics ICSCI2007.

[7] Adrian Low ,”Computer Vision & Image Processing”, McGraw Hill(1991)

[8] www.mathworks.com (Digital image processing)

[9] Milan Sonka et.al,”Image Processing Analysis and Machine Vision“, International Thomson computer press, UK-1996.

[10] A.Buades, B Coil, J.M.Morel (2005),”A Review Of Image Denoising Algorithms with New one”, Multiscale Model, Simulation, Vol.4, No.2, pp: 496-530, Industrial and applied Mathematics.

[11] Shalkoff R.J, 1989, John wiley and sons, New York, “Digital Image Processing and computer vision”.

[12] Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, 1st Edition

[13] Ryeol Kim, “Wavelet Domain Partition-based signal Processing with Applications to Image Denoising and Compressing”, Ph. D. Thesis, 2006.

[14] www.mathsworks.com