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X-Noiseguard Intelligent Noise Reduction for High-Fidelity X-Ray Imaging

Harish G[1] and Dr. H. Jayamangala[2]
PG Student, Department of Computer Applications[1]
Assistant Professor, Department of Computer Applications[2]
Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, Tamil Nadu, India
22304310@vistas.ac.in and jayamangala.scs@velsuniv.ac.in

Abstract: *The presence of noise in images produced by medical imaging equipment is common and unavoidable. Image noise can obscure and stimulate pathology, even sometimes to the extent of making them diagnostically unusable. To minimize noise in medical images, it is essential to comprehend the sources of noise and how they occur. In this project, we have reviewed different sources of noise that are present in images produced in radiography and tomography imaging techniques, the causes, effects and the various ways that are employed in their reduction. In order to completely eliminate noise in radiological imaging systems, we recommend that detectors that are free from noise should be designed and incorporated into future imaging systems. For segmentation and classification if we need a better result we need to target a preprocessing technique which involves removal of noise. For better PSNR we will be using Gaussian filtering technique for noise removal*

Keywords: X-ray imaging, Image noise reduction, Gaussian filtering method

I. INTRODUCTION

The modern application of x-rays diagnosis in conventional radiography and computed tomography (CT) imaging systems can be historically traced to the discovery of x-rays by a German Professor, Wilhelm Conrad Roentgen in November 1895. Roentgen produced a ray emitted from an evacuated glass envelope (tube) with positive and negative electrodes encapsulated in it. When a high voltage was applied to the tube, the tube produced a fluorescent glow capable of passing through a heavy paper covering and exciting phosphorescent materials in the room. This invisible ray, when passed through solid matter and in combination with a photographic plate produces a picture of bones and interior body parts.

II. LITERATURE SURVEY

1. MRI image preprocessing and noise removal technique using linear and nonlinear filters S. Suhas; C. R. Venugopal, Publisher: IEEE 2023

For the study of anatomical structure and image processing of MRI medical images techniques of noise removal have become an important practice in medical imaging application. In medical image processing, precise images need to be obtained to get accurate observations for the given application. The goal of any denoising technique is to remove noise from an image which is the first step in any image processing. The noise removal method should be applied in a watchful manner otherwise artifacts can be introduced which may blur the image. In this paper, performance evaluation of the MRI Image de-noising techniques is provided. The techniques used are namely the median and Gaussian filter, Max filter, Min filter, and Arithmetic Mean filter. All the above filters are applied on MRI brain and spinal cord images and the results are noted. A new method is proposed which modifies the existing median filter by adding features.

The experimental result of the proposed method is then analyzed with the other three image filtering algorithms. The output image efficiency is measured by the statistical parameters like root mean square error (RMSE), signal-to-noise ratio (SNR), peak signal-to-noise ratio (PSNR).

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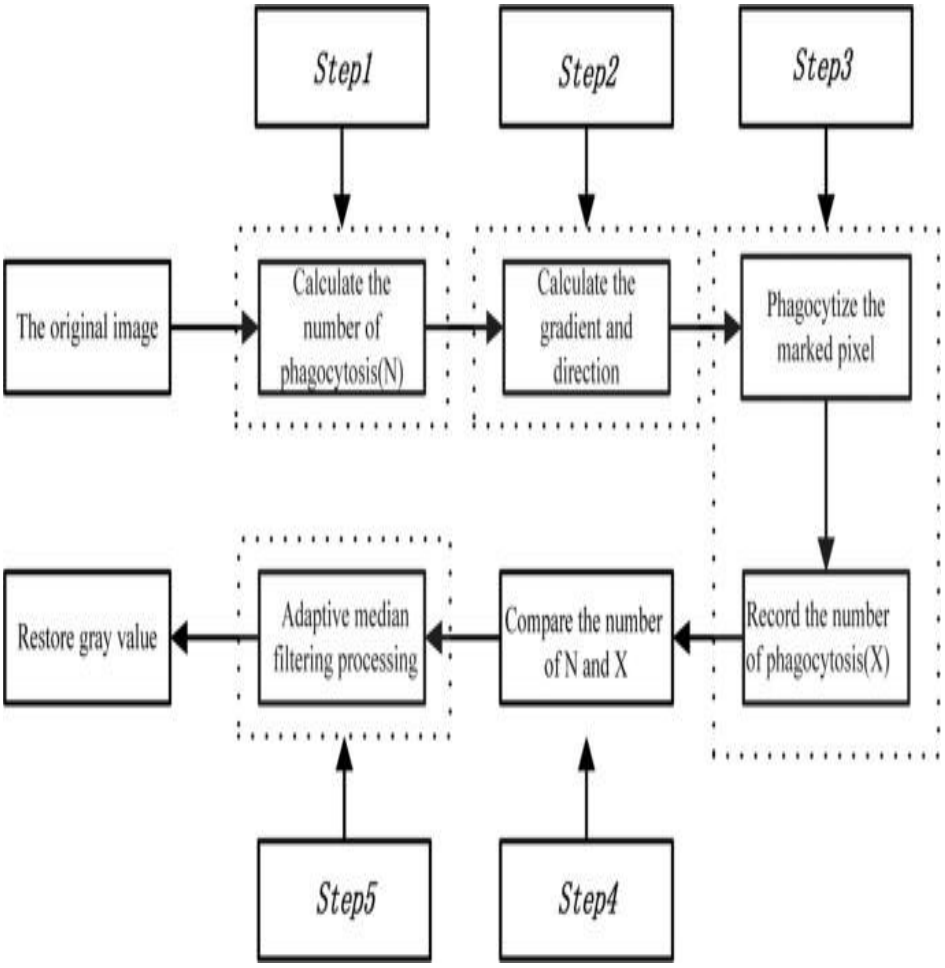
2. Analysis of filtering and novel technique for noise removal in MRI and CT images S. Anitha; Laxminarayana Kola; P. Sushma; S. Archana Publisher: IEEE 2023

Magnetic resonance imaging is a technique to get a clear picture of group of cells (tissue) and group of tissue (organ) by using magnetic and radio waves, and which is without x-ray and other harmful radiation which leads to cancer, and it placed a major role in treating brain, ankle, foot and prostate cancer. To get accurate MRI and CT images for further diagnosis is difficult as they tend to suffer from various noises, like speckle noise, Poisson noise, salt and pepper noise, Gaussian noise. To avoid these noises many noise removal filters such as median filter, ksl filtering, and wiener filter are used. In this paper, Median and Wiener filtering algorithms and result image quality is measured by PSNR, RMSE and MSE are discussed and compared.

III. METHODOLOGY SECTION



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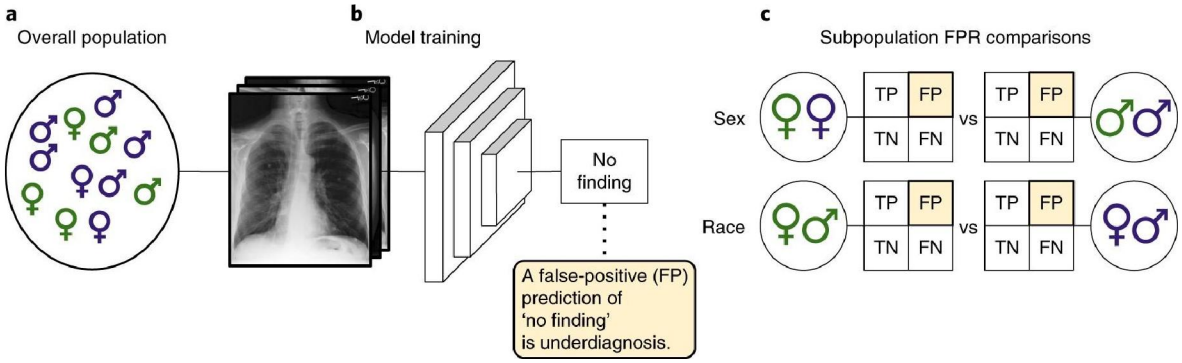
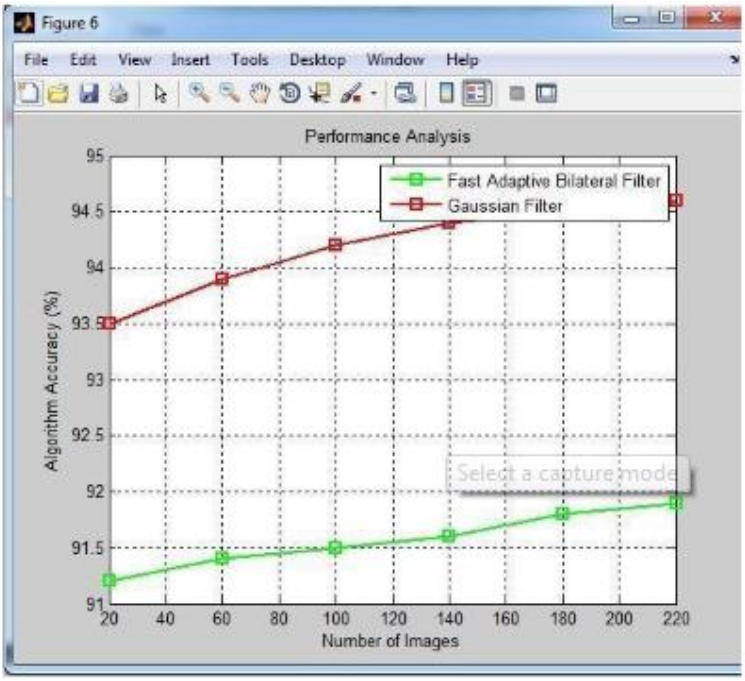


The proposed system was developed using matlab. The existing system caused a long time transmission process but the system developed now has a very good user-friendly tool, which has a menu-based interface, graphical interface for the end user. After coding and testing, the project is to be installed on the necessary system. The executable file is to be created and loaded in the system. Again the code is tested in the installed system. Installing the developed code in the system in the form of an executable file is implementation.

IV. OUTPUT SCREENS



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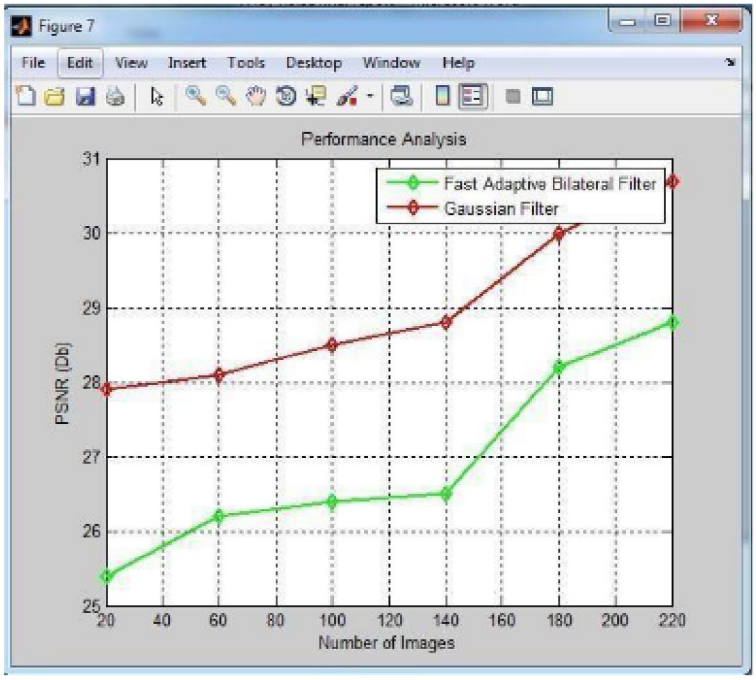

V. CONCLUSION

Radiological noise comes from different sources and can greatly affect the quality of images produced by radiographic and tomography imaging techniques. Manufacturers of modern imaging devices have integrated a software into their scanners to enable reconstruction of images towards noise reduction and improve image quality. However, reconstruction of images sometimes leads to an increase in dose but with reduction of noise and improved image quality. Ideally, reconstruction of image should be performed to reduce noise, minimize dose and improve image quality. Since noise is non-avoidable in radiological imaging, it is recommended that, radiographers, radiologist and medical physicist should be able to quantify the amount of noise in a clinical image, apply the appropriate reduction technique to reduce noise to the minimum, whiles reducing radiation dose to the minimum level as possible and improve image quality. Noise free detector features are also highly recommended and should be incorporated in future designs of radiological imaging systems.

REFERENCES

[1] SarvestanSoltani A, Safavi A A, Parandeh M N and Salehi M , “Predicting Breast Tumor Survivability using Data Mining Techniques”, IEEE 2019.
[2] Software Technology and Engineering (ICSTE), 2nd International Conference, Vol.2, pages 227-231,2019.
[3] Werner J C and Fogarty T C, “Genetic Programming Applied to Severe Diseases Diagnosis”, In Proceedings Intelligent Data Analysis in Medicine and Pharmacology (IDAMAP), 2019.
[4] Iranpour M, Almassi S and Analoui M, “Breast Tumor Detection from fna using SVM and RBF Classifier”, In 1st Joint Congress on Fuzzy and Intelligent Systems, 2019.
[5] Joachims T, Scholkopf B, Burges C and Smola A, “Making large-scale SVM Learning Practical, Advances in Kernel Methods-Support Vector Learning”, Cambridge, MA, USA, 2019.
[6] Soman K P, Loganathan R and Ajay V, “Machine Learning with SVM and Other Kernel Methods”, PHI, India, 2019.
[7] Crammer Koby and Yoram Singer, “On the Algorithmic Implementation of Multiclass Kernel Based Vector Machines”, Journal of Machine Learning Research, MIT Press, Cambridge, MA, USA, Vol.2, pages 265-292, 2019.

[8] Riccardo Poli, William B and Langdon Nicholas F McPhee, "A Field Guide to Genetic Programming", Lulu Enterprises, UK, 2019.
[9] Markus Brameier and Wolfgang Banzhaf, "A Comparison of Linear Genetic Programming and Neural Networks in Medical Data Mining", IEEE Transactions on Evolutionary Computation, Vol.5, Issue No.1, 2019.
[10] Hussein A Abbass. An evolutionary artificial neural networks approach for Breast tumor diagnosis, Artificial Intelligence in Medicine, 25(3):265{281, 2019.
[11] Pedro Henriques Abreu, Hugo Amaro, Daniel Castro Silva, Penousal Machado, and Miguel Henriques Abreu, Personalizing Breast tumor patients with heterogeneous data, In The International Conference on Health Informatics, pages 39-42. Springer,2019.
[12] Mehmet FatihAkay. Support vector machines combined with feature selection for Breast tumor diagnosis. Expert systems with applications, 36(2):3240-3247, 2019.
[13] MafazMohsin Al-Anezi, MarwahJasim Mohammed, and Dhufr Sami Hammadi. Artificial immunity and features reduction for effective Breast tumor diagnosis and prognosis. International Journal of Computer Science Issues (IJCSI), 10(3), 2019.
[14] Musrrat Ali, Millie Pant, and Ajith Abraham. Simplex differential evolution. ActaPolytechnicaHungarica, 6(5):95-115, 2019.
[15] Y Benchaib, Alexis Marcano-Cede~no, Santiago TorresAlegre, and Diego Andina. Application of artificial metaplasticity neural networks to cardiac arrhythmias classification. In Natural and Artificial Models in Computation and Biology, pages 181-190. Springer, 2019.