



# Human Visual System based Unsharp Masking for Enhancement of Mammographic Images

Vikrant Bhateja<sup>a,b\*</sup>, Mukul Misra<sup>a</sup> and Shabana Urooj<sup>c</sup>

*<sup>a</sup>Faculty of Electronics & Communication Engineering, Shri Ramswaroop Memorial University, Lucknow-Deva Road (U.P.) India; <sup>b</sup>Department of Electronics and Communication Engineering, SRMGPC, Lucknow (U.P.) India ;<sup>c</sup>Department of Electrical Engineering, School of Engineering, Gautam Buddha University, Greater-Noida (U.P.) India.*

---

\*Address correspondence to this author at the: Department of Electronics and Communication Engineering, Shri Ramswaroop Memorial Group of Professional Colleges (SRMGPC), Faizabad Road, Lucknow-226028 (U.P.) India. Email: [bhateja.vikrant@ieee.org](mailto:bhateja.vikrant@ieee.org). Contact No.: +91-9935483537.

## HIGHLIGHTS

- NPF has shown distinguished performance when applied for mammogram enhancement.
- This paper presents the usage of NPF in design of Non-Linear Unsharp Masking (UM) framework for the enhancement of mammographic images.
- Application of HVS based adaptive thresholding and non-linear fusion operators provides for an effective minimization of background noises.

**Abstract:** Non-Linear Polynomial Filters (NPF) consists of a schema of linear and quadratic filter components operating as a fusion of low-and high pass filters. NPF has shown distinguished performance when applied for mammogram enhancement. The role has been multifaceted, as there is visual contrast improvement of Region-of-Interest (ROI), i.e. the tumor region as well as those of the surrounding diagnostic features. This paper presents the usage of NPF in design of Non-Linear Unsharp Masking (UM) framework for the enhancement of X-ray mammograms (digital mammographic images). The UM approach presented consists of operational modules namely: edge preserving and contrast enhancement algorithms which are realized using different variants of NPF. Application of Human Visual System (HVS) based adaptive thresholding during contrast enhancement provides for an effective minimization of background noises. The responses of the different modules are then combined using non-linear fusion operators based on an improved logarithmic model of perception and human vision. The

Download English Version:

<https://daneshyari.com/en/article/4951007>

Download Persian Version:

<https://daneshyari.com/article/4951007>

[Daneshyari.com](https://daneshyari.com)