**A GENERALIZED UNSHARP MASKING ALGORITHM**

**Abstract**

In this project our main aim is to Enhance the Sharpness and Contrast of images by using generalized algorithm include un-sharp masking and its variants, histogram equalization, retinex and de-hazing algorithms, and generalized linear systems. Enhancement of contrast and sharpness of an image is required in many applications. Unsharp masking is a classical tool for sharpness enhancement. We propose a generalized unsharp masking algorithm using the exploratory data model as a unified framework.

The proposed algorithm is designed to address three issues

 1) Simultaneously enhancing contrast and sharpness by means of individual treatment of the model component and the residual

2) Reducing the halo effect by means of an edge-preserving filter

3) Solving the out-of-range problem by means of log-ratio and tangent operations.

We also present a study of the properties of the log-ratio operations and reveal a new connection between the Bregman divergence and the generalized linear systems. This connection not only provides a novel insight into the geometrical property of such systems, but also opens a new pathway for system development. We present a new system called the tangent system which is based upon a specific Bregman divergence. Experimental results, which are comparable to recently published results, show that the proposed algorithm is able to significantly improve the contrast and sharpness of an image. In the proposed algorithm, the user can adjust the two parameters controlling the contrast and sharpness to produce the desired results. This makes the proposed algorithm practically useful.

**Block Diagram for Algorithm**

**Refferences:**

1. G. Ramponi, “A cubic unsharp masking technique for contrast enhancement,” *Signal Process.*, pp. 211–222, 1998.
2. S. J. Ko and Y. H. Lee, “Center weighted median filters and their applications to image enhancement,” *IEEE Trans. Circuits Syst.*, vol. 38, no. 9, pp. 984–993, Sep. 1991.
3. M. Fischer, J. L. Paredes, and G. R. Arce, “Weighted median image sharpeners for the world wide web,” *IEEE Trans. Image Process.*, vol. 11, no. 7, pp. 717–727, Jul. 2002.
4. R. Lukac, B. Smolka, and K. N. Plataniotis, “Sharpening vector median filters,” *Signal Process.*, vol. 87, pp. 2085–2099, 2007.
5. A. Polesel, G. Ramponi, and V. Mathews, “Image enhancement via adaptive unsharp masking,” *IEEE Trans. Image Process.*, vol. 9, no. 3, pp. 505–510, Mar. 2000. E. Peli, “Contrast in complex images,” *J. Opt. Soc. Amer.*, vol. 7, no. 10, pp. 2032–2040, 1990. S. Pizer, E. Amburn, J. Austin, R. Cromartie, A. Geselowitz, T. Greer, B. Romeny, J. Zimmerman, and K. Zuiderveld, “Adaptive histogram equalization and its variations,” *omput. Vis. Graph. Image Process.*, vol. 39, no. 3, pp. 355–368, Sep. 1987.
6. J. Stark, “Adaptive image contrast enhancement using generalizations of histogram equalization,” *IEEE Trans. Image Process.*, vol. 9, no. 5, pp. 889–896, May 2000.