

## Focus Circle Transform: Based on Area Processing and Geometric Processing Transform

**Majid Alshammari**  
School of Engineering  
University of Bridgeport

### *Introduction*

Digital image processing is the field of processing digital images by using computer algorithms. Technically, it is the art of modification an image, that is, color values, or intensities, based on the image spatial coordinates. According to(Adams, 2002) there are four image processing transforms: Point processing, Area processing, Geometric processing transform, and Frame Processing transforms.

### *The Proposed Transform*

The proposed transform, is a combination of Area processing transform and Geometric processing transform, called focus circle transform. Therefore, the transform is based on the values of a distance between two points and the radius that will be entered by a user. The distance between two points is calculated by this formula  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ . If the distance  $>$  radius, then the algorithm convolves the chosen mask plus increased fade to black. If the distance  $\leq$  radius, then the algorithm convolves the default sharpening mask (3x3 High Boost (un-sharp)).

### *Implementation*

The proposed Transform used for difference implementations. For example, it may use for making more focus on an object inside an image by creating a circle of focus. The circle of focus implemented by using a sharpening mask (3x3 High Boost (un-sharp) as a default) within a specific radius, which is entered by a user after determining the X and the Y values on the source image. The Area that is out of the circle of focus is implemented by using a smoothing mask which is chosen by the user (7x7 Box Filter) in addition to faded it to black. Fading to black will increase as we go far from the circle of focus to make the circle of focus more clear. The following images are implemented by the proposed transform.



(1) The original

(2)X = 128 , Y = 128, and Radius =60



(3)X = 55 , Y = 55, and Radius =60 (4)X = 200 , Y = 200, and Radius =60

The image number 1 is just the original image. In the image number 2,  $X = 128$ ,  $Y = 128$ , and the radius = 60, as a result the circle of focus in the middle. In the image number 3,  $X = 55$ ,  $Y = 55$ , and the radius = 60, so the circle of focus at the left corner. In the image number 4,  $X = 200$ ,  $Y = 200$ , and the radius = 60, the circle of focus at the bottom of the right corner.

### **Conclusion**

In this paper a new transform has been introduced. The new transform utilizes Area processing transform and Geometric processing transform. The proposed transform can be used to make more focus on an object inside an image by creating a circle of focus.

### **Reference**

Adams, W. R. (2002). *Digital Image Processing: Definitions, Derivations and Details* (First Edition ed.).