ABSTRAC

A digital imagery is a form of popular imagery for having ease in collecting, sending, and processing. A digital image are often damaged or image quality degradation caused by unfavorable environmental conditions at the time of making a digital image such as the presence of dust. That requires a noise filter to improve the quality of image that has been damaged, so the image quality will be obtained the same or close to the quality of the digital image before affected by noise.

In this final task will be built a system that test the combination of detector and noise filter to reduce noise in a digital image. Noise to be tested is *impulsive noise* which generate noise by changing the intensity of a pixel value becomes the maximum intensity or minimum intensity in grayscale image. *Impulsive noise* detection method used was *Boundary Resetting Boundary Discriminative Noise Detection* (*BRBDND*) and *Signal Dependent Rank Order Mean* (*SDROM*). While the filter method to be used is the *Adaptive MMSE Filtering* (*Adaptive MMSE Filtering*). *Boundary Resetting Boundary Discriminative Noise Detection* detected impulsive noise pixels are tested and classified into low-density cluster, middle cluster, and high-intensity cluster in where the pixel being examined including the noise if they are in the group of low-density cluster and high-intensity cluster.

Method of *Signal Dependent Rank Order Mean* make detection of impulsive noise by determining the fourth *threshold* value to be compared with the sign difference between neighboring pixels and the central pixel in the matrix mask of 3x3. If there is a signed difference value that exceeds the *threshold* value, then the tested pixel is noise. Method of *Adaptive MMSE Filtering* make the filter with uniformly averaged pixel values of neighboring pixels to be subjected to filter process. Size mask that was used to filter process is a 3x3, 5x5, and 7x7 which will analyze the influence of mask size on the result of a combination of detector noise filter with the *Adaptive MMSE Filtering* based on an objective parameter value of *Peak Signal to Noise Ratio* (*PSNR*).

The combination of *SDROM+Adaptive MMSE Filtering* and combination of *BRBDND+Adaptive MMSE Filtering* able to combine to increase the image quality is affected by *impulsive noise*, where the combination *BRBDND+Adaptive MMSE Filtering* can improve image *PSNR* value was *noise* until it reaches an average difference of 10.3658 dB. While the combination *SDROM+Adaptive MMSE Filtering* can improve image *PSNR* value was noise until it reaches an average difference of 8.4209 dB.

Key words: *Adaptive MMSE Filtering, Boundary Resetting Boundary Discriminative Noise Detection, Impulsive Noise, Signal Dependent Rank Order Mean.*