

## **Removal of high density salt and pepper noise from image and video based on optimal decision based algorithm**

### **ABSTRACT**

Removal of high density salt and pepper noise is an interesting field of research. However, most previous approaches do not lead to good results. If the density of noise increases rapidly, the quality of the image tremendously decreases and the restoration of those images is a difficult task. This paper proposes an optimal method to suppress the noise with high density properly based on a nonlinear filter and decision-based approach. We assume a  $3 \times 3$  fix window to scan the image from top-left to bottom-right of the image pixel by pixel. This size of window guarantees the image saving with more details and avoiding the image blurring. There are two steps, detection of the corrupted pixels and then restoration. Detection is provided by using statistical analysis in each window, then the appropriate replacement for the noisy pixel is conducted from given values inside the current window or adjacent reconstructed pixels based on mean calculation and also, for very high density of noise which density of noise is bigger than 80%, the reconstruction is based on a recursive approach. Experimental results on some benchmark images and video clips show that this method is a successful algorithm for suppression of salt and pepper noise with high density; besides, they show that the computational complexity and time consuming are reasonable.

**Keyword:** Salt and pepper noise; High density; Median filter; Decision based algorithm