International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.04, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

AN INSIGHT INTO CELLULAR AUTOMATA-BASED IMPULSE NOISE FILTRATION ALGORITHMS

Zubair Jeelani[1], Fasel Qadir[2]

[1]*Department of Computer Science, University of Kashmir, India*
[2]*Department of Computer Science, University of Kashmir, India*

ABSTRACT

Application of Cellular Automata (CA) to Digital Image Processing has achieved considerable attention in last several years.CA are now used for noise filtration in digital images, particularly many CA-Based Impulse Noise Filters have been proposed. Impulse noise in an image is introduced during transmission over transmission media by external noise sources like atmospheric disturbances, or due to corrupted hardware memory locations or fault in camera sensors. In this paper we present a review of different CA-based impulse noise filtration algorithms with a focus on their use of Cellular Automata. A comparison of the algorithms on the basis of CA used, type of image they filter, parameters used, and type of impulse noise they filter used is also discussed.

Keywords: Cellular Automata, Image Enhancement, Impulse Noise, Noise Filtration, Salt And Pepper Noise

I.INTRODUCTION

Noise in image processing generally refers to unwanted data that conceal or distort the original information carried in a digital image. Digital images may get corrupted by different types of noise during different stages of image processing like image acquisition due to malfunctioning of the sensors in a digital camera, or during encoding and transmission, when the images are transferred over noisy transmission lines. Different types of noise like impulse noise, Gaussian noise, speckle noise may corrupt digital images. There are two types of impulse noise, salt and pepper noise and random valued noise. For images corrupted by salt and pepper noise, the noisy pixels can take only the maximum and the minimum values in the dynamic range [1]. Random valued noise on the other hand, may assume any value in the dynamic range.

Cellular Automata (CA) are dynamic, complex space and time discrete systems originally proposed by Stanislaw Ulam and John von Neumann in the 1940s as formal models for self-reproducing organisms [2][3]. 2D-CA is a grid of cells arranged in a rectangular area. Each cell can be in one of the finite number of states defined for the automaton. The cells change their current state after discrete time steps according to some pre-defined rules. The rule (*transition function*) uses the current state of the cell under consideration as well as the states of the neighboring cells to evaluate the next state of the cell. Efficiency of CA lies in the fact that most of