

JOURNAL OF OPTOELECTRONICS LASER

ISSN:1005-0086

Volume 41 Issue 4, 2022

Fractal Dimension Estimating Methods for Data Analyzing: Survey

Tanya Shakir Jarad^{*1}, Murtadha Mohammad Hamad² & Azmi Tawfiq Hussein Alrawi³

^{*1,2&3}Department of Computer Science, College of Computer Science and Information Technology, University of Anbar, Anbar, Iraq

ABSTRACT Over the 3-decades ago and more, Fractal Geometry (FG) has received a lot of attention of a number of researchers, with robust application and excellent properties in relation to the scenario of the current research. A crucial part is played by the Fractal Dimension (FD) in Analysis of complex objects that have not been analyzed in geometry of Euclidean. FD is an essential side of FG in presenting indicative applications in various fields of study consist of pattern recognition, image processing, graphics of computer, and much more. Image analysis is a crucial technique for processing of image to define image characteristics such as smoothness, roughness, texture, etc., and is only potential via FG. Because of this, many more techniques for estimating FD were evolved. The main goal of this paper is to supply a global review of new evolutions in surface ruggedness analyzes and a general overview of the various concepts, how they work, the benefits and limitations, and how the different concepts used for estimating the FD depend on various algorithms. This paper also discuss various factors that affect the estimation of FD; it discusses the kinds of similarity properties, sampling process, spatial resolution, spectral band, box-height criteria and region of interest. We have also attempt to offer the FG area-oriented application in the core area. In many types of literature, there are several contradictory findings regarding the effects of various parameters during estimate dimension analyses. Majorly it has been distinguished that the estimation of FD will be affected by the range of gray scale, texture property, color distance, color property, and the other factors already mentioned, so this paper will be advantageous to authors to choose accurate estimation of FD. Fortunately, various algorithms result in various results, even using database images of the same type, so the choice of the suitable method is, therefore, a great challenge to estimate accurately. It is thus necessary to develop an in-depth and appropriate under-standing for selecting the suitable and a robust algorithm for better and more accurate analysis of roughness. Also, we proposed using heuristic methods in order to estimate how fractal techniques.

Keywords: Fractal Dimension, Fractal Geometry, Self-Similarity, Surface roughness images (color and grayscale).

I. INTRODUCTION

Fractal Geometry (FG) is a standard way of characterizing complicated nature by using property of Mandelbrot's Self-Similarity (SS) [1,2]. A fractal is a disintegrated or geometric structure that has to be divided into sub-sections, so, as an original, individual decreased sections appear to preserve SS because SS-related FD problem definitions are commonly used to define roughness. In the beginning, the word "fracture" was learned from Mandelbrot to conceal

Search 'Add Link'

Export PDF

Edit PDF

Create PDF

Adobe PDF Pack

Convert files to PDF and easily combine them with other file types with a paid subscription

Select File to Convert to PDF

Select File

Convert, edit and e-sign PDF forms & agreements

Free 7-Day Trial