RESTORATION OF IMAGE BY THE CONJUGATE GRADIENT METHOD USING MATLAB APPS DESIGNER

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ABSTRACT

The Conjugate Gradient (CG) Method is a well-known iterative method for solving unconstrained optimization problems. Image restoration is among the most challenging problems and it is one of the unconstrained optimization problems. The most challenging process in image restoration is restoring an image affected by impulse noise. The impulse noise has two types: salt and pepper noise and random valued impulse noise. Solving the image processing problem using the CG method manually is tedious since it involves many iterative calculations. Hence, the main objective is to review the CG method development applied to image processing problems and to develop GUI MATLAB for image restoration using the CG method. The term "GUI" refers to the graphically represented user interface for computer operations, which serves as the channel for communication between the computer and its users. Using GUI MATLAB, users no longer need to use the combination of function and coding to perform image restoration. The GUI MATLAB facilitates the user by creating buttons and several callback functions. It was more convenient this way. In this research report, there are 42 lists of formulas in the standalone application GUI MATLAB. During the experiment, four lists of CG methods will be used for this research: HS, FR, PRP+ and WYL. The image that will be used is Lena, Man and Circle. Besides, the noise degrees 0.35, 0.45, 0.55 and 0.75 will be used in applying GUI MATLAB. In order to test the GUI, the result will be compared to the result from the paper by Ma et al., (2022) for FR, PRP+ and WYL.

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