

# Crack depth estimation on steel surfaces using image processing and Neural Network

Mohamed Abolella Abdellatif Gaber, Yasser S. Mohameda, Hesham M. Shehataa, Taher H. Awad

## Abstract

Automatic crack detection is needed to reduce cost and to improve quality of surface inspection that is needed for maintenance of infrastructures. In this research, a novel system was developed to detect steel cracks and to estimate their depth from 2D images. The objective is to develop an affordable and user-friendly inspection system in replacement of expensive 3D measurement devices. A learning strategy was adopted and several learning structures were exploited to decide on the suitable together with the maximum depth of steel cracks measured by laser microscope to train a learning structure. Feed forward back propagation Neural Network was found to produce an over-all average error of 18.81% in testing which is 10% less than the previous error using another learning strategy (updated 3D Make toolbox) for depth recovery. The system performance is comparable to the state of the art and provides Alexandria University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license

*Alexandria University Engineering journal by Elsevier 2019, October*