

AUTOMATIC JUDGMENT OF SPINAL DEFORMITY BASED ON BACK PROPAGATION ON NEURAL NETWORK

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ABSTRACT. Spinal deformity is a serious disease, mainly suffered by teenagers during their growth stage. In this paper, we propose a new technique for automatic judgment method of spinal deformity from moire topographic images. Normally the moire stripes show a symmetric pattern, as a human subject is almost symmetric. According to the progress of the deformity of a spine, asymmetry becomes larger. Medical doctor checks the asymmetric moire patten from the moire topographic image on visual screening. Numerical representation of the degree of asymmetry is therefore useful in evaluating the deformity. In this study, displacement of local centroids and difference of gray values are evaluated statistically between the left-hand side and the right-hand side regions of the moire images with respect to the extracted middle line. The degree of the displacement and differences of gray values are learned by using a neural network employing the back propagation algorithm and satisfactory classification rates are obtained. An experiment was performed employing 1200 real moire images and 90.3% of the images were classified correctly.

Keywords: Spinal deformity, Moire topographic image, Symmetry, Middle line, Neural network

1. Introduction. Spinal deformity is a serious disease mainly suffered by teenagers during their growth stage. There are many causes of spinal deformity, but all of them are unknown. The most common type is termed as "idiopathic" that shows 80% of the spinal deformity. There are two basic types of spinal deformity, namely structural and nonstructural spinal deformity (The latter is also called as functional).