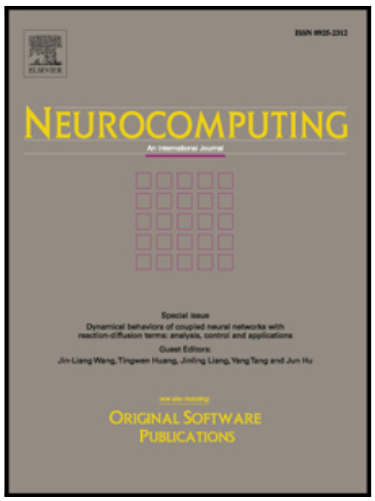

Automatic Texture Defect Detection using Gaussian Mixture Entropy Modeling

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Automatic Texture Defect Detection using Gaussian Mixture Entropy Modeling

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***Abstract*—In this paper we propose a new unsupervised, automated texture defect detection that does not require any user-inputs and yields high accuracies at the same time. To achieve this end we use the non-extensive entropy with Gaussian gain as the regularity index computed locally from texture patches through a sliding window approach. The optimum window size is determined by modeling the entropy values by a two-mode Gaussian mixture model and checking for the minimum entropy of the mode-probabilities. The outlier entropy values corresponding to defective areas are defined as those that exceed thrice the standard deviation as is the norm in statistics. The result is automatic defect detection with no manual intervention. Empirical results on defective texture images from the Brodatz database provide accurate localization of the defect as compared to Chetverikov and Hanbury's maximal regularity method, which requires manual setting of threshold parameters for each type of texture despite of being a benchmark for texture defect detection.**

Keywords- Gaussian Mixture Model, Non-Extensive Entropy with Gaussian Gain, Texture defects, Sliding window approach, Texture Regularity

I. INTRODUCTION

Texture defect detection finds its uses in the textile industry for automatic fabric inspection, and also has the potential for contributing to modern day video-surveillance and abnormality detection. Texture defect detection techniques are broadly classified into statistical methods that are based on gray-level co-occurrence matrices and the transform methods an example being Gabor filters [1]. A more explicit categorization in [2] groups fabric defect detection techniques into motif-based methods, which consider the characteristics of the smallest pattern unit or motif, and the non-motif based methods. The non-