DEVELOPING AN AUTOMATED MACHINE VISION SYSTEM FOR OBJECTIVE SOIL RELEASE EVALUATION

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Abstract

Soil release is an important functional attribute of a fabric that impacts its market value. Since visual evaluation of soil release by human graders is subjective, there exists the need for objectively assessing the same. In order to address this issue, a machine vision scheme based on image analysis was developed by the authors. The input to the system was a digitized fabric image, and the output was a soil release grade that was based on the digitized AATCC soil release replicas. This system was subsequently validated on a sizeable dataset of fabrics, and promising results were obtained.

In the current work, the modifications, extensions and improvements to the machine vision system are presented. In particular, the following are the issues discussed: (1) Optimizing the performance of the system by modifying the pre-processing stage of the image analysis block (2) Improving the stain segmentation scheme and evaluating the segmentation accuracy of the algorithm (3) Assessing the discriminative power of the soil release system (4) Evaluating the repeatability of the system (5) Extracting additional measurements from the stained fabric image, and (6) Making the system fully automatic by imparting the capability to detect multiple stains on a fabric.

The details of the proposed machine vision system and the results of the validation study are collectively described in two manuscripts that have been accepted for publication in the Optical Engineering Journal and the Textile Research Journal respectively.