

**CLUSTERING COTTON FIBER LENGTH DISTRIBUTIONS USING SHAPE FEATURES****Mourad Krifa****The University of Texas at Austin****Austin, TX****Abstract**

Mechanical damage in cotton fiber processing both shifts the fiber length distribution and alters its shape. This leads to length distributions with complex shapes (often bimodal) that cannot be classified based on simple summary statistics (Krifa, 2009). In such cases, the best way to compare and classify samples with varied degrees of fiber damage is to visually examine the empirical length histograms. However, this can only be done with a limited number of samples. This research presents an approach to classifying cotton samples based on histogram data using clustering techniques. The goal of the analysis is to quickly classify the samples into relatively homogenous groups of different damage levels. The method was applied on a set of 163 commercial bales tested on HVI and AFIS. Three sets of classification criteria were tested, namely, HVI properties, AFIS parameter, and AFIS length histograms. The results show that empirical histograms produce the clusters with the lowest variability, followed by AFIS parameters. HVI properties produced clusters with some heterogeneity, with approximately 15% of the bales being misclassified. Those bales will be further examined in order to determine the possible causes for misclassification.

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