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Paper: Raw Material Classification by means of Hyperspectral Imaging and Hierarchical Temporal MemoriesÂ

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Abstract: The recently proposed hierarchical temporal memory HTM) paradigm of soft computing is applied to the detection and classification of foreign materials in a conveyor belt carrying tobacco leaves in a cigarette manufacturing industry. The HTM has been exposed to hyperspectral imaging data from 10 types of unwanted materials intermingled with tobacco leaves. The impact of the HTM architecture and the configuration of internal parameters on its classification performance have been explored. Classification results match or surpass those attained with other methods, such as Artificial Neural Networks (ANNs), with the advantage that HTM are able to handle raw spectral data and no preprocessing, spectral compression, or reflectance correction is required. It is also demonstrated that an optimized configuration of the HTM architecture and internal values can be derived from the statistical properties of the hyperspectral data, allowing the
extension of the approach to other classification problems.Â