Review

Quality control of industrial processes by combining a hyperspectral sensor and Fisher's linear discriminant analysis

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Abstract

A non-intrusive and non-contact system for the real time detection of spurious elements in raw material processing chains for industrial environments is presented. Observation line spectrographs, obtained from the visible–near infrared (Vis–NIR) reflectance of the material under study, are obtained using a dual spatial-spectral technique. Therefore, a huge amount of information is involved in the process and an efficient classification algorithm would be a great asset. In this paper, the validity of Fisher's linear discriminant for this application is investigated.

The technique has been successfully tested on the tobacco industry. However, the technique is not limited to tobacco leaves, but other materials can additionally be discriminated or classified.

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Contents

1. Introduction

Raw material on-line characterization and discrimination on the input stages of processing chains are a key production or quality-control process in many industrial sectors. Sometimes

they are required to automatically classify the raw material on different quality levels and after that, in many cases, to discriminate the desired raw material from other unwanted spurious materials. For instance, in the tobacco industry, a great variety of materials such as plastic, cardboard, paper, etc. can be found intermingled with the raw material (tobacco leaves). These "defects" should be rejected before making cigars. In general terms, the problem demands the determination of both presence and position of these defects while the mixed materi-

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