A Web based Intelligent Sensory Evaluation System in the Textile Integrated Supply Chain

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Abstract.

This chapter presents a web based intelligent sensory evaluation system of industrial products, developed according to the practical requirements of textile enterprises. This system, implemented on websites, permits to carry out normalized business transactions between distant industrial partners and describe, analyze and interpret sensory data provided by distant multiple panels. In the sector of textile/clothing/distribution, sensory data constitute a very important component in the information flow of the integrated supply chain. In our system, intelligent techniques have been used to process uncertainty and imprecision existing in sensory data and a criterion of distance between two sensory panels has been defined in order to characterize the difference between suppliers and customers. Based on this distance, we propose a procedure for converting evaluation terms between different panels, which is useful for solving business conflicts in product quality. The effectiveness of this system has been validated using a practical example of fabric hand evaluation.

1 Introduction

The European Textile/Clothing (T/C) industry is still important in the European economy, in terms of production and employment. However, there exist many barriers in this sector that are pressing textile companies to face the following competitive challenges:
− Shorter product life cycles: Distributors and consumers are looking for more variety and personalization,
− Lack of flexibility in the supply chain,
− Cost reduction: Retailers wish to keep their sales margins, which leads to the competition for cheaper prices on products,
− Homogeneity need: The lack of integration, the heterogeneity and the lack of standards constitute a chronic weakness of the European T/C Industry.

Under this challenging economic pressure, there is a strong need for developing new means in order to enhance communications between all related companies in the textile/clothing/distribution supply chain and between these companies and consumers [1, 2]. In general, the structure of this supply chain should be optimized by exploiting relevant information on product quality, product design and marketing obtained from different companies in a cooperative way.

Today, industrial partners working in the textile/clothing/distribution supply chain are generally located in different parts of the world. Their professional knowledge, technical criteria, cultures and languages related to product quality and product design are quite different. In this background, a normalized sensory evaluation platform in this international supply chain can effectively help the understanding of all partners on products and decrease business conflicts between suppliers and customers. In practice, the supply chain oriented sensory evaluation work is generally done by consultation companies or evaluation centers independent of related producers. In order to optimize the cost and efficiency of the supply chain, we wish to realize the corresponding evaluation platforms on websites and perform the evaluation work on them. In this case, all partners, especially distant partners can freely carry out normalized communications and business transactions between them.

In this chapter, we present a sensory evaluation system of the textile/clothing/distribution supply chain implemented on websites. Sensory evaluation in the integrated supply chain is applied at two levels: 1) Design Oriented Sensory Evaluation (DOSE) and 2) Market Oriented Evaluation System (MOSE) [3]. In the following sections, only some basic functions at DOSE level are presented in detail because web based distant communications between business partners play a leading role in the supply chain. The functions at MOSE level, rather similar to those of DOSE, have been discussed in [4, 5]. Our chapter is organized as follows. In Section 2, we