TRENDS: A content-based information retrieval system for designers

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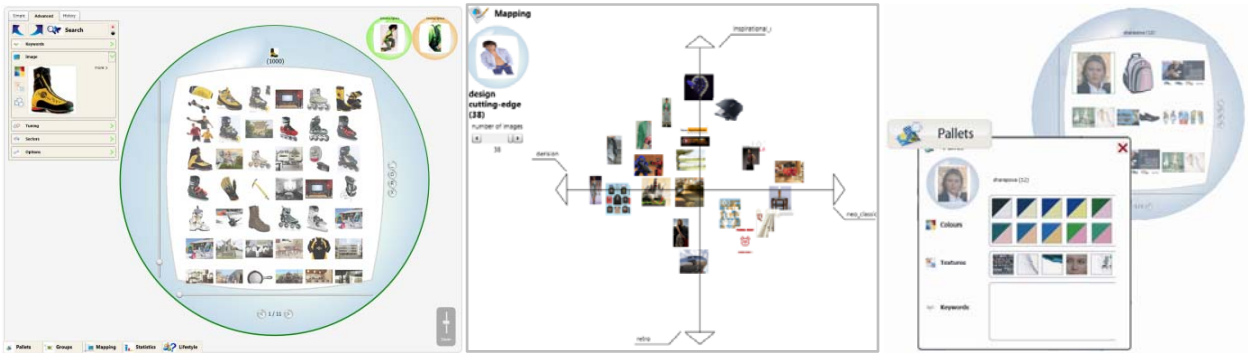

(a) (b) (c)

Figure 1 : *(a) Image search by example (b) Semantic mapping (c) Pallets*

1. Introduction

The TRENDS European project aimed at developing an image and text retrieval engine in order to support the activity of the designers in the early stages of their design process [TRENS 2007]. The study of the designers' activity has led us to the production of an image database in which designers will find inspirational material. A content-based image search engine has been elaborated, starting from recommendations taken from the methodology employed by the designers in their activity, to end with a complete system incorporating image retrieval technologies and various tools to extract relevant information from these images.

2 TRENDS functionalities

The TRENDS system proposes much functionality that answers to specific methodological needs. The first family of tools, namely search functionalities, related to image retrieval. The second family of tools, namely advanced functionalities for design, related to the categorization of images, and their statistical analysis. We provide a list of the functionalities in the following.

Image retrieval functionalities:
-*image search by text*: the user inputs some keywords, semantic adjectives or concepts;
-*image search by example*: the user selects an image as a query, similar images are found in the database (figure 1a);
-*mixed text and image search*: a combination of keywords and images is used as a request
-*relevance feedback*: the system refines the query results using positive and negative examples pointed out by the user.

Image processing features:
-*semantic mapping*: using the semantic adjectives appearing in a set of results, the system builds up a mapping (see figure 1b)
-*pallets*: using specific harmony rules, the user can extract the pallets of colors and textures appearing in a set of images (see figure 1c)
-*grouping*: based on visual features, the user can automatically categorize a set of images into subsets for extracting trends
-*statistics on image / text search*: using text and image search, the system can show in real time the list of sectors in which similar images can be found.

Currently the resulting database of TRENDS system is 300 Go large with 1,888,525 files (JPG format) after filtering and categorized in 25 sectors.

3 TRENDS Specificities

The specificities of TRENDS that reflects research advances and technological innovation can be summarized according to two main axes from a user perspective and from a system perspective.

From a user perspective, TRENDS system is specific by its orientation towards designers. This point of reference is important in the way it will directly impact the interface and the system. Indeed some authors already explained that for creative activities like design the proposed search functionality should enable a more or less open way from very open or even random, to targeted and enabling to get precise details.

From a system perspective, TRENDS system uses early fusion of visual features and offers the user the possibility to activate any combination of them: the semantic search performed both for text and images, the ability of the system to generate pallets extracted from images or sets of images and in this way to support digitally the elaboration of trendboards, the generation of statistics automatically linked with the query parameters, the information about consumers, and the image modifier.

References

TRENDS 2007, Meta-deliverable 1 – State of the art, available on www.trendsproject.org

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