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CONTENT-BASED IMAGE RETRIEVAL FOR THREE-DIMENSIONAL TRADEMARKS

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Abstract. *Intellectual property rights, including copyright, are becoming increasingly important throughout the world. The number of registered trademarks in the image trademark database has risen rapidly. Both the text description of the trademark registration and the image content of the trademark are important. This study focuses on how to effectively retrieve trademarks from a three-dimensional trademark database based on image content. One three-dimensional trademark consists of several images, whereas a two-dimensional trademark contains only one. Therefore, image retrieval methods designed for two-dimensional trademarks seem to be inadequate for three-dimensional trademarks. This study presents an automatic three-dimensional trademark image retrieval (3DTIR) system based on corner features. Experiments are undertaken on three-dimensional trademark images from the website of Intellectual Property Bureau, Ministry of Economic Affairs, Taiwan. Experimental results manifest that the proposed approach provides accurate retrieval results on three-dimensional trademark image database.*
Keywords: Content-based image retrieval, Similarity measurement, Three-dimensional trademark

1. **Introduction.** Due to the rapid advances in digital technology and persistent activity of international trade, a trademark is very important for ensuring that a business can continue to trade. In many countries, trademarks must be formally registered via the national patent office obtaining legal protection. Table 1 presents the number of registered trademarks in major countries since 2004 [1]. For instance, 45,876 trademarks were registered in Taiwan in 2008 and 243,230 were registered in the past five years. The requirement for trademarks is rising and trademarks now have increasingly complex design patterns. The development of multimedia devices has led to easy image creation, storage and transmission, so that thousands of digital images can be produced. The number of digital trademark image collection is also rising rapidly. Therefore, the increasing demands of trademark management, effective retrievals and efficient registrations from the large trademark image database are becoming increasingly important.

Content-based image retrieval (CBIR) is one image retrieval technique [2-6]. Images are represented in CBIR by a set of multidimensional low-level visual features such as color, shape, spatial and texture. Additionally, the system can extract the features of the images and retrieve the relevant images from the image database automatically [7,8]. CBIR has recently become a popular research topic in image and vision computing. Various CBIR systems have been developed, including BALAS [9], MIRROR [10], Netra [11], Photobook [12], PicHunter [13], PicSOM [14], QBIC [15], SIMPLIcity [16], Virage [17] and VisualSeek [18].