An Efficient Parallel Texture Classification for Image Retrieval

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This paper proposes an efficient parallel approach to texture classification for image retrieval. The idea behind this method is to pre-extract texture features in terms of texture energy measurement associated with a 'tuned' mask and store them in a multiscale and multi-orientation texture class database via a two-dimensional linked list for query. Thus, each texture class sample in the database can be traced by its texture energy in a two-dimensional row-sorted matrix. The parallel searching strategies are introduced for fast identification of the entities closest to the input texture throughout the given texture energy matrix. In contrast to the traditional search methods, our approach incorporates different computation patterns for different cases of available processor numbers and concerns with robust and work-optimal parallel algorithms for row-search and minimum-find based on the accelerated cascading technique and the dynamic processor allocation scheme. Applications of the proposed parallel search and multisearch algorithms to both single image classification and multiple image classification are discussed. The time complexity analysis shows that our proposal will speed up the classification tasks in a simple but dynamic manner. Examples of the texture classification task applied to image retrieval of Brodatz textures, comprising various orientations and scales are presented.

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