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A Biologically Inspired Approach to Automatic Classification of Textile Fabric Prints Based On Both Texture and Colour Information

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Abstract : Machine Vision has been playing a significant role in Industrial Automation, to imitate the wide variety of human functions, providing improved safety, reduced labour cost, the elimination of human error and/or subjective judgments, and the creation of timely statistical product data. Despite the intensive research, there have not been any attempts to classify fabric prints based on printed texture and colour, most of the researches so far encompasses only black and white or grey scale images. We proposed a biologically inspired processing architecture to classify fabrics w.r.t. the fabric print texture and colour. We created a texture descriptor based on the HMAX model for machine vision, and incorporated colour descriptor based on opponent colour channels simulating the single opponent and double opponent neuronal function of the brain. We found that our algorithm not only outperformed the original HMAX algorithm on classification of fabric print texture and colour, but we also achieved a recognition accuracy of 85-100% on different colour and different texture fabric.

Keywords : automatic classification, texture descriptor, colour descriptor, opponent colour channel
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