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Iban Plaited Mat Motif Classification with Adaptive Smoothing

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ABSTRACT

Decorative mats plaited by the *Iban* communities in Borneo contains motifs that reflect their traditional beliefs. Each motif has its own special meaning and taboos. A typical mat motif contains multiple smaller patterns that surround the main motif hence is likely to cause misclassification. We introduce a classification framework with adaptive sampling to remove smaller features whilst retaining larger (and discriminative) image structures. Canny filter and Probabilistic Hough Transform are gradually applied to a clean greyscale image until a threshold value pertaining to the image's structural information is reached. Morphological dilation is then applied to improve the appearance of the retained edges. The resulting image is described using Binary Robust Invariant Scalable Keypoints (BRISK) features with Random Sample Consensus (RANSAC). We reported the classification accuracy against six common image deformations at incremental degrees: Scale+Rotation, Viewpoint, Image Blur, Joint Photographic Experts Group (JPEG) Compression, Scale and Illumination. From our sensitivity analysis, we found the optimal threshold for adaptive smoothing to be 75.0%. The optimal scheme obtained 100.0% accuracy for JPEG Compression, Illumination, and Viewpoint set. Using adaptive smoothing, we achieved an average increase in accuracy of 11.0% compared to the baseline.

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1. INTRODUCTION

Borneo is widely known as a home to the world's richest and aesthetically appealing plait work traditions. These traditions derive from the island's diverse cultural history and a product of creativity as well as ingenuity of its different communities [1]. Decorative mat plaiting is a craft skill known in most indigenous communities in Borneo. Plaited mats are used for basic floorcovering, for sitting, for sleeping and for ritual purposes during religious ceremonies. Sleeping and ritual mats tend to be the most elaborately decorated and may feature sacred motifs that are believed to be carrying spiritually powerful patterns that establish link between humans and the gods [2]. Modern practice of naming plaited mat motifs has suffered from a relative neglect in material culture studies, often resulting to a devoid of meaning. The relation between a motif and the name by which it is called is often not relevant. Thus, it is specious to interpret motifs only through their names [3]. Our previous work [4] investigated the use of an invariant image-based feature descriptor for recognizing *Iban* plaited mat motifs. We argue that this is the best route (i.e., image-based classification) to automate the mat motif recognition task. With modern smartphones being equipped with camera(s)