Performance Evaluation of SIFT Descriptor against Common Image Deformations on Iban Plaited Mat Motifs

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Borneo indigenous communities are blessed with rich craft heritage. One such example is the Iban’s plaited mat craft. There have been many efforts by UNESCO and the Sarawak Government to preserve and promote the craft. One such method is by developing a mobile app capable of recognising the different mat motifs. As a first step towards this aim, we present a novel image dataset consisting of seven mat motif classes. Each class possesses a unique variation of chevrons, diagonal shapes, symmetrical, repetitive, geometric and non-geometric patterns. In this study, the performance of the Scale-invariant feature transform (SIFT) descriptor is evaluated against five common image deformations, i.e., zoom and rotation, viewpoint, image blur, JPEG compression and illumination. Using our dataset, SIFT performed favourably with test sequences belonging to Illumination changes, Viewpoint changes, JPEG compression and Zoom + Rotation. However, it did not perform well with Image blur test sequences with an average of 1.61% retained pairwise matching after blurring with a Gaussian kernel of 8.0 radius.

Keywords: Iban mat motifs, Content-based image retrieval and invariant feature descriptor.

1.0 Introduction

Sarawak, the Land of Hornbill, is the largest Malaysian state with the most number of indigenous tribes. When it comes to cultural art craft, Sarawak is blessed with diverse backgrounds and traditions which produce a plethora of patterns, motifs and designs for creating unique and beautiful products. Sarawak is famous with its traditional art forms, or rather handicrafts, made by the indigenous people with materials collected from the rich rainforests. A handicraft product is defined by the Malaysian Handicraft Development Corporation as any product that has artistic or traditional cultural attractions and is the result of a process that depends solely or partly to the skill of hand (Tiing, 2013).

In this study, we focus on Iban’s mat plaiting motifs plaited by one of the indigenous communities in Sarawak, i.e., Iban Batang Ai from Rumah Bintung, Lubuk Antu. As there is no written documentation, it is rather vague on how the Ibans came to learn mat plaiting skill. The skill is considered as one of the oldest traditions according to Selleto (2012) amongst the Ibans, with the plaiting of plain mats considered to be of the same status as knitting in traditional European societies. Previously, it was deemed as an essential asset to an Iban girl that she