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Study of Wavelet Transformation Method for feature Extraction Characteristics Based In Identifying Authenticity Indonesian Batik

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Abstrak

Batik is the cultural heritage of indigenous peoples in Indonesia. The original Indonesian batik '*cap*' and '*tulis*' has a characteristic in the production process that uses a technique closing '*malam*' / wax from wax-resist dyeing process. Currently developing the promotion and online sales through cyberspace. To help viewers and consumers cyberspace recognize the authenticity of Indonesian batik, so in this paper, the authors will review the image processing to be able to recognize batik photo circulating in the virtual world is an original photo of Indonesian batik or not. This is done to discuss and review studies feature extraction prior to recognize characteristic motif using wavelet method.

Keywords: batik, feature extraction, wavelet

1. Introduction

Batik from Indonesia received international recognition by UNESCO on October 2, 2009 as "Reperesentatif List of the Intangible Cultural Heritage of Humanity". In this case UNESCO recognized batik is not the object, but what distinguishes the batik from other countries is technically unique manufacturing process using the closing 'malam' / wax with a 'canting' and 'cap', as well as produce a pattern in the form of a cultural symbol that became a philosophy of life and identity of the people Indonesia.

One attempt to introduce the authenticity of Indonesian batik on e-supermuseum Indonesian batik (budiman,2012a) designed an e-museum merging function with the e-marketplace, in an e-museum (budiman,2012b) can provide knowledge about the authenticity and beauty of the motif of Indonesia to visitors online. But at this e-supermuseum consumer has not received assurance of authenticity of products sold batik artisans in the virtual stalls contained in the e-marketplace, this is because the products offered batik craftsmen online only through media images. Of the batik photo consumers can not see whether the results from the process of batik cap, canting, or screen printing (printing). Printing, screen printing, and through painting techniques have also been carried out in the process of making batik or

patterned fabric by other countries, so it is not characteristic of batik from Indonesia. Thus, to provide customer satisfaction in online shopping batik needed software that can distinguish batik produced from the ‘cap’, ‘tulis’, or printing of a photograph of batik.

Results interview with the curator of the museum batik batik solo Danarhadi (budiman,2012a) that the authenticity of batik and write can be seen easily because it almost has a front and rear color brightness are almost the same, this is what distinguishes the batik printing or screen printing has a bright color only on the front side. But this can not be seen through the images show only one side. Batik and writing can also be seen from the nearby has a distinctive character strokes, namely the edge image is not perfect due to overtopping or color leakage at the closing ‘malam’ / wax from wax-resist dyeing process. This is what can be the problem so it can be raised in this study to be able to recognize the authenticity of batik ‘tulis’, ‘cap’, and printing through media images using image analysis with the introduction of the character and characteristics of the leakage rate pattern color of the outline drawing on batik ‘tulis’, ‘cap’, and ‘sablon’ (printing).

2. Batik Pattern Recognition

Digital image processing research in batik today is to recognize the pattern motif (Rangkuti et al, 2014; putra et.al, 2011; Imanuddin et al, 2010; moertini and sitohang, 2005). Indonesia is rich motif that required recognition motif based on the region of origin to identify the origins of batik (Rangkuti et al, 2014).

Batik in Indonesia is recognized worldwide through UNESCO is not the object of batik, but the unique manufacturing process hereditary and contains original Indonesian culture philosophy (budiman, 2012a). Manufacturing process by hand using canting or cap to cover the fabric with ‘malam’ (wax), so that the cloth that covered the wax is not affected by the color in the color by dipping a cloth in a vessel containing drugs color, it is called with the wax -resist dyeing. The process of making the canting called ‘batik tulis’, and with a cap called ‘batik cap’.

Batik ‘tulis’ and ‘cap’ the original write hereditary made in Indonesia. With the development of time to simplify the process and reduce the price of emerging batik ‘sablon’ (printing) processes. To distinguish it can be seen directly on batik and cap both sides of the fabric has a color that is almost as bright as through the process of dyeing color, but the only bright batik color printing on one side. In a previous study (budiman, 2012a), has not been able to verify the authenticity of batik through media images in e-marketplace. Further research is to be able to analyze the texture through the photo media characterize the pattern and color leakage rate in the region given the closure of wax. In Batik has a distinctive character because it is done by hand, so that at the edges of the image motif is not too neat,

there is overflow or leakage of colors that penetrate the cover of night / wax, this does not happen at the edge of the motif batik printing where the image is very symmetrical and neat.

3. Feature Extraction

Batik is a unique characteristic feature of an object image batik. So, we need to be able to distinguish the feature extraction or recognize a batik. In the feature extraction acquired traits distinguishing objects that have to be used as the data set and used in pattern recognition training.

Introduction authenticity and cap batik is very dependent on the quality of feature extraction, to obtain the characteristics karakterikstik batik motif or pattern images to generate the data set of training with a good degree of accuracy, it is very influential in getting the recognition motif texture analysis for quality. Features a unique characteristic of the characteristics of the texture of the image to be recognized by digital image processing. Feature extraction is performed to find the area that has the characteristic features in the image, the region can didibedakan based on the characteristics of color, shape, texture, size, intensity, or statistical properties. Statistical characteristic features commonly used is standard deviation, correlation, contrast, energy, entropy, and homogeneity.

To measure the characteristics of the texture is done with the method of analysis which is a fundamental feature extraction in image analysis (nixon and Aguado, 2008). Feature extraction is done after the Region of Interest (ROI) is known from the results of the pre-process and segmentation. The results of the statistical characteristic feature extraction form will be used for the classification stage recognition phase. Statistical characteristic features commonly used is standard deviation, correlation, contrast, energy, entropy, and homogeneity. Methods for generating unique characteristic traits of the few studies using wavelet transform method, such as used for recognition motif (Rangkuti et al, 2014; son et.al, 2011; Imanuddin et al, 2010; moertini and Sitohang, 2005). Wavelet transform method is suitable for feature extraction applications involving signals or data that a-periodic, discontinuous (intermittent), full of noise (noisy), and transients. In wevelet transformation time analysis with different frequency from STFT (Short-Time Fourier Transform), and a family of functions generated by wavelet bases y (x) is called the mother wavelet and develop into a variety of methods based on wavelet transform to the analysis of data on the extraction features. Wavelet transformation process data in the form of other changes are more easily analyzed.

As far as I read to study texture analysis and image classification is applied to determine the authenticity of Indonesian batik from a photograph has not been performed,

previous studies merely perform pattern recognition motifs native Indonesian batik (Rangkuti et al, 2014; son et .al, 2011; Imanuddin et al, 2010; moertini and Munaf, 2005). Introduction motif identification dilukakan to show the origin of batik (Rangkuti et al, 2014) with a unique texture and shape of the motive, so it can be made to match to identify the origin of the characteristics of the target image in the image database. In that study (rengkuti et al, 2014) in analyzing the character of the texture used Daubechies wavelet transform method type 2 and invariant moment. In the study (moertini and Sitohang, 2005), the use of multiple algorithms dilakukakan to determine the performance of the algorithm is good for cluster and batik classification based on color, contrast, and motifs to match the consumer's personal appearance batik. In research Imanuddin (Imanuddin et al, 2010) was limited to categorize motif pattern features in the database by region of origin using morphologycal processing with methods dilation and erosion, it is also done in the study (putra et al, 2011) with the extraction batik using wavelet transform with a combination of discrete wavelet transform and rotate wavelet filter can produce a more optimal accuracy characteristics compared to using separately.

Character recognition research models the number of pixels of color leakage at the edges of the image batik pattern to produce a dataset based on the class in accordance with batik features, cap, and printing it refers to previous research related to texture analysis algorithm for the extraction and classification pixel based image penyepadanan pattern edge of the image, as shown in Table 1.

Table 1. Related Journals

Researcher name	Research themes	**Method**	**Advantages**	**Disadvantages**
Moertini, Veronica S., Sitohang, Benhard. (2005)	Batik classification based on color, contrast, and motives.	Classification Motif combining Shape-bases using mask and texture-bases using wavelet method. With the classification using the K-Nearest Neighbor.	Analysis of the development of algorithms is done in detail by comparing eight kinds of wavelet algorithms. And can be used to test on other issues.	The duration is not too high, and only in test them with a range of sizes and ornaments, not in the detailed test them on motives.
Putra, Ricky Eka., Suciati, Nanik., Wijaya, Arya Yudhi. (2011)	Motif batik documenting.	Texture feature some combination of DWT and RWT. By using the classification method Canberra Distance.	Merger better than the DWT or RWT only.	Results of average accuracy of 70% is required classification by other methods (MLP, SVM, etc.). Only 5 motifs tested.
Arisandi, Bernardinus., Suciati, Nanik., Wijaya, Arya Yudhi. (2011)	Introduction batik motif based image spatial and frekuency.	Feature extraction by decomposition using wavelet transformation (DWT + RWT). And classification with Neural	Classification of multilayer perception can be overcome massive parallelism in wavelet decomposition results more quickly.	Accuracy is still low for testing data that is different from the training data.

		Network Multilayer perceptron variant.		
Rangkuti, A., Haris, Harjoko, Agus., Putro, Agfianto Eko.(2014)	Batik motif Characteristics	Using the wavelet decomposition method with four statistical parameters and variants moment. Classification using fuzzy S Curve.	Made more specific wavelet method using wavelet transform method daubeches type 2 and invariant moment.	Not to use the unique features for image identification. Optimal precision below 95%
Rangkuti, Abdul Haris. (2014).	Image classification for the texture characteristics.	Wavelet Decomposition with three statistical parameters. Classification using Fuzzy Neural Network.	Optimizing precision reaches 95%. simplify parameters without entrophy.	Need to be tested kekarakteristik picture is more complicated and complex.

4. Conclusion

From the description above it can dilakukakan research is to develop a model approach to feature extraction through statistical parameter characteristic features with wavelet method, and can be used as a data set that contains the characteristics of texture as a distinguishing characteristic color leakage at the edges of the image batik pattern, cap, and printing. To measure the effectiveness of problem-solving skills can be compared again with the combine wavelet-based texture or by any other method of neural network, GLCM (Gray Level Co-occurrance Matrix), and edge detection.

Good extraction results will largely determine the success of the classification in pattern recognition. With the initial development for introduction and cap batik as Indonesian nation's indigenous culture will produce a contribution to the field of information technology culture in the form of software applications that can provide information to consumers about the authenticity batik offered by e-commerce or e-marketplace with media images. And to contribute to the field of science is the development of the application of the model in classifying batik pattern recognition based on the production process by measuring the unique characteristics as a characteristic texture based on the shape and the number of points widening the color of the edge image patterns of batik.

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