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Batik image classification using treeval and treefit as decision tree function in optimizing content based batik image retrieval

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ABSTRACT

This research is to increase the percentage of similarity and to increase the speed of the retrieval of characteristic of batik image which is the texture and shape. In order to obtain an optimal result, the classification process is performed using a decision tree with treeval and treefit function, where the value used is the result of the image feature extraction. For this image extraction, the values that originate from the approximation coefficient that uses the wavelet transform method deubecheuss level 2 and invariant movement. The research is performed on 7 types of pattern and 225 images. The result using 5 types of batik patterns namely lereng, parang, kawung, nitik and truntum using 20 test data on each pattern, has a similarity percentage above 80 - 85 percent. For 2 other patterns which is mega mendung and ceplok using 10 data on each pattern, has a similarity percentage above 30 – 40 percent only. Based on the result, further research is required to using other methods and functions.

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Keywords : Batik, treeval, treefit, approximation coefficient, Wavelet Transform, Invariant moment ,

1. Background

In order to support the development of Indonesia's culture especially in preserving batik cloth, it is necessary to perform researches that is related to the batik pattern characteristic. Batik is a cultural heritage not because of the batik itself but because of the art in making the batik. The occurrence of the problem in claiming the batik culture is partly caused by the lack of arwareness of our nation on the importance of the batik culture preservation. To prevent this problem from happening, it is required to have a complete documentation on Indonesia's batik. In existing research on Batik image retrieval, currently it is based on colour and shape characteristic and only a few research is using shapae and texture characteristic. In fact, all batik patterns have symbolic meaning that contains information of the batik image, especially on its shape and texture characteristic. For that reason this research is using an approach involving two extraction features of Batik Image Retrieval (BIR). [19-21], Content Based Batik Image Retrieval is an approach for image retrieval based on the information contained in the Batik image itself such as colour, shape and the texture of the image. CBIR comprises of the following steps, preprocess, pattern extraction, indexing and image retrieval[24,17].

An image retrieval system is a system to retrieve information in a form of an image by measuring the similarity precentage of the image query that is input by the user and the image stored in the database[13,15,16]. The problem in content based searching

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system is to find a feature that can represent unique characteristic of the image, so that it can be used accurately to identify images. The visual feature that can be extracted from the image data are texture, colour and shape [16]. In relation to the batik image, the texture feature is an important feature because of the ornaments on the batik cloth can be seen as a different texture composition. This research however, is also focused on the shape and colour feature of the batik image [18][20..21]. The main focus of this research on batik image retrieval system is to obtain an optimal result in obtaining a pattern similarity which is more relevant to the intented image. Therefore this research will be developed not only to find the texture feature but also the shape similarity through the concept of CBIR on batik image[27,28].

Some research has been performed by developing a retrieval system, based on contents of Batik image, some using the Generalized Hogh Transform method to identify a specific pattern in a batik image [25]. In earlier research it is also developed a retrieval system concept based on Kodebook which is developed using keyblock structure to encode and decode a batik image [28]. An image retrieval concept based on the batik image content that has a specoal characteristic on the image using filter log-Gabor and colour histogram has also been developed.

1.1 Scope of the Research

The scope of this research is :

A. The research object is focused on 7 batik pattern which is ceplok, lereng, parang, nitik, truntum, kawung, and mega mendung. This research is focused on the texture and shape characterisic. In the retriecal process, classification process is performed first using the treefit function to generate the decision tree and the treeval function to form the classification. The research object is batik image which is in a form of an image database and image query with the following specification: having a jpg format and 200 x 200 *pixel in size*, and the image that is input or used as the image query can be an image with no specific sized.

1.2 Objectives and Benefits

The objective of this research is:

1. To develop an accurate image classification method in order to be able to increase the capability in performing batik image processing.
2. To increase the accuracy and speed in the batik image processing by performing classification process using tree fit and treeval functions.
3. To facilitate the batik image retrieval processing from image query that has been grouped into classes based on pattern characteristic in the form of a decision tree using treeval function.

The benefits of this research is as follows:

A. By developing a method for image extraction and classification, the accuracy of the image retrieval based on characteristic will be increased.
B. The result of this research is expected to obtain a high accuracy and high performance of the batik recognition process.

2. SUPPORTING OF THEORY

2.1 Treefit and Treval Decision Tree

Treefit (x,y) function is to create a decision tree to predict the response y which is predicted by the x value. x can be a marix with a value for prediction. y is also a vector used as a response of n or an array of character that contain class name n and it is based on value in the x column.

Treeval function is used to create the classification or regression from the decision tree produced by the treefit function, including a matrix X on the prediction value. In order to classify and perform regression based on the creator value (yfit), which is based on the response from one point to obain the prediction valu, and the classification treebased on the class number where tree is to relate the point with the ith data (X(i)) and convert a number of points into class name[4].

2.2 Invariant Moment

To identify an object in an image, segmentation process frequently has problems with regards to the object's position, object rotation and changes in the objects' scale. Changes or rotation in position, different sizes of objects, whether it is small or large causes error in identifying that particular object. Moment is able to represent an object in many ways such as area, position, orientation and other defined parameters. The purpose using this method is to obtain invariant moments from all objects from a Batik image. Every Batik image will have 7 values of invariant moments. All 7 (seven) value of invariant moments will be used for identification process [10,20,21].

2.3 Texture and Shape Characteristic Calculation