THE COMPUTATIONAL TREE OF THE DAYAK TREE OF LIFE

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1. Introduction

As the third largest island in the world, Borneo is a home to the Dayak. Growing with so many sub-tribes, living on the forest, far from another, Dayaknese has one special motif called Batang Garing. Batang means tree and Garing means life, together they represent a symbol of the Dayak's life principle. The Batang Garing holds important meaning for Dayaknese. It beautifully represents life and growth as well as death and sorrow. The objective of this research is to proof that among the diversity of Batang Garing, it can be distinguished and clustered based on its morphological and analytical characteristics.

2. Research Method

The sample of this research is 500 motifs of Batang Garing collected around the Borneo Island. To see the corelation between one Batang Garing and another is based on their similarities and dissimilarities. Most common parameter used to distinguish motifs are shape and color. The first parameter is related to the morphology of the Batang Garing itself, including the number of leaves and branches, as well as its fractal dimension. The second parameter is based on its color division that can be seen from the RGB histogram using MatLab. We also add two extra morphological parameters which attach to each Batang Garing, which are the ornament, the items where the Batang Garing grows, and the media to produce the Batang Garing. The data that has been sorted according to the parameters will be visualized into coordinate points and Euclidian distances using mulidimensional scaling (MDS) by inserting the data into the IBM SPSS software. From that we could see the datas distribution.

3. Results and Analysis

Figure 1 shows the 500 motifs of Batang Garing collected in this research.

Each of the motifs is analyzed based on its morphological characters and analytical, including the fractal dimension and the value of color histogram.

Figure 1. 500 motifs of Batang

Table 1 shows example of the result of the analysis of the Batang Garing.

Table 1. Morphological and Analytical Table

The data from the table is converted into matrix and visualized using Multidimensional Scaling (MDS) by means of IBM SPSS software, as seen in Figure 2.

Figure 2. The visualization of the data as a result of the MDS

4. Conclusion

The result of the Multidimensional Scaling analysis shows the similarity and dissimilarity of motifs represented by Euclidian distances. Some data (motifs) are closely similar to each other and some are quite far. Hence, the data is possible to be clustered.

5. Future Work

The future work will be to make the computational kinship tree of the 500 Batang Garing motifs. The tree is based on the memeplexes of the motifs derived from the morphological and analytical table. Each column represent one meme, and the memeplexes of each motif is a combination of of its memes, as shown in the following formula:

$$M_k = \bigcup_i^N m_i$$

6. References

[1] Situngkir, H. (2008). Evolutionary Clustering in Indonesian Textile Motifs. *BFI-Working Paper: WP-VII-2008*

[2] Shepard, R.N. (1980). Multidimensional Scaling, Tree-Fitting, and Clustering. *Science: 210(44): 390-398*

[3]https://www.statisticshowto.datasciencecentral.com/multidimensional-scaling/