

The Phylomemetics of Batik

Hokky Situngkir

[hs@compsoc.bandungfe.net]

Dept. Computational Sociology

Bandung Fe Institute

Abstract

The paper reports the analysis of phylomemetic tree onto batik motifs developed uniquely in all corners of living and in the heart of tradition of Indonesian people. The diversity is visualized, be it classical traditional motifs and the ones recognized to be recently innovated. This is the first important thing we can learn about through the phylomemetic tree, *i.e.*: as a visualization of creativity landscapes of Indonesian batik. The second thing to be learnt is that we could see the clustering of collective cognitive people respect to different ethnic groups and community in which the batik motifs were originally developed as well as innovated and improved dependent on the way people at the region produce, design, and then appreciate batik. This brings us to the concluding remarks, that batik is the world heritage grown in Indonesian archipelago.

Keywords: batik, phylomemetic tree, memetics, Indonesian archipelago, traditional heritage, fractal design

the true mystery of the world is the visible, not the invisible...
Oscar Wilde, *The Picture of Dorian Gray* (1891).

1. Introduction

The technique of batik draws the picture and ornamentation by using the resist media (mostly particular types of wax, however some other batik crafters use clay, thread stitching, etc.) to keep it free from coloring matter during the dyeing process. Thus, the ornamentation of batik when the crafters drawing dot and lines in the fabric can be seen as making the "negative" of the drawings. The batik designers must have comprehensive knowledge and realization on reversing the things that she wanted to be emanated from the drawings through colors and patterns with the making of the dots and lines eventually covered by the resist media. We can imagine the complexity of the designs as drawn by the batik maestros, since most traditional batik clothes use more than two or three colors. Most designs of traditional and classical batik cannot be enjoyed before the coloring process. The patterns in its waxed form are just the inverse, things to be kept free after the dyeing process. This is shown in figure 1, the "journey" of the cloth from the wax drawing to the finishing after the dyeing.



Figure 1

The fate of the design in waxed cloth (1) and after the dyeing process (2) and the removal of the wax (3).

This is why most traditional batik crafters and artists reject the reductionist point of view, simplifying *batik* or "*mbatik*" (the whole process of the making) merely just a sort of motif. In advance, the traditional technology used in batik crafting has been widely exploited by the people living in Indonesian archipelago from generations to generations. The sociology of batik has been laid upon two disseminated dimensions: the geography (spatial) and the time (temporal) of which emerged from the diverse collectivity of cognitive process from diverse ethnic groups in Indonesia (*cf.* [1], [2]).

This is what the paper wants to present all about. Acquisitions of phylomemetic to visualize and observe the diversity of cultural drawings in the way of painting by using batik technique in its broadest understanding: The traditional fabrics incorporating the media resist dyeing technique.

We have collected data from the open library of Indonesian digital cultural heritage library¹ and choose ones can be categorized as *batik*. Our motivation is to reveal the memetic proximity among the artifacts that are emerged from the cognitive process of which good fitness (high acceptance and appreciation) respect to particular ethnic groups. Interestingly, surfing through the data of Indonesian batik (in stead of just the ones from Java) would bring amazement for the high diversity among the artifacts. An illustration is shown in figure 2.

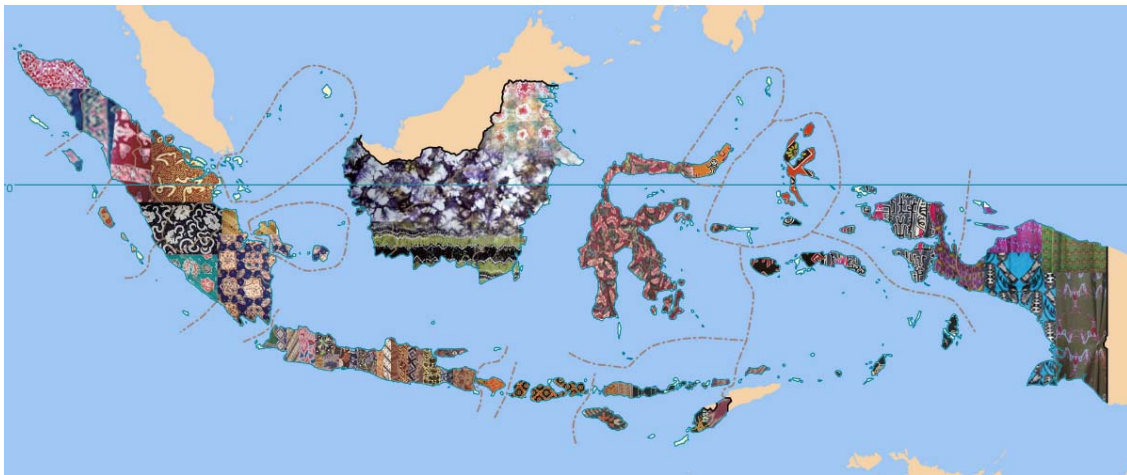


Figure 2
The illustrative “map” of Indonesian Batik

2. The Phylomemetic Tree of Indonesian Batik Motif

As in genetics, the phylomemetic tree (in genetics: phylogenetic) is constructed by having the sequence of memes (in genetics: gene) representing the traits emerging the motif as we see. The sequences, we call it memeplexes, are thus aligned and we can calculate the homology between a motif to another statistically. The detailed statistical methodology for searching the memes in the alignments is explained in [5] covering the fractal [3] dimensions (as the geometric properties of the ornamentation and decoration incorporated) and the distribution of primary colors used in producing the craft. From the variables obtained in the two computational observations and calculations we can fill the memeplexes emanating from each artifact. The method of the phylomemetic tree construction is based upon the correlations transformed into distances in ultrametric spaces among memeplexes as it has been discussed in [4] and [5].

From almost 500 batik motifs from all over the Indonesian archipelago, we obtain the phylomemetic tree as shown in figure 3. The figure depicting the “cognitive kinship” of the ethnic groups in the archipelago of Indonesia while all of them incorporating the same method of crafting: media-resist dyeing. When different exclusive social systems recognize the same methodology on reflecting what in their minds respect to visual aesthetics, spirituality and transcendent views on social norms, social hierarchy, symbols and arts,

¹ The *Perpustakaan Digital Terbuka Budaya Indonesia*, <http://www.budaya-indonesia.org/>

observation on the yielding motifs can bring us to the trajectory of “cognitive proximities” among them.

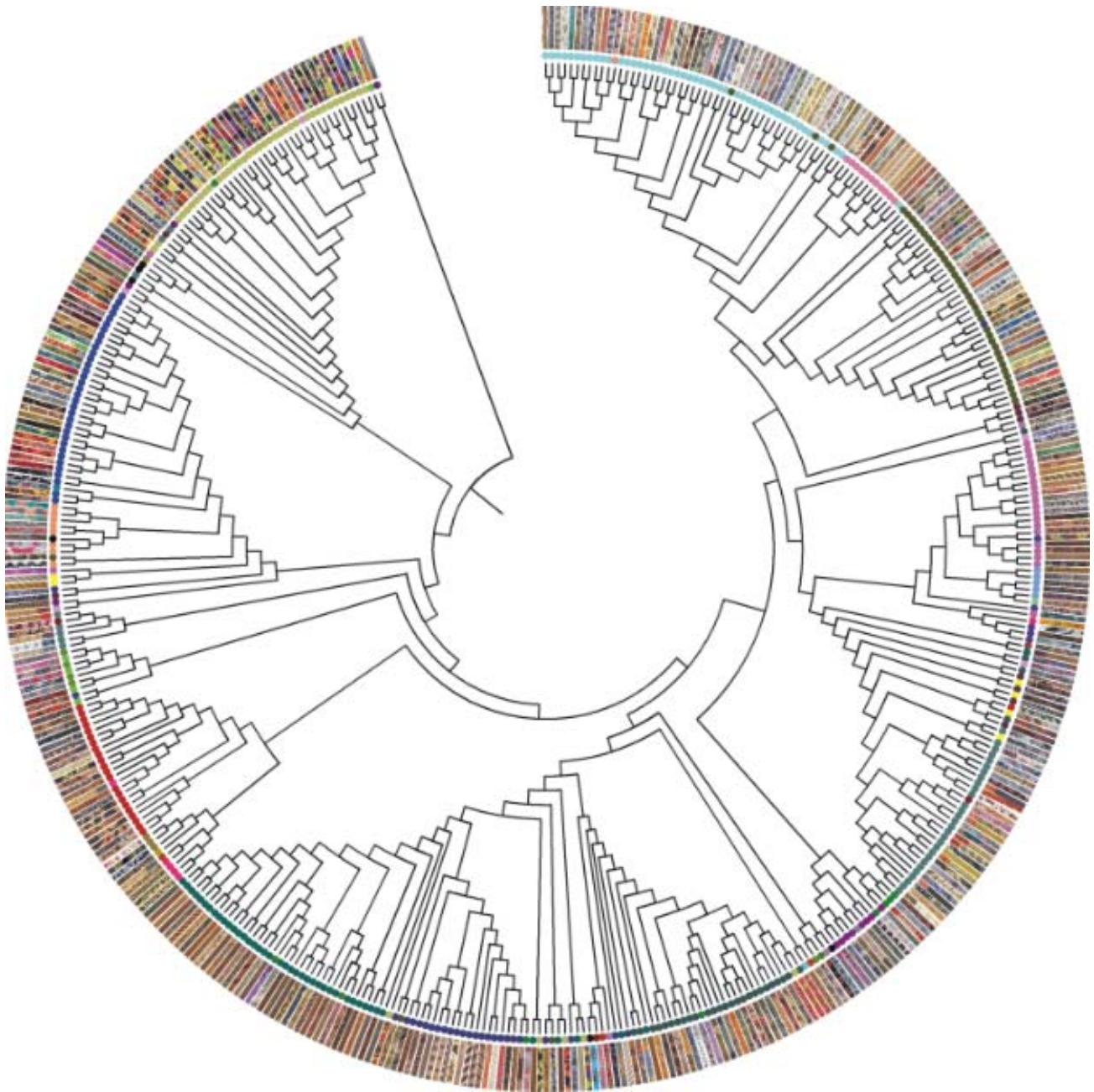


Figure 3
The phylomemetic tree of Indonesian Batik

More or less, this is shown as we gaze throughout the obtained phylomemetic tree of Indonesian batik. As shown in figure 3, the different colors on each node before the respecting motifs present different geographical aspects in which the motifs are used in the

social representation. In the next section we will discuss how and what we can learn about Indonesian batik from the phylomemetic tree.



Figure 4

Three examples of batik from Cirebon that are presented separated from the other one from the same place but clustered in motif from the neighboring batik center, Indramayu.

3. Discussions

Figure 3 presents the closeness between batik motifs one another, and apparently, motifs from same places are mostly clustered. The fact reflects that the fitness of the innovation of particular products in a place would be very dependent on the memetic propagation among individuals in the respective places. The macro view characteristics here is emerged from social and cultural interactions that shaping the appreciations collectively. However, some places close enough geographically could also weave one another on their cultural artifacts. This explains that several Cirebon's batik motifs is presented in the cluster of their neighbor, Indramayu (both are very close center of batik in West Java).



Figure 5

Batik motif from Jambi of which high proximity with those from Inderamayu (*left*) while the colorful with flowering motif (*right*) has characteristics similar with batik from coastal region of Cirebon while it is coming from Yogyakarta's batik tradition itself.

However, today memetic propagation can be possibly occurring from places to places independent from the geographically neighboring ones. The batik designers from Jambi (Sumatera), for instance, can learn and employ styles of drawing and ornamenting from

products from Inderamayu (West Java), and sometimes the innovation could widely accepted.

We could find a lot of these similar phenomena. Even more, batik motifs from a particular place are spreading in different clusters in our phylomemetic tree. Possibly this phenomenon comes from the fact that the data we use to represent the place are those inspired or innovated from batik from other places. This is obvious regarding the vast and rapid development on transportation and telecommunication technology since the last two decades ago or more. This is an interesting fact about the visualization with the phylomemetic tree as a tool to visualize high diversity data because it can be innovatively utilized mapping spectral data with high dimensionality [9] thus in the case of batik as the living cultural artifact, artists and innovators of today batik can enrich their landscape of creativity for future innovation [6].

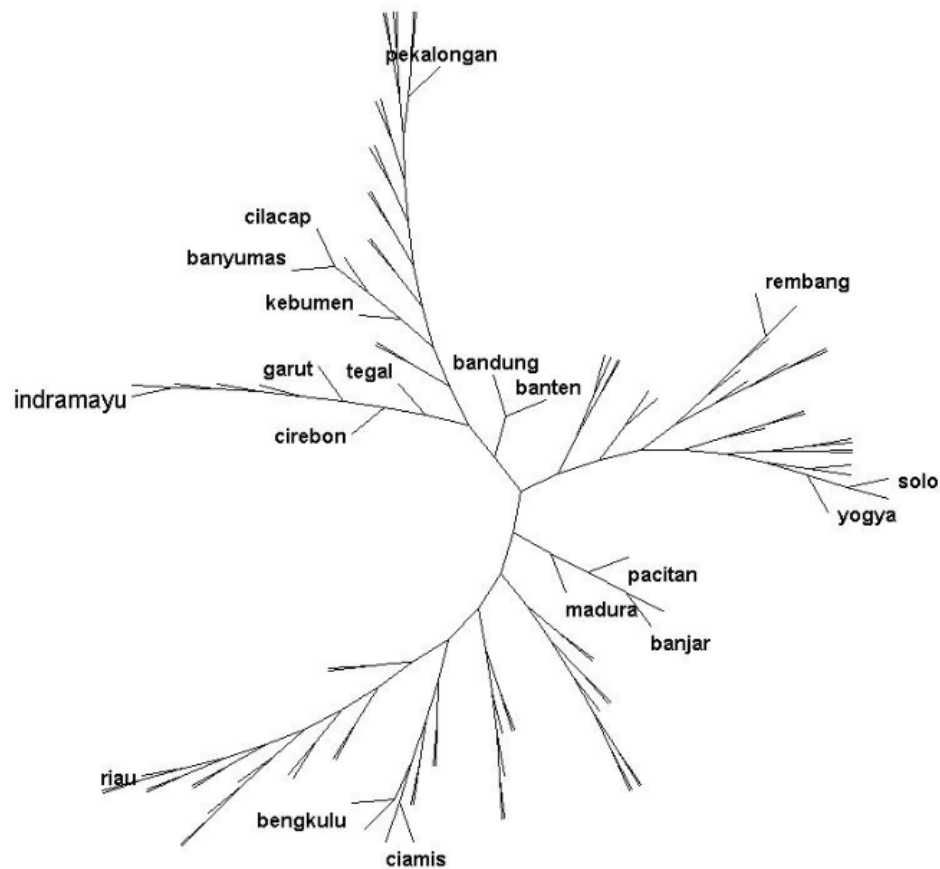


Figure 6

The clustering of showing the proximities of the appreciation on particular and specific batik motifs from places to places in Indonesia as derived from phylomemetic tree in figure 3.

The further question when we observe the phylomemetic tree of the Indonesian batik is the pattern that could emerged from the clustering among represented data. In order to see this, we group data sets from the same origins to see how a people from one place have

proximity with those from other places from the view of their appreciation on their respective batik motif. Thus, we neglect some data sets that are not in their respective cluster of large data sets and then group motif data sets from the same batik center. The result is depicted in figure 6.

Figure 6 shows 19 places that widely recognized as batik center in Indonesian archipelago. Interestingly, the main branches of the customized tree more or less confirm some classifications of batik in conventional approaches. For instance, the work of [7] reported that in Javanese tradition (batik craft across the Java Island), patterns of decoration and geographical aspects where they are developed, batik textiles can be roughly categorized as Batik *Vorstenlanden* and batik from coastal regions. Batik *Vorstenlanden* is the art of textiles that is existed in places like *keraton*, Javanese traditional government or monarchy, i.e.: Solo and Yogya, while Coastal Batik is those developed in near seashore areas and harbors where interactions with traders abroad are high, e.g.: Cirebon, Indramayu, Pekalongan, Tuban, Madura. Intuitive thought from this work give us explanation on the major differences of the ornamentation in Batik *Vorstenlanden* and its coastal counterpart for the latter are rich with the influence from many other culture, e.g.: Chinese, Arabic tradition.

The interesting part from our phylomemetic tree of batik, is that we are not excluded any batik ornamentation from the geographical localities where they were grown. All of batik motifs known to be existing in Indonesian archipelago are included in our analytical method and let the data talks about the obtained clustering. Thus, from our calculation and computation to generate the cladistic tree, at least we could discover four branches of the batik developed from generations to generations in Indonesian archipelago.

The *first* branch is where batik motifs from Rembang, Yogyakarta, and Solo is highly clustered. It is interesting to discover that the latest two regions has been confirmed as the center of *keraton* in Indonesia, and in batik traditions, both are where Batik *Vorstenlanden* is grown. However, the existence of batik motif from Rembang (also known as Lasem Batik) is not inconsistent at all, since even though Rembang batik is frequently classified as sort of batik from coastal area, this region is one of the oldest place where Islamic civilization was begun throughout Java [8]. Thus, it is very possible, batik ornamentations from Rembang were inspiring or being inspired from the two other places.

The *second* branch is the place where batik motifs from Pekalongan, Cilacap, Banyumas, and Kebumen are highly clustered. Those are the centrals of batik ornamentation frequently categorized as those from coastal areas for their geographical aspects as well as the specific ornamentations.

The *third* branch makes our observation through the phylomemetic tree even become more interesting, for this is where batik motifs from Western Java is dominated, be it from Inderamayu, Cirebon, Tegal, Garut, Banten, and even Bandung, where the contemporary batik motifs are developed and improved so fertile. From this fact, we can learn that there exist unique differences between batik motifs from western part of Java island with those from their eastern counterpart. Interestingly, the phylomemetic tree presents this solely by incorporating the motifs employed in our analysis, while some anthropological and aesthetic observation strongly confirm it.

The *fourth* branch is presented by those batik motifs from wider batik centers, be it from places in Java island *i.e.*: Pacitan, Madura, and Ciamis, and also those from outer regions of the Island, *i.e.*: Southern Kalimantan, Papua, Riau, Jambi, and Bengkulu. This fact expresses how batik traditions are very various and diverse of the three places in the Java Islands as well as with those from the Sumatera and Kalimantan covered by our data. It is very interesting that different production and appreciation to traditional fabric of batik (social aspect) is confirmed by analytical model that is merely laid upon the memetic ornamentation.

Thus, the four branches could be proposed as an alternative classification of the very diverse Indonesian batik traditional motifs that is made up from empirical observations through data. This is the contribution motivated the presentation of the phylomemetic tree that expresses the heterogeneous and variations of batik which is developed and improved as traditional heritage by people in Indonesian archipelago instead of only Java as perceived by commonality. However, since it is possible for us to include the results of recent and new innovations in the presentation of the phylomemetic tree, it can also used as a visualization of creativity landscapes where innovators could take advantage to which possible and interesting motifs that are existed could be incorporated for future development of the beautiful batik.

4. Closing Remarks

We present the phylomemetic tree incorporating the data of batik motifs from all over the places in Indonesian archipelago that is covered by online and open digital library. From the obtained phylomemetic tree we see the “kinship” of the highly diverse cognitive aesthetic appreciation of batik. We used the broader terminology of batik motif in our analysis as motif yielded from the process of media-resist dyeing. Interestingly it shows the clustering presented by the phylomemetic tree is not only observable from the spatial aspects as well as the process of production and crafting but also emanates from the motif itself reflecting the way of the cognitive appreciation collectively by the respective social groups.

Incorporated motifs are clustered in the tree by the proximities between the memeplexes analyzed by fractal geometry and statistical aspects of spectral colorings. The data used is not only the widely recognized ones since the old times traditionally but also ones from recent innovations. The visualization of the large dataset thus can be seen as the “cartography” of the creativity landscapes of Indonesian batik that is not – as fame and commonly recognized – only developed and improved by Javanese, but also a lot of ethnic and social groups throughout the archipelago.

In advance, our further observation on the obtained phylomemetic tree of batik brings us to some confirmation and even further elaboration of batik classification as a sort of proposal laid upon empirical data. As it has obviously shown in the phylomemetic tree, from the coverage of our datasets, batik motifs are clustered whether in the leaf of *vorstenlanden* batik, batik in coastal areas of eastern regions of Java, batik developed in western part of java, and batik from outer places of Java Island. However, further analysis on larger datasets are still on demand, since the more data we employ in our phylomemetic

construction (especially those in the fourth class – the batik from regions out of Java island) the more accurate clustering thus classifications promised by the tree. This brings us to the concluding remarks, that batik is the world heritage grown in Indonesian archipelago.

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