Geometry Application: 3D Batik Design Development using jBatik Software

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Abstract- Surabaya is one of the producers of Indonesian batik. The development of Surabaya batik motifs is currently increasingly innovative. This situation is an excellent opportunity in the use of technology in making batik designs, so that market needs can be met. jBatik software is a software that serves to help make batik designs quickly and easily. This software is a geometry application, using fractal principles and the Lindenmayer System. This study aims to produce innovative 3-dimensional batik designs in a fast and easy way. This research is expected to be able to increase the artistic and economic value of Subaya batik. This research was carried out in two stages, the first stage included literature study and field observation. In the next stage, Batik designs were explored using the jBatik software. The themes raised relate to history, figures or heroism, the sea, and plants. The result of this research is a Surabaya batik motif design, with a 3-dimensional shape combined with bright colors.

Key Words- Development, design, Surabaya batik, jBatik, 3 Dimensions

I. INTRODUCTION

Surabaya is one of the producers of Indonesian batik. The development of Surabaya batik motifs is currently increasingly innovative. This situation is an excellent opportunity for the use of technology in making batik designs, so that market needs can be met. jBatik software is one of the software that serves to help make batik designs quickly and easily[1]. Batik is a cultural heritage of Indonesian ancestors. Mathematics is part of culture and history, and the culture around us has many mathematical concepts, such as making houses, and batik craft patterns[2]. The concept of geometry is widely used in Surabaya batik patterns.

Similar to batik in other coastal areas such as Madura batik and Cirebon batik, Surabaya batik also has bright colors with very distinctive unique motifs. What distinguishes Surabaya batik from other regional batiks is the themes raised relating to history, figures or heroism, the sea, and plants. However, the Surabaya batik motif also contains the local wisdom of the Surabaya people. This can be seen from the emergence of motifs, such as: ships, clover leaves, high-rise buildings, and the atmosphere of the mall. So that the 3D batik design will make Surabaya batik motifs more innovative without losing their identity.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

2.1 Research methodology

This research uses two stages. Beginning with literature study, and observation. After analyzing the data, the next stage is the development stage of Surabaya batik designs using jBatik software.

2.2 Tools and materials

The tool used in this research is the jBatik Pro software, which is first installed on the laptop. Furthermore, the batik design is described in the software. The resulting design is then printed on cotton cloth using a digital printing machine.

2.3 Work procedures

This research begins with the process of collecting data through a literature study, which includes searching for data on the development of batik in Surabaya. Information about the development and use of jBatik software is also deepened. Literature studies are carried out through books, journals, and scientific articles. Furthermore, field observations were carried out to determine the development of Surabaya batik motifs. jBatik software perfects batik designs using a computer with Surabaya cultural ornaments.
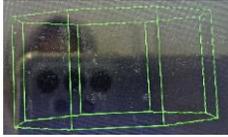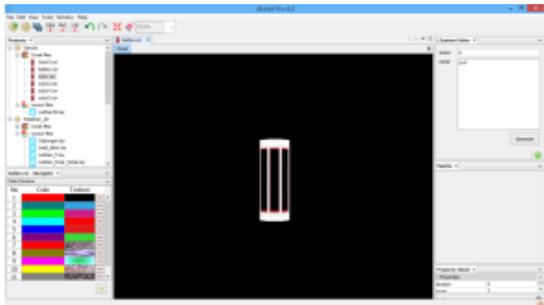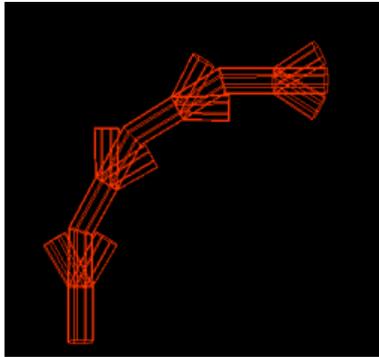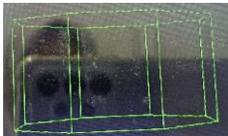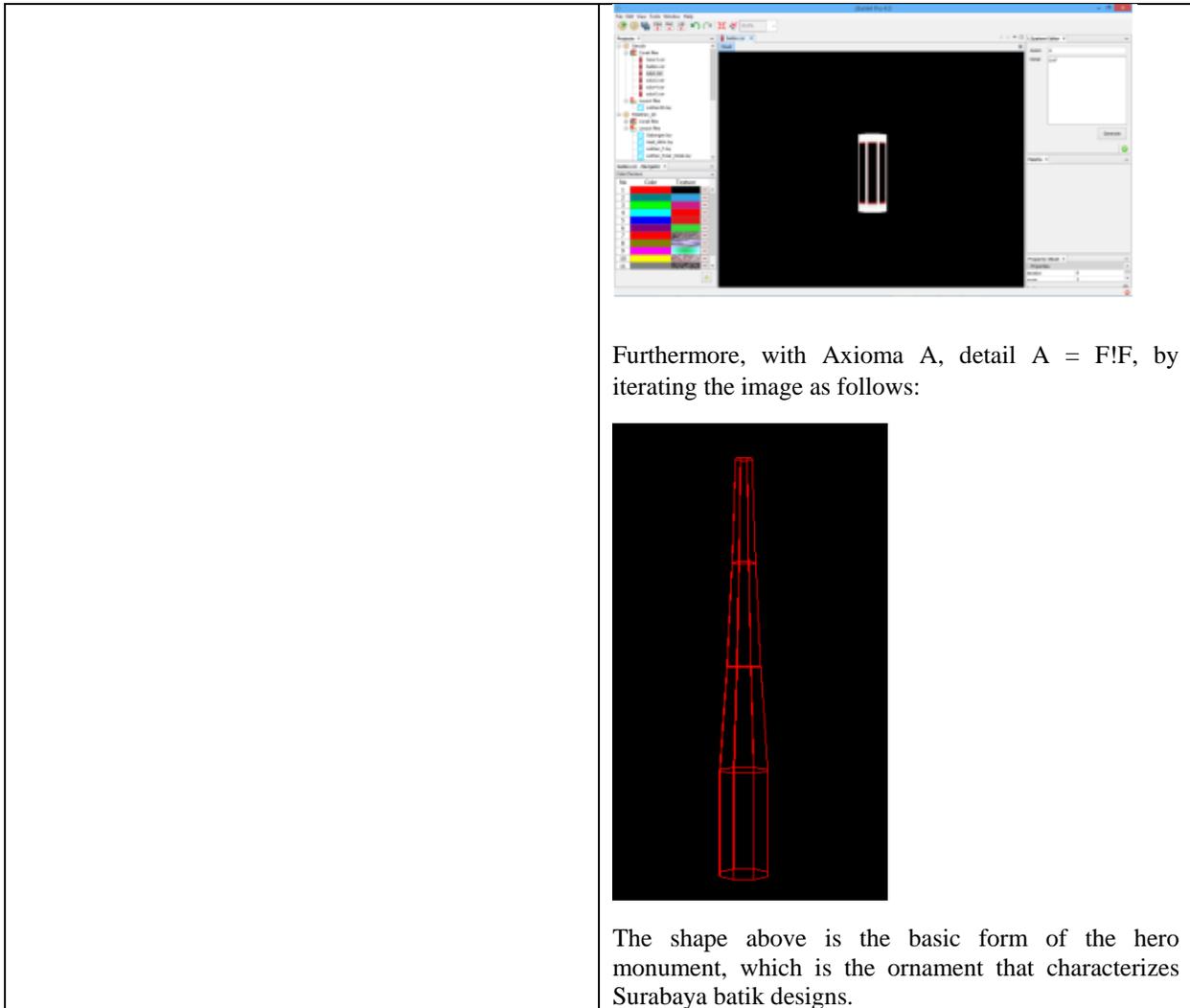
III.   RESULTS AND DISCUSSION

JBatik is software for making batik motif designs using fractal formulas, where fractal is a branch of mathematics that studies repetition and equations that are usually generated in a way to repeat a composition. With the jBatik design software, the process of making batik patterns can be done by mapping batik patterns mathematically to be translated into digital batik patterns by the jBatik software. The fractal pattern is generated by a mathematical function in a recursive process and iterates in finite or infinite order.

3.1 Making patterns

Several geometric shapes are used to make batik ornaments, such as monuments and tendrils

Tabels 1: Build Geometry

Build Geometry	Information
Octagonal 	With a length of 10, a width of 1, the shape of the octagon becomes as follows: Next, with an angle of 30º, Axioma A, and detail A = F [+F] F, by iterating, we get the following form: The shape above, becomes a tendril shape.
Octagonal 	With a length of 10, a width of 1, the shape of the octagon becomes as follows:

Furthermore, with Axioma A, detail A = F!F, by iterating the image as follows:

The shape above is the basic form of the hero monument, which is the ornament that characterizes Surabaya batik designs.

Then it is saved in 3D format to the PNG library, so it can be used on 2D layers, and the result is as shown below:
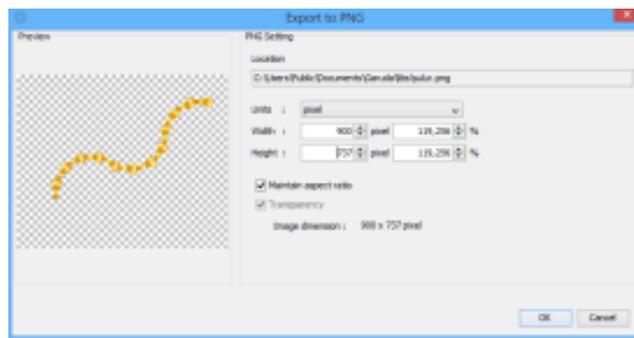

Figure 1: 3D Vines

Furthermore, in the same way, the 3D ornament pattern of the hero monument, clover leaves, and red flowers is made, which are ornaments that show the characteristics of the city of Surabaya.

3.2 Making batik design
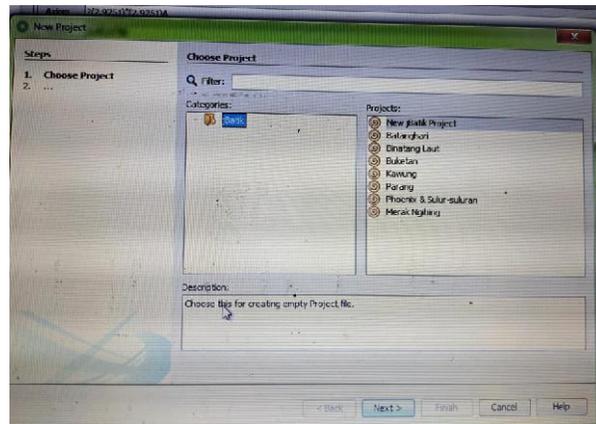
1.   Click on file→select New Project→click Next

Figure 2: Visual jBatik

2. Give it a name and set the size→click Finish
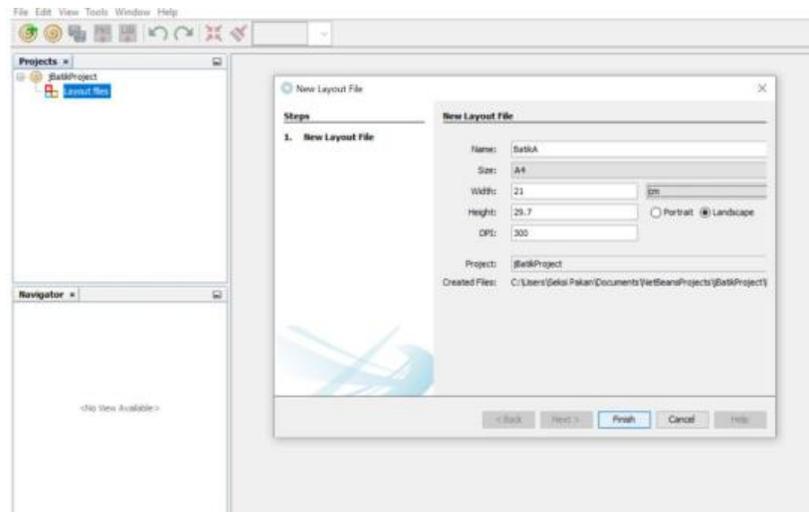

Figure 3: Visual jBatik name and set the size

3. Click New Layer, then drag the selected image onto the layer
    Images can be imported from other storage media. Not only the patterns available in the jBatik software can be used, but you can also choose the desired alternative pattern, by importing the pattern in .png format.
4. Then grouped, cloned and arranged
5. To add a hero's memorial and flowers, click New Layer
6. Next drag the image into the box that appears
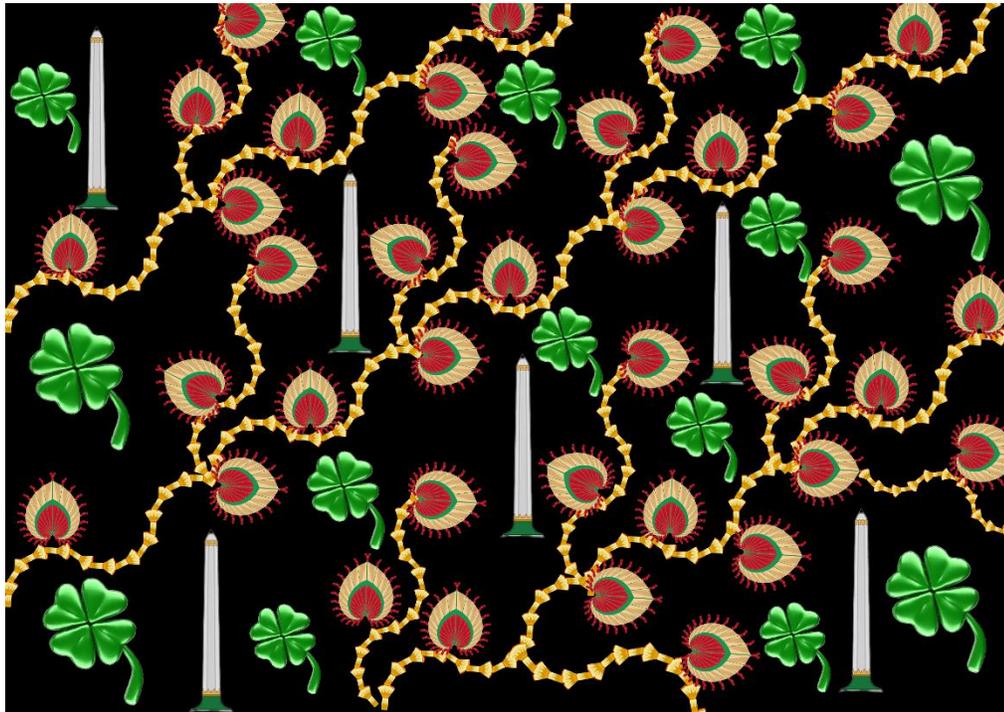   The final result of the design is as shown in the following image:

Figure 4: Final design Surabaya batik

In the batik design, the vines and the hero's monument are made from the basic shape of an octagon, with axioms and iterations, resulting in an image with a 3D effect.

IV.   CONCLUSION

With the features offered by the jBatik Pro software, batik craftsmen will be greatly assisted in the process of designing and making batik designs with 3-dimensional motifs. The data storage process can be done digitally, so the resulting designs can be printed directly on the cloth. In this way, craftsmen can make batik faster and in large quantities, so that they can meet market needs.

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