# ENHANCING A RELIABLE TRADITIONAL CLOTHES PATTERN RETRIEVAL: CNN MODEL AND DISTANCE METRICS

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## ABSTRACT

This study describes the traditional clothing patterns retrieval very diverse forms and textures. With so many variations in each clothes pattern, an appropriate and supported CNN model is needed as well as the right distance matrix method to support retrieval performance. This research was conducted on 76 types of traditional cloth patterns originating from 22 regions in Indonesia. In conducting an experiment to retrieve this clothes pattern, 3 CNN models were used, namely EfficientnetB7, InceptionV3 and VGG 19 and 2 distance matrix methods, namely Euclidean and Manhattan. Based on the experiment, the average with 2 measurement distances is 86.2%. The CNN model has the highest accuracy on EfficientNetB7 with an average of 92%. Inception V3 with an average accuracy of 85%, and the next VGG 19 has an average of 81%. Basically, some batik cloth patterns have an accuracy of up to 100% retrieval using 3 CNN models, but some patterns have an accuracy below 50%, so this is part of the continuation of research on traditional cloth patterns should convey the importance of your research in a concise and logical manner.

**Keywords:** *CNN, EfficientnetB7, Inception V3, VGG 19, Manhattan, Euclidean*

## 1. INTRODUCTION

This Indonesia is an archipelagic country that is not only blessed with a very stunning landscape, but also has a rich culture that is so diverse. One of them you can see from the variety of traditional clothes in each region. In terms of motifs, patterns, and colors, traditional clothes in Indonesia are different from one another. The fame of the archipelago literature above is not only due to its beauty, but also because the philosophy and meaning contained in the piece of cloth is so deep. We as Indonesians should participate in preserving this high-value culture [1]. For the beauty and uniqueness of this variety of traditional clothess that have been passed down from generation to generation, it turns out to be full of deep philosophies and stories.

Traditional clothes originating from each region of Indonesia usually have different textures, shapes and colors. This is the hallmark of the traditional cloth. For certain patterns represent harmony, love, and customs and so on. It should also be noted that traditional clothes manufacturers can produce different textures, this is due to the way they are made and the intent of the cloth pattern. Thus, many factors can give a characteristic to traditional clothing [2]. There are several traditional cloth patterns in Indonesia, namely Batik, Ulos, Mega mendung and others, Each motif of traditional Clothes have different characteristics and uniqueness from each region [3]. In the modern design world of traditional Clothes, basic design subject may be a good tool to introduce local values while the young learn to compose the elements and design principles as design sensitivity training. One of the tasks is doing a pattern composition using local content, and Traditional clothes is a complex local pattern that is commonly used as inspiration [4].

The recognition and classification of image patterns based on visual similarity can be accurate. Basically Content-Based Batik Image Retrieval or CBBIR is one of the studies that focuses on the problem of recognizing or retrieving batik images based on their characteristics. Initially the image must be converted to grayscale, then transformed using wavelets and moment invariance and sharpened using canny edge detection. With the

above steps, not only the texture of the batik image can be found, but the shape and color can also be recognized through this feature extraction concept [5]. Actually, this research focuses on supporting the retrieval process of traditional Clothes patterns that have a variety of characteristics.

This study uses several Convolutional Neural Network models such as Inception V3, VGG 19 and efficientnetB8. However, In order to improve the accuracy of the output, pre-processing will be carried out to remove noise in the image and perform image resizing, optimizing, and normalizing the image database. All previous processes in supporting the image retrieval of Traditional Clothing, which had previously been carried out feature extraction into feature vectors from query images which were built in the same way as feature vectors in the image database. In this way, feature vectors can be measured for similarity using distance metrics such as Euclidean distance or Manhattan distance. These processes are combined to form research on Content-Based Image Retrieval with improving this system to get good results on Traditional Clothing retrieval.

## 2. RELATED STUDY

In study calculated the similarity of the image of the test batik and the image of the training in the database with the Euclid function. In this method, the percentage of similarity uses fuzzy logic with a sigmoid curve that calculates the shape and texture characteristics. The results of this study produce an optimal precision of 90-92% in finding similar batik images. But besides that, it also produces 10 seconds faster execution results when using the threshold algorithm compared to the Fagin algorithm [6]. Research Feature extraction process used wavelet transform and classification carry out the rules formed from training images with fuzzy neural network. The results of classification accuracy if the image characteristics are the same as the training image then the average accuracy can reach 96% but if the characteristics are really different it will be a new rule. However, if the resulting rules are the same, then Backtracking algorithm is used to solve the problems [7].

In another study, to retrieve batik images based on image characteristics that utilize wavelet transforms such as haar wavelets to obtain texture characteristics, and color moment, or both feature of the same method. Image from F-norm theory is used to extract feature features and image color. This study also illustrates that the use of Haar wavelets has a performance of 71.25%, a color moment of 77.0%, and both methods of 88%. By using both method increases retrieval efficiency on all datasets

[8]. In study about of traditional clothes such as Batik, the feature extraction batik image by utilizing the advantages of the SURF and SIFT algorithms. As for the classification process using the SVM or MLP algorithm in order to identify differences in patterns of all batik images [9]. While the development of this research using the SIFT algorithm and the Bag of Word concept where by doing self-extraction and the classification process with the SVM algorithm so that the classification accuracy reaches 97.67% in normal images, and 95.47% in images that experience rotation and 79% in the image that has changed the scale[10].The research of traditional clothes with invariance dilemma. Convolutional neural network in order to solve the problems in image classification. The proposed model used deep ConvNet VGG16 as feature extractor (transfer learning), achieves slightly better average of $89 \pm 7\%$ accuracy than SIFT and SURF-based that achieve 88 $\pm$ 10% and 88 $\pm$ 8% respectively [11]. Invariant Dilemma Research is solved by using the MUECS-LBP algorithm for Feature Extraction and Neural network to perform the Classification Process [12]. Further research on the Invariance dilemma of batik images using the Mulwin-LBP algorithm has been carried out to improve classification accuracy [13].

This study was conducted to classify 42 classes of traditional clothess originating from 22 regions in Indonesia. By using several CNN models for feature extraction and image classification that is invariant to rotation and scale. The average classification accuracy with Inception V3 3.0 is 83.9%, but the highest accuracy is between 98.1%–99.7%. With resnetV2 50 the average classification accuracy is between 78.3% for the highest between 93.7%–94.3% [14].

In Some experiments on images using several different scales and rotations where the average classification accuracy with the VGG 16 model is 79.23% while the highest classification accuracy is between 84.2%-92.5%. However, with the VGG 19 model, the average classification accuracy is 79.95%, while the highest accuracy is between 92.6%-96.3%. However, with the mobilenetV2 model, the average classification accuracy is 83.44%, while the highest accuracy is between 87.3%-96.4%. Research for traditional clothing pattern recognition with Deep CNN has succeeded in recognizing some traditional clothing patterns up to more than 92%[15]. An experiment to retrieve traditional clothes images with the VGG 19 model and 4 distance metric mothods. The results of the average accuracy of 74 patterns from 22 provinces are highest in the Manhattan method with an average of 87.04 %, Euclidean with an average of 86.41%,

and the Minkowski method an average of 85.26% and the Chebyshev method an average of 66.07%. However, some traditional clothing patterns can be identified up to 100% by both Manhattan and Euclidean methods. Weakness from this experiment where the CNN model algorithm has not been able to overcome the dilemma of invariance to different rotations and scales [16].

## 3. RESEARCH METHOD

In research on traditional cloth patterns, the stages of the process can be seen in Figure 1.0.
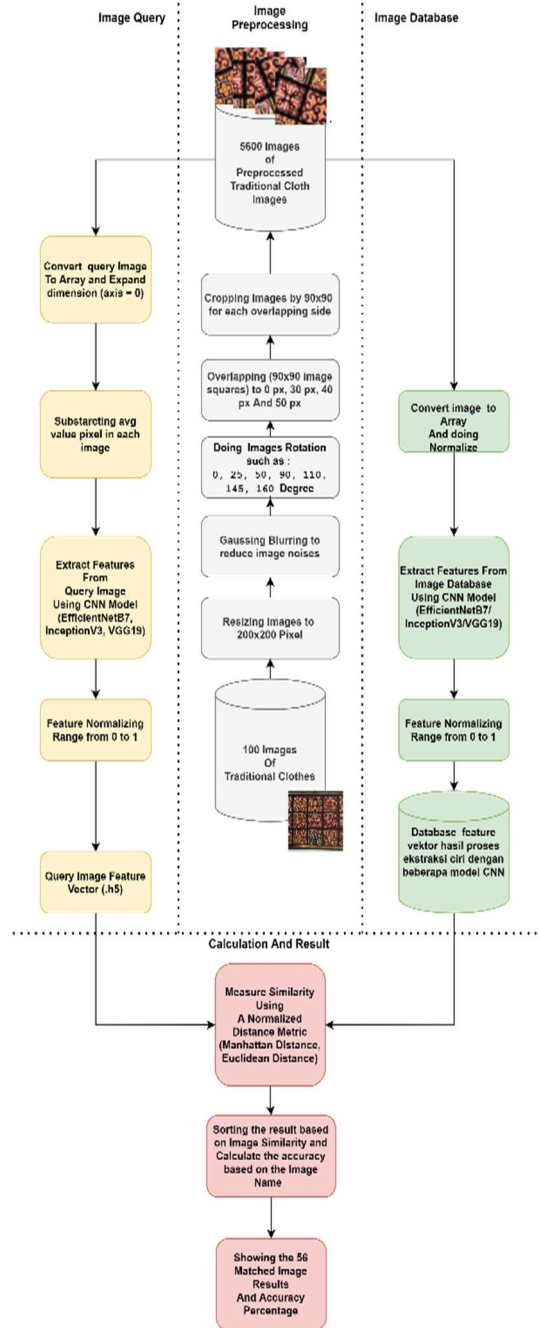


*Figure 1.0 : Research diagram study of "Image Retrieval of Traditional Cloth Using CNN"*

In Figure 1.0 illustrates several activities in the process of retrieving the image of traditional fabrics. The process starts from collecting traditional fabric images, storing traditional fabric data in the database, and querying traditional fabric images. Each process is depicted with 4 different colors, namely white, red, blue, and purple. At the preprocessing stage, it is done by processing to be of

the same size for both the training image and the test image, but before that, the image must be processed first to be free from noise, including images that have undergone changes in rotation and scale. Furthermore, the image will be carried out a feature extraction process where the image will be processed into an array both for the query image (test image) and the training image. Furthermore, all images will be processed with several CNN models, namely EfficientnetB7, Inception V3, and VGG 19. The results of feature extraction processing will be stored as query images for test images, while training images will be stored in the fabric pattern image database. Furthermore, the process of measuring the similarity of the distance between the training image and the test image is carried out, which for this measurement uses 4 methods. After measuring the similarity, the percentage of similarity is sorted from very similar to less. For the stages of each process in this chart can be seen in the following explanation.

### 2.1 Preparing images of traditional cloth

Before starting another process, traditional Image clothes must be collected. Basically, all traditional cloth images are taken from the internet. All images collected are processed in .jpg and .png formats. Next is the selection of images that have good intensity and resolution and little noise. This is done so that it is optimal at the time of the next process.

The collected image must be reprocessed so that it is suitable for the pixel size and does not vary, including eliminating noise around the image. In this experiment the image size is set at 200x200 Pixels. So that the ratio of the image data collected must be the same. So that with the same ratio size will facilitate the processing of image feature extraction [14]. This is done also to prevent if there is a change in the image inadvertently thereby reducing the authenticity of the traditional fabric pattern and the accuracy of the output. Furthermore, for the naming of the pattern identity image using a 2-letter format followed by a number. Combined letters and numbers In this case, the letters indicate the name and the numbers indicate the fabric variant. This is done to make image identification easier. Collection of traditional clothing patterns in Figure 2.0.



*Figure 2.0 : Resized collected images from the internet*

### 2.2 Dataset Setup

In conducting an experiment using 74 patterns of traditional fabrics that have been randomly collected from the internet. In the process of collecting it is divided into 31 classes based on the region. Where each class consists of 5 traditional fabric patterns of the same area. As for the query image, there are 74 images selected for this study which represent different patterns. Each traditional cloth drawing pattern undergoes rotation is in $0^o$ rotation and has no overlap.

### C. Features Extraction using CNN

In this research, the traditional clothes retrieval have a variety of patterns. However, to get the characteristics of the image is to extract the image. One of the CNN models is VGG19 which is a type of deep learning convolutional neural network that has a very high level of accuracy in classification [16].The other CNNs that were used are EfficientNetB7 and InceptionV3. In a CNN, there are three main layers which are Convolutional, Pooling, and Fully Connected Layer. But in the case of image retrieval, the fully connected layer is important because this layer is a multilayer perceptron (MLP) which is a part of an artificial neural network (ANN) with neurons that are linked by connecting weights[17]. Different CNN means different amount of features that can be extracted. For example in VGG19, each about 4096 features get extracted out of an image. These extracted features are what the feature vectors of this study become. Before extracting features, all the images must be converted into an array type and preprocessed into a certain range depends on the model [18]. Once converted and preprocessed, extraction features using CNN can be started. All the feature vectors also must be normalized to make the feature vectors range from 0 to 1. This is done to reduce the extremities of feature vectors.

### D. Measuring Images Distance

Images Distance is a process of measuring the distance between two points of feature vectors. In this study, there are two types of Distance Metrics that were used namely Manhattan Distance and Euclidean Distance. However, the basic formula for the Distance Metrics is a derivative of the Minkowski formula as follow [17]:

Given two simple feature vectors $X = [x_1 \ldots x_n]$ and $Y = [y_1 \ldots y_n]$

$$\Delta d = \left( \sum_{i=1}^{n} |x_i - y_i|^p \right)^{\frac{1}{p}}$$

Where:
$x$ = component feature parameter 1
$y$ = component feature parameter 2
$n$ = the total of parameter1 and parameter 2
$p$ = distance order
$i$ = the feature parameter number.

The concept of this process is the smaller of distance between two parameter became the higher similarity between the two feature parameter. To measure between image database with (4144, 4096) and query image with (1,4096) each image feature vector in the image database is calculated to query image. The output is saved in an array that consists of distance similarity and the Image name.

### E. Sorting And Showing Output

After doing main process of traditional clothes retrieval such as features extraction, classification and the next step is sorting process which being required to get the results from highest to lowest similarity. In this study, indirect sort is used to get the image database feature vector. As we mentioned before, a small distance means high similarity. Therefore, sorting process from the lowest to highest distance is the solution to this problem. In a topic of calculating accuracy, it can be calculated using a simple equation. The following equation can be used to calculate accuracy:

$$\text{Acc} = \frac{Total\ Relevant\ Images}{Amount\ of\ identical\ Images} * 100\%$$

There are also things to note:
➢ Total Relevant Images means the amount of all the images that have the same pattern
➢ Amount of identical images is the amount of images created after preprocessing per image.

## 4. RESULT AND ANALYSIS

### 4.1 Result

Image retrieval performance calculation is a recall process performance can be calculated from total relevant images to the amount of identical

images multiply by 100 percent. The results are divided into two distance metrics which are Manhattan and Euclidean. Both of these have a different way of calculating vectors. Those differences can be seen in the following graphs. Therefore, these are the results of Image Retrieval Using Proposed 3 model CNN such as EfficientNetB7, InceptionV3 and VGG19. They will support with 3 the Measurement Distance such as Manhattan and Euclidean. The average accuracy retrieval using manhattan distance can be seen in figure 3.0.

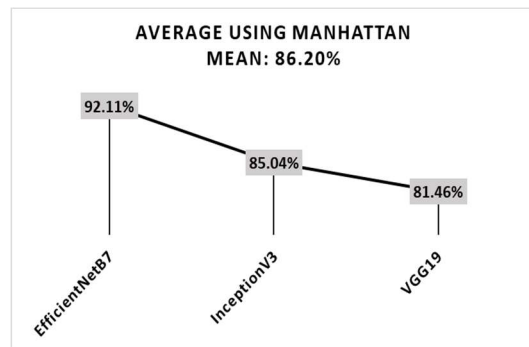### A. Average accuracy of 3 CNN models using Manhattan Distance Metrics



*Figure 3.0 Average Accuracy of 3 CNN models using Manhattan Distance*

In Figure 3.0 experiment to determine the traditional Clothes patterns similarity using Manhattan Distance. This distance method is used to determine the retrieval accuracy based on the similarity of the Clothes pattern image after the feature extraction process with 3 CNN models, namely EfficienetB7 has a retrieval accuracy of 92.11%, for InceptionV3 has an accuracy of 85.04% and VGG19 has an accuracy of 81.64 % which is the smallest accuracy in this experiment. However, the highest accuracy for each pattern using 3 CNN models is 100%.

The percentage of retrieval accuracy can be seen in the Figure 3.0. Eventually, some clothes traditional pattern hava resulted of 100% maximum accuracy value in using EfficientB7 and Manhattan Distance. This value can be seen on the following top 12 accuracy charts using Manhattan Distance can be seen in Figure 4.0.
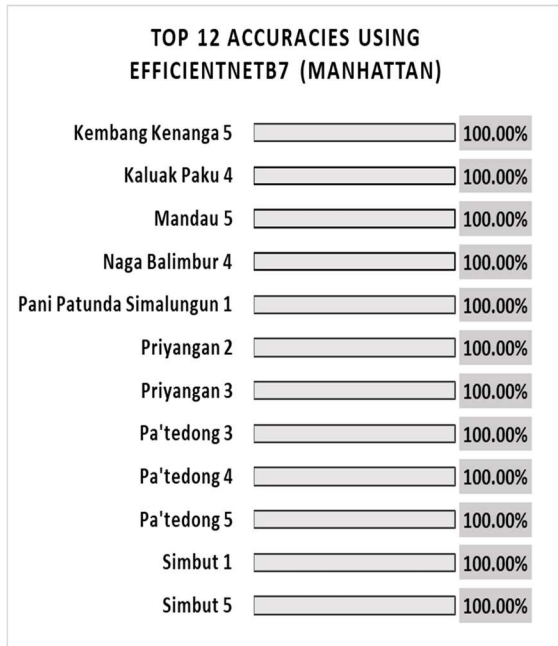
*Figure 4.0 Accuracy Results of 12 traditional clothes patterns with EfficientNet B7 and Manhattan Distance*



*Figure 5.0  Figure 4.0 Accuracy Results of 12 traditional clothes patterns with inception V3 and Manhattan Distance*

Figure 4.0 illustrates the top 12 accuracy using the CNN model, namely EfficientnetB7. Based on the experiments, the average retrieval accuracy reaches 92.11%. It is illustrated that there are10 traditional Clothes patterns that had a retrieval accuracy of 100%. Based on this experiment, EfficientNetB7 has a very good average accuracy compared to other CNN models such as InceptionV3 dan VGG 19.

Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong there are 3 similar patterns, Priyangan Clothess have 2 similar patterns including Simbut Clothes there are 2 similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Kembang Kenanga, Mandau, Naga blimbur. In this experiment, the retrieval accuracy performance is up 95%.
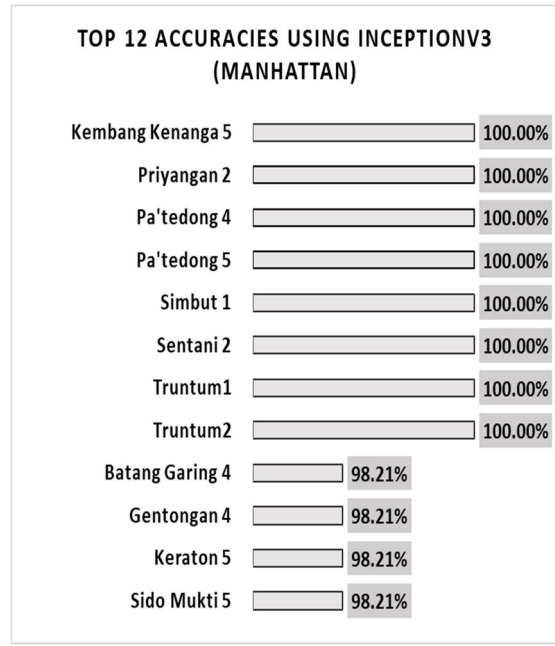
Figure 5.0 illustrates the top 12 accuracy using the CNN model, namely inceptionV3. Based on this experiments, it is illustrated that there are 8 traditional Clothes patterns that had a retrieval accuracy of 100%. while for other Clothes patterns, the average retrieval accuracy reaches 85.04%. Based on this experiment, InceptionV3 has a better average accuracy than VGG 19. Although in general the difference in accuracy is not too significant.

In this experiment of Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong which have 2 similar patterns, truntum Clothess have 2 similar patterns including Simbut Clothes there are 2 similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Kembang Kebananga, SidoMukti, Keraton, Priyangan and gentongan. In some pattern have  retrieval accuracy performance up 98% such as batang garing 4, Gentongan4, Keraton 5 and Sidamukti 5 pattern
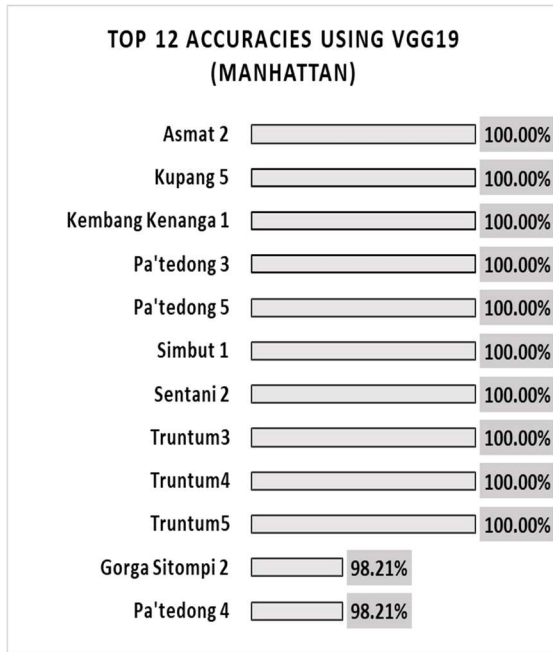
*Figure 6.0   Accuracy Results of 12 traditional clothes patterns with VGG 19 and Manhattan Distance*

Figure 6.0 illustrates the top 12 accuracy using the CNN model, namely VGG 19. Based on this experiments, it is illustrated that there were 10 traditional Clothes patterns that had a retrieval accuracy of 100%. while for other Clothes patterns, the retrieval accuracy reaches 81.46%. Based on this experiment, VGG 19 has a good average accuracy include InceptionV3. Although in general the difference in accuracy is not too significant.

Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong there are 2 similar patterns, truntum Clothes have 3 similar patterns, Pa'tedong have 2 similar pattern, including Simbut Clothes have 2 similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Gorga Sitompi, and Pa tendong4. In this experiment, the retrieval accuracy performance is up 95%.

TABLE 4.1

Traditional Clothes Pattern Retrieval Accuracy Performance Using 3 Models Of Cnn And Manhattan Distance

| Name | Average Accuracy | Min | Max | Query Accuracy >= 90% |
|---|---|---|---|---|
| EfficientNet B7 | 92.11% | 76.79 % | 100% | 64 |
| InceptionV3 | 85.04% | 69.64 % | 100% | 33 |
| VGG19 | 81.46% | 60.71 % | 100% | 29 |

Based on table 4.1, it can be seen that EfficientNetB7 has the highest average retrieval accuracy compared to other CNN models. The average retrieval accuracy is 92.11%, while the lowest accuracy is 76.79% and the highest is 100%. With this EfficientNetB7 model, the number of traditional Clothes patterns that have accuracy above 90% is 64 images. However, using the InceptionV3 and VGG19 models, the average data retrieval accuracy is 85.04% and 81.46%, respectively.

In addition, the minimum accuracy value between the InceptionV3 and VGG19 models has a fairly large difference, namely 69.64% and 60.71%. About 9% for the difference. Meanwhile, the number of traditional Clothess that have accuracy above 90% with Inception and VGG19 are 33 images and 29 images. Based on This experiment explains why InceptionV3 has higher average accuracy than VGG19 with the distance method used is Manhattan Distance.

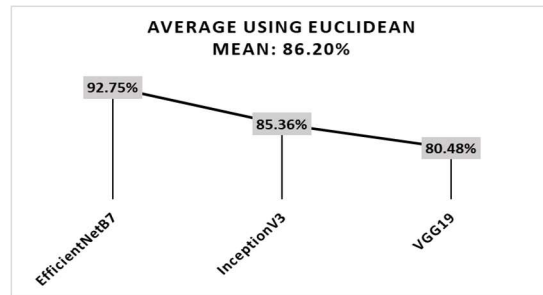B. *Average accuracy of 3 CNN models using Euclidean Distance Metrics*



*Figue 7.0  Average accuracy of 3 CNN models using Euclidean Distance Metrics*

In this experiment to determine the similarity of traditional Clothes patterns using Euclidean Distance. This distance method is used to determine the retrieval accuracy based on the similarity of the Clothes pattern image after the feature extraction process with 3 CNN models, namely EfficienetB7 has a retrieval accuracy of 92.75%, for InceptionV3 has an accuracy of 85.36% and VGG19 has an accuracy of 80.48 % which is the smallest accuracy in this experiment. However, the highest accuracy for each pattern using 3 CNN models is 100%. The percentage of retrieval accuracy can be seen in the Figure 7.0.

In order to carry out the results clearer, the following are charts of top 12 accuracies using different CNN methods namely EfficientnetB7 can be seen in Figure 8.0.

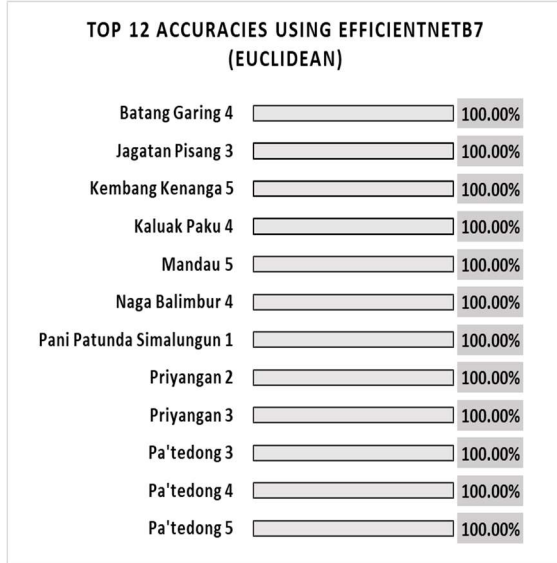*Figure 8.0 Top 12 Accuracies Using EfficientNetB7 With Euclidean                                    Distance*



Figure 8.0 Iillustrates the top 12 accuracy using the CNN model, namely inceptionV3. Based on previous experiments, it was illustrated that there were 8 traditional Clothes patterns that had a retrieval accuracy of 100%. while for other Clothes patterns, the retrieval accuracy reaches 92.11%. Based on this experiment, EfficientNetB7 has a very good average accuracy compared to other CNN models.

Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong there are 3 similar patterns, Priyangan Clothess have 2 similar patterns including Simbut Clothes there are 2 similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Kembang Kebanga, Mandau, Naga blimbur. In this experiment, the retrieval accuracy performance is more than 90%.

illustrates the top 12 accuracy using the CNN model, namely VGG 19. Based on previous experiments, it was illustrated that there were 10 traditional Clothes patterns that had a retrieval accuracy of 100%. while for other Clothes patterns, the retrieval accuracy reaches 98.21%. Based on this experiment, VGG 19 has a better average accuracy than InceptionV3. Although in general the difference in accuracy is not too significant.

Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong there are 2 similar patterns, truntum Clothess have 2 similar patterns including Simbut Clothes there are 2

similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Kembang Kebananga, SidoMukti, Keraton, Priyangan and gentongan. In this experiment, the retrieval accuracy performance is more than 90%.
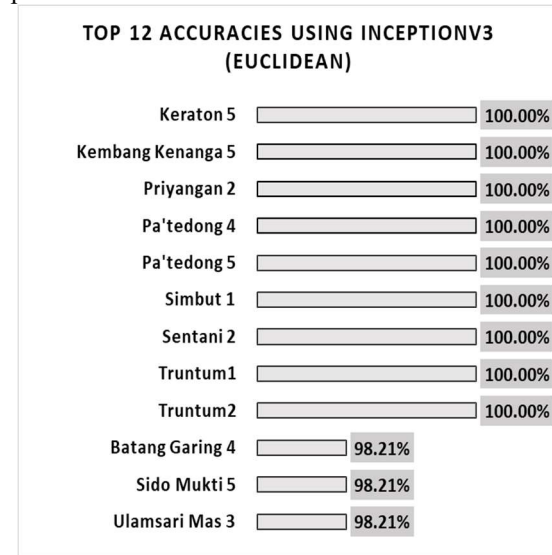


*Figure 9.0  Top 12 Accuracies Using InceptionV3 With Euclidean Distance*

Figure 9.0 illustrates the top 12 accuracy using the CNN model, namely Inception V3. Based on previous experiments, it was illustrated that there were 9 traditional Clothes patterns that had a retrieval accuracy of 100%. while for other Clothes patterns, the retrieval accuracy reaches 98.21%. Based on this experiment InceptionV3 has a better average accuracy. Although in general the difference in accuracy is not too significant.

Traditional Clothes patterns that have a retrieval accuracy of up to 100% consist of Pa'tendong there are 2 similar patterns, truntum Clothess have 2 similar patterns including Simbut Clothes there are 2 similar Clothes patterns. However, for other Clothes patterns, there is only 1 type, such as Kembang Kebananga, SidoMukti, Keraton, Priyangan and gentongan. In this experiment, the retrieval accuracy performance is more than 90%.
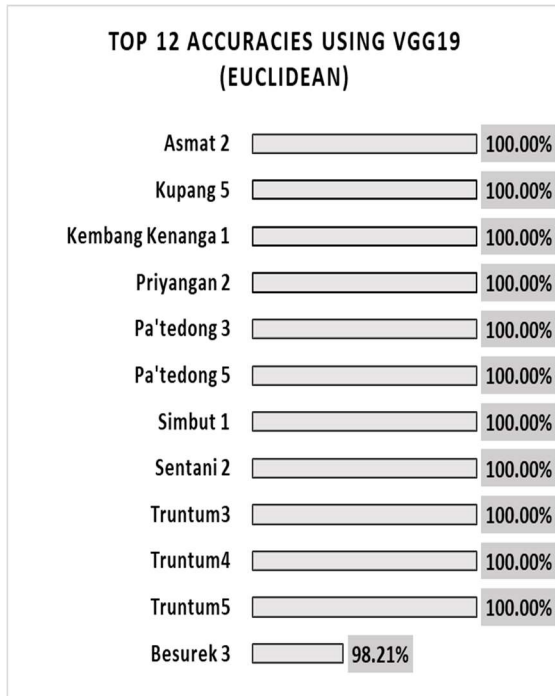
*Figure 10. Top 12 Accuracies Using VGG19 With Euclidean Distance*

Last, this chart shows top 12 accuracies using VGG19. This result shows a bit better than the Manhattan with 11 out of 12 query images are 100%. 3 out of 11 are Truntum query images. Then, it is followed by Pa'Tedong again with 2 query images at 100%.

TABLE 4.2.

TRADITIONAL CLOTHES PATTERN RETRIEVAL ACCURACY PERFORMANCE USING 3 MODELS CNN AND EUCLIDEAN DISTANCE

| Name | Average Accuracy | Min | Max | Query Accuracy >= 90% |
|---|---|---|---|---|
| EfficientNet B7 | 92.75% | 78.57 % | 100.00 % | 64 |
| InceptionV3 | 85.36% | 71.43 % | 100.00 % | 33 |
| VGG19 | 80.48% | 57.14 % | 100.00 % | 27 |

Based on table 4.2, it can be seen that EfficientNetB7 has the highest average retrieval accuracy compared to other CNN models. The average retrieval accuracy is 92.75%, while the lowest accuracy is 78.57% and the highest accuracy is 100%. With this EfficientNetB7 model, the number of traditional Clothes patterns that have accuracy above 90% is 64 images. However, using the InceptionV3 and VGG19 models, the average data retrieval accuracy is 85.36% and 80.48%, respectively.

In addition, the minimum accuracy value between the InceptionV3 and VGG19 models has a fairly large difference, namely 71.43% and 57.14%. About 14% for the difference. Meanwhile, the number of traditional Clothes that have accuracy above 90% with Inception and VGG19 are 33 images and 27 images. Based on This experiment explains why InceptionV3 has higher average accuracy than VGG19 with the distance method used is Euclidean Distance.

4.2 Analysis

In the experiment, there were 100 different traditional clothes query images used for this study. These images represent the differences from one pattern to another. Therefore, the performance of each image represents how well each pattern fits in this experiment. Because this experiment shows both Manhattan distance and Euclidean distance resulted in very similar output. One distance metric has the advantage over the other, so vice-versa. For example, EfficientNetB7 and InceptionV3 show better performance when using Euclidean Distance. The opposite happens when using VGG19 at a slightly better overall result and minimum value.

Another thing to note is that every test resulted in Pa'Tedong as the one with most query images at 100% accuracy result. Some other like Truntum and Simbut followed this behavior with slightly fewer query images that have 100%. This might be contributed by how the patterns look. This shows that this method has little difficulty in capturing traditional cloth images based on queries. This result may be caused by the way the image was taken in the previous process. Factors like brightness, contrast, inefficient image preprocessing or many other things might play role in the results. Also, a high-accuracy query has a pattern that looks very different and unusual from other cloth patterns. An example of the query process on the clothes pattern database can be seen in figure 4.9.
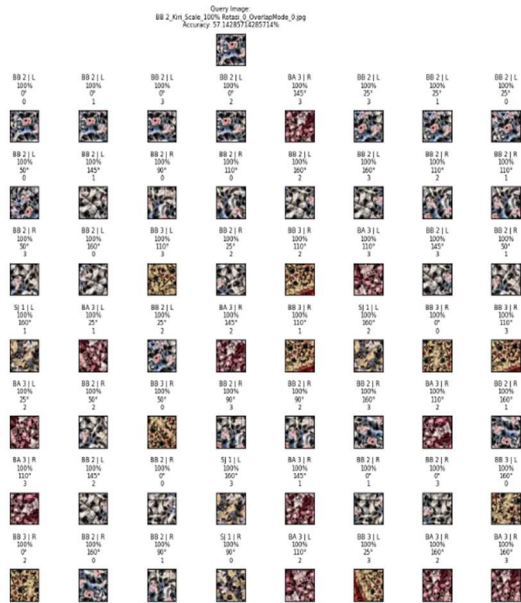
*Figure 4.9: Example of query with the lowest accuracy (Query of VGG19 with Euclidean Distance)*

In Figure 4.9 seems like has the correct retrieved images when in fact some of them are different from the query image. This example indicates that this method is only able to see colors and patterns. Most of the unique features that every traditional cloth has been somehow ignored. This research explains queries with low accuracy have retrieved images that look the same to query but not exact answers. For the next research, better pattern distinction, color differentiation, and using other methods like SIFT might improve the performance of this kind of study on traditional clothes.



*Figure 4.10 Example of query with highest accuracy (Query of EfficientNetB7 with Manhattan Distance)*

As of figure 4.10, this query image has a clear and distinct pattern that makes the machine recognize it easier. The color also contrasts that it is easy to differentiate between the pattern and the background even with bare eyes.

## 5. CONCLUTION

In conclusion:
1) This Image Retrieval study uses several kinds of rotation and overlapping in image capture.
2) The retrieval process of traditional Clothes patterns based on query images begins with a feature extraction process using 3 CNN models, namely EfficientNetB7, Inception V3 and VGG 19, supported by the distance method between the Clothes pattern database and the query image, namely Manhattan and Euclidean distances.
3) The average of results using this method is 86.20% in both distance metrics. This result means this study carried out a good enough results on image retrieval but also needed a lot of improvement.
4) Better pattern distinction, color different, and using other methods like SIFT or SURF to support the image Classification using SVM which It might improve the performance of image retrieval studies.

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