APPLICATION OF INFORMATION TECHNOLOGY AND IMPLEMENTATION ANDROID-BASED COMMUNICATION ARTISANS WEAVING ULOS BATAK

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ABSTRACT

Ulos is a traditional Batak weaving fabric consists of various kinds, the pattern or motif, function and size. Among the existing ikat fabrics, only deep meaning ulos. Ulos distinguished over the making of SIO/motif with Parameswara converted, and became standard for determining value and price. As the development of the era of globalization and technology community Indonesia especially the younger generation, increasingly rely on technology and consider it more attractive compared to recognize and preserve the culture of his country on its own, especially for information knowinghow it is cause it needsandsoftwareHowto provide an getexcitingulos introductionasingleapplicatitoappronpriate.
technoloy development as an effort to preserve Ulos. From collection data using a detailed questionnaire, note the large number of young people who are interested and need information and how do I get the ulos. So that an application that was built is useful to know the type of information, as well as the sale of ulos. Getting to know the image used method of ulos SURF (Speed Up Robust Features) to match the image by specifying a keypoint ulos object, and then look for similarities keypoint for each object. the results obtained in the research tailored to the goal, then the conclusion introduction applications make it easier to get to know society ulos ulos and know the meaning, types and functions of marketing and sales as well as ulos ulos.
Keywords : Ulos, Batak, *Speed Up Robust Features*, *Keypoint.*

1. INTRODUCTION

Ulos in a general sense is a traditional Batak weaving fabric consists of various kinds, the pattern or motif, function and size. Ulos in terms of customs there are three types, namely herbang ulos (traditional woven fabric), ulos na ra so bad (in the form of a piece of land or rice called ulos will not be obsolete) and ulos tinonun aware (in the form of money, called ulos woven in a day). Among the existing ikat fabrics, only deep meaning ulos and very spacious. Differentiated over the making of SIO/motif with Parameswara converted, and became standard for determining value and price.

The design was developed in the fabric of ulos is the resultsthe ofworktheexcavationof Batak culture of ornament which is expressed in a new design, and still continue to be excavated with a wide range of improvisation. Batak are divided into 5 sub ethnic geographically i.e. Batak Toba, Batak Karo, Batak Simalungun, Batak Mandailing, Batak and Pakpak. This causes a lot of variety and type of ulos in Batak. Whereas in Batak there are 12 types of ulos, namely ulos jugia (homitan), ulos ragidup, ragidup silinggom, ulos ulos ragihotang, ulos godang or ulos sadum angkola, ulos runjar, ulos sibolang, ulos suri-suri ganjang, ulos mangiring, ulos maratur star, ulos sitolu tuho, bolean ulos.

The community of North Sumatra Batak fact people generally decide to wander and raise families in their place to wander. So parents begin to ignore and not introduce meaning, types and functions of ulos that often they use when custom event Batak. Based on the testing post-questionnaire test the done, then it can be drawn the conclusion that the 96.67% of respondents know ulos but 53.33% of respondents did not know the kinds of ulos on batak toba and 63.33% of respondents did not know the usefulness of ulos on toba batak language, so 63.67% of respondents do not know the pattern and motif ulos on batak toba and 83.67% of respondents are interested in having ulos, and 53.33% interest in the ulos according to respondents is declining.

Because of the many android users currently in Indonesia, so that makes it easy to provide information about ulos. In 2014 the rapidly growing android users reached 1.1 billion users. By utilizing Android that has an operating system that is operated in a smartphone. Android also provides open platform for application development to create

the newest and exciting. Besides Android users also in the current Indonesia in already developing rapidly its use.So simplify provide information about ulos.

The system to be built is the system introduction the object of ulos using a mobile Android with a implement algorithm Speed Up Robust Features (SURF). The algorithm is a development of the SURF algorithm PROPERTIESwhere SURF utilizing the computing speed of the filter box by using an integral image. An integral image is an image of the matrix of the value of each pikselnya is the accumulation of the values of the pixels above and left.

2. THE CONTENT OF RESEARCH

2.1 Model making software

Model the construction ofdevicethe software using the model of the waterfall, because it produces a well structured system of ditiap process. The processes contained in the model of the waterfall can be seen in the following image:

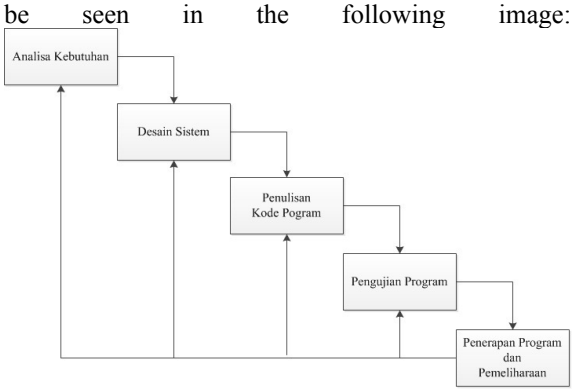


Figure 1 Method of Waterfall

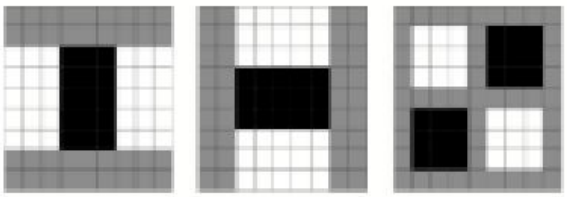
2.2 SURF (*Speed-Up Robust Features*)

The method of speed-up Features is a Robust method of detection features use the keypoint of an image. Keypoint itself are the parts of an image whose value remains strong or when changing the scale, rotation, blurring, 3D transformations, lighting and also changes shape. Changing shape of it could happen because of the shape of the original image data is not intact or not perfect image that is in the sample picture. The test image that are not intact as possible because there are other objects that cover, or shooting is not perfect, or the State of the object itself that has undergone a change.

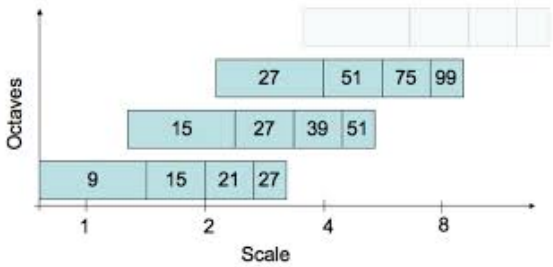
2.2.1 Scale Space Ekstrema Detection

Scale space is divided into a number of octave, where one octave represents the filter response is obtained with the konvolusi image input filter with increased size. In the SURF, the lowest level in the scale space obtained from the output of the filter 9x9. This filter is associated with the value of the Gaussian with σ = 1.2. When making a larger filter, there are several factors that must be taken into account. The increase in size is limited by the length of the lobe that are positive or negative Gaussian derivatives of second order. A positive lobe is represented by the color white box in Figure 1, and negative lobe is represented by the color of the black box in Figure 1. Figure 1 shows two Gaussian derivatives against x, y, and xy.

Because we need the position of the central pixel fixed, then increase the minimum pixel size 2 (one pixel for every side), because there are 3 dimasing filter each lobe, then the size of the increase in filter is 6. Thus the size of the filter-filter for first octave is 9 x 9, 15 x 21, 15 x 21, 27 x 27. For every octave increase in size, the new filter is double (from 6 to 12, 24, 48 and be), so the size of the filter for the second octave is 15, 27, 39, 51. Third octave 27, 51, 75, 99, and if the original image size is still bigger than the size of the filter then the fourth octave created with size filter 51, 99, 147, and 195. Figure 2 shows an example of scale space.



Gambar 1. Turunan Orde Dua Gaussian



Gambar 2. Scale Space

2.2.2 Keypoint Localization

After the process of determining the threshold, then the process of non-maxima suppression is performed to search for a set of candidate keypoint. This process is done by comparing each pixel of the image on scale space with 26 neighbors, which consists of eight points on the original scale and 9 in each the scaleaboveofthe and below (total overall 9 + 8 + 9 = 26). The result of the non-maxima suppression is the keypoint of the resulting image. This process is the last process in search for keypoint that is by using the interpolation with the data close to the keypoint. This is done with a 3 dimensional quadratic compatibility. H(x, y, σ) stated a determinant Hessian, defined as the following equation:

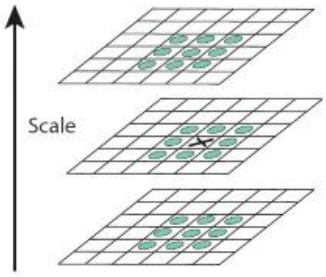
$$H(x) = H + \frac{\partial H^T}{\partial x}x + \frac{1}{2}x\frac{\partial^2 H}{\partial x^2}x \qquad (0\text{-}1)$$

Location of extreme diinterpolasi, $x = (x,y,\sigma)$, found

by finding the derivative of this a zero value, which can be described by the following equation:

$$x = - \frac{\partial^2 H^{-1}}{\partial x^2} \frac{\partial H}{\partial x} \qquad (0\text{-}2)$$

If greater than 0.5 on the x or y direction σ, location need to be adjusted again by doing interpolation again. This procedure is repeated until the value is less than 0.5. When interpolation has been done a few times but the result does not meet a value below 0.5, then deleted the keypoint. The remaining Keypoint is stable.



Gambar 3. Non-Maxima Suppression

2.2.3 Orientation Assignment

Keypoint invariant in order against the rotation of the image, then we have to identify the resulting orientation around the keypoint. For that purpose, the first step is to calculate the Haar wavelet responses in the direction x and direction y on the area neighbouring pixels around the keypoint in the shape of a circle with a distance of 6s, where s is the scale of the keypoint was detected. The size of the wavelet specified be 4s. Filtering process is accelerated with integral images, and ex.the generated represented as titiktitik in space with horizontal axis axis along the response and vertical response along the axes of coordinates.

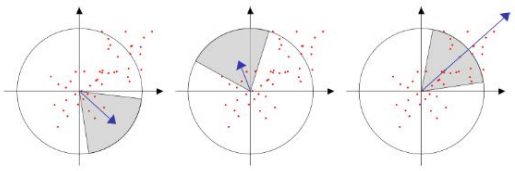


Figure 4. The Shift In The Orientation Of The

For the extraction process descriptor, the first step is to create a box around the area of keypoint, where keypoint at the center of the box, and the orientation around the specified orientation.



Figure 5. Calculation of orientation on the scale different

$$v = [\Sigma dx, \Sigma dy, \Sigma |dx|, \Sigma |dy|] \qquad (0\text{-}3)$$

It is also invariant wavelet responses against the lighting, while the properties of invariant against contrast is achieved through the formation of descriptors into a unit vector.

2.3 Matriks Hessian Affine Region

Matrix is the arrangement of numbers arranged by rows and columns. Numbers numbers called entries in the matrix or also known as element (the element). The Hessian matrix is the matrix of each element of the second partial derivatives of a function. Let f (x) function with n variables that have the second partial derivatives and derivatives are continuous, the Hessian matrix of f (x) is written H is:

$$H = \begin{bmatrix} \frac{\partial^2 f}{\partial x_1^2} & \frac{\partial^2 f}{\partial x_1 \partial_2} & \cdots & \frac{\partial^2 f}{\partial x_1 \partial_n} \\ \frac{\partial^2 f}{\partial x_2 \partial_1} & \frac{\partial^2 f}{\partial x_2^2} & \cdots & \frac{\partial^2 f}{\partial x_2 \partial_n} \\ \cdots & \cdots & \ddots & \cdots \\ \frac{\partial^2 f}{\partial x_n \partial_1} & \frac{\partial^2 f}{\partial x_n \partial_2} & \cdots & \frac{\partial^2 f}{\partial x_n^2} \end{bmatrix}$$

Hessian matrix can be used to perform a test of the second derivative of a function of more than one variable, namely to identify the optimum relative value of that function. The stationary point of categorization function of two variables by using Hessian matrix, let f (x) = F (x 1, ..., xn) is a real-valued function where all the partial derivative is continuous. For example, a stationary point x 0 is from F and H H = defined (x 0) with equation Hij = Fxi, yj (x 0). H (x 0) was Hessian of F at x0

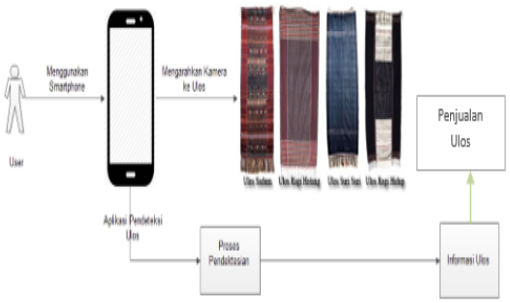
The stationary point can be classified as follows:

a. x0. Is a relative minimum of F if H(x0.) positive definite

b. x0. Is a relative maximum of F if H(x0.) negative definite
c. x0. Is a saddle point of F if H(x0.) indefinite

2.4 Analysis of system architecture

The physical architecture of the system that was built consisted of shooting ulos, system image into text information extraction using algorithm SURF for generate the type of ulos. This application serves as the interface so users can easily do the introduction of types and functions of ulos.



In this section, users who use the application introduction of ulos grab images from the camera on using ulos motif android Smartphone. After the picture is taken so that the images will be processed to determine type on the ulos. The main function of the application introduction types of ulos was as media information in the application forms for the submission of information on types of ulos easily and test algorithms used what function fits the sense of the algorithm itself SURF based mobile Andorid.

2.5 Functional needs analysis

The analysis of the needs of the functionaldescribe the process the activitiestheof the will applied in a system and explain the necessary needs of the system so that the system can run well and in accordance with their needs. These include the functional needs analysis needs analysis systems, needs analysis, content and modeling systems.

2.5.1 Needs analysis System

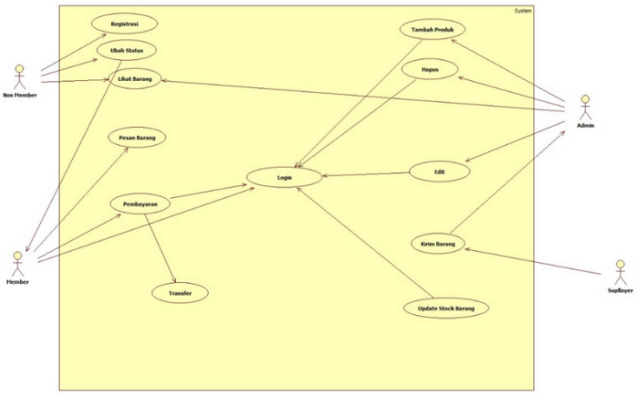
In the development of application system design, system requirements analysis previously done in order for the system to be built in accordance with the expected or required of the user. As for the necessary system requirements i.e., complete information on the type and function of ulos.

2.5.2 Modeling System

Modeling of system function to determine the functions that can be performed by the class system on the application and specify the required for the realization of the functions of the system the has analyzed previously and describe it into the form of a diagram.

2.6 *Use Case Diagram*

Usecase Diagram is construction to describe relationships that occur between actors with activity contained on the the system. Use case modeling objectives include is operational and functional requirements define the system by defining a system deployment scenarios will be built.



Gambar 4. Use Case Diagram

2.7 Non-functional needs analysis

The analysisThisof thedscribe the the needs of the the system consists of the hardware, the device software

2.7.1 Analisis Perangkat Lunak

The needs of thedevice software are all factors that must be met to design the software so that the software in accordance with the intent and purpose of the manufacture of the software. Some proponents of software as follows:

a) Operating system Windows 7 Ultimete
b) Eclips(IntegratedDevelopment Environment),asthesoftware used for build android applications.
c) Java as a programming language that is used in software to build applications.

2.7.2 Analysis Hardware

The props in the form of mobile and camera consists of hardware and software that interact each other. The software provides instruction-instruction to the hardware to do the task certain. Device hard theused are as follows:

1) Android-based smartphones at least Ice Cream Sandwich

2) Camera mobile at least 5MP., for the purposes of filming ulos done directly.

3) A minimum of 512 MB of RAM. Memory, external storage to store data generated by the application program.

2.8 Design System

The design will be started after the stage of analysis of the sistemselesai done. The design can be defined as the planning and making of representations, sketches or settings of some separate elements into a unified whole and functioning.

2.8.1 Design Interface

Interface design is done to design the interface used by the user either admin or user that uses the application introduction of Ulos.



Figure 7. Form The Main Menu (F1)

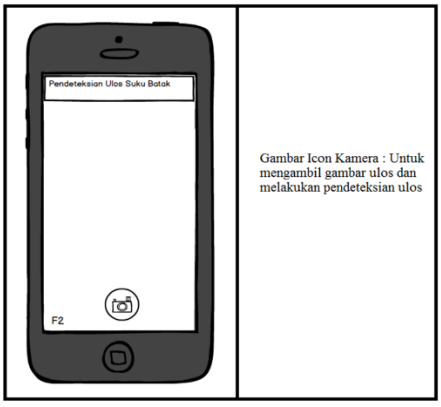


Figure 8. The form Start Menu to take pictures ulos (F2)

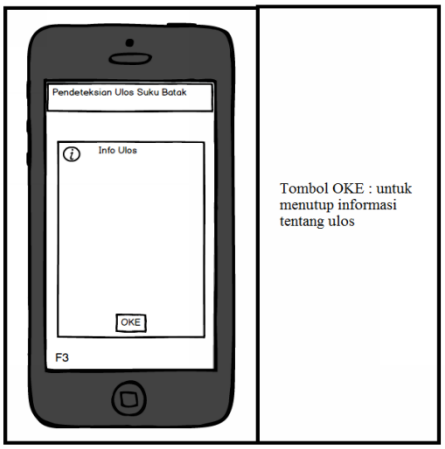


Figure 9. Form information about ulos

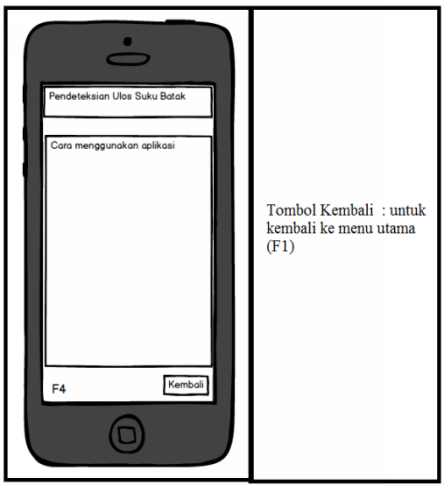


Figure 10. Form Menu Of

3. COVERING

3.1 Conclusions

Based on the results obtained in the research and drafting of this thesis as well as adapted to the purpose, then the conclusion that application, the introduction of the community makes it easy to get to know ulos ulos and know the meaning, types and functions of ulos and how marketing and sales of ulos online.

3.2 Advice

Based on the results of the overall application, then be given advice that the addition of a feature that can Maybe developed. Even application development for the detection of ulos on batak toba batak and more besides improves data retrieval.

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