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Design of Balinese Traditional Frame Application using Face Detection Features and Frame Upload Menu Android Based

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ABSTRACT

Tradition is one of inseparable cultural aspects of Balinese people’s way of living. Balinese Tradition consist of a variety of rich aspects that must be preserved. The preservation of Balinese arts and cultures can be done by accommodating the development of ICT (Information, Communication and Technology) especially in image processing aspect. The rapid development of ICT can ease us to preserve Balinese arts and cultures. The application which we made is mobile application that uses Android Operational System. This image processing application which uses Balinese Traditional frame is the media that can be used for preserving Balinese arts and cultures. This application has 6 features namely; Frame Feature, Brightness Feature, Contrast Feature, Cropping Feature, Caption Feature, and Face Detection Feature. The strengths of this application can be found in its Face Detection Feature and Frame Upload Menu. The Face Detection Feature can detect the face and blank space of the caricature frame to be matched in controlling the image input. The Frame Upload Menu will ease and give users freedom to creatively play with the user’s authentic frame. The image processing of this Balinese Traditional frame application is influenced by the size of the input files and the specification of the smartphone. The result of the application is in form of a picture with Balinese Traditional frame in it. The issues that are solved through this research are able to give a real effect in preserving Balinese arts and cultures by using Balinese Traditional frame and developing this application with Android Operational System.

Keywords: Balinese Tradition, Frame, Image Processing, Android

1. INTRODUCTION

Tradition is a valuable property of every regions as well as Bali. The richness of Balinese Tradition is in the uniqueness of every aspects of life, culture and architecture. Philosophies that exist in Bali are well contained in Balinese Traditional architecture with its variant in the implementation. That implementation can be in form of giving Traditional architecture touch to Balinese Traditional frame. Image processing by using frame have been widely used nowadays, yet the implementation that uses Traditional frame especially Balinese Traditional frame does not exist yet. For that reason, emerge the concept of developing a Balinese Traditional frame application. This research based on the explanation above, is conducted to develop an android based application that can be used to do an image editing process by giving the touch of Balinese Traditional frame.

2. RESEARCH METHODOLOGY

The research methodology used in the manufacture of Android-based image processing application using Design Science Research Methodology (DSRM), because it focuses on solutions to problems and application development. This DSRM methodology was first introduced by Ken Peffers, Marcus A. Rothenberger, and Samir Saterjee [1]. Android-based image processing application is an application that develop in a simple image processing that is focused only on attachment of the image input and the simple image editing namely: Brightness, Contrast, Cropping, Caption and Face Detection Features that are used in Balinese Traditional caricature frame.
Figure 1 is a research methodology that will be used in the development of image processing applications based on Android this.

2.1 The Design of System Architecture
The design of the system architecture is a picture of the whole process on the system as well as the features that exist in the application for ease in understanding briefly.

The design of the system architecture are six main features, namely: Frame Feature, Brightness Feature, Contrast Feature, Cropping Feature, Caption Feature and Face Detection Feature. The above features can save the results of each process directly. Features can be used or not in accordance with the wishes of the user to process the application, the following explanation of each feature and how it works.

2.2 Flowchart System
The flow diagram (flowchart) describes the workflow system overall system and explain the sequence of procedures the system working. The purpose of this flowchart is explained in detail for the establishment of the system. Flow diagram of the overall system that came with the system described as follows.
Figure 3 is an overview of the workflow system in general by dividing the process into a function to perform system tasks. System tasks contained in the selection of features for image processing to produce the results of the process.

3. LITERATURE REVIEW

Architecture is a visual era that includes past architecture that has the perception of "tradition" that is memorable, historically and leaving romanticism. Balinese architecture is one of the archipelago architecture that became a source of inspiration architectural design world [2].

3.1 Bali Arts

Bali is famous for various art that is able to invite many tourists. Balinese culture steeped in mystical terms and the art of making Bali increasingly has its own spirit to those who visit it [3].

1. Dance
2. Instrumental Art
3. Statue arts
4. Art Relief
5. Art and Images

3.2 Culture Bali

Balinese culture in terms of historical perspective can be divided into three basic traditional, the tradition of small, great traditions, and modern. Small tradition is oriented local Balinese culture with the characteristics of well-organized system of irrigation by groups of non-formal organization called Subak and livestock for the purpose of ceremonial purposes and meet the needs of families as well as make goods/home appliances and religious facilities. Great tradition is acculturation between local Balinese culture with Hindu Javanese culture that gave birth to the culture of Bali tradition. Characteristics are their centralized power through the concept of god king. The king is regarded as an incarnation of Lord with all its advantages compared to the common people[4].
The difference between the core part of a culture with parts of the embodiment illustrated by some characteristic like the one at the core of culture, for example:
1. The value system.
2. Religious beliefs are sacred.
3. Indigenous already learned in the socialization process of individual citizens.
4. Indigenous has netted function in society, while the final part of a physical culture are tools, useful objects, science, ordinances with all the techniques for comfort.

The final part of the formation of culture, namely the physical culture, the people of Bali are still maintained and cared for [4].

3.3 Caricature
Caricature is the medium used to convey the message drawn in a simple and violates anatomy, although in fact to achieve the simplicity of the need to study diligently and jellies [5].

3.4 Digital Image Processing
The image processing is image processing using the system in order to be a good quality image. The purpose of image processing is to improve the quality of the image so that the information can be understood pad an image in the process of digitally [6].

1. Imagery
Image in Latin imago is a representation, likeness or imitation of an object or objects. Grouping the image can be divided into the image appears and the image is not visible.
   a. Analog image
   b. Digital Image
   c. RGB (Red, Green, Blue)
   d. The color image (8 bits)
   e. Citra Color (16 bit)
   f. The color image (24-bit)
   g. Pixel Values [10]-[12]

2. Color Image Processing
Color is the result of the perception of light in the visible spectrum region of the retina of the eye and has a wavelength between 400nm up to 700nm. Color depends on the nature of reflection (reflectance) of an object. Color is seen a reflection, while others are absorbed. Ray source needs to be taken into account as well as the nature of the human visual system when capturing a color [7].

3. Brightness
Brightness is the process of adding the brightness of the value of the degrees of gray. Brightness is an attribute of visual perception in which a source color looks emit or reflect light. The process is done by adding the brightness value of the degree of gray with a value adder (step by step digital image processing). Brightness is the perception caused by the lighting of a visual target [8].

4. Contrast
Contrast is the difference in darkness and brightness in an image process of setting the value range interval for each value of the degrees of gray. Contrast also add brightness as brightness but there are differences of both an increase in brightness in contrast have a wider spacing of brightness. Contrast is a difference gradation, brightness, or tone (color) of dark areas (shadow) with areas of light or white colors are striking once on an object [8]. Brightness and contrast is a digital image enhancement function which is used for adding or subtracting the brightness of the image. This function is used when the brightness of the image does not match [8].

5. Cropping
Cropping is cutting an image on a specific area to be taken and processed. Certain areas with an image area of a photo taken as the data, in order to get the right data and small-sized so as to facilitate the process of computing the data [9].

6. Resizing
The technique is commonly used for this operation is an interpolation technique. Interpolation is a way to estimate the value of certain among the known values in the same range. Interpolation is performed to estimate the value of the
image in pixels between the location of the image. Interpolation is a process that is done by the software to do a remake of the sample image data to determine the value of pixels applied [7].

4. RESULT AND DISCUSSION

Balinese Traditional frame application based on Android is an application used to preserve all aspects of Balinese Traditional via Android mobile technology with Balinese Traditional frame made on the application. Balinese Traditional frame application using Java Programming language for Android. Balinese Traditional application frame for testing purpose to the image paste in the frame provided on the application.

**Figure 4. Main Display Applications**

Figure 4 is the main view there are applications of the camera menu and the gallery menu, the user is directed to the image stored on the memory Android smartphone and the camera menu, the user is directed to take photos.

**Figure 5. Upload Frame Menu**

Figure 5 Upload Frame Menu is menu that allows users to create the design of the frame in accordance with the wishes of the user. This menu can determine the number of photos that are included in the frame user uploads.

**Figure 6. Caricature Frame**
Figure 6 is a caricature frame available on application. Caricature frame using the traditional aspects of Balinese effort to preserve art and culture of Bali. The user can use the Bali Traditional caricature frame by adding a face on the empty space available on the frame caricature.

The face detection feature on the application Balinese Traditional frame can be implemented when using frame caricature to find an empty space on the frame caricature.

### Table 1: Trial Details Face Detection Features

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<th>Face Detection Test</th>
<th>Information</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td>There are many faces from the image on the right, but not detected.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
<td>There are facial using accessories hat and face unobstructed fingers, but the face is detected by the application.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
<td>There are 5 faces, 2 of them with a sideways position is detected while the other 3 in the upright position is not detected.</td>
</tr>
<tr>
<td>4</td>
<td><img src="image7" alt="Image" /></td>
<td><img src="image8" alt="Image" /></td>
<td>There are 14 cartoon faces with different positions but only one face is detected.</td>
</tr>
<tr>
<td>5</td>
<td><img src="image9" alt="Image" /></td>
<td><img src="image10" alt="Image" /></td>
<td>There is a picture with a rotation of 180°, but the face is not detected due to hard to detect facial features inverted.</td>
</tr>
<tr>
<td>6</td>
<td><img src="image11" alt="Image" /></td>
<td><img src="image12" alt="Image" /></td>
<td>There are pictures with 90° rotation, but the face is not detected due to feature only detects faces positioned at an upright or sideways.</td>
</tr>
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</table>
Detection of a face detection feature using the library Google Play Service has detected a face, but some face too much or little looks vaguely undetectable. Face Detection Features can’t detect a face if the image is rotated, only the face images premises upright position can be detected.

5. CONCLUSION
Image processing application that uses Balinese Traditional frame is an editing application that has 6 features namely; Traditional Frame Feature, Brightness Feature, Contrast Feature, Cropping Feature, Caption Feature and Face Detection Feature. The strengths of this application are in its frame feature and face detection feature. Frame Feature offers Frame Upload Menu that can be used to upload users’ desired frame. On the other hand, Face Detection Feature can be used to detect face to ease users when fitting the caricature frame. This feature is using Google Play Service library and will work well if the picture is not rotated.

REFERENCES

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