Implementasi Algoritma Fast Corner Detection FAST (Feature Form Accelerated Segment Test) dan Augmented Reality untuk Menentukan Keaslian Batik Studi Kasus (Batik Trusmi) Cirebon

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Abstract

Indonesia has a diversity of cultural arts, including art crafts. This craft art covers several fields including the arts of wood crafts, metal crafts, ceramic crafts, leather crafts, and textile crafts. In textile crafts, there are several types, such as weaving, knitting, embroidery, and batik. One area that has a characteristic of batik is Cirebon. Cirebon has a traditional batik center, namely Trusmi Batik. TrusmiBatik is a company that produces various kinds of batik, including mega mendungbatik motifs, paksinagaliman, patrankeris, patran kale, umbrella lion, barong lion, sunyaragian arum garden, banjarbalong, ayam alas, supiturang, nagaseba, sawat bride and groom cymbals, etc. The Trusmi batik company has problems on how to minimize artificial batik and how to distinguish original batik from artificial batik. One of technologiesthat can be used is Augmented Reality by using a QR Code (Quick Response) as a sign especially those which can find out whether the batik is original or imitation. The Feature From Accelerated Segment Test is a high-speed interest point detection algorithm based on pixel considerations in circular areas around interest points. Using the FAST algorithm can be used to detect markers so that they can distinguish original batik from artificial batik.

Keywords: Trusmi Batik, QR Code, Augmented Reality, FAST.

1. INTRODUCTION

Indonesia has a diversity of cultural arts, including handicrafts. These crafts cover several fields including wood crafts, metal crafts, ceramics, leather crafts, and textile crafts. In textile crafts, there are several kinds such as weaving, knitting, handicrafts. embroidery, and batik crafts.

Batik is one of the crafts that attracts the attention of the public. Batik grows and develops in Indonesia as a manifestation of the cultural richness of batik areas such as Yogyakarta, Surakarta, Pekalongan, Indramayu, Madura, Lasem, Sukoharjo and Cirebon. One of the areas that has the characteristics of The batik is Cirebon, in the Cirebon area it has a traditional batik center, namely the Trusmi batik center, Trusmi consists of two areas, namely Trusmi Kulon and Trusmi Wetan, Since decades ago Trusmi Village has become a batik icon in Cirebon, many batik craftsmen are in the Trusmi area. At first the batik craft in Cirebon was started by Ki Gede Trusmi.

Batik Trusmi is a company that produces various kinds of batik, including the batik motif mega cloud, paksinaga liman, patran keris, patran kale bride, simbar deer, and others, the location of the Trusmi batik is located on Jalan. Syekh Datul Kahfi Number 148 Cirebon. The Trusmi batik company has problems on how to minimize imitation batik and how to distinguish original batik from imitation batik so that consumers are not deceived by the

imitation batik, and the difficulty in preventing batik counterfeiting is by making new batik with a design and appearance similar to the original.

Many irresponsible parties easily make similar batik and consumers will be easily fooled by artificial batik, because the imitation batik is made in such a way that it is similar to the original Trusmi batik. Researchers chose Trusmi batik center, because the Trusmi batik center is the center of batik. in Cirebon. One way to minimize or prevent it is to make a special sign that can ensure that Trusmi batik is original. For that purpose, a technology called Augmented Reality can be used by using QR Code (Quick Response) as a special sign that can identify the batik is original or imitation.

QR Code is a two-dimensional image that can represent all types of data such as text, images, etc. QR Code is a development of a barcode that was originally one-dimensional, QR Code has the ability to store data that is much larger than barcodes While Augmented Reality is interaction technology that can combine 2D or 3D virtual worlds that will be added to the real world and combine the two. Augmented Reality technology users can see the real world with virtual objects that are added to the real world. So users can see virtual objects and real objects at the same time and in the same place. The application that will be developed by the author is an application based on Augmented Reality. This application will be created using the C # programming language.

2. RESEARCH METHOD

2.1 Software Development Methods

The system development method used in designing this application uses the RUP (Rational Unified Process) method which is a software engineering method developed by Rational Software which was acquired by IBM in February 2003.

RUP (Rational Unified Process) uses the concept of object oriented with activities that focus on developing models using the Unified Model Language (UML), this model emphasizes a set of exercises that can be used as a complete system. From the picture below, it can be seen that the RUP has several dimensions, including the following:

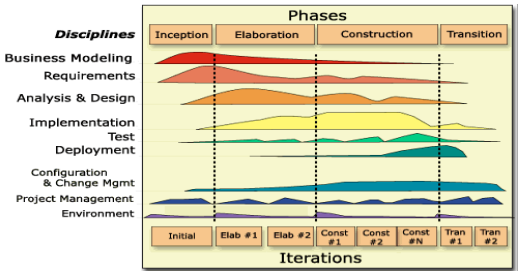


Figure 1 RUP (Rational Unified Process)

In the RUP (Rational Unified Process) method above, it has four stages or phases in software development, namely:

1. Inception
   At this stage the writer determines the scope of system development from the results of literature studies, observations and interviews that the author does, including the results of research and the internet.
2. Eloboration
   At this stage, from the results of literature studies, observations and interviews, the author can identify problems in the system created.
3. Construction
   At this stage, it explains how to implement and test the application that is made. In the implementation stage, it is explained what hardware and software are needed to implement this application. While at the testing stage, testing is carried out. Testing is carried out to ensure the quality of the application that is made is as expected.
4. Transition
   At the Transition stage, which is the delivery of the finished application to the user, and testing the application whether the system is as expected.

2.2 Problem Solving Methods

2.2.1. Feature From Accelerated Segment Test (FAST) Algorithm

FAST (Features From Accelerated Segment Test), is an algorithm for detecting high-speed interest points based on the consideration of pixels in a circular area around the interest point. Interest point detection is an approach used in computer vision systems and the segmentation process to take multiple angles from an object and infer the contents of an image. Angle detection is often used in motion detection, image matching, tracking, 3D modeling and object recognition. An angle is defined as the intersection of two sides. An angle can also be defined as a point that has two dominant sides and different directions from that point. A point of interest is a point contained in an image that is well positioned and can be detected properly. This means that a point of interest can be a corner point but also an actual point of interest.

FAST corner detection works on an image as follows:

Find a point p on the image with the initial position (x p, y p).

Find the four points. The first point (n = 1) lies on the coordinates (xp, yp + 2), the second point (n = 2) is located at the coordinates (xp + 2, yp)

the third point is located at the coordinates (n = 3) lies on the coordinates (xp, yp-2), the fourth point (n = 4) is located at the coordinates (xp-2, yp).

Compare the intensity of the center point p with the four surrounding points. If there are at least 3 points that meet the following conditions, then the center p is the vertex.

Repeat the process until all points on the image have been compared in intensity.

Sample case

1. Find a point p on the image with the initial position (xp, yp).

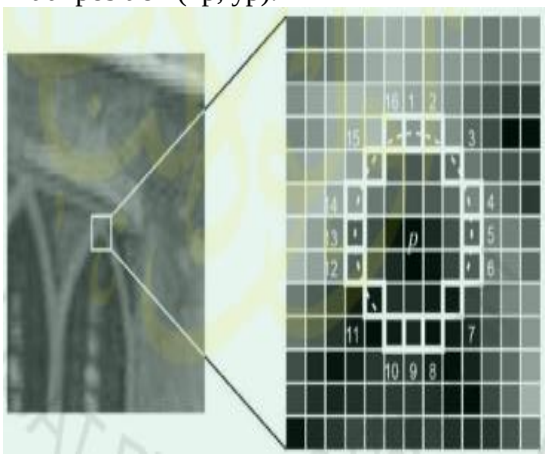
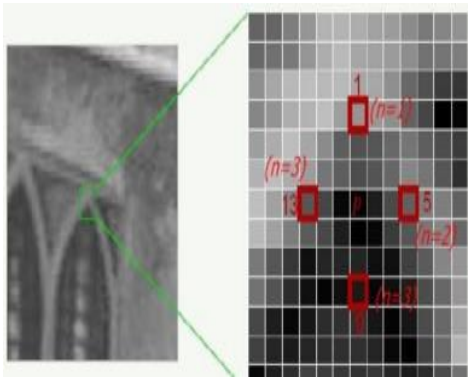


Figure 2 Figure shows the starting point tested
(Dr. Edward Rosten, 2003)

1. Determine the four points.

The first point (n = 1) lies at the coordinates (xp, yp + 3), the second point (n = 2) lies at the coordinates (xp + 3, yp), the third point is located at the coordinates (n = 3) lies at the coordinates (xp, yp-3), the fourth point (n = 4) is located at the



coordinates (xp-3, yp).

Figure 3 The four coordinate points
(Dr. Edward Rosten, 2003)

1. Compare the intensity of the center point p with the four surrounding points. If there are at least 3 points that meet the following conditions, then the center p is the vertex.
2. Repeat the process until all points on the image have been compared in

intensity.

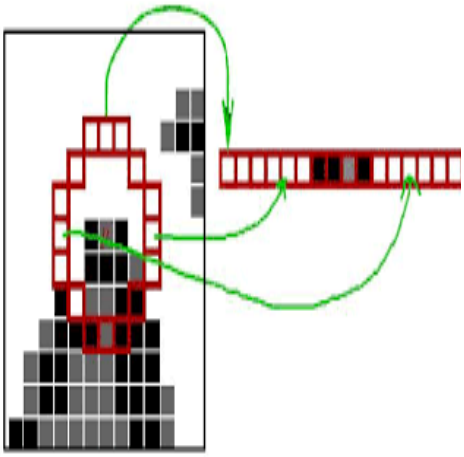


Figure 4 Three points of FAST Corner Detection (Dr. Edward Rosten, 2003)

3. RESULTS AND DISCUSSION

3.1 Problem Analysis

The Trusmi batik company has problems on how to minimize imitation batik, and how to distinguish original batik from imitation batik so that consumers are not deceived by the imitation batik, and the difficulty in preventing batik counterfeiting is by making new batik with a design and appearance similar to the original. those who are not responsible easily make similar batik and consumers will be easily fooled by imitation batik, because the imitation batik is made in such a way that it is similar to the original Trusmi batik.

3.2. Current System Analysis

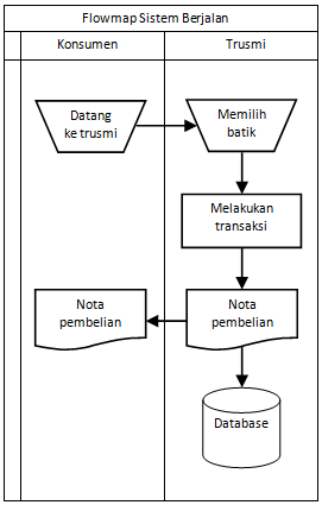


Figure 5 Flowmap of the Running System

1.3. The Proposed System

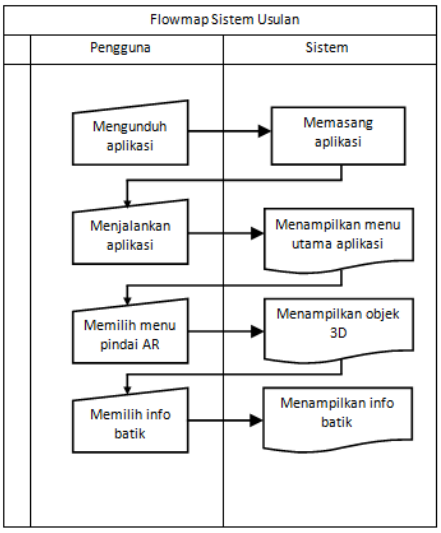


Figure 6 Flowmap of the Proposed System

3.2. System planning

3.2.1. Use Case Diagram

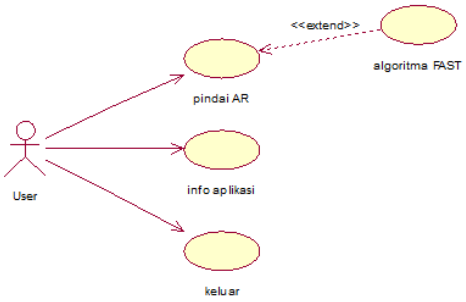


Figure 7 Use Case Diagram

3.2.2 AR Scan Activity Diagram

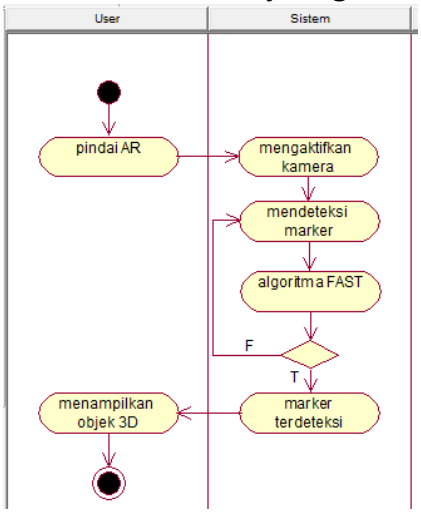


Figure 8 AR Scan Activity Diagram

3.2.3 Activity Diagram Application Info

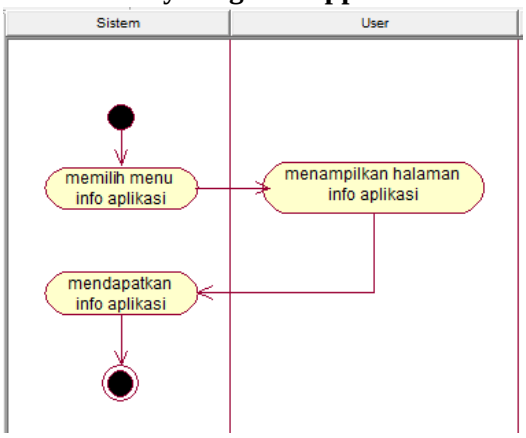


Figure 9 Activity Diagram Application Info

3.2.4 Activity Diagram Exit

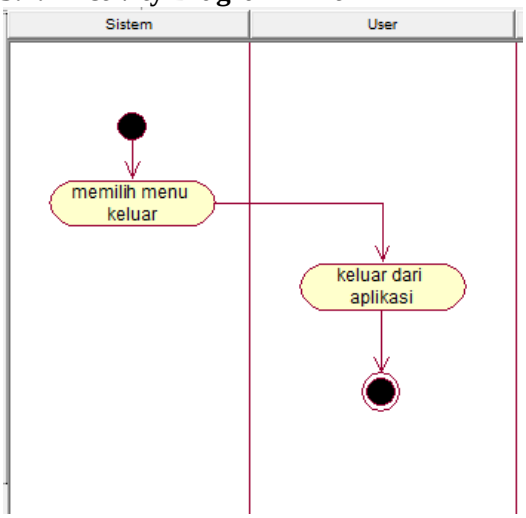
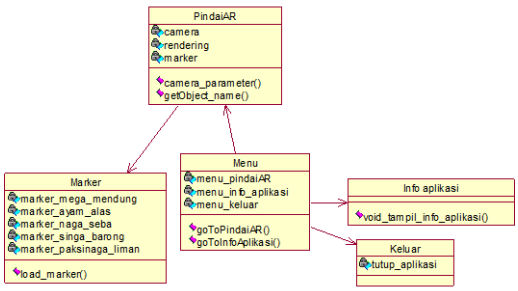


Figure 10 Exit Activity Diagram

3.2.5 Class DiagramGambar 11 *Class Diagram*



3.2.6 *Sequence Diagram* Pindai AR

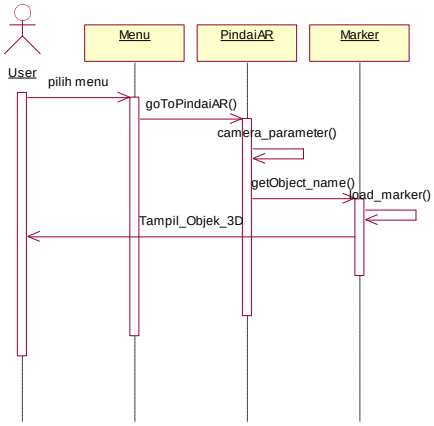


Figure 12 AR Scan Sequence Diagram

3.2.7 Sequence Diagram Application Info

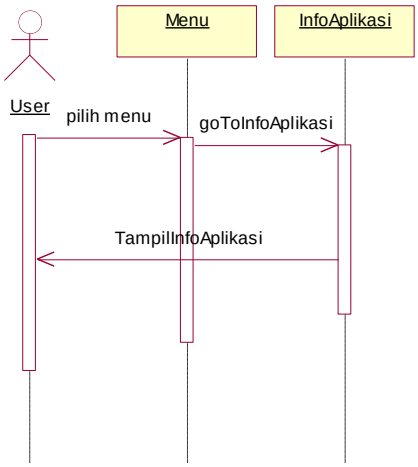


Figure 13 Sequence Diagram Application Info

3.2.8 Main Menu Interface Design

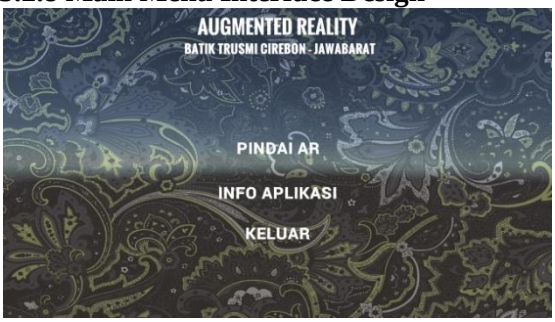


Figure 14 Main Menu Interface Design

3.2.9 AR Scan Interface Design

Figure 15 AR Scan Menu Interface Design

3.2.10 Application Info Interface Design

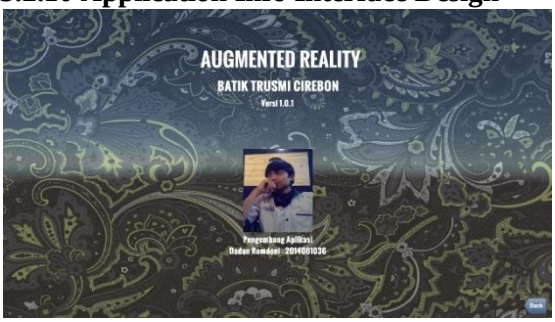


Figure 16 Application Info Menu Interface Design

4. CONCLUSION

The conclusion of this thesis research entitled: "Implementation of the FeatureFormAcceleratedSegmentTest and Augmented Reality Algorithm to Determine the Authenticity of Batik Trusmi Cirebon" is as follows:

1. This application makes it easy for consumers who come to the Cirebon Trusmi area to get information and differentiate between original Trusmi batik and imitation batik so that consumers are not deceived by imitation batik.
2. The information provided becomes more interactive with the Augmented Reality technology and with the existence of a trusmi batik 3D object that is similar to the original object, it will attract visitors who come to the Trusmi Cirebon area.

5. SUGGESTIONS

1. It is hoped that there will be further research so that this application can be developed again for other platforms, such as Windowsphone and iPhone (iOS).
2. It is hoped that the Cirebon Trusmi Batik 3D object in this application will be better and more similar to the original Cirebon Trusmi Batik object.

REFERENCE

[1] Mohammad SyahrofiIrsyad. (2016). "Aplikasi Augmented Reality Sebagai Media Simulasi Ikatan Kimia Berbasis Android Menggunakan Metode *FAST Corner Detection*". Program Studi Teknik Informatika, Universitas Maulana Malik Ibrahim Malang.

[2] Octaviana, Vian. (2017). Implementasi Algoritma *Feature Form Accelerated Segment Test*dan *Augmented Reality* pada benda-benda purbakala di Museum Cipari.

[3] Salahudin M, Rosa A.S. (2011). Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek. Bandung: Penerbit Informatika Bandung.

[4] Afdhol Dzikri, Risyan Aief Setyawan. (2016). "Analisis Penggunaan Metode *Marker Tracking* Pada *Augmented Reality* Alat Musik Tradisional Jawa Tengah", Vol . 2,April 2016, ISSN : 2252-4983.

[5] Nugroho, A.(2009). Rekayasa Perangkat Lunak Menggunakan UML dan Java. Bandung : Penerbit Andi.