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ICon-LBG 2016

The Third International Conference on Law, Business and Governance

PROCEEDINGS

Hosted by

Faculty of Law, Faculty of Economics and Faculty of Social Science
Bandar Lampung University (UBL)

Icon-LBG 2016

THE THIRD INTERNATIONAL CONFERENCE ON LAW, BUSINESS AND GOVERNANCE 2016

20, 21 May 2016
Bandar Lampung University (UBL)
Lampung, Indonesia

PROCEEDINGS

Organized by:

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PREFACE

The Activities of the International Conference are in line and very appropriate with the vision and mission of Bandar Lampung University (UBL) to promote training and education as well as research in these areas.

On behalf of the Third International Conference on Law, Business and Governance (3th Icon-LBG 2016) organizing committee, we are very pleased with the very good response especially from the keynote speaker and from the participans. It is noteworthy to point out that about 46 technical papers were received for this conference.

The participants of the conference come from many well known universities, among others : International Islamic University Malaysia, Unika ATMA JAYA, Shinawatra University, Universitas Sebelas Maret, Universitas Timbul Nusantara, Universitas Pelita Harapan, Universitas Bandar Lampung, Universitas Lampung.

I would like to express my deepest gratitude to the International Advisory Board members, sponsor and also to all keynote speakers and all participants. I am also gratefull to all organizing committee and all of the reviewers who contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector of Bandar Lampung University (UBL) who give us endless support to these activities, so that the conference can be administrated on time

Bandar Lampung, 21 May 2016

Mustofa Usman, Ph.D
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IDENTIFYING CRIMINALITOR USING FACE DETECTION ON ROOM SECURITY SYSTEM

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Abstract

Security is a State where free from danger. because with good security, everyone will feel comfortable and serene setting, so that it became one of the priorities that take precedence. In this research, we will discuss about the facial image recognition systems using Histogram of Oriented Gradient is applied to the face detection system to identify the perpetrators of the crimes. Histogram Of Oriented Gradients is one of the algorithms used to extract object features in the image using the human object, its application in this research is used to detect any pattern of the face. The existence of this system is expected to help law enforcement authorities to identify the perpetrators of crime, face can then be caught in the end the number of crime cases is reduced.

Keywords:*HOG, SVM, detection, Face Detection.*

1. INTRODUCTION

Security is a State where free from danger. because with good security, everyone will feel comfortable and serene setting, so that it became one of the priorities that take precedence.

Along with the changing times that intensified, there is a new way to support security. One of its applications is in artificial intelligence (Artificial Intelligence) with the introduction of the image of the face so that only people who are indeed entitled to who can use it. With a facial recognition system, then law enforcement authorities will be greatly helped and can recognize and acquire data from thousands of faces. This system using facial image recognition technology to identify a person's face.

Facial image recognition is a process to recognize and identify a person's face. Facial image recognition technology included in the biometric that uses human characteristics. By using image recognition technology face, we can obtain data that is precise, accurate, and to improve the efficiency of time and human resources because this technology can be monitored in places that are considered very important to do monitoring such as banks, shopping centers and other places with maximum time (1x24jam). (Kurniawan. A, 2016)

Rampant crime cases that occurred in the increasingly troubling the public, the perpetrators are not hesitate hurt everyone who they consider to be a threat to them, making law enforcement authorities must conduct stringent safeguards Extras, but the ability of the perpetrator of the crime that is meticulous in outwit security system makes law enforcement authorities the difficulties to find and recognize the identity of the perpetrators. This is because of the lack of a good security system and continuous improvement.

In this research, we will discuss about the facial image recognition systems using Histogram of oriented gradients are applied on face detection system to identify the perpetrators of the crimes. The existence of this system is expected to help law enforcement authorities to identify the faces of the perpetrators of crime, then happens can get caught in the end the number of crime cases is reduced.

2. METHOD

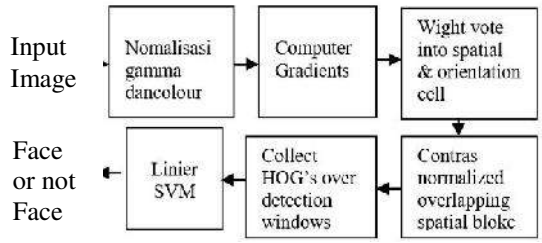
Histogram Of Oriented Gradients is one of the algorithms used to extract object features in the image using the human object. Based on his pace early in the process, the method converts the RGB image is HOG (Red, Green, Blue) into grayscale, which is then followed by calculating the gradient of each pixel. After getting the value of the gradient, then the process next determines the number of orientations that will bin used in making a histogram. This process is called spatial orientation binning. But earlier in the process to compute the gradient of the image training is divided into multiple cell and are grouped into larger size is called a block. While in the process of normalization of block geometry calculations used R-HOG. This process is done because there is a block that overlap. In contrast to the process of making an image histogram using value – the value of the intensity of the pixels of an image or a certain part of the image for the manufacture of histogramnya.((Dalal, N. Triggs, B, 2005)

1. Emgu CV

EmguCV play a role to bridge C # and OpenCV, EmguCV is wrapper.Net to OpenCV. With EmguCV, in OpenCV functions can be invoked through the programming language that is compatible with the net such as C #, VN, VC ++ and. The advantage of using EmguCV the most important is the library is completely written in C #, which is certainly more secure since the creation of the object or reference to be managed by the garbage collector. EmguCV has two layers, namely the basic layer and a second layer. Basic layer contains the function, structure, and enumeration that directly reflect what is on the OpenCV. It is this layer with the functions on the OpenCV can be invoked with the C # programming language. While the second layer contains classes that make use of advantages of the technology.The net.Inside. (http://library.binus.ac.id/eColls/eThesisdoc/Bab2/2012-1-00535-mtif%202.pdf).

2. HOG Detection

Histogram Of Oriented Gradients are used to extract object features in the image using the human object. Based on his pace early in the process, the method converts the RGB image is HOG (Red, Green, Blue) into grayscale, which is then followed by calculating the gradient of each pixel. After getting the value of the gradient, then the process next determines the number of orientations that will bin used in making a histogram. This process is called spatial orientation binning. But earlier in the process to compute the gradient of the image training is divided into multiple cell and are grouped into larger size is called a block. While in the process of normalization of block geometry calculations used R-HOG. This process is done because there is a block that overlap. In contrast to the process of making an image histogram using value – the value of the intensity of the pixels of an image or a certain part of the image for the manufacture of histogramnya, these are the stages in the Histogram Of Oriented Gradient .(Dalal, N. Triggs, B, 2005)



Picture 1. The Groove face detection

3. Normalize gamma and color

On the conversion of an image into grayscale can be done by taking all of the pixels in the picture then color each pixel would have taken information about 3 basic colors, namely red, blue and green (via the function RGB color), the three basic color it will be aggregated and then shared three so that the average value obtained. This average value will be used to give color to the image pixels so that color to grayscale, the three basic colors of a pixel will be set to be the value of the average (through the RGB function), to get the value of grayscale can be found with the following conditions:

$$f_0(x,y) = \frac{f_i^R(x,y) + f_i^G(x,y) + f_i^B(x,y)}{3}$$

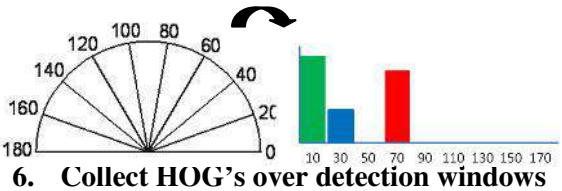
4. Compute Gradients

Calculate the value of the Gradient (Gradient Compute) is a process image after the conversion. A gradient is a result of the measurement of change in a function of intensity, and an image can be viewed as a collection of some of the functions continuous intensity of the image. This process is used to obtain the line edges on the object in the image. Gradients of an image can be obtained by filtering by 2 dimensional filter i.e. filter vertical and horizontal. The first image is converted in the form of grayscale to avoid having to consider the contribution of different intensity to every area of color (RGB). A method commonly used is the 1-D centered, with a matrix as follows:

[-1,0,1]

5. Contrast normalized over overlapping spatial blocks

In this process of generating the coding that is sensitive to local image content, but still resistant to small changes in the pose and appearance. The picture is divided into several areas with small space called cells. For each cell will be accumulated histogram 1-D local or orientation of the edges of all the pixels in the cell. Combination cell-level histogram 1-D form the basic orientation histogram representation. Each orientation histogram divides the various angles of gradient into the numbers remain in the designated bins. The magnitude of the gradient of the pixels in the cell used to vote into the orientation histogram.



6. Collect HOG's over detection windows

Picture 2. Angle Of Gradient, Histogram Graph On The Cell

6. Collect HOG's over detection windows

HOG chains there are detection process Collect HOG's over detection windows or gathering together the HOG against window detection on images of captured by webcams that occurred in HOG on EmguCV framework.

In this process is the gathering of all descriptor blocks which is overlapping grid includes deection window to nature feature vector for use in combined classifier, used as descriptor parameter series is the R-HOG. R-HOG block descriptors using shaped square or rectangular grids that overlap. R-HOG compute grid (which defines the number of cells in each block) of pixel cells each contain bins, where this step is a parameter.(Suryadi, K, Sikumbang S. 2015)

7. Linear SVM

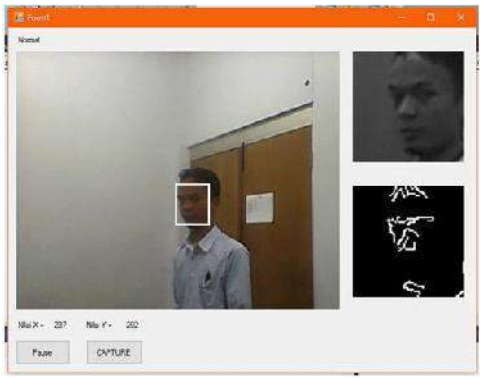
Support Vector Machine (SVM) is a machine learning method that works over pronsip Strucrural Risk Minimization (SRM) with the goal of finding the best hyperplane that separates the two class (category) in the input space. The basic principle of Support Vector Machine is a linear classifier, and is being developed in order to work on a non-linear. To check if the window contained in the object will be detected or not, use SVM Classifier to separate human and non-human or in this research is the detection of objects. On the SVM Classifier and classification algorithms that attempt to separate a hyperplan optimal.(Cristianini N., Taylor J. Shawe., 2000)

3. DISCUSSION

This system can detect any pattern of human face in real time that is in the room. In testing it took several positions with conditions varying face rotation.

1. The position of the Object in an oblique

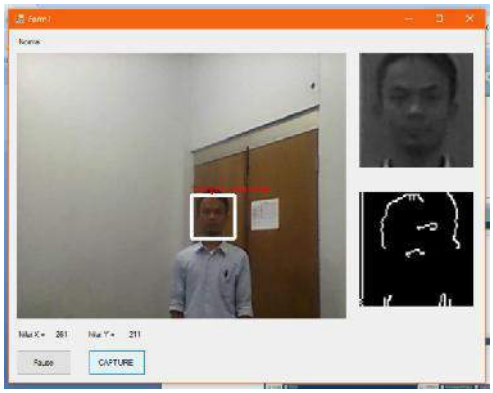
This test is done to find out the influence of the variation of the rotation of the position of the face against the accuracy and speed of detection, of the test results indicate that the system is able to detect with the fastest time with a time of 0.5 seconds.



Picture. 3. The position of the Object in an oblique

2. The position of the Object in a State far

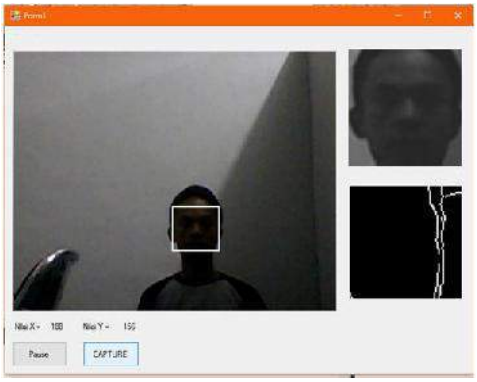
This test is done to find out the influence of the position and distance of the face towards the accuracy and speed of detection, of the test results indicate that the system is able to detect with the fastest time with a time of 0.8 seconds



Picture 4. The position of the Object in a State far

3. The intensity of the Lighting

This test is done to find out the extent of the impact insitas the light that can be detected, the results of the experiment showed that the system was able to detect in the dark state that come with the value with the value of the mean ± 50 to ± 200, maximum value mean for maximum light, lighting should be evenly on the face.



Picture 5. The intensity of the Lighting

4. RESULT

From the results of the process of detection will be obtained a number of featured face that has been detected by the system, the data will be the face of the record, can then be used as the data can be processed further for other purposes such as the investigation of a case and others.

Picture 6. Result of face detection system

5. CONCLUSION

1. In the system is the number of objects not affects against system performance in the face of the object detected.
2. The detection system is influenced by the intensity of the light in the room
3. The system may detect in lighting are not stable with mean value ± 50 to ± 200 for dark and light value

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