Real-Time Face Tracking Using Local Binary Patterns Histograms Algorithm

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Abstract. Human face detection is an important early stage in automated facial recognition systems. In a single image, the purpose of face detection is to identify all the areas present in the image to find the face area and the non-face area. In image detection, colors have a high sensitivity to changes in light, so to overcome this, RGB image transformation is carried out into a color space whose luminance and chromatic components are separated so that it is enough to use chromatic only for the skin color detection process. Face tracking is carried out with image processing techniques and a complex set of algorithms. The face-tracking process gives the computer the ability to detect the face. The tracking process is carried out using the Local Binary Patterns Histograms algorithm. The Local Binary Patterns Histograms algorithm is one of the object recognition algorithms that divides an image into several parts and then translates them into their representative binary numbers in the form of a histogram. For good tracking results, you must use adequate lighting or bright lighting to get maximum results. Face tracking can be detected correctly with three users at a distance of three meters..

Keywords: Image Processing, face tracking, Local Binary Patterns Histograms

1 Introduction

In general, the automatic facial recognition system consists of a face detection subsystem, which serves to determine the position and size of the face in an image; a feature extraction subsystem, which functions to extract the characteristics contained in the facial area; and a facial recognition subsystem, which is in charge of comparing images of input faces with a set of faces in a database so that in the end the level of recognition of the facial image can be determined [1]. In the modern era like today, development is very fast, especially in the technology used to analyze human physique and behavior (biometric). One of them is the facial recognition system (face recognition), which is one of the personal identifications that can be used for a variety of purposes in human and computer interaction [2]. Human face detection is an important early stage in automated facial recognition systems. In a single image, the purpose of face detection is to identify all areas in the image to find the area of the face and the non-face area. to present a survey of a critical and comprehensive face detection algorithm [3]. One of the detection methods for the face that is quite popular, especially in colored imagery, is through skin color. This is because skin color is an important feature of the face. In image detection, colors have a high sensitivity to changes in light, so to overcome this, the transformation of RGB images into a color space whose luminance and

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chromatic components are separated is enough to use chromatics only for the skin color detection process [4][5].

2 Research Method

Face tracking is one of the things that is experiencing rapid development in the world of computer vision. A wide variety of algorithms and methods have been applied to perform face detection. Face tracking is carried out with image processing techniques and a complex set of algorithms [6]. Face-process tracking gives the computer the ability to detect the face. Face tracking: using the algorithm they developed, computers can recognize human faces in general by recognizing human faces human [7][8].In progress, facial recognition is influenced by several factors of variability, namely, variability in This extra-personal factor arises because the facial recognition process is performed on different faces due to racial and genetic factors. In general, the face tracking process and the face detection process have the same function. The difference is only in the detection process: if the input is in the form of an image, the system runs offline so that it can use a face detection process; if the input is in the form of video, the system runs online or in real time, and the process used is the face tracking process. The study was conducted using the LBPH (local) algorithm (binary patterns histograms) for facial recognition projects. Because it divides the image into several parts and then translates it into its representative binary number in a histogram shape, LBPH is the incorrect object recognition algorithm. In LBPH, there are at least 4 parameters that we must understand, i.e., "Radius" (the central radius of the reference pixel), "Neighbors" (pixel neighbors' reference), "Grid X" and "Grid Y" (image division). The more results for X and Y grids, the better and more precise the results. In OpenCV, there is already a subroutine (class) that encapsulates everything we need for this LBPH algorithm, i.e., class cv; face; LBPH Face Recognizer. With this class, we can easily classify detected objects according to the dataset we are creating in advance, so that the ultimate goal of object recognition can be achieved.

3 Results and Discussion

When a project can recognize faces based on their identity (face recognition), it has been designed. As a result, everyone has a face detected by the camera, which the computer will directly translate into the person's face name.

The process of designing this application consists of several stages, namely:

1) In this experiment, the author uses an environment
2) For the smooth running of the project, the author first installs the module using a command prompt
3) In making this project, the author made several stages to recognize faces according to their identities such as, create a face reference dataset, drill data, perform facial recognition
4) In the next step, the author creates 1 new folder to store several files containing coding and datasets from the introduction application this face
5) The next stage is the coding process using idle python pre-installed. The coding process is divided into 3 files
6) The next process is to run the script 01_face_dataset.py through the command prompt, wait until the window appears and capture your face in 30 seconds. The program will generate 30 images jpg (grayscale) in the 'datasets' folder. When there is a prompt 'enter user-id end press ==>' type the number '1' for user 1 (e.g. you), '2' for the face second person, '3' for a third person, etc.

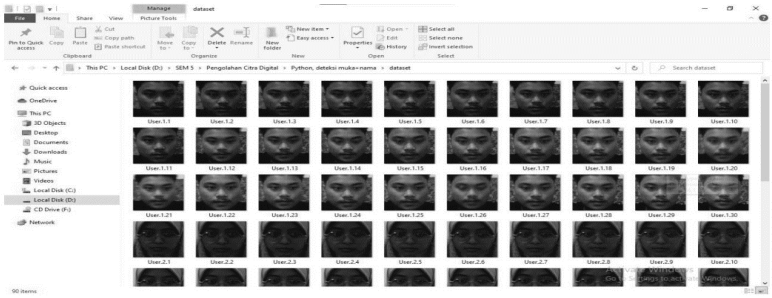

Figure 1. Datasets for the face database

In this real-time face tracking process, we use Python and OpenCV to detect faces in real-time and bring up the faces that were detected according to the contents of the database. This newly developed project can detect faces and names via a webcam. At the time of the detection process, the author uses the lighting of the room to be bright enough that the results obtained in this first experiment are pretty good.

Figure 2. Experiments with bright light

At the time of the detection process, the author uses dim lighting in the room so that the results obtained in this second experiment show that the application can still detect faces and names well.

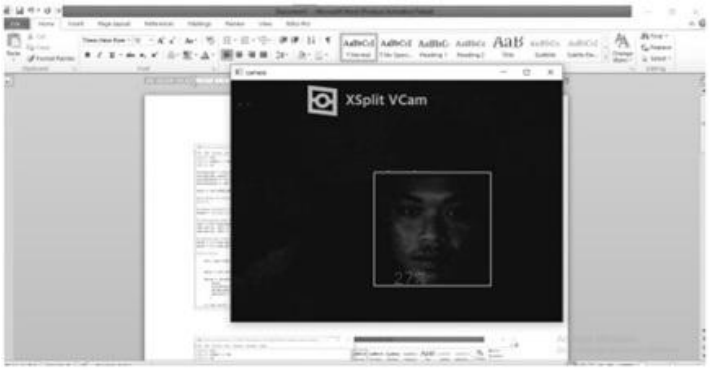

Figure 3. Experiments with dim light

4 Conclusions

In the results of the discussion that has been described in this study, the author can include several things related to creating a face detection project. In real time, this face tracking process is carried out using Python and OpenCV with input media, namely a webcam. To achieve the best tracking results possible, use adequate or bright lighting. When tracking faces for detection in a dark room, the face is still detected. This developed application is still simple. For future researchers, we hope they can develop better and more useful applications for many people.

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