

CHAPTER 3

RESEARCH METHODOLOGY

1. Literature Study

The first stage in conducting this research is looking for some references. References used are sourced from several national and international journals on the topic of face detection.

2. Collecting Data

Wedding photos are taken from Google images with different sizes. For testing images are 20 wedding photo images consisting of 2 faces with a solid background. For training image consists of various eye and mouth models of various size and created by manually cropping.

3. Program Implementation

a) Pre Processing

1) Skin Detection

The first step to determine the faces in a wedding photo is detecting the skin. Skin detection is done by changing the RGB color to binary color where if the image pixel includes the scope of the skin then the RGB color becomes white and if the image pixel is not included in the skin's scope then the RGB color becomes black.

2) Image Erosion

This step is useful for thickening detected objects in the face, so that the object's shape is more clearly defined and facilitate the process of segmentation of the object.

3) Edge Detection

Edge detection is used to facilitate pattern searching. Edge detection is done using a specific kernel. In this research, the kernel that used is named outline kernel sourced from *Setosa.io* by *Victor Powell*.

b) Feature Extraction, Recognize the Position and Size of Objects Using Adaptive Freeman Chain Code

Adaptive Freeman Chain Code algorithm is used to determine width and height object, position of the objects, the pattern of objects, determine the area of interest, determine possible facial areas and check the validity of the pattern. Probably the face region is determined by calculating the number of holes in an object. If the holes are more than 1 it will be considered as a possible face. The next step is determines a valid pattern for similarity detection, if the input pattern size is very different from the database pattern then it is considered invalid, if the position of eyes and mouth according to the nature of the face then it is considered invalid.

c) Pattern Matching Using Adaptive Changing Consecutive Characters Algorithm

The final step is to detect the patterns that have been discovered through the Adaptive Freeman Chain Code, then the pattern is detected similarity using the Adaptive Changing Character Consecutive algorithm. Modification of the algorithm is by rotating the pattern that has been obtained. Eye and mouth similarity is determined by a certain threshold.

d) Add Training Data to the Database

If there are objects that are not detected by the system, it is possible to update the training data. The training data determined from the position

of the eyes and mouth detected based on position without comparing the patterns in the database.

4. Testing Program

There are 3 testing programs, namely skin detection with different compositions, program process speed, test accuracy to detect eyes and mouth in images with 4 different categories, and testing rotated training data.

