CHAPTER 1

INTRODUCTION

Computer is being used widely in the modern world because it is the intelligent architecture. But its intelligent depends on the software developing. Therefore, the application of numerical expression has been extremely interested in the modern world, which the software competition has been increasing. Beside the software developing, the communication device has been developed in computers. This communication device is called Modem. It is a device, which connects the personal computer to a network. By using a modem, a computer can send to and receive data from another computer over the phone line [1]. For this reason, the selection of programming languages for software is considered specially. If the selected programming language can operates on Internet, that software will display its result to another computer. Therefore, JAVA programming has been a suitable programming in communication. And my research, I developed the software on color communication by using the JAVA programming language.

Color communication is very important for product design in the present market because it is a useful tool for the color information exchange between manufacturers and customers. There are some researches [2,13,15,16,17,18,19,20,21,22] trying to study the human color perceptions and consider how human can communicate their interests and feeling. They investigated the use of the color perception words such as deep, warm and dynamic, which describe psychological

sensations, and also they have been trying to derive visual scales of the psychological sensations. The scales were numerically expressed as empirical formulae based on CIELAB and MUNSELL color system [2]. With the scales, the magnitude of human color perception can be predicted through an equation method.

This equation method is the method, which calculate the color perception values from the color perception equations. The process starts from the transformation of RGB value of a selected color sample into XYZ value by through a monitor profile. The monitor profile used in the transformation is a linear equation in a form of matrix, which could give an acceptable result. And the next process, the XYZ value was transformed into $CIEL^*a^*b^*$, $CIEL^*C^*h^°$ and xyz chromaticity coordinate. And the obtained color perception value of a color sample was calculated from $CIEL^*C^*h^°$ value.

The color perception equations were analyzed from the linear regression method. Regression analysis [3] is a statistical method that uses a relationship between two or more variables so that one variable can be predicted or explained by using information on the others. The relation between the variables using a mathematical formula is called the regression modal. The regression model will give an acceptable model when the correlation coefficient (r) close to 1 or −1. The correlation coefficient [4] is a measure of the strength of the linear relationship between two variables.

From the previous studies [13], both variables are the visual color perception and the instrument color perception.

And the obtained regression model is called the color perception equations.

This research developed the program of the application of numerical expression of color perception on the Internet and displays the color on monitor in sRGB system because it is the color space, which is used as a communication standard. And this program can communicate the human feeling induced by colors into color perception values. Therefore it will be helpful for various fields.

1.1 Objective

To develop the program based on the application of numerical expression of color perception of Thai observers on the Internet by JAVA language programming.

1.2 Scope of the Research

The dissertation covers the study on the developing program, which was applied from the color perception equations of Thai observers. These equations were derived from the linear regression method and evaluated from the twelve opponent word pairs by seven-point method. And this research created the monitor profile for the transformation from XYZ values into RGB values. The color display on monitor is in sRGB system, which used the white point of D65.

1.3 Content of the Thesis

This thesis studies the application of numerical expression of color perception on Internet and the content of the thesis consist of six chapters such as Chapter 2 describes the theoretical considerations and literature reviews. The theoretical considerations in this chapter refer to the Munsell system, XYZ tristimulus values and color spaces, the color perception equations, the color display system, and Java programming language. Chapter 3 explains the overlapping technique to create the monitor profile, which is the important tool to achieve high accuracy color transformation.

In the Chapter 4, the description on materials under study, the experiment procedures and apparatuses are described.

Chapter 5 contains the results and discussion on this research. Finally, the results are concluded in Chapter 6 also with some suggestion.