ABSTRACT

Skin is the outermost layer that functions as a protector of the body from the outside environment. The condition of human skin can change due to external factors (temperature, insect bites, dust, UV rays) and internal factors (hormones, food, age) causing skin abnormalities. This skin disorder is difficult to detect manually and the cost is quite expensive if using existing modalities.

*Therefore, this study aims to design an economical tool for detecting skin color and types of skin disorders (sunburn, keloid and hyperpigmentation) using the TCS3200 color sensor. Skin detection is carried out based on the Fitzpatrick skin type reference, especially categories 3, 4, and 5 for Indonesians (milk white, chocolate and dark chocolate categories). The RGB values generated by the color sensor are converted to XYZ values and then converted to CIE L*a*b. Furthermore, the value is displayed on the LCD display along with the classification of skin color or type of skin disorder.*

*From the measurement of skin color and types of skin disorders using a color sensor, the L*a*b ranges for cream white, brown and dark brown skin colors are 61≤L≤67, 33≤a≤41, 13≤b≤26; 43≤L≤52, 44≤a≤57, 34≤b≤50; 36≤L≤44, 55≤a≤60, 47≤b≤54. While the L*a*b values for sunburn, keloid and hyperpigmentation skin disorders were 57≤L≤59, 39≤a≤44, 19≤b≤24; 51≤L≤57, 42≤a≤50, 12≤b≤32; 41≤L≤44, 54≤a≤60, 44≤b≤48. Based on this range, the measurement of skin color and type of skin disorder was validated in 22 participants and obtained an accuracy of 83% and 82%, respectively.*

Keywords: CIE L*a*b, Color Sensor, Human Skin Abnormalities, Human Skin Color RGB