Sound Wave Modulation as a Method of Color Perception for the Visually Impaired

Hantanto, Jane (School: Smak Penabur)

Colors play important roles in our life. The inability to sense colors might cause difficulties for the visually impaired in recognizing money and choosing commercial products. Converting color into sound can be an alternative method for visually impaired people to learn how to perceive color as they have more sensitive hearing than normal people. In this research, I developed a system which uses RGB values of color to modulate a sound wave, applying amplitude and frequency modulation. Each of the RGB value has a specific role in the modulation. A colorful object will produce high pitched sound. This system consists of a white LED, three phototransistors, a processing unit, and earphones as the sound emitter. This system was tested to the blind (group 1) and blindfolded normal people (group 2) by two methods. The first method was a color matching test. Group 1 matched the color of fruits with the color of origami paper. The result was 33% guessed the color of the fruit correctly. They also learned how to choose a commercial product (milk and snack carton) by memorizing the sound. The second method was color recognition test. Group 2 learned the sound of 20 colors for 5 minutes. They were tested with 12 sounds and guessed the colors. The average number of correctly guessed was 7. From the result of the tests, it can be concluded that this system can be a method of color recognition for visually impaired people. Keywords: color perception, visually impaired, sound wave, modulation

Awards Won: