

Effect of Exposure Time of Near Infrared Light Radiation (NIR) on Human's Vein Visualization

ABSTRACT

Human blood specimen contains information about health and possible diseases that help the physician identifying the appropriate medical diagnosis. Venepuncture and intravenous cannulation are among the most common medical procedures that were performing on patients. However, there is difficulty to find the visualization of vein structures. The use of infrared radiation will be the right preference since it can penetrate the tissue and a non-invasive method. Many studies have focused on the characteristics of NIR on human skin, but the effects of exposure time as one of the design parameter in NIR exposure was not discovered. This research proposes studies that ease the handling operation and minimize the operating cost of NIR imaging in visualizing vein-structure. The study aims to measure and compare the effect of exposure time of the near infrared light emitting diodes on the vein visualization. The working principle is started with the haemoglobin in the blood absorbs the infrared light, so the vein appears darker than other areas. Then, a detection system consists of an infrared camera to capture the vein digital images. This study will then process the overall quality of the images with different exposure time by highlighting the vein-morphological structure using hessian and contrast method. The results revealed that increasing time of exposure does not increase the absorption of the NIR in both palm and arm area. Image processing further confirms this result by showing the extracted and highlighted vein. For all images, the numbers of vein appeared are the most significant factors that contribute to the vein visualization. This study can add to the process of developing a vein visualization system.