

Thesis Title	Contrast Enhancement of Latent Fingerprint Image Based on Polarized Specular Reflection and Digital Image Processing
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Abstract

The propose of this work is to study and design the non-contact optical method to captured fingerprint image using polarized specular reflection for increasing the contrast of latent fingerprint. The experimental setup was constructed with a fluorescent lamp. The light is incident onto the smooth surface at different angles. Latent fingerprint was deposited on non-absorbing and non-porous photo papers. The fingerprint was imaged by a digital camera with a circular polarizing (CPL) filter while the viewing angle of the camera was equal to the incident angle of the light source. The recorded fingerprint image was then analyzed and transformed to the gray scale images by MATLAB program. The GELQUEST program was used to create the intensity profile along the position on the gray scale image. Results from the intensity profile showed that the contrast of gray scale fingerprint image collected with CPL filter and the incident angle near Brewster angle of 50-60 degree was increased by 6 times than that of conventional image. In addition, the effects of paper color, light source and irradiance of light source on the contrast of the fingerprint images were also studied. The results showed that the darker the paper surface, the higher the image contrast. The optimum contrast was obtained from the daylight fluorescent lamp with an irradiance of $0.210 \mu\text{W}/\text{cm}^2$.

Keywords: Contrast / Image Processing / Latent Fingerprint / Polarization / Specular Reflection