

Thermal-to-Visible Face Recognition via GAN-Synthesized Image Training

Facial recognition in thermal imaging presents a greater challenge compared to face recognition in the visible-light domain. This is mainly due to the small data-sample size presently available in most thermal face-imaging databases. This paper addresses this problem by using a synthesis approach in which artificial visible-domain images of faces are generated from thermal images and then identified in the visible-light domain. The generation of the artificial face images is carried out using a Generative Adversarial Network, and face identification is carried out using a separate deep neural network. In recent years, commonly employed techniques have focused on creating the best quality visible images out of thermal images, while performing the identification via a pretrained, standard visual face recognition network. This paper presents a method of training based on using synthesized images along with original ground-truth visible-domain images to create a closed-set face recognition system that is accustomed to the characteristics of the artificially generated images. This allows the recognition network performance to be optimized specifically for thermal face recognition. This approach produces significantly better thermal face recognition performances than recent thermal face recognition methods and proposes an end-to-end thermal face recognition system, using a database comprised of thermal-visible pairs of face images for training.