Fingergan

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Abstract: *Latent fingerprints are often of low quality, characterized by unclear ridge structures, uneven contrast, or overlapping patterns. Despite these challenges, they are crucial for criminal identification. Enhancing these latent fingerprints is essential for accurately identifying suspects. Our proposed method improves latent fingerprint enhancement by leveraging prior knowledge of fingerprint structures, represented through a dictionary of reference orientation patches derived from high-quality fingerprints. This approach involves estimating ridge orientation and ridge frequency for the latent fingerprint. We introduce a novel method that frames latent fingerprint enhancement as a constrained fingerprint generation problem within a Generative Adversarial Network (GAN) framework, which we call FingerGAN. This network ensures that the enhanced latent fingerprint is nearly indistinguishable from the true fingerprint in terms of the fingerprint skeleton map weighted by minutia locations and the orientation field regularized by the FOMFE model. Since minutiae are crucial for fingerprint recognition and can be directly extracted from the fingerprint skeleton map, our holistic framework directly optimizes minutia information to significantly enhance latent fingerprint identification*

Keywords: Latent Fingerprint Enhancement, Generative Adversarial Network, Fingerprint Skeleton Map