

Orientation Field Modeling of Low Skin Quality Biometric Fingerprints

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In biometric fingerprint data, one often finds images originating from fingers with rough or creased skin, especially with elderly people or manual workers. This makes it difficult to estimate the local ridge pattern orientation. In fingerprint matching systems, wrong orientation estimates can lead to difficulties like missing or spurious minutiae, especially along creases. We present a new construction method of a global orientation field model, based on local orientation bundles, singularity candidates and rational models, that yields better estimates in such situations. We also describe fundamental limitations on orientation field modeling in relation with inherent instability of singularity and minutiae features.