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Evaluating the Change of Directional Patterns for Fingerprints with Missing Singular Points Under Rotation

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Abstract:

Overcoming small inter-class variation when fingerprints have missing singular points (SPs) is one of the current challenges faced in fingerprint classification, since class information is scarce. Grouping the orientation fields to form Directional Patterns (DPs) shows potential in classifying these fingerprints. However, DPs change under rotation. This paper evaluates the change of DPs for fingerprints with missing SPs to determine a method of rotation that produces unique DPs for a Whorl (W) with a single loop and a single delta; a Right Loop (RL), Left Loop (LL), Tented Arch (TA) and a W with a single loop; a RL and LL with a single delta; and lastly a Plain Arch (PA) and a Partial Fingerprint (PF) with no SPs. The proposed method of rotation is based on the remaining SPs and achieves a manual classification accuracy of 91.72% on the FV C 2002 and 2004 DB1, and FV C 2004 DB2.