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信息科学

基于Radon方向场检测指纹奇异点

黄杰贤, 杨冬涛, 龚昌来

嘉应学院 电子信息工程学院,广东 梅州 514015

摘要： 为了快速、准确地检测与定位指纹奇异点(核心点、三角点)以实现指纹分类与匹配,本文引入了Radon算子来提取指纹的纹理方向特征以实现指纹方向场的分割。提出了方向熵的概念来描述方向场的分布特征,给出了基于方向熵的奇异点区域搜索方法。定义了方向密度函数以衡量奇异点搜索的优劣,指导奇异点侦测的方向熵阈值调整。最终实现了对奇异点的准确定位,准确率达到83%。跟同类算法分析比较,提出的方法在准确性与检测效率方面均更具优势。抗噪实验还表明该方法具有良好的抗干扰能力与实用性,能满足实际应用要求。

关键词： 指纹提取　奇异点检测　方向场　方向熵

Inspection for fingerprint singular points based on Radon directional field characteristics

HUANG Jie-xian, YANG Dong-Tao, GONG Chang-lai

School of Electronic Information Engineering, Jiaying University, Meizhou 514015,China

Abstract: With the aim to locate singular points (core point and delta point) precisely and to complete fingerprint classification and matching, the Radon transform was introduced firstly to extract the directional filed characteristic of a fingerprint image and to implement the image segmentation. The concept of directional entropy was proposed to describe the distribution of directional filed characteristic and the singular point area search method based on directional entropy was given. Furthermore, a directional density function was established to evaluate effectiveness of singular point location, which can guide the inspecting system to achieve optimal directional entropy threshold. After singular points were detected, the performance of similar algorithms was compared by taking accuracy and efficiency into consideration. Experiments show that the algorithm proposed in this paper is more advantageous, and it not only achieves high inspecting accuracy by 83%, but also has better adaptability and robustness fitted for practical application.

Keywords: fingerprint extraction　location on singular point　directional filed　directional entropy

通讯作者: 黄杰贤

作者简介: 黄杰贤 (1982-),男,广东梅县人,博士,2005年于沈阳航空工业学院获得学士学位,2008年于广东工业大学获得硕士学位,2012年于华南理工大学获得博士学位。主要从事机器视觉及自动控制方面的研究。E-mail: huangjiexian@126.com
作者Email: huangjiexian@126.com

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