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# Multi-feature fusion for thermal face recognition

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**Abstract**

Human face recognition has been researched for the last three decades. Face recognition with thermal images now attracts significant attention since they can be used in low/none illuminated environment. However, thermal face recognition performance is still insufficient for practical applications. One main reason is that most existing work leverage only single feature to characterize a face in a thermal image. To solve the problem, we propose multi-feature fusion, a technique that combines multiple features in thermal face characterization and recognition. In this work, we designed a systematical way to combine four features, including Local binary pattern, Gabor jet descriptor, Weber local descriptor and Down-sampling feature. Experimental results show that our approach outperforms methods that leverage only a single feature and is robust to noise, occlusion, expression, low resolution and different $l_1$-minimization methods.

*Keywords:*
Feature fusion, Sparse representation, Thermal face recognition

## 1. Introduction

Face recognition has a wide range of applications in the areas of video surveillance, information security, identity authentication, etc. For example, Smile-to-Pay system conducts the payment, account transfer and transaction via face instead of bank card and password; online photo sharing platform in Google Plus automatically recognizes individuals in photographs; face recognition systems are already used in immigration control in Japanese Airport. However, visible face recognition is still a challenge, mainly because it suffers

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