

A thesis submitted for the degree of
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**FACE RECOGNITION USING
LOCAL PATTERNS AND
RELATION LEARNING**

Len Bui

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Summary of Thesis

The study area of this thesis is face recognition, one of the important fields in computer vision. Although face recognition has recently achieved many advances, the process is still not able to meet the accuracy requirements of many applications that are affected by variations in pose and illumination. The aim of this thesis is to develop a more advanced approach that can handle the challenges in pose and illumination in face recognition. The thesis proposes Robust Multi-Scale Block Local Binary Pattern as a new facial representation that is sufficiently robust to accept variations in pose and illumination and yet contains rich discriminative information. The thesis also investigates the metrics or scores in general used to measure similarity/dissimilarity in face recognition and contributes two novel classification methods, namely Extended Bayesian Learning and Relation Learning, to overcome difficulties such as the Small-Sample-Size problem and gain good performance for face recognition systems.

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List of Abbreviations

DCT	Discrete Cosine Transform
DFT	Discrete Fourier Transform
HFIF	Holistic Fourier Invariant Feature
ICA	Independent Component Analysis
k-NN	k-Nearest Neighbor
LBP	Local Binary Pattern
LDP	Local Derivative Pattern
LLE	Locally Linear Embedding
MBLBP	Multi Block Local Binary Pattern
MLP	Multi Layer Perceptron
NLPCA	Nonlinear Principal Component Analysis
NN	Artificial Neural Network
PCA	Principal Component Analysis
PIN	Personal Identification Number
RMBLBP	Robust Multi Block Local Binary Pattern
SVM	Support Vector Machine

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