Dedication

To my father soul, my mother for their endless Love, Support & Encouragement……

To my sisters & brothers ……..

To My Husband who inspired me all the time ……..

To my soul my son Amin Amir …….

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List of Abbreviations

AAM	Active Appearance Model
ADALINE	Adaptive linear element
ANN	Artificial neural networks
ANOVA	Analysis of variance
ART	Adaptive resonance theory
AU	Action Units
BPA	Back propagation Algorithm
CMAC	Cerebellar Model Articulation Controller
DCT	Discrete Cosine Transform
FACS	Facial Action Coding System
FEE	Facial emotion expression
GA	Genetic algorithms

HENN	Hybrid Emotional Neural Network
HMM	Hidden Markov model
ISFER	Integrated System for Facial Expression Recognition
JAFFE	Japanese Female Facial Expression
LBP	local binary patterns
LG	Local generalization
LGSP	Local Gaussian Structural Pattern
LP	Linear programming
MLP	Multi-layer perceptron
MSE	Mean squared error
PCA	Principle Component Analysis
PDF	Polynomial discriminant function
QBA	queen bee algorithm
ROC	Receiver operating characteristics
SLN	Single layer network

SVD	Singular value decomposition
SVM	Support vector machine
TPR	True positive ratio

Abstract

This research presents methods of identifying **(Facial Expression Recognition)**. The objective of this recearch is to present a combact texture oriented method , along with the dimensions reductions,so it would be used in the training of three neural networks: (Single Layer Neural Networks (SLN), Back Propagation Algorithm (BPA) and Cerebellar Model Articulation Controller (CMAC)) for identifying facial expressions. The proposed methods are called (intelligent) methods because they can assimilate the variations in facial emotions and hence proved to be better for untrained facial expressions. Conventional methods have limitations, so facial expressions should follow some constraints. Gabor wavelet is used in different angles to extract possible textures of the facial expression, in order to achieve the expression detection accuracy. Higher dimensions of the extracted texture features are further reduced into a two-dimensional vector by using Fisher's linear discriminant function in order to increase the accuracy of the proposed methods. Tarining and testing have been done on JAFFE database on certain facial expressions (angry, disgust, happy, sad, surprise and fear) .The performance comparisons of the proposed algorithms are presented. The resultes obtained are acceptable according to international standards.

المستخلص

تقدم هذه الدراسة طرقا للتعرف على تعابير الوجه (**Facial Expression Recognition**). الهدف من الدراسة تصميم طريقة مدمجة من النسيج الموجه مع تقليل الأبعاد لتستخدم في تدريب الشبكات العصبية وهي (**BPA, SLN and CMAC**) للتعرف على تعابير الوجه. تسمى النظم المقترحة "بالطرق الذكية" وذلك لأنها قادرة على استيعاب التغيرات في تعابير الوجه وبالتالى اثبتت انها أكثر دقة في تعابير الوجه غير المدربة. للطرق التقليدية قيود يجب اتباعها في التعرف على تعابير الوجه، لذلك تم استخدام **Gabor Wavelet** في اتجاهات مختلفة لاستخراج الخواص المحتملة من تعابير الوجه. تم تقليص الابعاد العليا لنسيج الخصائص المستخرجة باستخدام دالة **Fisher's Linear Discriminate** وذلك لزيادة دقة النظام في التعرف على تعابير الوجه. تستخدم دالة **FLD** لتحويل متجه الخصائص ذو الأبعاد العليا الى متجه ذو بعدين لتدريب خوارزميات الشبكات العصبية للنظام المقترح. تم التدريب والاختبار باستخدام قاعدة البيانات **JAFFE** لتعابير مختلفة للوجه وهى: غضب، اشمئزاز، حزن، سعادة، مفاجأة وخوف. وكانت النتائج المستخلصة مقبولة حسب المعايير العالمية.