شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائـــــــق الاصليـــــة تالفـــة

بالرسالة صفحات لم ترد بالاصل

Ain Shams University
Faculty of Engineering
Computer and System Engineering Department

Neural Networks Applications

A thesis

Submitted in Partial Fulfillment of the Requirements of
the degree of Master of Science in Electrical Engineering
(Computer & Systems Department)

Submitted by

Tarek Salah Abdel Azim Abdel Latif

B.Sc., Electrical Engineering

Supervised By

Prof. Dr. Ahmad Z. Badr

Faculty of Engineering Ain Shams University, Cairo

Dr. Ali A. Somaie

Egyptian Armed Forces
Research and Software Development Center

Associate Prof. Hazem Abbas

Faculty of Engineering
Ain Shams University, Cairo

Cairo- Egypt
2000

بِســـــمِ اللهِ الرحَّمنَ الرّحِيَم

" اقرَأ بِاسمِ رَبِكَ الَّذِى خَلَقَ * خَلَقَ الإِنسَانَ

مِن عَلَقٍ* اقرَأ وَرَ بُّكَ الأَكرَمُ* الَّذِى عَلَّمَ بِالقَلَمِ*

عَلَّمَ الإِنسَانَ مَا لَم يَعلَم* "

صدق الله العظيم

Ain Shams University

Faculty of Engineering

Examiners Committee

Name : Tarek Salah Abdel Azim
Thesis : Neural networks Applications
Degree : Master of Science in Electrical Engineering
(Computer and systems Engineering)

Name, Title and Affiliation **Signature**

Prof. Dr. Mater Ali Mater

Professor of Systems and Electrical Engineering

Military Technical Collage, Cairo.

Prof. Dr. Gamal Eldeen Mohamed Ali

Head of Computer and Systems Engineering Dep.

Faculty of Engineering,

Ain Shams University, Cairo.

Prof. Dr. Ahmed Zaki Badr

Professor of Systems and Control

Faculty of Engineering,

Ain Shams University, Cairo.

Dr. Ali Ali Somaie

Research and Development Software Center,

Egyptian Armed Forces.

Date 27/06/2000

Abstract

This thesis describes three image recognition models. The applications on hand utilize the eigenvector technique and the neural networks for aircraft identification purpose. The methods of image identification are reviewed using statistical, syntactic, and neural network. In the first method, the contour of each aircraft image is isolated and clipped using image pre-processing operations. Image silhouettes normalization followed by feature extraction are done using the principal component analysis. A highly recognition success is obtained with x-features, where x is the number of referenced aircraft.

An aircraft identification system based on back-propagation neural network is presented. The effect of activation function and number of hidden neurons on recognition performance is studied through this work. The last approach is based on Kohonen and Grossberg models. It was found that the aircraft recognition method based on back-propagation and counter propagation approaches has been succeeded to recognize the test images with signal to noise ratio greater than –5.9 dB and -9.11 dB respectively. In addition, the above two systems have positive response when the test images became uncompleted with percent until 14% and 40% respectively. The neural network systems are tested on 1508 aircraft images some of them are noisy and uncompleted.

The noise associated with aircraft images has been measured and found to be uncorrelated. All the presented aircraft recognition methods are invariant to translation and rotation except the first one is not sensitive to scale variation.

Keywords: Image processing, pattern recognition, Eigenvector technique, Neural network, Back-propagation, Kohonen and Grossberg networks.

Acknowledgment

All deepest thanks are due to Almighty God, the merciful, the compassionate for the uncountable gifts given to me

I would like to express my thanks and gratitude to ***Prof. Ahmed Z. Badr***, for his kind supervision, generous advice, clarifying suggestion and support during the whole scope of this work.

Special thanks ***to Dr. Ali Ali Somaie*** , who enlightened my mind with the idea of thesis, for his assistance, guidance knowledge pioneering the aim of the work during each algorithm's program.

I would like to thank my parents for their efforts during the thesis development.

Finally, I would like to thank ***My wife*** for valuable help throughout the work, in preparing the manuscript and for being understanding and selfless. I would like to present this thesis to ***my daughter Yassmena***.