Detection

I dedicate this dissertation to my loving parents whom I am always grateful.

To my family Osman Ahmed, dr. Nagatkhider, sisters and brothers for their caring supports without it would not have been possible.

To my supervisor dr.Banazir Ibrahim who I am debt for her guidance.

A special feeling of gratitude to my husband Hamza Ibrahim whom have supported me throughout the life.

Acknowledgment

-My greatest thanks to Allah for his gifts which never end.

-special thanks to my supervisor Dr. Banazir Ibrahim who treat me like her sister and for her great efforts, guidance and benefit of her experience that she has provide to me throughout this work .

-special gratitude also intended to the staff of bio medical department in Sudan university for their help.

-Deeply thanks for those who helped and tolerated the trouble of this project.

Table of Content

CHAPTER FIVE: RESULTS AND DISCUSSION

List of tables

List of Figures

Glossary

PAM	primary acquired melanosis
US	Ultrasound
UV	Ultraviolet
CT scan	Computerized tomography
PET	Positron emission tomogram
EM	Electromagnetic
AI	Artificial intelligence
MATLAP	Matrix Laboratory
IPT	
ROI	Region of interest
VOL	Volume of interest
SOM	Self organizing map
PCA	Principle component analysis
LP	Linear perceptron
CNN	Convolutional neural network
Pes	Processing elements
ART	Adaptive resonance theory
MLP	Multilayer percptron
LMS	Least mean square error
ECG	Electro cardio graph
MIT/BIH	
CNV	Contingent negative variation
BPN	Back propagation neural
S/N	Signal to noise ratio
PCA	Principal component analysis
NN	Neural network
SVM	Support vector machine

ANN	Artificial Neural network
GLCM	gray-level co-occurrence matrices
MSE	Mean square error
MRI	Magnetic resonance imaging
AES	Anterior eye segment
RGB	Red Green Blue
ASM	Angular second moment
IDM	Inverse difference moment
GUI	Graphical user interface
CAD	Computer Aid Diagnoses system
AUC	Area under curve
SE	Sensitivity
SP	Specificity
TP	True Positives
TN	True Negatives
FP	False Positives
FN	False Negatives

Abstract

Melanoma of the eye is the most common type of cancer affecting the eye; although it's still quite rare. It occurs mainly as a secondary tumor from lung and breast cancers which are considered the most common cancers in the world. Even though early detection increases the chances of survival, problems occur due to difficulty in diagnosis. Artificial Neural Network (ANN) is a software program that mimics a biological neural network. It can be programmed to help in classifying and diagnosing the type of cancer. The objective of this research is to program ANN to classify and diagnose the type of eye melanoma. 40 pre-diagnosed samples (20 malignant and 20 benign) were used for this research. The images obtained were processed and enhanced using median filter and histogram techniques, and the region of interest which was determined by a physician was cropped and texture features were extracted from it using MATLAB. Finally using ANN the cancer was classified as either benign or malignant. ANN achieved an accuracy of 85 %, a sensitivity of 80 % and a specificity of 90 %. Furthermore the system was tested using a pre-diagnosed malignant image, which tested positive using ANN. ANN is effective in the classification of eye melanoma and has achieved high levels of accuracy. It’s recommended that physicians use ANN to enhance diagnosis, but a training course might be needed to help with the use of the program.

المستخلص

سرطان العين من اقل انواع السرطان اصابه لكن ميلانوما العين من اكثر انواع السرطانات انتشارا بالنسبهللعين.يظهر اساسي كمرحلهمن مراحل سرطان الرئه والثدي اللذان يعتبران من اكثر انواع السرطان انتشارا في العالم. والاكتشاف المبكر يودي الي زياده فرص النجاه من المرض بالرغم من صعوبه التشخيص.الشبكه العصبيه الاصطناعيه هو عباره عن برنامج يقوم بمحاكاة الشبكه العصبيه الحيويه ويمكن برمجته للمساعده في تصنيف وتشخيص انواع السرطان.الهدف من هذا البحث هو برمجه شبكه عصبيه صناعيه لتصنيف وتشخيص ميلانوما العين.40 عينه مشخصه مسبقا (20 ورم حميد و20 منها ورم خبيث) استخدمت في هذا البحث. هذه العينات بعد الحصول عليها تمت معالجتها، استقطاع المنطقه المستهدفه عن طريق مختص و استخراج الخصائص عن طريق استخدام برنامج متخصص. اخيرا باستخدام الشبكه العصبيه الاصطناعيه تم تصنيف الورم اذا كان خبيث او حميد. عن طريق برنامج الشبكه العصبيه الاصطناعيه تم الحصول علي دقه بنسبه 85% ،حساسيه بنسبه ،نوعيه بنسبه . بالاضافه الي ذلك تم اختبار البرنامج عن طريق عينه ورم خبيث مشخصه مسبقا اعطت الشبكه العصبيه الاصطناعيه نتائج ايجابيه. الخلاصه الشبكه العصبيه الاصطناعيه فعاله في تصنيف ميلانوما العين و اعطت دقه جيده.التوصيه استخدام الاخصائين للشبكه العصبيه الاصطناعيه يزيد من دقه التشخيص ويجب عمل دورات تدريبيه للاخصائين لفهم البرنامج.