

بسم الله الرحمن الرحيم

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*Enhancement of nuclear medicine bones images using image
processing technique*

تحسين صور الطب النووي للعظام باستخدام تقنية معالجة الصور

A thesis Submitted for Partial Fulfillment of M.Sc. degree in Nuclear Medicine

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الآية

قال تعالى :

(وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ ۚ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا)

صدق الله العظيم

سوره النساء الايه 113

DEDDICATION

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time. I am also very grateful to my brother and my sister .

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There are a number of people without whom this thesis might not have been written, and to whom I am greatly indebted

*I wish to express my special thanks to **Dr.***

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Abstract

Nuclear medicine imaging is an incontestable vital tool for diagnosis, it provide I o- invasive manner the internal structure of the body to detect eventually diseases or abnormalities. Unfortunately ,the presences of speckle noise in these images effect edges and fine details which limits the contrast resolution and make diagnostic more difficult. This study aims to enhancement of bone scintigraphy image by using image processing technique and have been using IDL program to enhance quality of image in order to evaluate contrast enhancement in different nuclear medicine bone

image such as grey color ad to evaluate the usage of new non linear approach for contrast enhancement, the random sample consist of 30 bone image for patients whom underwent bone scintigraphy scan ,the study was conducted and taking information from nuclear medicine department in Fedail hospital in period between to .IDL program techniques such as median filter and histogram equalization ,are used on this study to analyzed and enhanced data (bone scan image) .this study showing significant different between the original image and the image that processed using IDL techniques ,in terms of contrast especially in histogram equalization. the signal, SNR and contrast calculations in both black and weight area using median filter and histogram equalization which having mean of white and black area; 1178, 34.56135, 2639.5, 51.3737, 0.372803, 10511.5, 102.525, 15055.5, 122.7and 0.150303 respectively.

المستخلص:

الطب النووي هو أداة حيوي لتشخيص لا جدال فيه ,يوفر طريقة غير جراحية للبنية الداخلية للجسم للكشف عن الأمراض وتشوهات الأنسجة .للأسف وجود ضوضاء رقطه في هذه الصور يؤثر علي الحواف والتفاصيل الدقيقة التي تحد من وضوح التباين وتجعل التشخيص أكثر صعوبة.الدراسة تهدف إلي تحسين صور العظام الومضائي باستخدام تقنية معالجة الصور وتقييم استخدام نمط غير خطي ف تباين الصور ,تم اخذ عينات عشوائية تتكون من30صورة لمرضي خضعوا للفحص الوميضي للعظام ,وقد تمت الدراسة واخذ المعلومات من قسم الطب النووي ب مستشفى فضيل وقد تم جمع البيانات ف الفترة الواقعة بين نوفمبر2016 إلى فبراير 2017 وتقنيات تحسين الصور الموجودة ف برنامج لغة البيانات التكرارية مثل المرشح الوسطي و معادلة الرسم البياني قد استخدمت ف هذه الدراية لتحليل وتعزيز البيانات (صور العظام) .هذه الدراسة تظهر الفرق الكبير بين الصورة الاصليه والصورة التي تمت معالجتها باستخدام تقنيات لغة البيانات التكرارية ,من حيث التباين وخاصة معادلة الرسم البياني تم حساب الإشارة ,نسبة الإشارة إلي الضوضاء و التباين بالنسبة للمناطق البيضاء والسوداء باستخدام المرشح الوسطي و معادلة البيانات وكانت النتائج,122.7,15055.5,102.525,10511.5,0.372803,51.3737,2639.5,34.56135,1178,0.150303

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List of abbreviations

IDL	Iterative Data Language
CT	Computed Tomography
MRI	Magnetic Resonance Image
SPECT	Single Photon Computed Tomography
SPECT/CT	Single Photon Computed Tomography/ Computed Tomography
PET	Positron Emission Tomography
PET/MRI	Single Photon Computed Tomography/ Magnetic Resonance Image
MUGA	Multigated Acquisition
RVG	Radionuclide Ventriculography
RNA	Radionuclide Angiography
FDG	Fluoride DeoxiGlucose
DEXA	Double Exposure R-ray
MDP	Methyl Diphosphate
FWHM	Full Width Half Maximum
G FOW	Geometrical Field Of View
SD	Stander Deviations
2D	Two Dimensions
3 D	Three Dimensions
FOW	Field Of View
HIST_EQUAL	histogram equalization
ADAPT_HIST_EQUAL	adaptive histogram equalization
SNR	Signal-to-Noise Ratio
CIR	Contrast Improvement Ratio
MFA	Mean FieldAnnealing
BSS	Blind Source Separation