

## **Dedication**

**To my very special people my father and my mother.**

## **Acknowledgement**

I would like to present my deep thanks to my supervisor Dr Kasim M. Al-Hity for his great support and real guiding.

I am also thankful to my colleagues in physics department of the National Center of Radiation and Isotopes for there helping.

Also I would like to record my deep appreciation to my family. I really believe any thanks for them will be small drop in huge sea of gifts.

## **Abstract**

Digitizing radiograph films gives the centers and the departments of radiology the chance to get benefits of treating, transmitting and archiving digital images of patients. These processes are the back bone of teleradiology which can be very helpful for third world countries.

In this work three radiograph films with different quality have been scanned by low cost flatbed scanner instead of proper expensive films scanner to minimize costs. The resulted images have been dark with so poor contrast.

Standard linear and nonlinear spatial sharpening operators have been used to treat these defects. Only Nonlinear sharpening operator shows amount of improvement depending on the quality and contents of the image. Then five linear spatial sharpening operators have been developed to modify the contrast and increase sharpening of the images. Three of these operators achieve acceptable enhancement for all images and one of them achieves relative enhancement depending on the quality of the treated image.

Smoothing operators have been used in addition to the modified operators to study the possibility of improvement. Results show relative improvement depending in the contents of the treated image.

Results of the work show possibility of using the modified operators to get acceptable quality of images for the scanned films with low costs of resources.

## الخلاصة

الحصول على صور رقيمة لأفلام الأشعة التشخيصية يعطي مراكز وأقسام التشخيص الإشعاعي الفرصة لمعالجة هذه الصور وإرسالها إلى المراكز والأقسام الأخرى هذا بالإضافة إلى أرشفتها حيث تعتبر هذه العمليات أساس علم التشخيص الإشعاعي عن بعد وهو علم له تطبيقاته المفيدة خصوصاً لدول العالم الثالث. فى هذا العمل تم إختيار ثلاثة أفلام متفاوتة الجودة ومسحت ضوئياً بإستخدام ماسح ضوئي منخفض التكلفة عوضاً عن الماسح الضوئي المخصص لهذا الغرض وهذا من أجل خفض التكاليف، إذ أن الأخير ذو تكلفة عالية.

تم الحصول على صور مظلمة منخفضة التباين حيث تم إستخدام مؤثرات التوضيح المكاني العيارية من النوع الخطي والغير خطي من أجل معالجة هذا الخلل. حيث لم تعطي المؤثرات الخطية أي تحسن بينما أبدت المؤثرات غير الخطية تحسن نسبي يعتمد على جودة ومحتوى الفلم الممسوح.

تم تطوير خمس مؤثرات توضيح مكاني خطية بحيث تكون قادرة على تعديل التباين وزيادة وضوح الصورة عند إستخدام هذه المؤثرات. أبدت ثلاثة منها تحسن ملحوظ ومقبول في جودة الصور بينما حقق مؤثر رابع تحسن نسبي يعتمد على جودة الفلم الممسوح.

تم إستخدام هذه المؤثرات المعدلة مجدداً لكن بإضافة مؤثرات تنعيم مكاني عيارية بغرض دراسة أي تحسن يمكن الحصول عليه حيث أظهرت النتائج حدوث تحسن نسبي يعتمد على محتوى الفلم الممسوح.

النتائج التي تم الحصول عليها أظهرت إمكانية إستخدام المؤثرات المعدلة المقترحة للحصول على صور رقيمة ذات نوعية مقبولة بتكاليف منخفضة.

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