



## **Dedication**

*To my sprit soul off Abe*

*To my family*

## Acknowledgements

Thanks to my GOD who helps me and gives me assistance and support. I am eternally indebted to my supervisor for all the help, guidance and expertise provided by him throughout this study. I really appreciate all the valuable time he has spent in helping me with programming and new ideas about this research. I have been very fortunate to have him as my supervisor and it would take more than a few words to express my sincere gratitude.

# **Abstract**

This study was aimed to segment and classify the normal liver in MR image. Using pixel intensity and texture analysis to classify and then segment the liver using the classified image then further classify the segmented liver using textural feature. The MRI system used Philips intera 1.5 Tesla and the data collected randomly from 50 patients out of 200. The classification and segmentation processes were carried out using Interactive Data Language (IDL) program as platform for the generated codes. The results of classification were fed to SPSS software to find the classification score for further classification. The total classification accuracy of the segmented liver with it is associated component was 94.3%, with 100% classification for liver tissue, IVC and, while ligament, portal and hepatic vein was 85.7% for each. The most discernible features were the mean intensity feature and the signal feature. In conclusion the applied algorithm showed a potential success to adopt such procedure in medical image processing.

## ملخص البحث

هدفت هذه الدراسة إلى تقسيم وتصنيف الكبد السليمة. بإستخدام قيمة البكسل والتحليل النسيجي لتصنيف الكبد ومن ثم تجزئة الكبد بإستخدام الصورة المصنفة. ثم بعد ذلك تجزئة صورة الكبد المصنفة بإستخدام الخصائص النسيجية وتم. إستخدام جهاز الرنين المغنطيسي فيليبس بقوة 1.5 تسلا , وجمعت البيانات عشوائيا من 50 مريض من أصل 200. أستخدم برنامج لغة البيانات التفاعلية كمظلة لكتابة الكود للحصول على عمليتي التصنيف والتقسيم. نتائج التصنيف أدخلت في برنامج التحليل الإحصائي لإيجاد معدل التصنيف ولتعزيز التصنيف الإضافي . الدقة الكلية لتصنيف الكبد المجزئة مع الأجزاء المشاركة في تكوينها كان بنسبة 94.3% ونسبة 100% كانت لتصنيف أنسجة الكبد والوريد التاجي الأمامي في حين كانت الأربطة الضامة والأوردة الكبدية الداخلية بنسبة 85% لكل منهما. وكانت السمات الأكثر توضيحا لشدة البكسل هي خاصية الوسيط ؛ والخاصية الموجيه. وفي الخلاصة الخوارزمية المطبقة أظهرت إمكانية نجاح تبني مثل هذا التطبيقات في معالجة الصور الطبية.

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## **List of abbreviation**

CT	Computer Tomography
MRI	Magnetic Resonance Image
IVC	Inferior Vena Cava
ROI	Region of interest
ATP	Adenosine Triphosphate
MRF	Markov random fields
ANN	Artificial neural networks
RMF	Recursive Median Filter
FD	fractal dimension
LSM	Level Set Method
LAVA	Landscape Animation for Visualizing Attractors
DICOM	Digital imaging and communication in medicine
IDL	Interactive data language
TIFF	Tag Image File Format
SPSS	Statistical package for the social science