

Abstract

This study is an attempt to study the liver ultrasound images using computer analysis techniques and hence the main objective of this study was to characterize the liver tissues in an ultrasound images into three classes which includes; fatty, cirrhosis and normal tissue types by using texture analysis. The texture were extracted from spatial gray level dependence matrix using a window of 20×20 pixels of angle zero and distance equal one pixel. The images were collected from 60 patients represents the classes of the study in the period from 6/2011 to 2/2012. The images were scored by an expert two sonologist where the scoring was accepted in case of agreement between the two of them. Then the textural features were extracted from selected sub-images that show only the class of interest. The classification technique were adopted as a method of pattern identification the images into three classes. A linear discriminant analysis using stepwise were used to classify the sample into the predefined classes. The stepwise selected 9 features out of fifteen features as the most discriminant features; they included: sum variance, Entropy, Energy, Inverse difference moment, Correlation, sum entropy, Difference average, Information1 and mean. The result of this study showed that the total classification accuracy was 93.3%, with an accuracy of 85.1% 98.4% and 94.9% for fatty, .cirrhosis and normal tissue respectively

المقدمة

هذه الدراسة هي محاولة لدراسة صور الكبد بالموجات فوق الصوتية باستخدام تقنيات الكمبيوتر لإنشاء برامج تساعد في التشخيص وبالتالي فإن الهدف الرئيسي من هذه الدراسة هو تحديد خصائص أنسجة الكبد في صور الموجات فوق الصوتية إلى ثلاث فئات وهي تشمل: الدهنية، تليف الكبد و الأنسجة الطبيعية، باستخدام مميزات احصائية توصف النسيج . تم استخراج مميزات توصيف النسيج من مصفوفة الاعتماد علي مستوى اللون الرمادي باستخدام نافذة 20×20 بكسل بزاوية صفر ومسافة واحد بكسل . و قد تم جمع الصور من 60 مريض وتمثل مجموعات الدراسة في الفترة من 6/2011 إلى 2/2012 . وتمت قراءة وتحديد هذه الصور من قبل عدد اثنين اخصائيين خبيرين في مجال الموجات الصوتية حيث تم قبول القراءة في حالة الاتفاق بينهما , ثم تم استخراج الملامح التكوينية من تحديد الأماكن المختارة من الصور التي تظهر فقط الفئة المطلوبه . تم اعتماد تقنية التصنيف كوسيلة لتحديد مطابقة الصور وذلك إلى ثلاث فئات محددة , و تم اختيار 9 مميزات توصيفيه من اصل 15 كأفضل مميزات توصيف . و أظهرت نتائج هذه الدراسة ان مجموع دقة التصنيف كانت 93.3% مع دقة 85.1%, 98.4%, 94.9% للفئات الدهنية , تليف الكبد والعادية علي التوالي .

Dedication

To whom I love

To whom I care about

Acknowledgment

**Great thanks and grace to Allah for guidance
helping me finishing this research**

**My deep thanks and grateful appreciation
extend to my teacher and supervisor Dr.
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