

Dedication

.To my family, and my friends

Acknowledgements

I would like to thank the Almighty God, I am greatly indebted to my supervisor prof.Dr. MOHAMED ELFADIL MOHAMED,to anyone who helped and encouraged me to learn, specifically at SUST,where I discovered my vision for
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Abstract

This study was carried out in order to characterization of brain tumor in MRI by applying texture analysis to the brain tissues represented on MRI to recognizes the brain tumors from the other brain tissues which included: grey and white matter, CSF and brain tumor. This study was carried out in the period from January 2015to June 2015 in Khartoum state at Alnelain hospital. The images were obtained by Philips inters 1.5 Tesla MRI systems. The data of this study collected from 50 patients having axial, sagittal and coronal views that include brain tumor and they were selected randomly from a set of 200 patients. the data were extracted from the image using 3×3 pixels window inside the window the first order statistics were calculated and used to classify the brain MRI into one of the four tissues mentioned earlier. The window scans the whole image by interlacing it one pixel horizontally, then start again from the send line when the above one was completed till the end of the image. The results of this study showed that the overall accuracy of classification process was 94.8% and for the tumor the sensitivity was 97.3% white

matter and grey matter showed a classification accuracy of 95.7% and 89.7% and for CSF was 94.3%. In conclusion these results showed that brain tumor can be classified successfully and delineated using texture analysis with a minimum effort

ملخص البحث

اجريت هذه الدراسة بهدف توصيف الورم الدماغي بالتصوير بالرنين المغنطيسي من خلال تطبيق التحليل النسيجي لانسجة المخ ، لتمييز أورام الدماغ من انسجة المخ الاخرى التى شملت المادة الرمادية و البيضاء والسائل النخاعى الدماغى.

وقد اجريت هذه الدراسة في الفترة من يناير 2015م –حتى يونيو 2015م ، في ولاية الخرطوم بمستشفى النيلين ، تم اخذ الصور بواسطة نظام فيليب انترا 1.5 تسلا وجمعت بيانات الدراسة من حوالى 50 مريض من الاوضاع المختلفة ، متضمنة اورام الدماغ وتم اختيارهم بطريقة عشوائية من مجموعة قوامها 200 حالة مرضية .

البيانات استخلصت من صور الرنين المغنطيسي 3×3 وحدة داخل نافذة حسابات الاحصاء من الدرجة الاولى ، الذي استخدم لتصنيف صور الرنين المغنطيسي الماخوذة للدماغ لتمييز كل واحدة من الانسجة الاربعة المذكورة اعلاه .

اظهرت نتائج الدراسة ان الدقة الشاملة في عملية التصنيف كانت 94.8% و بالنسبة للاورام الحساسة 97.3% واظهرت المادة البيضاء والرمادية دقة التصنيف 95.7% و 89.7% والسائل النخاعي الدماغى كانت 94.3% ، وفي الختام اظهرت هذه النتائج ان ورم المخ يمكن تصنيفه بنجاح وتخطيطه باستخدام التحليل النسيجي باقل جهد ممكن .

Abbreviation

| | |
|--|-------|
| Co efficient Of Variation | COV |
| cerebrospinal fluid | CSF |
| computed tomography | CT |
| edge | E |
| fuzzy cognitive map | FCM |
| fast spin echo | FSE |
| gray | G |
| gray level co-occurrence matrix | GLCM |
| gray matter | GM |
| contrast | H |
| Interactive Data Language | IDL |
| linear Discriminant Analysis | LDA |
| magnetic resonance imaging | MRI |
| Proton density | PD |
| single photon emission computer tomography | SPECT |
| Support Vector Machine | SVM |
| echo time | TG |
| repetition time | TR |
| World Health Organization | WHO |
| white matter | WM |
| positron emission tomography | PET |
| Spin echo | SE |

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