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A Survey on Automated Classification Techniques in Data Mining for Brain Tumor Analysis

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Abstract: Data mining is popularly research area known for knowledge discovery .In this paper we highlights the classification techniques in data mining for the detection of brain tumor. This survey results tends to automated techniques in classification applied in brain tumor analysis. In segmentation of MRI, identification is complicated process in medical field. A Comparative study is applied here to show the difference between various proposed techniques in the identification of brain tumor.

Keywords: Brain tumor, MRI, TANNN, segmentation

I. INTRODUCTION

Data mining demands a hidden patterns in a group of data that to predict future behavior. Data mining projects uses the techniques such as Clustering, prediction, sequential pattern and decision trees are the data mining techniques. Classification, which based on machine learning that classify each items as a set of data in predefined set of classes or groups. This technique is applied here for the survey of data about tumor. A brain tumor is a abnormally growing cells in the brain and skull. It can be noncancerous or cancerous. Tumor damages structures of the brain. The figure 1 shows the brain MRI with the portion of tumor affected area which destroys tissues of brain.

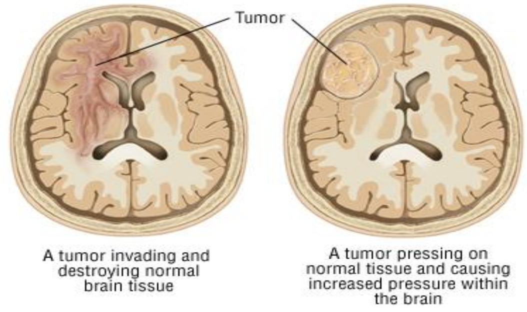

Fig 1: Brain with the Tumor

Magnetic resonance imaging (MRI) uses a magnet, radio waves, and a system generates pictures of the brain. It might provide view of parts of the brain compared to CT scan. Two kinds of data mining classification techniques which are: Statistical methods and Data comparisons methods. Segmentation presents a significant problem due to variability in size, shape, and appearance.

Tumor segmentation relevant in diagnosis and monitoring, surgery.Statistical methods are Naïve Bayes, SVM and Discriminative Analysis; in these methods are complex.Data comparisons methods are Decision Trees, Nearest Neighbor algorithm, and Neural Networks. These methods consume a lot of time.By comparing with these two methods both are complex. So by combining these two methods could be reduces the complexity.

II. LITERATURE REVIEW

In this section, represented review of the segmentation techniques and their advantages are discussed. Disease detection and classification of the tumor area find out as dark pixel darker or white brighter.Segmentation performed by the algorithm of Content-based Image Retrieval. In feature extraction, done by threshold, at last approximation of the classification method used to find the tumor shape as well as position in MRI image[1].

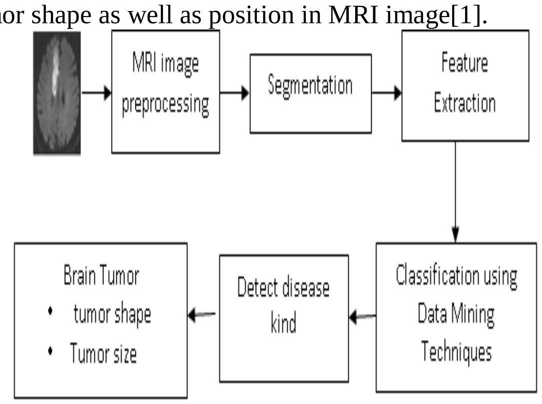

Fig.2: Block Diagram of the Brain Diseases Classification System

Here, a combination of two classification techniques, achieves a high results which they are, Tree Augmented Naïve Bayes classifier which improves the performance tumors classifications and nearest-neighbor classifier as accuracy in classification.

These techniques collectively combined in TANNN[1].Tree Augmented Naïve Bayes Nearest Neighbor :In this technique which classifies the image by using the TAN. After that, nearest neighbor algorithm is used to classify the region of tumor to detect what kind of tumor the patient suffers.

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TABLE I: THE ACCURACY OF THE CLASSIFICATION TECHNIQUES USING K-MEANS AND CBIR SEGMENTATION ALGORITHMS

Segmentation	DA	NN	NB	SVM	DT	KNN	TANNN
Brain MRI using (K-Means)	75.93	91.44	76.08	92.59	87.04	82.3	99.4
Brain MRI using (CBIR)	90.12	96.10	93.52	92.59	96.19	93.7	99.8

III. SURVEY STUDY

In this, additional patterns which are not clearly accumulated. Automating the segmentation techniques for images used in applications such as the tissue volume quantification, anatomical structure study, diagnosis areas, pathology, planning for treatment and the computer-integrated surgeries. Therefore, accuracy and the reliability are assigned more importance in the identification. So that requires more highlighted methodologies to apply there.[2]. MR images, and CT scanned images are used by the researchers by rare, and the studied literature is summarized in the table (Table III).

Table II. Compare and Contrast Table

Summary	Proposed Technique	Algorithm Used	Benefits	Identified Problems
CT image segmentation	Receptive field	Radial basis function on neural network	Training algorithm is relatively simple as compared to the back-propagation iterative algorithm used with MLP.	The proposed algorithm does not perform well on trained data.
Segmentation of brain MR images	Segmentation of brain MR images	Expectation Maximization	Technique possesses ability to encode both spatial and statistical properties of an image. The proposed framework employs unsupervised classification using iterative updating.	The method requires estimating threshold which is heuristic in nature. This method does not produce accurate results most of the time and is computationally expensive.
MRI data Segmentation	Bias field Estimation	Modified Fuzzy C-Mean	BCFCM algorithm is faster to converge to generate accurate classification.	Technique is limited to a single feature input. Incorporation of spatial constraints into the classification blurs some fine details.
MR image segmentation	Gaussian Multi-resolution Analysis	Expectation Maximization	Methodology is lesser sensitive to noise and utilizes strong spatial correlation between neighbouring pixels.	By using this technique, th edges rarely appear in the images.
Fusing images	Wavelet based	Discrete Wavelet frame transform	Technique uses enhanced version of DWT and is relatively easy to implement.	-
Segmentation of MR images	Neural Network	Fuzzy Adaptive radial basis function	The technique removes noise from medical images without losing sharpness of the objects.	Only one task related to fusion was focused. Dynamic ranges were not considered during calculations.
Medical image segmentation	Geometric algebra for volume representation and	Marching cubes along with region growing strategy	Reduced the number of primitives to model volumetric data and use	Images were obtained from CT scan which has its own limitations

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using CT scan	registration		less primitives for registration process and makes registration process faster.	like blurred boundaries and similar grey level between healthy and non-healthy tissues.
3 level image segmentation	Maximum fuzzy partition entropy of 2D histogram	QGA	QGA is selected for optimal combination of parameters.	Compute each possible value QGA is practically not possible.
Decoding cognitive states from MRI data.	Mean intensity	Support Vector Regression	Methodology applies statistical techniques.	Virtual environment sometimes leads to inaccuracy.
Segmentation using MRI and MRSI.	T2 Weighted image	Nosologic imaging	Combining MRI with MRSI feature improved classifiers' performance.	The proposed method provides only one dimensional image feature.
Medical image processing	Neural Network	-	The study offers a comprehensive review of the paper published	A review paper.
Symmetry analysis	Modular approached to solve MRI segmentation	Symmetry analysis	The proposed can identify the status of increase in the disease by employing quantitative analysis.	MRI segmentation is one of the essential tasks in medical area but is boring and time consuming. Visual study of MRI is generally more interesting and fast.
Combination of mean shift and normalized cut	Normalized cut method	mean shift, normalized cut, component analysis	The brain tumor in the processed data is detected through component analysis.	-
Image classification [2015]	Labeling images into one of a number of predefined categories	K-Nearest Neighbor	Better results in terms of sensitivity, specificity, accuracy and overall running time.	Produce all considerable patterns without prior knowledge of the patterns

IV CONCLUSION

Brain tumor and detection of that is main problem in the world wide. So the earlier detection of that is an important one to treatmenting them. Compared to image mining segmentation produce clear results pattern in the MRI images.Due to the accuracy and reliability of MRI, the detection of brain tumor is a sensitive task. Number of classifiers have been proposed for the segmentation of normal and abnormal MRI images. The future study focuses on achieve good results of segmentation method which are use in the MRI brain images.

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REFERENCES

[1] M. Suganya, M. Menaka, "Various Segmentation Techniques in Image Processing: A Survey", International Journal of Innovative Research in Computer and Communication Engineering, Vol.2, Special Issue 1, March 2014.

[2] Eman M. Ali , Ahmed F. Seddik, Mohamed H. Haggag "Using Data Mining Techniques for Children Brain Tumors Classification based on Magnetic Resonance Imaging".

[3] Anjum Hayat Gondal, Muhammad Naeem Ahmed Khan " A Review of Fully Automated Techniques for Brain Tumor Detection From MR Images"

[4] M.N. Ahmed, S.M. Yamany, N. Mohamed and T. Moriarty, "A modified fuzzy c-means algorithm for bias field estimation and segmentation of MRI data,‖*Proceedings of the IEEE transaction on Medical Images"*, KY, USA, March 2002.

[5] V.B Padole and D.S. Chaudhari, "Detection of Brain Tumor in MRI Images Using Mean Shift Algorithm and Normalized Cut Method,‖ International Journal of Engineering and Advanced Technology", June 2012.

[6] S. Roy and S. K. Bandyopadhyay, "Detection and Quantification of Brain Tumor from MRI of Brain and it's Symmetric Analysis", International Journal of Information and Communication Technology Research, Volume 2 No. 6, June 2012.

[7] T. U. Paul and S. K. Bandhyopadhyay, "Segmentation of Brain Tumor from Brain MRI Images Reintroducing K–Means with advanced Dual Localization Method", International Journal of

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Engineering Research and Applications (IJERA), Vol. 2, Issue 3, pp. 226-231, May-Jun 2012.

[8] J. J. Corso, E. Sharon, S. Dube, S. El-Saden, U. Sinha and A. Yuille, "Efficient Multilevel Brain Tumor Segmentation With Integrated Bayesian Model Classification", IEEE Transactions on Medical Imaging, Volume: 27 , Issue: 5, pp. 629 - 640, May 2008.

[9] T.U Paul and S.K. Bandyopadhyay,"Segmentation of Brain Tumor from Brain MRI Images Reintroducing K – Means with advanced Dual Localization MethodTuhin",‖ International Journal of Engineering Research and Applications, June 2012.

[10] M. Kumar and K.K. Mehta, "A Texture based Tumor detection and automatic Segmentation using Seeded Region Growing Method",‖ International Journal of Computer Technology and Applications, August 2011.

[11] J. Luts, T. Laudadio, A.J. Idema, A.W. Simonetti, A. Heerschap, D. Vandermeulen and S. VanHuffel, "Nosologic imaging of the brain: segmentation and classification using MRI and MRSI,‖ NMR in Biomedicine", May 2008.

[12] J.K Sing, D.K. Basu, M. Nasipuri and M. Kundu, "Segmentation of MR Images of the Human brain using Fuzzy Adaptive Radial Basis function Neural Network. Pattern Recognition and Machine Intelligence,‖*LNCS*, Berlin, Heidelberg", 2005.

[13] E. M. Ali, A. F. Seddik. M. H. Haggag, "Classification of Hydrocephalus using TAN", International Journal od Advanced Research in Computer Science and Software Engineering, Pp. 90-97, Vol. 5 , Issue. 11, November 2015.

BIOGRAPHY

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