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A SURVEY ON BRAIN TUMOR DETECTION AND SEGMENTATION FROM MRI IMAGES

Shruti Reshmi[1*], Rajashekhar D. Salagar[2], Shriharsha S. Veni[2]

[1,2]Dept. of Computer Science and Engineering, B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur – 586103, India

[*]*Corresponding Author: reshmi.shruti@gmail.com, Tel.: +91-8*904399623.

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***Abstract*—** A tumor is a clot or growth of tissues in a brain, which is not normal and causes harm to the tissues. The identification of tumor in brain is a challenging task. MRI (Magnetic resonance image) is a strong radio waves and magnetic field is a type of scan used by MRI to produce diagnosed image of body. The biomedical image processing uses the method of segmentation to explore the useful segmentation. The segmentation method is used to identify the tumor in brain by using different methods such K-mean, Wavelet Statistically Textures Features, Fuzzy C means, Spatial FCM, Proximal Support Vector Machine. This paper gives the overview of the techniques for detection of tumor from MRI images. In this paper, different step are carried firstly preprocessing is used to remove noise from MRI image then Skull of the brain is detect and segmentation method are applied for identification of tumor from MRI image. By using median filter noise are removed from MRI image. The Classification of normal or abnormal brain tumor is carried out by using SVM classifier.

***Keywords*—** MRI images, Brain Tumor, Brain, and Segmentation, SVM, K-mean .

I. INTRODUCTION

As indicated by the World Health Organization (WHO) roughly calculated, most widely recognized brain disease is tumour and this is the purpose behind the determination and treatment of the brain tumour has fundamental significance for many peoples every year on the planet. The brain tumour is group of cell which is not normal within the brain. There are two types of tumour: Benign Tumours and Malignant Tumours. Malignant or cancerous tumour is the starting stage of tumour, it is not harmful and benign tumour also knows as secondary tumour that spreads all over the brain, it will harm other tissues that cause the death condition [1].

In previous couple of years many have used different algorithms to detect brain tumours. The main purpose of this paper is to detect the brain tumour from MRI image using SVM, segmentation by using unsupervised methods and K-means clustering algorithm. K-means algorithm is used to remove noise, K-means clustering is used to form the set of objects based on the properties or features or attributes into the number of k groups, the cluster is formed by minimizing the distance between the data using Euclidean algorithm and corresponding centroid group[2][3][4][5][6].

To find the information of tumour object labelling is used and SVM classifier is used distinction between normal and abnormal tumour [4]. The complexity decreases by using Cohesion based self-merging algorithm The MRI images of normal brain and abnormal brain is as shown in Fig 1.

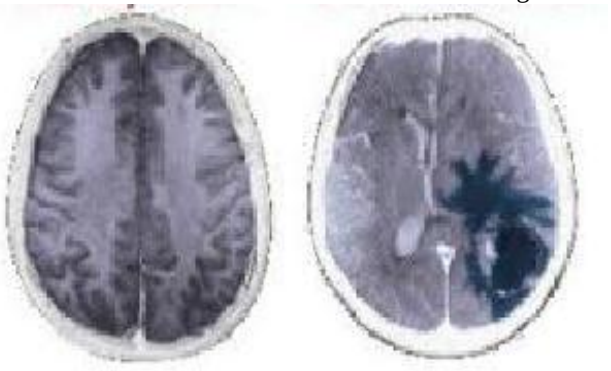

Fig 1. Normal brain and abnormal brain

II. RELATED WORK

In [1] , work has been proposed showing that the brain tumours are automatically segmented in CT images by merging Wavelet Statistical Texture features(WST) and Wavelet co-occurrences texture features (WCT) based textured features extraction method and the optimal features texture are selected and examine feed forward

neural network classifier, Probabilistic neural network(PNN) to divided the tumour region. This Technique effectively functions well for division of tumour region with high affectability, specificity and exactness. The conventional image processing operations is used to support the neural network can be operatively uses for division of tumour. PNN able to detect and segment the abnormal tumour region by decreasing the complexity and time as saved. The proposed work will efficiently work well with small tumour, but difficult for larger tumour.

In [2], work has been proposed that the mergers of two algorithms i.e. K-mean and fuzzy C means segment the brain tumour by using CAM (computer aided method). The shape of tumour and where it is present in brain is obtained from MRI images is determined. The cluster has provided the calculated amount of area which will display the phase of tumour. The brain tissues are obtained by using K-mean algorithm. Before applying K-mean algorithm noise has to be filtered by using median filter in images. Then apply the k-means algorithm to obtain a tumour from MRI images. Fuzzy C mean used for segmentation and it provides the more accurate structure of tumour extraction and features are acquired are the output threshold. At last, this work determined the reasoning for accurate evaluated tumour structure and where it is exactly present in brain or threshold calculation.

In [3], the tumour cells are divided with precision and reproducibility with less investigation time. The 3D analyser equipment is utilized for 3D analysis of brain MRI. The 3D slicer is helpful for 3D analyser. The growth rate of brain tumour is determined by using graph generation of particular patients and type of tumour. The image which does not have noise is passing to k-mean and tumour is obtained from MRI images. After that by using modified Fuzzy C means segmentation is take place for determination of exact structure extraction of affected tumours. At the end tumour structure, tumour location, and phases is obtained using some formulae.

In [4], work has been proposed; which is concentrated on segmentation method which helpful to separation of tumour parts from brain tumour in MRI. In proposed work K-means followed by object labelling algorithm detect a tumour from MRI images. The Pre-processing stage is done using morphological methods and median filter. K-mean is applied then object labelling algorithm is used to labelling the binaries image. It label the various object in the images. The proposed division strategy was tried different things with MRI filtered pictures of human brains therefore obtain position of tumour in the images. One of the dataset of human brain is scanned using MRI operations then operated through segmentation method thus that provide end result efficient.

In [5], the input consisting of tumour in MRI image is pre-processed by suppressing the distortion or unwanted noise. Median filter is used for removal of noise in images i.e. edges. After that SWT is applied, stationary wavelet transform will remove the noise in image because if its properties images de-noising provides superior performance by using wavelet. The object is subdivided by using segmentation the spatial FCM is utilized for segmentation. The proposed work provides good accuracy, faster rate to stabilize the survival rates.

In [6], author proposed; “computer aided diagnosis” which is helpful for facilitating damage recognition and properties of images and it is done by enhancing the medical capabilities and considerable decreases in time, exact conclusion and treatment is additionally made quick and conceivable. For assortment of tumour phases and detection of tumour by using new CAD method, different types of segmentation method are utilized such as K-means clustering, region localized based contour active segmentation and region seeded growing. The predication of increasing rate of tumour from MRI images can be done uses of CAD, without CAD difficult to perform.

In [7], work has been proposed that the techniques such as segmentation of images using SOM-clustering and automatically detect the tumour using Proximal Support Vector Machine (PSVM) from MRI brain images for detection of tumour in brain. In this work efficient assortment and segmentation is provided using Hemifacial spasm and Self Organizing Map HFS-SOM and PSVM. After division, the segmentation output is passes as input to the PSVM classifier, for extraction of features and selection. PSVM has training phases, the textures features are used which helps to decreases of complexity of PSVM classifier. The result of this work shows the rate of error is less and high precision. These work well for distinction of normal or abnormal brain with specificity, accurate rate and higher sensitivity.

In [8], author proposed a new combined technique i.e. hybrid technique by merging SVM along with two combining clusters method are K-mean and fuzzy C-mean for the determination of tumour. In this work, classification of tumour is easy and it also easier to provide level to the position of tumour so that the GUI interface provide that easier visualization. The system has high rate accurate and rate of error is less.

In [9], author proposed algorithm which effectively classifies the healthy tissues, the effected tissues, edema and tumour. In this work segmentation algorithm uses morphological methods and threshold by merging both for skull stripping. Sub bands can be formed by decomposed of images by using SWT, for vector features extraction

performs a spatial filtering process on those sub bands. Supervised FFBPN is used for segmentation operation.

In [10], CSM based K-means clustering partitioned algorithm is used, for finding the location of tumour in brain. Cohesion based self-merging algorithm (CSM), it has provide the efficient output by merging the self-algorithm that is compared to other merging process. This paper has provided less noise and probability find exact position of tumour is efficient. It also provides less time consuming and complexity decreases.

III. CONCLUSION AND FUTURE SCOPE

This paper presents the survey on Brain tumour detection from the MRI images using different techniques such as SVM unsupervised method, k-mean, fuzzy C means segment, Wavelet Statistical Texture features, object labelling and other algorithm, which will effectively and accurately detect the tumour ,its structure and exact location where tumour located in brain from MRI images.

REFERENCES

[1] A. Padma & Dr. R. Sukanesh "A Wavelet Based Automatic Segmentation of Brain Tumor in CT Images Using Optimal Statistical Texture Features", International Journal of Image Processing (IJIP), Vol. 5, Issue 5, pp. 553-563, 2011.

[2] Payal Mistry, Shagun Akhauri, Sayali Patil, S. p. Tondare, "Segmentation of brain tumors and its area calculation in brain MR images using k-mean Clustering and fuzzy c- mean algorithm", International Journal of Electrical, Electronics and Data communication, ISSN: 2320-2084 Vol. 2, Issue-3, pp. 38-41, 2014,.

[3] Purnita Majumder, V. P. Kshirsagar "Brain Tumor Segmentation and Stage Detection in Brain MR Images with 3D Assessment", International Journal of Computer Applications, Vol. 4, Issue-15, pp. 16-19, 2013.

[4] E. Mallikarjuna, "Brain tumor detection using segmentation based object labeling algorithm", Journal of Computation in Biosciences and Engineering, ISSN: 2348 – 7321, Vol. 3, Issue 2, pp. 1-5.

[5] Pranita balaji kanade, prof. P.p. gumaste "Brain tumor detection using MRI images", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering Vol. 3, Issue 2, pp. 146-150, 2015.

[6] Urmila ravindra patil, prof. R. T. Patil "Computer aided diagnostic system for brain tumor detection using k-means clustering", International Journal of Innovations in Engineering Research and Technology [ijiert], ISSN: 2394-3696 , Vol. 3, Issue 5, pp. 71-81, 2016.

[7] S.g.hate, a.d.vidhate "Advancement of brain tumor detection using Some-clustering and proximal support Vector machine", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 6, Issue 7, pp. 5552-5558, 2017.

[8] Jahanavi M S, Sree Priya Kurup "Hybrid Technique to Detect Brain Tumour Using SVM Classifier", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, An ISO 3297: 2007 Certified Organization, Vol. 5, Issue 6, pp.48-52, July 2016.

[9] Sruthy m k, sajitha as "A new topology for tumor and edema segmentation using artificial neural network", International Research Journal of Engineering and Technology (irjet), E-ISSN: 2395 -0056 Vol. 03, Issue 04, pp. 509-512, 2016.

[10] Subhranil Koley and Aurpan Majumder "Brain MRI Segmentation for Tumor Detection using Cohesion based Self Merging Algorithm", pp. 81-85.

[11] V. Vani and M. Kalaiselvi Geetha "Automatic Tumor Classification of Brain MRI Images", E-ISSN: 2347-2693, Vol. 4, Issue-10, pp. 144-151.

[12] D. N. Lohare, R. Telgade, R. R. Manza "Review Brain Tumor Detection using Image Processing Techniques" , E-ISSN: 2347-2693, vol. 6, Issues 5, pp. 735-740, 2018.

Authors Profile

Shruti Reshmi pursed Bachelor of Engineering in Computer Science and Engineering, from B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur in 2017. She is currently Pursing M.Tech from B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur. Her area of intersects are Image Processing, Internet of Things, Asp.Net.

Mr Rajashekhar D. Salagar pursed Bachelor of Engineering in Computer Science and Engineering, from KBNCE Engineering college, Gulbarga under VTU University of Belagavi in 2002 and M.Tech from BEC Enginnering college, Bagalkot in 2007. He is currently pursuing Ph.D. and working as Assistant Professor in Department of Computer Science and Engineering , B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur. His area of interest are Image processing, DBMS. He is a member of ISTE. He has 14 years of teaching experience.

Mr Shriharsha S. Veni pursed Bachelor of Engineering in Computer Science and Engineering, from B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur under VTU University of Belagavi in 2010 and M.Tech from BEC Enginnering college, Bagalkot in 2014. He is currently working as Assistant Professor in Department of Computer Science and Engineering , B.L.D.E.A'S V.P. Dr. P. G. Halakatti College of Engineering and Technology, Vijayapur. His area of interest are Image processing, Cryptography,Graph Theory. He is a member in CSI Nominee. He has 8 years of teaching experience.

