IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

BRAIN TUMOUR DETECTION USING MACHINE LEARNING

[1]Daksh Pruthi, [2]Vinayak Sadanand,

[1]Senior Analyst, Professional Services, FIS, Pune, India
[2]Software Engineer, Risk IT HSBC Software Development, Pune, India

***Abstract*—** In the medical field, medical image fusion plays an important role in diagnosis of brain tumors that may be classified as malignant or benign. To cut back uncertainty and minimize redundancy whereas extracting all the helpful info from the supply pictures, it's the method of grouping multiple pictures of the identical scene into one united image. SVM is employed to fuse 2 totally different visions brain tomography pictures. The image united is going to be a lot more informative than the pictures from the supply. The image united allows us to extract the characteristics of texture and wavelet. Based on supported trained and tested options, the SVM Classifier classifies brain tumors. The planned technique achieved sensitivity of 80.48 percent, accuracy of 99.69 percent and specificity of 99.9 percent. Experimental results obtained from the fusion method show that the utilization of the planned approach to image fusion shows higher performance compared to standard fusion methodologies.

INTRODUCTION

In regular medical applications such as virus diagnosis and treatment preparation, medical image processing has advanced as one of the critical factors. The quality of medical images is usually unsatisfactory due to the technical restrictions, degrading the accuracy of human interpretation and more medical image analysis, thus requiring an improvement in the quality of these images. One approach to improving image quality is to denoise image. Numerous denoising methods have been planned, such as adaptive filters, methods built on wavelets. Different effective technique is the fusion of images that advances image quality by merging the comparable information from multimodal images into a sole fused image. This resulting image is called as a fused image. A fusion process is a combination of residual information to synthesize an image with added information than a specific image and a synthesized image is more suitable for visual observation. Image fusion is technique of merging many input images from the similar brain into a sole fused image that conserves whole content information and holds significant features from distinctly original image. Compared with the specific image, the fused image should have more advantageous information content. For the most part, radiologists select side-by-side MR and CT images when both images are available. This gives them all the information available on the image, but their accessibility is limited to the visual correlation between the two images. It is conceivable to use both CT and MR images as it is hard to govern whether tissue or bone causes tapering of a spinal canal. Corresponding information is provided by both the CT and MR modalities. The images must be rationally aligned and fused organized in order to accurately visualize the associated bone and soft tissue structures. This process primes to better interpretation and usefulness of data. The source image is merely overlaid by conveying it to different color channels in fundamental multimodal image fusion procedures. This overlay approach is used in color image fusion to rise the amount of information over a single image, but it does not disturb the contrast of the image or distinguish the features of the image. we suggest novel region-based image fusion algorithm for multi focus and multimodal images that also disables the limits of different methods.

EXSITING METHODS:

- Image fusion technique based on DWT (Discrete Wavelet Transform).
- Hyper spectral Image fusion based on PCT (Principal Components Transform).

PROPOSED METHOD:

In this planned system, medical image fusion associate different modality of medical images to produce a high pixel fused image along with spatial & spectral information. The fused image with additional information upgraded the performance of image analysis algorithms used in different medical diagnosis applications. SVM is used in this paper for brain image fusion and K-Clustering features are mined from the fused brain images. The brain tumors region is segmented using the extracted features and SVM classifier helps to identify whether the tumors is “benign” or “malignant”. Thus, it benefits the physician and radiologist for brain tumors diagnosis for human surgical treatment.

BLOCK DIAGRAM:

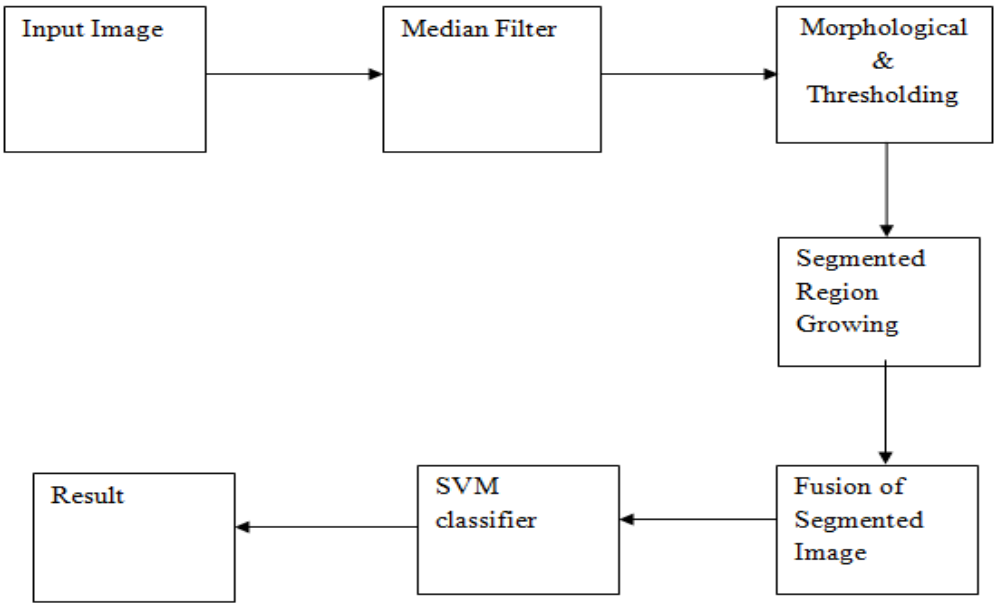


Fig 1. Object relation Sequence

SEQUENCE DIAGRAM

A sequence diagram displays object relations settled in time sequence. It illustrates the objects and classes tangled in the situation and the sequence of messages traded between the objects required to carry out the functionality of scenario. These diagrams are also called event diagrams/event scenarios.

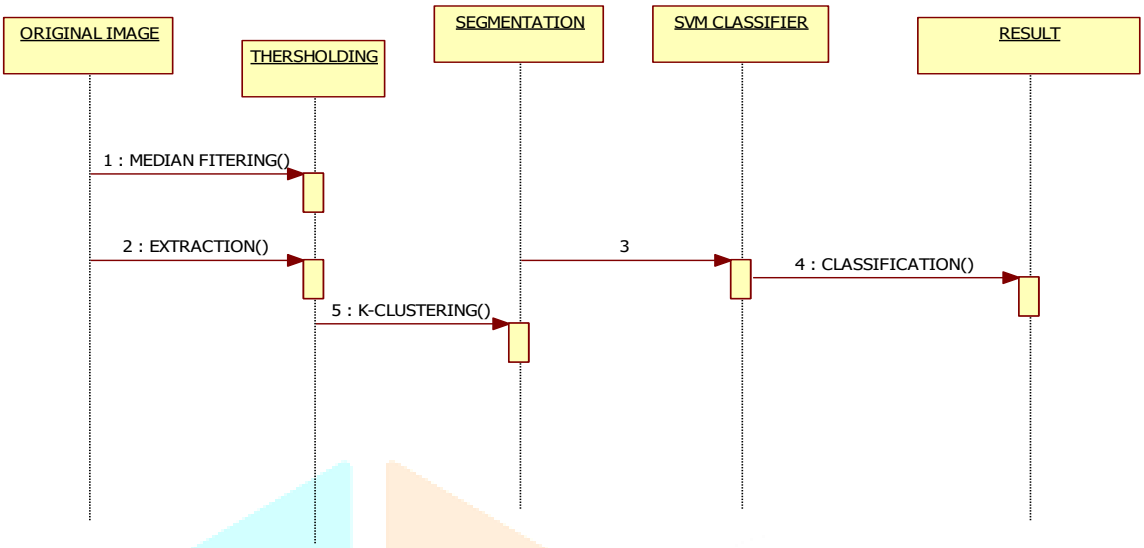


Fig 2. Object Relation Settled in Time

USE CASE

Use cases are set of scenarios which explains an interface between user and system. A use case diagram expresses bond between actors & use cases. The two important components a user and alternative system that will intermingle with the system modelled. A use case is a peripheral view of the system that denotes few action the user might accomplish in order to complete few tasks.

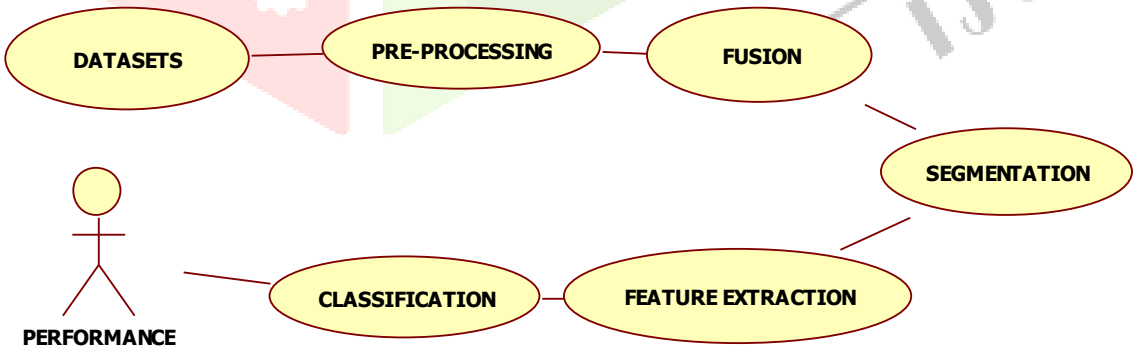


Fig 3. Bonds between actors and use case

ALGORITHM DESCRIPTION

MEDIAN SHARING

- Median filters are used for denoising the image.
- It's a significant process for image Enhancement.
- Noise reduction is a process of image processing to advance the results of future image processing.
- It conserves edges even though removing noise in image processing.

SVM (Support Vector Machine) Algorithm

- Support Vector Machine is machine learning algorithm (supervised machine learning).
- SVM can be used for numerical and nominal data.
- In this algorithm, we plot each data item as a point in n-dimensional space.
- where n is number of features with the value of each feature being the value of a specific coordinate.
- We accomplish classification by finding the hyper-plane which separate the two classes very well.

METHODOLOGY

- **PREPROCESSING**- Preprocessing the input MRI.
- **IMAGE ENCHANCEMENT** -by denoising the MRIs using the procedure called Median Filter.
- **FEARTURES EXTRACTION**-Mining the morphological features by using the k –means clustering procedure.
- **THRESHOLDING-**In addition, thresholding the extracted image. Thresholding is the simplest technique of image breakdown. From a grayscale image, thresholding can be used to generate binary images.
- **SEGMENTATION**-Then segmentation process will be carried out for further performance to identify whether the tumor is benign or malignant.
- **SVM-**Now the Support Vector Machine (SVM) classifier is used for classification as well as in regression condition. SVM Classifies the tumor into benign or malignant category.

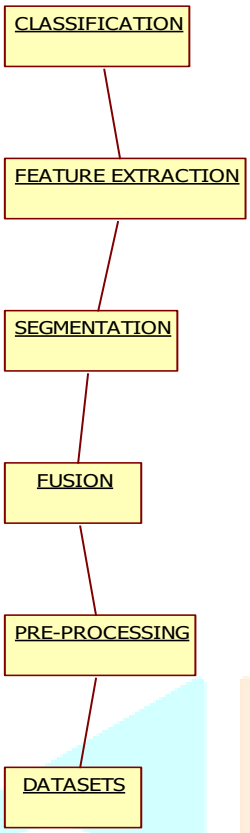
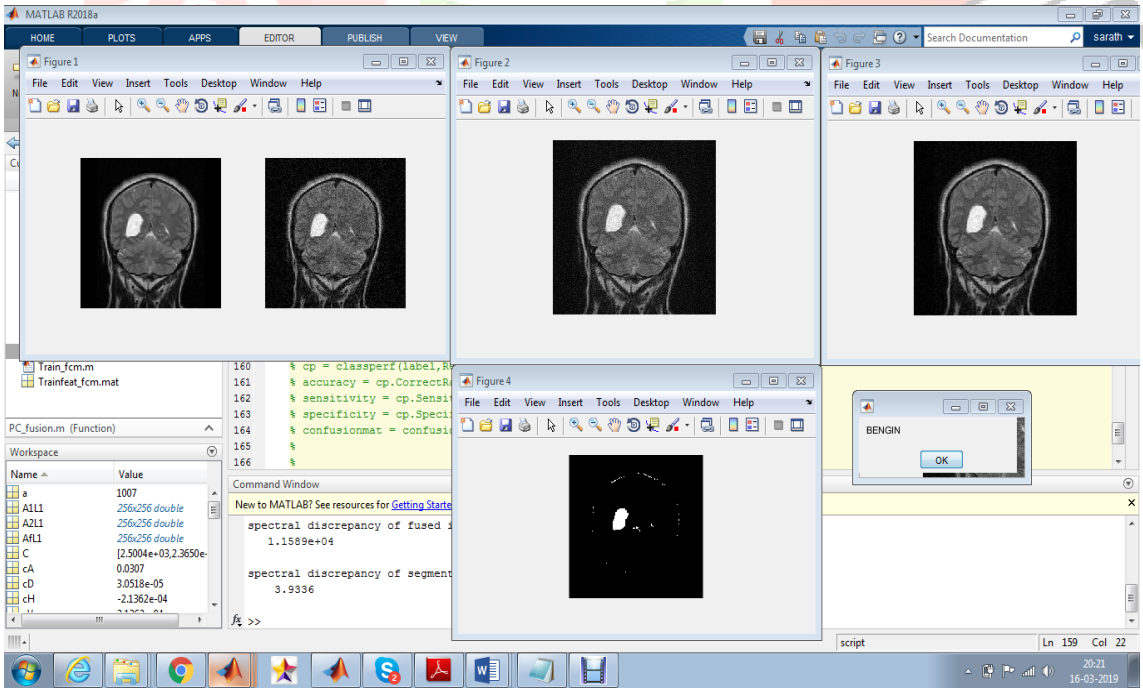


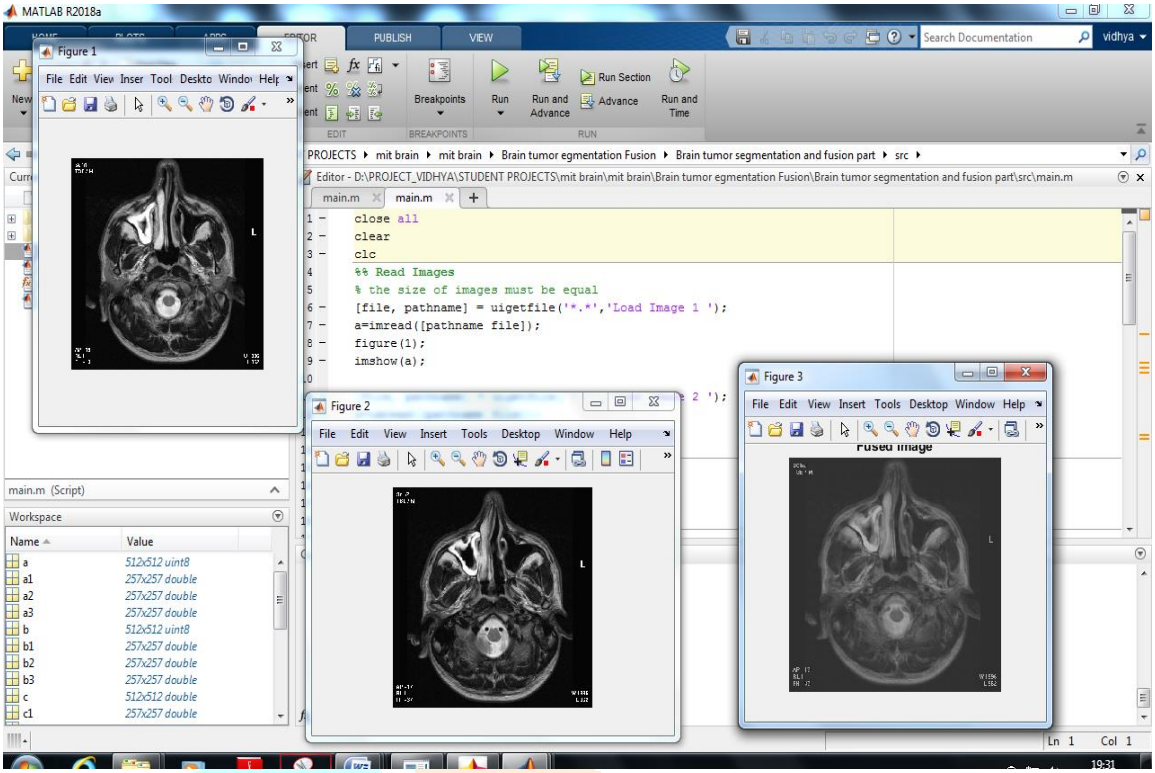
Fig 4. Segmentation process flowchart

Results:-

Sceenshot 1:



Sceenshot 2:



CONCLUSION

Medical image fusion combines different modality of medical images to produce a high-quality fused image with spatial and spectral info. The fused image with extra information advances the performance of image analysis algorithms used in different medical diagnosis applications. SVM is used in this paper for brain image fusion and K-Means Clustering features are mined from the brain MRI. The brain tumors region is segmented using the extracted features and adaptive SVM classifier helps to identify whether the tumors is benign or malignant. Thus, it helps the physician and radiologist for brain tumors judgement for human surgery.

FUTURE ENCHANMENTS

In future work, it would be interesting to include additional feature information. Besides the energy, correlation, contrast and homogeneity add more information to the feature extraction in order to make the system more sensitive; information from the textures or location. It will be interesting to continue developing more adaptive models for other types of brain tumors following the same line of work presented here. Another future line would be the detection of minor malignant brain tumors. It should be clear that many factors influence the appearance of tumors on images, and although there are some common features of malignancies, there is also a great deal of variation that depends on the tissue and the tumor type. Characteristic features are more likely to be found in large tumors. Minor tumors may not have many of the features of malignancy and may even manifest themselves only by secondary effects such as architectural distortion.

REFERENCES:

[1] T. Zaveri, and M. Zaveri, "A Novel Region Based Multimodality Image Fusion Method", Journal of Pattern Recognition Research, vol. 2, pp.
140–153, 2011.

[2] V. Tsagaris, V. Anastassopoulos, and G. Lampropoulos, "Fusion of hyperspectral data using segmented PCT for enhanced color representation", IEEE Trans. Geosci. Remote Sens., vol. 43, no. 10, pp. 2365–2375, 2005.

[3] G. Bhatnagar, Q. M. J. Wu, and Z. Liu, "Directive Contrast Based Multimodal Medical Image Fusion in NSCT Domain. IEEE Transactions on Multimedia, vol. 15, no. 5, pp. 1014–1024, 2013. DOI: 10.1109/TMM.2013.2244870.

[4] A. Rana, and S. Arora, "Comparative Analysis of Medical Image Fusion. International Journal of Computer Applications," vol. 73, no. 9, pp.10–13, 2013. DOI: 10.5120/12768-9371.

[5] Pinki Jain, and Anu Aggarwal, "Text Fusion in Medical Images using Fuzzy Logic based Matrix Scanning Algorithm," International Journal of Scientific and Research Publications, vol. 2, no. 6, pp. 1-6, 2012.

[6] Devid Hall, James LLians, Hand book of multisensor data fusion, CRC Press LLC, 2001.

[7] Goshtasby, Image fusion: Advances in the state-of-the-art Journal of Information Fusion, Elsevier, Vol. 8, pp 114-118, 2007.

[8] A general framework for multiresolution image fusion: from pixels to regions, Journal of Information Fusion, Vol. 4 (4), pp 259-280, 2003.

[9] P. J. Burt, E. H. Adelson, Mergin images through pattern decomposition, Proc. SPIE 575, pp 173-181, 1985.