

CERVICAL TUMOR DETECTION AND PROLIFERATIVE IDENTIFICATION USING K-MEANS CLUSTERING AND SVM CLASSIFIER

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Abstract- The development of irregular tissue in a particular place is called tumor. The human body contains large volume of cells. The normal procedure is that the old cells are replaced by new cells. But in rare phenomena normal function of this procedure is changed due to some unwanted growth of cells. The tumor is identified in earlier stage by using image processing techniques. It is very challenging work for current researchers. For detecting tumor in cervical, the MRI images are given as input. The main advantage of this work other processes is that it uses both K-means clustering and SVM classifier which results in high accuracy to find the position, size and the accurate percentage of the affected area. In this paper an important SVM classification and neural network classifier techniques are used to identify the cervical tumor in the beginning stages. If the tumor is being detected in early stages it is mostly curable. The main benefit of this concept is detecting the position of the tumor and to easily calculate the size of the tumor.

Keywords- Cervical Tumor, MRI Image, Segmentation, Filtering.

I. INTRODUCTION

In the current scenario Image Processing is one of the interesting areas for every researcher. Image processing concept contains various techniques. These techniques are used in various fields. Image processing techniques are applied in medical discipline also. Image processing concepts are used to identify the affected areas easily. From past ten years medical input images are analyzed by using computing techniques. Most of the algorithms produce accurate result. Due to this image processing approaches, it is used to detect number of diseases in human body. In this research, paper is divided into the following 5 division. The second section reviews the related works regarding this research. Section three describes the proposed method to detect tumor and section four shows the expected output. Section five describes the conclusion part of the current research work.

II. LITERATURE SURVEY

A new algorithm that proposed a new architecture to extract tumor part from the MR pictures was designed by Khurram Shahzad et al.,[1]. This algorithm contains different phases. In the first phase filters are used to improve the quality of the image. Then morphological operations are applied to increase the intensity of an image. Next the threshold rate is applied to binarize the image. To easily identify the tumor visibility the author applied all these techniques. Vipin Y. Borole et al., identification of the tumor location and position using various types of image processing techniques was carried out by Vipin Y. Borole et al.,[2]. The important techniques are preprocessing approach, filtering, image contrast improvement, edge finding and smoothing function. A segmentation technique for finding tumor location was used by Samriti et al.,[3]. In this work the author combined two various techniques. They are watershed and contrast approach. This combined approach gave the more accurate result compared with other methods. B.Bhavani et al.,[4] identified a new gist technique used to find the heart disease easily which works based on Decision Tree classifier.

attributes are used to help the medical peoples to calculate the tumor size and location. To implement this concept the author used MATLAB software. The reports are also generated in automatic manner instead of manual method.

The reason for the cervical tumor in human body was examined and MB Bramarambika et al.,[6] used program division technique and identified the tumors in the beginning stage. The MR input images are used for processing. Histogram technique was used to identify cell types in human cervical.

The indication of cervical tumor was done by Rohan K. Gajre et al.,[7] . He analyzed various image processing techniques that are specifically used to identify cervical tumor as soon as possible.

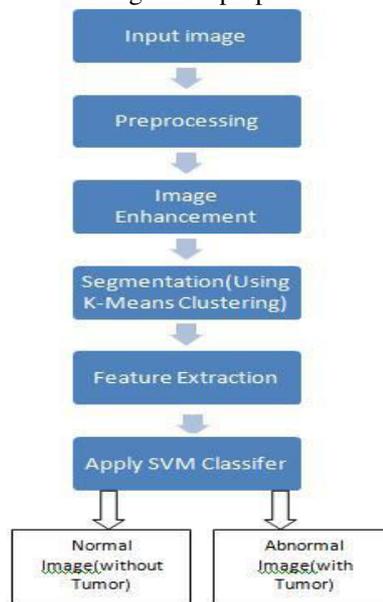
A new method to identify human cervical tumor with the position of the particular tumor was demonstrated by Shivakumarswamy G.M et al.,[8]. The MRI images are used to analyze his method. Initially preprocessing concept is used to identify and delete the noise of an image. Then the noiseless image was segmented by using clustering concept. After that tumor cells and normal cells are divided and the location of the tumor is calculated. Based upon the areas of an identified tumor the stage of the tumor is found out. Then the stage of the particular cervical image state are forwarded to the patient mobile using GSM concept.

An algorithm using Gaussian and median filters for identifying tumors in human body was designed by Khurram Shahzad et al.,[10]. If the tumor location is identified the remaining part of the existing image is shaded. It is used to easily identify the normal and abnormal part of the cervical.

III. METHODOLOGY

The main objective of this proposed work is to detect cervical tumour in human beings. Due to this work the death rate of human being is going to be reduced and to identify the tumour in earlier stage. In this work MRI images are used for input. Then the MRI images are pre-processed and enhanced the tumour image by using K-means clustering concept. In clustering, the image is identified whether the tumor is normal or abnormal. After clustering, the technique image extraction is carried out where the extracted image was given to the input of neural network classifier. The SVM and neural network classifier is used to identify whether the tumor is proliferative and also it gives the details about the size of tumor. The following figure 1 shows the flow diagram of our proposed work.

Figure 1: Flow diagram of proposed work.



INPUT IMAGE: The process carried out here is called as Image Acquisition. This is the very first step in any image processing technique. In this the input images of cervix that are affected by cancer are given to the MATLAB tool for further process.

PREPROCESSING: In this second method the image that is being selected in the image acquisition process is converted in the form of RGB to Grayscale, a median filter is being applied and finally noises are suppressed and a clear image is being extracted.

IMAGE ENHANCEMENT: The third method carried out is enhancement. In this, from the gray images the gray threshold value is taken for reference. Then this image is converted to black and white for binary values where we can work on pixels using those binary values. As a final step in this image adjustment is done for the image.

CLUSTERING: This is one of the important methods which is used for image segmentation. There are many clustering methods and we used K-Means Clustering for segmentation purpose.

SEGMENTATION: This is the core part of this project as it distinguishes the images based on the cancerous and non-cancerous region using K-Means clustering.

FEATURE EXTRACTION: Features like Contrast, Correlation, Energy, Homogeneity, Mean, Standard Deviation, Entropy, RMS, Variance, Smoothness, Kurtosis and Skewness are extracted from the cancer affected image.

SVM CLASSIFIER: The final and the most important step is applying SVM classifier which is used to classify the cancer based on their stage as Normal, CNI1, CNI2 without any supervision. This SVM classifier works based on neural networks.

IV. RESULTS AND DISCUSSION

In our implemented system we are going to detect the cervical cancer on the basis of the database that we have obtained from scan centers. First the input image is taken and given to the preprocessing stage. In the preprocessing stage we will undergo four stages first is converting the color image to black and white image which will help in more accuracy. Then followed by Resize stage where we reduce the size of the input image for speedy execution. Then third stage is we will remove the noise that is available in the image by using median filter. Then finally fourth stage will be the image enhancement stage where the input image will be more enhanced and brighter. Then we use k means clustering algorithm for segmentation of cervical areas from the tissue region and SVM algorithm for classification which will determine whether the classified segment is normal or abnormal condition. In addition to this the stage of the tumor is also classified by unsupervised learning.

Figure 2: Output of cervical tumor

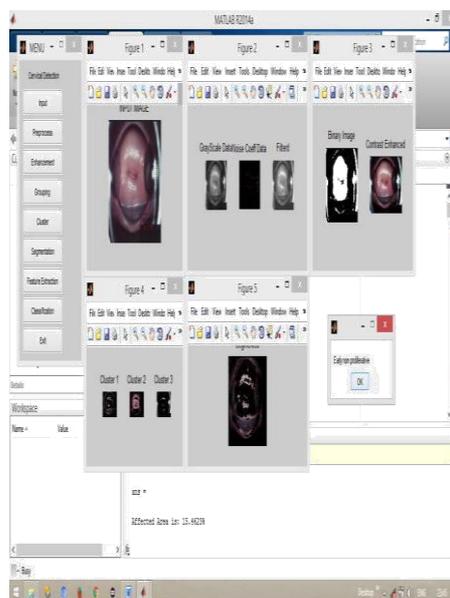
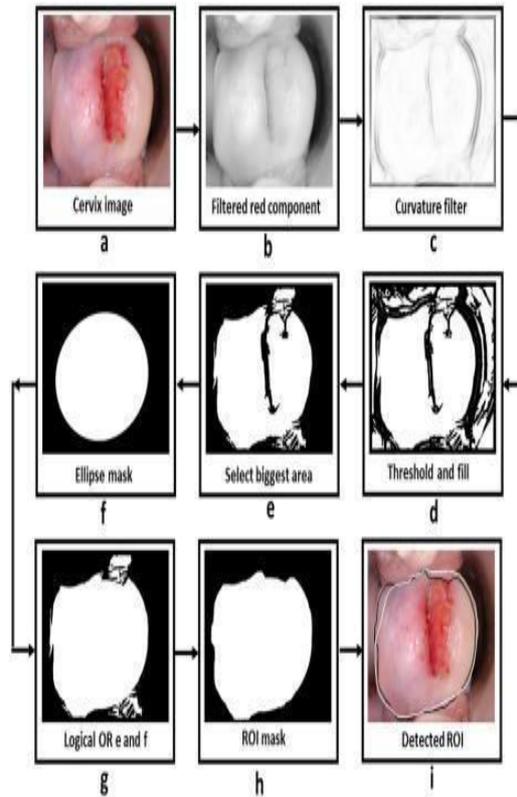


Figure 3: Output from MATLAB tool.

V. CONCLUSION

Identifying cervical tumor is critical task in the medical field. In this the proposed work is used to identify human cervical tumor in earlier stage. Here this work use computer aided system using various image processing and machine learning concepts. The location of this unwanted tissue is identified using K-Means clustering algorithm. The support Vector Machine concept is used to easily identify the affected and unaffected area. With noise contents the image has given to the input of K-Mean clustering technique. The dataset was taken from publically available resources. Feature extractions concept is applied in the result image of clustering and finally SVM techniques are used to find out the status of the tumor. In earlier stage it is more probably curable

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