

Detection of Various Neoplasm's in Medical Images using Edge Detection and Neural Network



Srinivasa Bapiraju Gadiraju, Poddolla Abhinayani, Devi Priya Gottumukkala,
Sree Vidya Dandu, Naga Mallik Atcha

Abstract: Brain tumor is one in all the extraordinary illness causes death among the people. Neoplasm is associate unconfined expansion of tissue in any neighborhood of the body. During the process have a tendency to tend to stand live taking man photos as input; resonance imaging that is guided into internal cavity of brain and offers the entire image of brain. In this paper brain tumor detection system is proposed. Here bunch methodology supported intensity was enforced. The Probabilistic Neural Network square measure used to identify the various levels of tumor like Malignant, Benign or traditional. PNN with Radial Basis are used for classification and segmentation of cells. In order to classify the normal or abnormal cells, proper decision need to be taken. This could be done in 2 levels: Gray-Level Co-occurrence Matrix and the classification are performed based on Neural Networks. The tumor cell detection is manually performed by the schematic methodology for X-radiation.

Keywords : Neural networks (NN), segmentation, malignant, Probabilistic Neural Network (PNN), Artificial Neural Network (ANN)..

I. INTRODUCTION

Brain tumors are of 2 kinds. They are primary & secondary tumor. The primary tumor cell is gift inside the skull & develops inside the skull. The primary brain tumor is nothing but malignant brain tumor. The secondary tumor is the tumor which develops outside the skull and moves inside the skull part. Biological process tumors area unit samples of secondary tumors [1]. The traditional working system of the brain gets disturbed when the tumor occurs inside the skull. Tumor moves the brain against skull & can increase the strain on the brain. The basic step of treatment is identifying the tumor. A brain is associate intracranial solid tumor or unusual growth of cells within the central vertebral canal or inside the

brain. Now a day the most frequent and dangerous disease in the universe is brain tumor.

For the better treatment, it's better to identify the symptoms of the tumor in the beginning stage. There square measure determines various kinds of brain tumors that create the choice terribly sophisticated. The classification is important to identify the kind of brain tumor that the patient was suffered by. An honest or a decent classification method ends up in the correct call and supply better treatment. Treatments of assorted kinds of brain tumour square measure largely betting on kinds of brain tumour. Treatment could totally different for every kind, and frequently.

More number of cells is present in the brain. The actions of the human body are controlled by these cells. For example, some cells are used to make movements, some are useful to think, act, etc. These cells are internally connected and human body acts according to the commands given by the brain cells. In brain, depending on the tumor location the symptoms may range from headache to stroke. Based on the tumor location it may cause different functioning disorders [1].

The following are the few signs of brain tumor:

- 1) Morning headache.
- 2) Bit by bit depletion in leg.
- 3) Numbness in arm.
- 4) Vision problems.
- 5) Voice issue.

In the scanning the MRI is wide used. The standard of image is large within the magnetic resonance imaging.

The standard of picture is absolutely necessary in cerebrum tumor. Incomparable view of the human body is produced by MRI Scan. [2-6]. The MRI scanned images can be seen clearly and the detailing of these images are effectively analyzed when compared to old fashioned scans names CT scan, X-beams. Compared to traditional nerve cell the quality of tumor cell is high. The following are the treatment procedures for the brain tumor:

- 1) Operation
- 2) Radiotherapy
- 3) Chemotherapy

During the treatment, the physician removes removable tumor cells from the brain. Brain tumor cells can be effectively treated by radiotherapy. The beta rays or gamma rays are applied on the tumor cells in the brain to kill them. Chemotherapy is another procedure to treat brain cancer [1]. Chemotherapy helps to prevent the spread of tumor cells into the blood and blood barriers. It also stops the growth of tumor cells.

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*Correspondence Author(s)

Dr. Srinivasa Bapiraju Gadiraju *, Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Affiliated to JNTUH, Hyderabad. India.

Poddolla Abhinayani, PG Scholar, M.Tech, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Affiliated to JNTUH, Hyderabad. India.

Devi Priya Gottumukkala, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Affiliated to JNTUH, Hyderabad. India.

Sree Vidya Dandu, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Affiliated to JNTUH, Hyderabad. India.

Naga Mallik Atcha, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Affiliated to JNTUH, Hyderabad. India.

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Chemotherapy has some side effects because it effects the growth of normal brain cells.

The planned system is the effective system to detect and classify the tumors in MRI Images. Mat lab is used for project implementation and coming sessions discusses about the classification and detection of tumors.

II. RELATED WORK

The brain tumor MRI images can be processed using different detection and classification techniques [7-9]. In order to detect the tumors some of the image processing techniques are used like histogram equalization, image adjustment, and image segmentation.

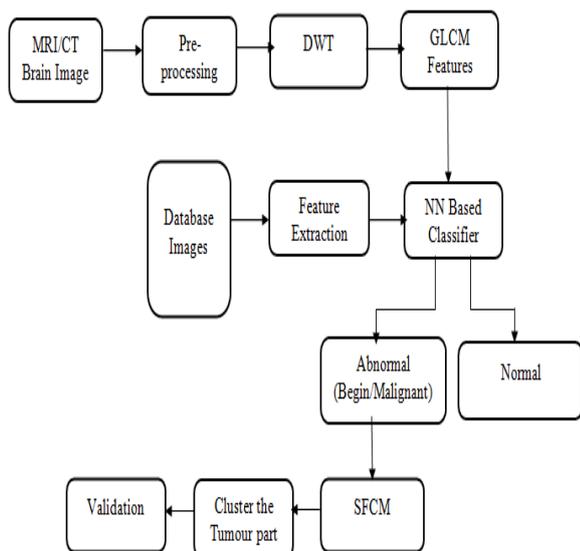


Fig1. Architecture for detecting and classification of tumor.

Extracting the tumor from the MRI image is the first most steps. One by one various functions are used for the detection. It's very difficult to extract the tumor from these images as they are darker in nature. And the improvement is required. Preprocessing is the 1st step; in this colored image is transpose into the gray colored image. By using gray scale imaging, it's an easy to recognize the image properties and the values may vary from zero to 255.

Image enhancement is the second most steps, by which we can enlarge the contrast of the image. Histogram equalization and image adjustment are the two techniques used for image enhancement. Intensity values of the images are adjusted by the image adjustment technique. The intensity of the normal brain cell has lower value when compared to brain tumor cell. Appearance of the tumor in the MRI image will be dark. There exists a small difference between the tumor and whole brain, which cannot be identified by the human naked eye.

In Image segmentation, Thresholding is the simplest methodology and it breaks the image into smaller parts, it uses only one parameter and the value of the parameter is more than the normal brain. This flow is repeated up to the tumor boundaries are found. Detecting of the tumor is the main objective of this paper. This method is more suitable for detecting the tumor from background.

All the pixels of the MRI image are compared with the threshold value. After the comparison, if the value is lower, then the pixels remains in the image, if it is greater those

pixels of the image will get removed. The binary images are produced by applying threshold values to the MRI images. Since the binary images have only two values '0' (0), '1' (255). The pixel values of an image greater than threshold value will be set to binary value '1' (255) otherwise will be set to '0' (0).

The result of the image is tumor along with the dark background. Dilation operator is used to fill the gaps which occurred at the edges during segmentation.

III. TUMOR CLASSIFICATION

In this paper a best ANN classifier is developed to find out multiple types of brain tumor. ANN is consisting of tuples which operate in parallel. This parts square measure galvanized from biological system a nervous. Every part in a very network referred to as somatic cell [4-5]. The output element fires when the result driven by multiplying weights with the inputs and then added to the bias at the node is positive. Fire implies that the energy is discharged to the succeeding element, else it does not fire.

ANN is an adaptive system [10-11]. It implies that the parameters of the system are altered during the operation. The parameters of the system are weights.

In this paper, 2- layered feed forward NN is used. This network consists of three layers i.e., 1 input layer, 1 hidden layer and 1 output layer and 1 output. Inside the hidden layer 10 nodes square measure is taken. In the second layer, two log sigmoid transfer perform square measure is used. {the 2|the 2} layer feed forward network with two log sigmoid functions square measure additional wide utilized in classification, pattern recognition. In this classification it offers higher ends up.

The input values are weights are multiplied and added at each node iteratively to get the output. If output value is higher than the log sigmoid function, then the value of output is 'one', else the value of output is '0' shown in Fig.2.

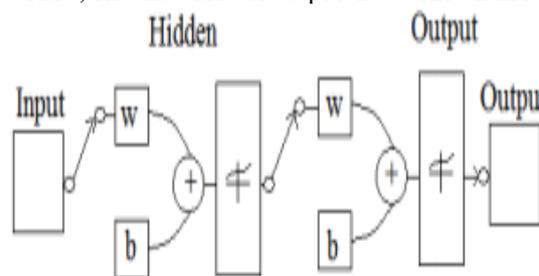


Fig.2 2- layered feed forward network with log sigmoid transfer function:

The NN system is intended in two phases.

- 1) Training
- 2) Testing

There square measure four steps in coaching method

- 1) Gather the coaching knowledge
- 2) Produce the 2 layered feed forward networks
- 3) Coaching the network
- 4) Network simulation

The familiar samples square measure applied to the 2 layered feed forward NN is trained with back propagation algorithmic program. The network is trained by changing the weights till we get accurate results. The attributes are fixed after training the NN.

In this project we built a NN with thirty six magnetic resonance imaging brain tumor samples are used for training the network. There are four classifications in the brain tumor and each one holds nine samples of the tumor. Total thirty six input MRI brain tumor samples square measure trained to NN through back propagation learning/training.

In the testing or recognizing stage which is the 2nd stage, the trained network is applied with the unknown samples. Then the classification of unknown samples done based on the trained input samples. Here classification is done by the trained network which does by comparison of existing samples with the new samples. Total of 4 brain tumor grades exists (involved) in this paper.

Trained NN is applied with different known MRI samples for different grades and it is checked whether it is working appropriately or not. For the known samples, the proposed methodology gives accurate or exact output. The performance of the proposed methodology is better in this paper.

IV. RESULTS

The planned system expeditiously categorized the magnetic resonance imaging brain tumor pictures. The tumor is segregate from the magnetic resonance imaging pictures by mistreatment higher than alluded processes/ways. The Classification of magnetic resonance imaging brain tumor pictures is also with success enforced by mistreatment ANN. The planned system expeditiously categorized the brain tumor magnetic resonance imaging pictures into totally different grades.

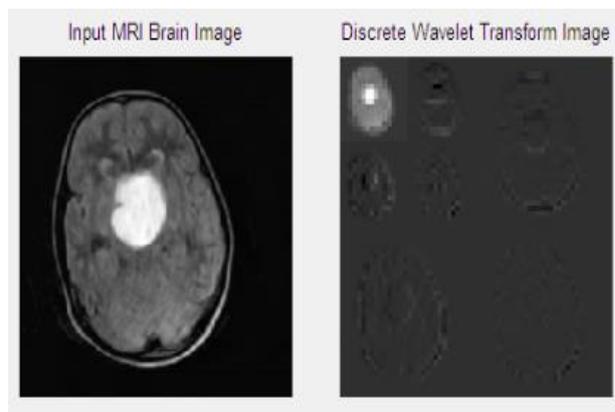


Fig 3: Selecting another MRI Image, Applying DWT and Classifying

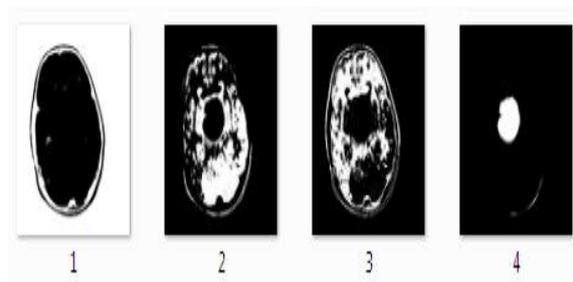


Fig 4: If the image has tumor then Clustering the tumor image

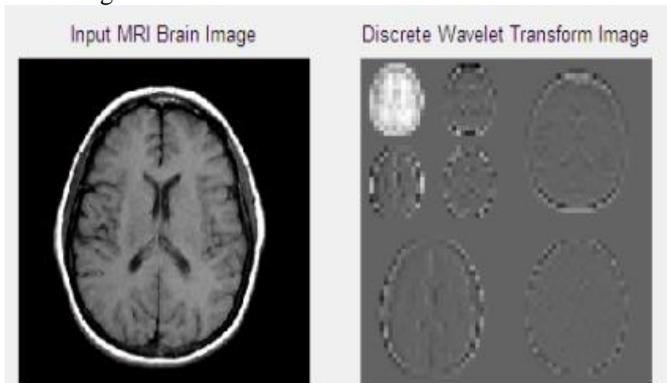


Fig 1: MRI images of human brain and applying DWT

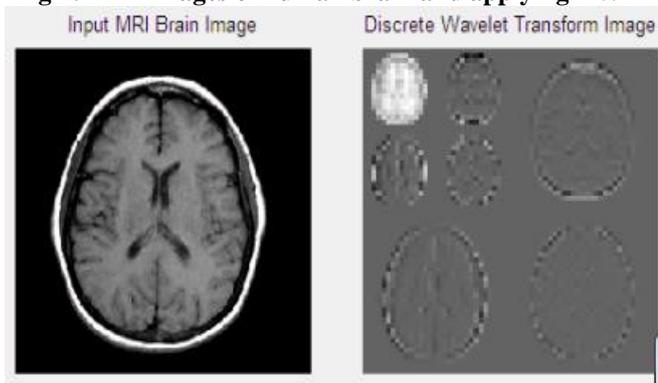


Fig 2: Demonstrating No tumor in this image and No clustering

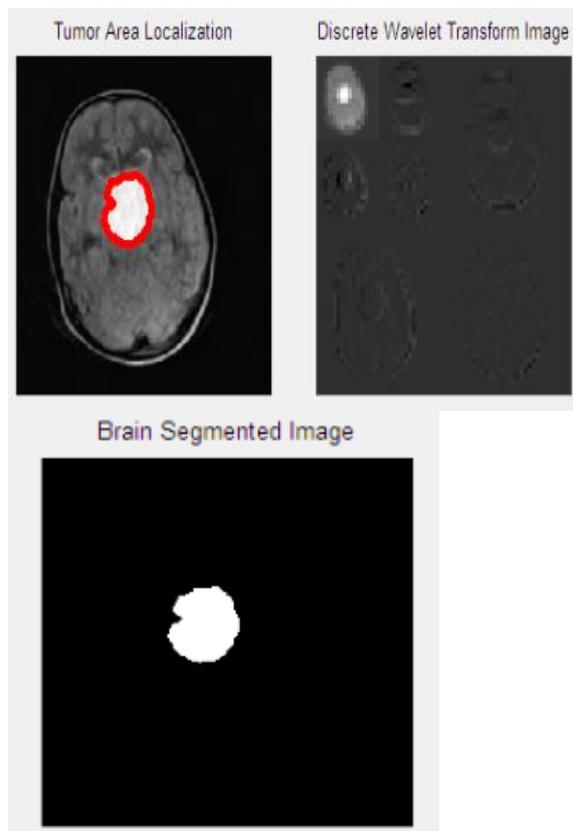


Fig 5: Complete Result of the Tumor Part Classification with Segmentation

V. CONCLUSION

In this paper the brain tumor of identification & classification is done by using unique algorithm. In this method we are going to combine PNN distinct riffle network with the GLCM.

By using this associate economical brain tumor Classification methodology we can get most recognition Simulation results. Mistreatment brain tumor info incontestable the flexibility of this planned methodology for best feature evulsions and economical brain tumor classification. The flexibility of this methodology is incontestable on the idea of obtained results on brain tumor image info. On different tumor databases the opposite combos square measure there for coaching and take a look at samples.

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AUTHORS PROFILE



Dr. Srinivasa Bapiraju Gadiraju, Professor, Dept of CSE, Gokaraju Rangaraju Institute of Engineering and Technology (GRIET), Hyderabad, Telangana, India Holds a Doctorate degree and three post graduations degrees, M.Tech (CSE), M.Sc (Nuclear Physics) and MBA (HR & FIN). Having more than two decades of teaching and Industrial experience.

He can be reached at gsbapiraju@gmail.com.



Poddolla Abhinayani, PG Scholar, M.Tech, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad. India. She can be reached at Email: abhinayani.p@gmail.com.



Devi Priya Gottumukkala, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad. India. . She can be reached at Email: mantena2377@gmail.com.



Sree Vidya Dandu, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad. India. . She can be reached at Email: dsreevidya15@gmail.com.



Naga Mallik Atcha, Assistant Professor, Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad. India. . He can be reached at Email: mallik.atcha@gmail.com.