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SEMANTIC SEGMENTATION AND ANN CLASSIFICATION USING FEATURE EXTRACTION OF BRAIN TUMOR MRI IMAGES

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Abstract - *Automatic defects identification in MRI could be very essential in Medical applications. It is high quantity data in MR images and blurred boundaries, tumor classification is very hard. Brain tumor stages: normal, Abnormal. Early detection of tumors is very important to save patient's lives. Image Detection is used to detect the brain-tumor sector towards the images of MRI from the brain and it is a very beneficial method nowadays. The technique of Image segmentation is followed for extracting abnormal tumor regions within the brain. The person might feel that he or she is having memory loss, to give an example of failing to remember close words or location of everyday entities. The approach proposed assures to be incredibly efficient and unique for brain tumor detection, classification. PNN (probability Neural Network) is a deep learning algorithm to the Image. The suggested talk extracts texture and structure features of the sector from the MRI scans and a Neural Network is exploited as a PNN category for detection of various phases of Brain tumor disease.*

***Key Words*: Machine Learning algorithm, Prediction**

1. INTRODUCTION

A brain tumor is an increase of undesirable cells inside the brain. Here the cells that divide and expand, ensuing in a massive quantity of undesirable tissues. This is called as tumor cell. The styles of brain tumor are normal, abnormal tumors. Normal tumors are unfolded into the brain which harms the normal brain cells, and it exerts stress at the brain inside the skull. Not all tumor cells are cancerous, however a few are, and that they are extraordinarily dangerous to one's health. It took some MRI photos of the brain to decide the position, shape, and scale of brain tumor tissues. MRI machines use a strong magnetic-field and radio-waves to produce photos that have very beneficial information. In brain disease diagnosis system, presence of less accuracy in an automatic image classification and division of tissue analysis due to poor texture discrimination and clustering inefficiency is an limitation. To overcome this limitation, here LBP based multi scale decomposition is used to analyze texture of an image and Neural Network classifier will be used for better classification and segmenting the abnormal tissues.

1.1 GLCM & SVM:

The **Support Vector Machine, or SVM**, is a linear model that can be used to clear up classification and regression issues. It can clear up both linear and nonlinear issues and is beneficial for an extensive variety of applications. SVM is a basic concept: The algorithm divides the information into groups by drawing a line or hyper plane.

The **GLCM** determines how well a pixel with gray-level (gray scale strength or tonality) value i appears horizontally, vertically, or diagonally to neighboring pixels with value j.

1.2 Literature Survey:

The Several techniques based **machine-learning** algorithms is applied to chest x-ray images .The performance of **KNN** was evaluated on Image is database creation of the work done .It is proposed to resolve the problem and aims to speed of convergence, using two important algorithm techniques .The Existing system is one of the solution in a real life in many ways in identify the solution. Analyzing the transaction pattern is nothing short of privacy and taking over a system process is full of risks and misjudgment in the process.

Annisa Wulandari et al [1] highlights the importance of the precise analysis of a brain tumor. Due to the contrasting color, it's difficult to identify the difference between brain tumor and normal tissue. Segmentation is a solution for analyzing brain tumors Brain tumor segmentation is completed to split brain tumor tissue from different tissues along with fat, edema, normal brain tissue and cerebrospinal fluid to conquer this difficulty, The MRI photo should be saved at the threshold of the photo first

with the median filtering. After that tumor segmentation process keeps going at thresholding method.

R. Tamilselvi et al [2] proposed about the **BRAMSIT** is a useful resource for feasible use through the MRI photo evaluation studies community. The BRAMSIT database is a proposed MRI database that aims to provide a group of normal and abnormal brain tumor images. The database interprets information like the patient's age and MRI axial location (i.e., trans-axial, coronal, and sagittal).

T.M.Shahriar Sazzad et al [3] research suggested a computerized method that requires initial increases to reduce gray-scale color variations. A tumor is a shape of a cell that develops out of manipulation of the normal forces and standardizes growth. Brain tumors are one of the predominant motives for human death each 12 months. Around 50% of brain tumors identified patients die with number one brain tumors every year within the United States. In these studies an computerized method has been proposed in which MRI gray-scale images have been integrated for brain tumor detection.. The experimental results revealed that the proposed method outperformed existing available methods in terms of accuracy while retaining a reasonable accuracy rate for pathology experts.

S. Somasundaram et al [4] discusses Magnetic Resonance Imaging (MRI) aids and facilitates the detection of very slight irregular growth in every portion of the human body. In 2D image segmentation, deep neural networks (NNs) and machine learning techniques have shown to be successful., However, segmenting vital organs from 3D medical MR images is a difficult job for NNs. Pre-Processing, Segmentation, Optimization, and Feature Extraction are only a few of the processing techniques used in tumor detection segmentation. Study focuses mainly on SVM and **Multi-class Support vector machines (MCSVM)** for Deeper Segmentation. To put off computational burden of processing 3-D clinical scans, this survey paper plan to study the modern-day improvement in image segmentation and image category primarily based totally on efficient and powerful toward processing of adjacent image patches from a tumor-affected human brain MRI that can move through the network with a target on gliomas, for that reason mechanically responding to an imbalance in the data. Thus, extra discriminative 3-D NNs and Computational Machine learning that assists in processing the enter images at more than one scales simultaneously. Finally, this article discusses the current state of tumor-based image processing segmentation and detection using deep learning models.

2. PROBLEM STATEMENT

The aim of this study is to put forward a model which assesses the strong impact of neural networks on the grey scaled division of images. Brain tumors are a diverse group of neoplasm's of the central nervous system that develop inside or near the brain. The healthcare industry is unlike any other industry. People demand the highest quality of care and facilities, regardless of cost, in this high-priority market. After the success of machine learning in other real-world applications, it is also a crucial tool for potential applications in the health field, offering exciting solutions with high precision for medical imaging.

2.1 Existing Methodology:

A theoretical version targeted at the shape and capabilities of biological neural networks is known as an Artificial Neuron Network (ANN). This network is made up of parallel processing components (neurons) that are strongly interconnected. These factors are stimulated through biological nervous systems. The inter-connections among factors largely decide the functions of the network. A layer of the network is a subset of the processing elements. In supervised artificial neural networks, the back propagation network is the most commonly used. Prior to training, the choice of structure plays an important position in figuring out the class accuracy. Back propagation of errors, also known as Back propagation is a common ANN teaching approach. In this paper, a three-layer network (input layer, output layer, and hidden layer) is constructed. There are 44 neurons in the input layer, 210 neurons in the hidden layer, and four neurons in the output layer.

3. PROPOSED SYSTEM

Step 1: It's important to understand how we can read and store images on our machines. Machine can identify the brain tumor image in pixel value. After Training the images 2 class in normal image and abnormal images (example 300 images).

Step 2: Pre-processing brain tumor image is increasing brightness and contrast adjustments. The process of extracting higher-level information from an image, such as shape, texture, color, and contrast, is known as feature extraction.

Step 3: Texture analysis is a critical component of human visual perception and machine learning. By choosing features, it is effectively used to increase the accuracy of the diagnostic system.

Step 4: Training image is the same process of testing image after input image checking the training image. Feature matching in the next classification **PNN** into the machine can predict the normal and abnormal brain tumor images.

3.1 Flow chart:

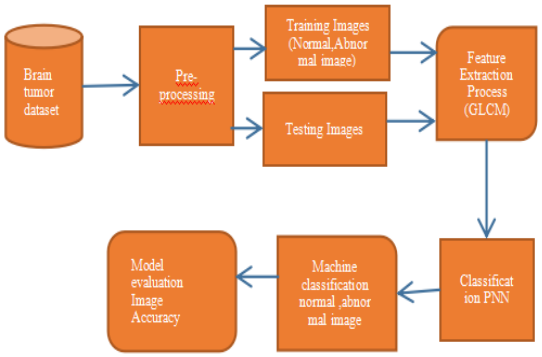

Chart -1: MODEL IMPLEMENTATION AND ANALYSIS

3.2 Architecture Diagram:

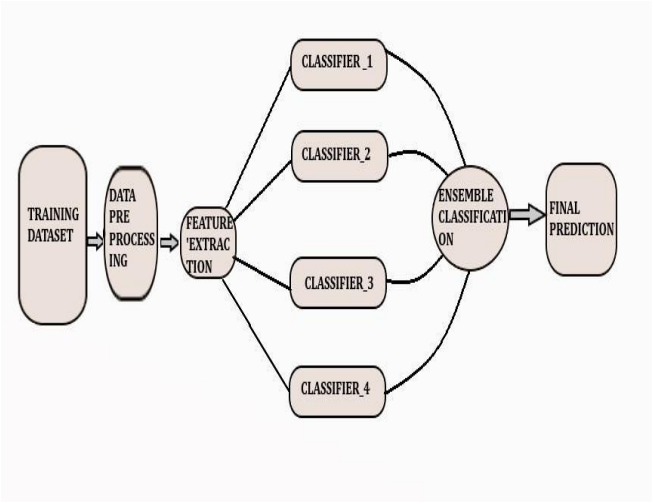

Chart -2: ARCHITECTURE DIAGRAM

3.3 Output Images:

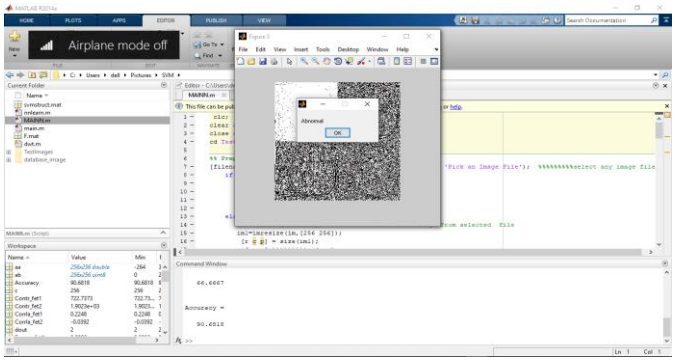

Fig -1: ABNORMAL RESULT IMAGE

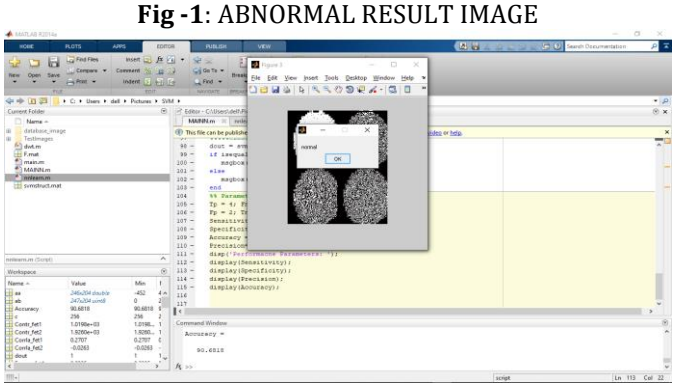

Fig -2: NORMAL RESULT IMAGE

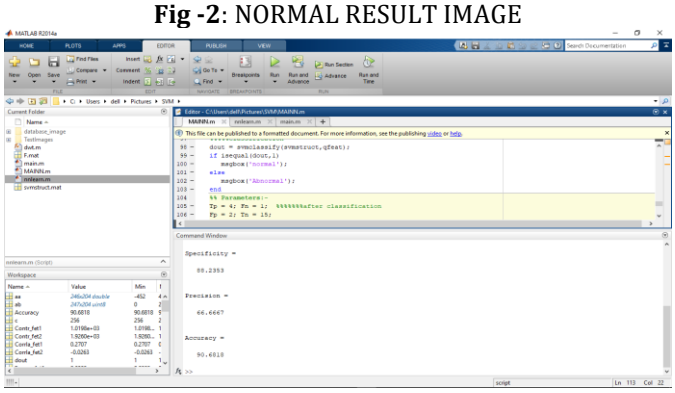

Fig -3: ACCURACY, SPECIFICITY, AND PRECISION

3.4 Trained Images:

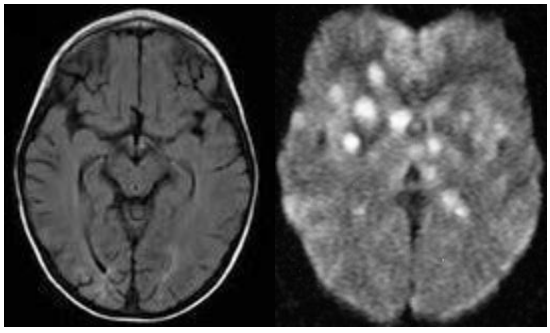

Fig -4: TRAINED IMAGES FOR NORMAL AND ABNORMAL

4. RESULT ANALYSIS

Brain MR images are taken that segmented into normal brain tissue (unaffected) and abnormal tumor tissue in this study (infected). Preprocessing is used to remove noise and smoothen the picture, which additionally improves the signal-to-noise ratio. Then, we've used discrete wavelet remodel that decomposes the pictures and textural features have been extracted from the **gray-level co-occurrence matrix (GLCM)** accompanied through morphological operation. The classification of tumors from brain MRI images is done using a probabilistic neural network (SVM) classifier. SVM Architecture algorithm achieved high accuracy 94%.

Besides, the results view will be displayed. The confusion matrix and ROC curve were used in this analysis to assess estimation accuracy.

5. CONCLUSION

As of today, the brain tumor epidemic has spread to over 210 countries. Healthcare markets have collapsed due to a dramatic rise in the number of cases. The study was developed to diagnose, in oversight and positive patients brain tumor. A decision support framework was used in this approach to make it easier to provide information in the form of conclusions.

REFERENCES

[1] Annisa Wulandari, **"Brain Tumor Segmentation to Calculate Percentage Tumor Using MRI"**, 2018 International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC),29-30 Oct. 2018

[2] R.Tamilselvi; A.Nagar.aj; M.ParisaBeham; M.Bharkavi Sandhiya, "**Database for Brain Tumor Diagnosis and Detection"**, Biomedical and Pharmacology Journal, 13 (3), pp. 1227-1237.

[3] T.M.ShahriarSazzad; K. M. Tanzibul Ahmmed; Misbah Ul Hoque; Mahmuda Rahman ,"**Development of Automated Brain Tumor Identification Using MRI Images"**, 2020 International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA), Ankara, Turkey, 2020, pp. 1-5.

[4] S. Somasundaram; R. Gobinath, "**Current Trends on Deep Learning Models for Brain Tumor Segmentation and Detection : A Review"**, 2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon), Faridabad, India, 2019, pp. 217-221.

[5] Mohanaiah P., Sathyanarayana P., GuruKumar L." **Image texture feature extraction using GLCM approach**", International Journal of Scientific and Research Publications, Volume 3, Issue 5, May 2013.

[6] Michael R. Kaus, Simon K. Warfield, Arya Nabavi, Peter M. Black, Ferenc A. Jolesz, Ron Kikinis, "**Automated segmentation of MR images of brain tumors**", https://doi.org/10.1148/radiology.218.2.r01fe44586, VOL. 218, NO. 2

[7] M. C. Clark, L. O. Hall, D. B. Goldgof, L.P. Clarke, R. P. Velthuizen, and M. S.Silbiger, "**MRI Segmentation using Fuzzy Clustering Techniques", IEEE Engineering in Medicine and Biology".** in IEEE Engineering in Medicine and Biology Magazine, vol. 13, no. 5, pp. 730-742, Nov.-Dec. 1994

[8] R.F. Chang, W.J. Wu, W.K. Moon, Y.H. Chou, and D.R. Chen., "**SVM for diagnosis of breast cancer on US images"**. Academic Radiology. 2003 Feb; 10(2):189-97.

[10] R.F. Chang, W.J. Wu, W.K. Moon, Y.H. Chou, and D.R. Chen "**Improvement in breast tumor discrimination by Support vector machines and speckle-emphasis texture analysis**". Ultrasound in Medicine and Biology, A survey. Pattern Recogn. 43, 1 (January, 2010), 299–317.

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