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# Brain Tumor Detection Using BlockChain

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**Abstract—**Brain tumor can be divided into two types: benign and malignant. Brain tumors are the most common and aggressive disease, which in its highest stage leads to a very short life expectancy. Thus, treatment planning is a key phase for improving patients' quality of life. However, it has some limitations (i.e., accurate quantitative measurements are provided for a limited number of frames). A reliable and automatic classification system is therefore necessary to prevent human mortality. Block chain technology is an emerging field of science that plays a major role in every application field of science, including education, banking, and healthcare. . In healthcare, most health problems arise due to their neglect of correct diagnosis by the doctor and ignorance of the symptom by the patients. The most common disease today is called cancer. A brain tumor usually has symptoms such as frequent headaches, unexplained nausea or vomiting. Sometimes he may also have blurred vision, double vision and sometimes loss of peripheral vision. In this project we will diagnose tumor using Blockchain strategy.
**Keywords**: Security, Reliability, Data Integrity, Block chain, health care, brain tumor.

## I. Introduction

Brain tumor can be divided into two types: benign and malignant. Brain tumors are the most common and aggressive disease, which in the highest stage leads to a very short life expectancy. Thus, treatment planning is a key phase for improving patients' quality of life. However, it has some limitations (ie, accurate quantitative measurements are provided for a limited number of frames). Therefore, a reliable and automatic classification system is necessary to prevent human mortality. Blockchain technology is an emerging field of science that plays a major role in every application field of science, including education, banking, and healthcare. . In the healthcare industry, most health problems are caused by the doctor's neglect of the correct diagnosis and the patient's ignorance of the symptom. The most common disease today is called cancer. A brain tumor usually has symptoms such as frequent headaches, unexplained nausea or vomiting. Sometimes he may also have blurred vision,

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double vision and sometimes loss of peripheral vision. In this project we will diagnose tumor using block chain strategy

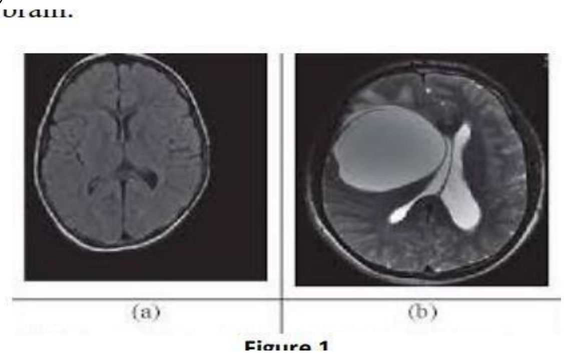


**Figure-1: Example of an MRI report showing the presence of tumor in brain with solid white color mass.**

## II. Literature Survey

Author I) Nitin Satpute, proposed the paper "Brain Tumor detection using Block chain strategy", topic of medical image processing has seen a lot of diverse work done recently. The topic of medical image processing is now home to scientists from a variety of disciplines, such as computer vision and machine learning. Consequently, we examined some of the studies conducted to determine the most efficient and advanced techniques that might be significant for us. Devkota et al. [1] developed the complete segmentation process on the basis of Mathematical Morphological Operations and the spatial FCM technique, which decreases computational effort, although the suggested solution has not been tested to the assessment stage. It identifies malignancy with 92% accuracy and labels it with 86.6% accuracy. In the study by Dr. Chinta Someswararao [2] , where he used a combined Convolution neural network classifier model for determining whether or not the patient has a brain tumor along with machine vision to automatically crop the patient's brain from MRI scans. His overall accuracy is much higher than, say, the criterion of 50%. However, it might be significantly enhanced by using more train data or alternative models and approaches. By combining a cleveredge detection technique with adaptive thresholding, Badran et al. [3] were able to extract the ROI. The dataset contained 102 images. A Canny algorithm for edge detection and adaptive thresholding were applied to the initial and next following set of the neural network respectively after the images had been preprocessed. The removal of Brain Tumors was made simple, fully automated, and effective by Khurram Shahzad and Imran Siddique [4]. The use of morphological gradients and thresholds, as well as morphological operations like erosion and dilation, is made. The morphological gradient is used to calculate the threshold. When the image is converted to black and white using threshold, a tumor and some noise appear on the screen. By compressing the image and employing erosion techniques to reduce noise or unwanted little elements, the image is thinned. Following erosion, dilation is used to rebuild the portion of the removed tumor that erosion has destroyed. C. Sowmiya, Dr.P. Sumitra proposed "Brain Tumor detection using Block chain strategy" to excel in a variety of ,machine vision-based systems, Muhammed Talo et al. [5] designed AlexNet, a CNN architecture. A Dearth of datasets that are pre-tagged is one the main factors holding back the progress of deep learning techniques in the medical sector. In order to

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enhance general accuracy, a data augmentation strategy was used that addresses this by increasing the quantity of data points from easily accessible annotated picture data sources. The performance of transfer learning models derived from convolutional neural networks was good when weight sharing generated a network large enough to conduct computerized malignancy detection or prediction using Computed tomography data. Ravikumar Guruswamy and Dr. Vijayan Subramaniam [7] reprocessed and retrieved the MRI image characteristics in study. This study made use of both real-time and simulated visuals. Next, to eliminate the undesired disturbances, an intensive preprocessing procedure is used.

According to Author III) Aditya Gupta, presents a novel approach for noise removal, retrieval, and malignancy identification on MRI images. This stage has a significant success rate, which ensures the system's overall reliability. For segmentation and pattern maintenance, Joseph et al. [8] used Lloyd's algorithm (k-means) and Support vector machine algorithms, and they built a relationship between Support Vector Machine and the skull masking strategy. A mix of Lloyd's segmentation and Support Vector Machine technique with skull masking is used to produce a better result. They altered the feature extraction method as well as the previously used Lloyd's k-means approach to conceal more of the cranial tissue and generate a more accurate tumor-detecting scan. As a result, identifying the type of tumor, its location, and the stage, which has yet to be precisely identified, might allow us to achieve far more.

According to Author IV) Venkatesh lotlikar, the major purpose of their work is to separate malignant cells from the BRATS 2018 dataset and use variables such as age, contours, and volumetric factors to predict overall patient survival rate. They also tackled the difficulty of identifying brain cancer types and estimating survival rates, for which they employed several ways and determined the accuracy of each method so that they might modify that method. The proposed method utilizes fewer features but achieves more accuracy than state-of-the-art approaches.Dr. Manoj S. and Yuvaraju B, the mortality prognosis into three categories based on factors such as age and tumor type: short-term, medium-term, and long-term survivors. Several research papers on brain tumor classification and detection have been published, some of the researchers employed traditional classifiers, while others utilized deep learning techniques. Some works that employed traditional methods to achieve a significant result, while others did not. However, we may deduce from these results that deep learning outperforms traditional classifiers owing to its learning process and network memory consumption.

## III. Proposed Methodology:

In this study, to improve the performance and reduce the complexity involves in the CT scan image. Brain tumors can be detected manually by experts from the CT scan images we apply Preprocessing on that and show the accurate result

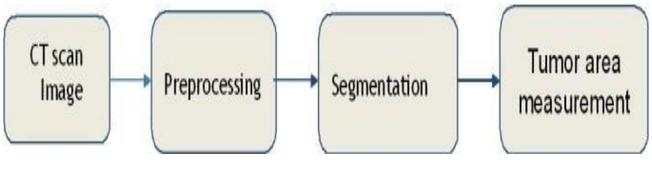


**Fig 1. Methodology of Brain Tumor Detection**

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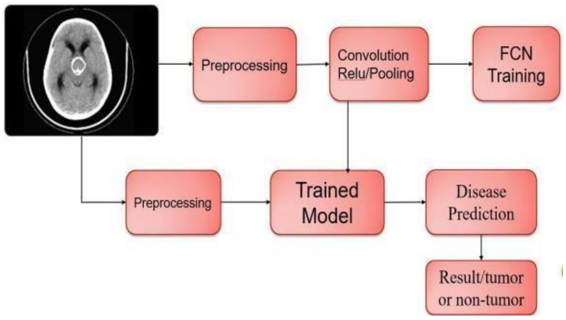


**Fig 2 Architecture of Brain Tumor Detection system**

- ***CT SCAN IMAGE:***

The term "computed tomography", or CT, refers to a computerized x-ray imaging procedure in which a narrow beam of x-rays is aimed at a patient and quickly rotated around the body, producing signals that are processed by the machine's computer to generate cross-sectional images or "slices" of the body. These slices are called tomographic images and contain more detailed information than conventional x-rays. Once a number of successive slices are collected by the machine's computer, they can be digitally "stacked" together to form a three-dimensional image of the patient that allows foreasier identification and location of basic structures as well as possible tumors or abnormalities.

- Preprocessing

Successful Segmentation of the image is followed by the post-processing of the image. Pre-Processing of the image involves steps to judge the size of the tumor and its type. Pre-processing may also involve variousoptimization techniques to further improve the result.
Preprocessing is consists of three steps:
Gray-level
Conversion. Resizing of image.Median filtering.

- Segmentation:

The process of splitting an image into multiple parts is known as segmentation. It creates various sets of pixels within the same image. Segmenting an image makes it easier for us to further analyze and extract meaningful information from it. It is also described as "The process of labeling each pixel in an image such that they share the same characteristics". The process results in pixels sharing a common property.

- Tumor Area Measurement:

Two CT scans from each of 31 patients were collected. Using a computer interface, five observers contoured tumor on three selected CT sections from each baseline scan. Four observers also constructed matched follow-up scan tumor contours for the same 31 patients. Area measurements extracted from these contours were compared using a random effects analysis of variance model to assess relative inter observer variability. The sums of section area measurements were also analyzed, since these area sums are more clinically relevant for response assessment

## IV. Block chain

The diagnosis of brain tumors is usually based on imaging data analysis of brain tumor

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images. Accurate analysis of brain tumor images is a key step in determining a patient's condition. Therefore, how to accurately detect brain tumor images is very important. Brain MRI image is mainly used to detect the tumor and tumor progress modeling process. This information is mainly used for tumor detection and treatment processes. MRI image gives more information about given medical image than the CT or ultrasound image.

MRI image provides detailed information about brain structure and anomaly detection in brain tissue. Actually, Scholars offered unlike automated methods for brain tumors finding and type cataloging using brain MRI images from the time when it became possible to scan and freight medical images to the computer. Conversely, Neural Networks (NN)
and Support Vector Machine (SVM) are the usually used methods for their good enactment over the most recent few years. So we propose a system where we use MRI or CT scan images as input and using Machine Learning and Block chaining we will detect brain tumor of the patient. CNN (Convolutional Neural Networks) Algorithm will be used to train our model and block chaining will play an important role for transferring data using particular block Flow

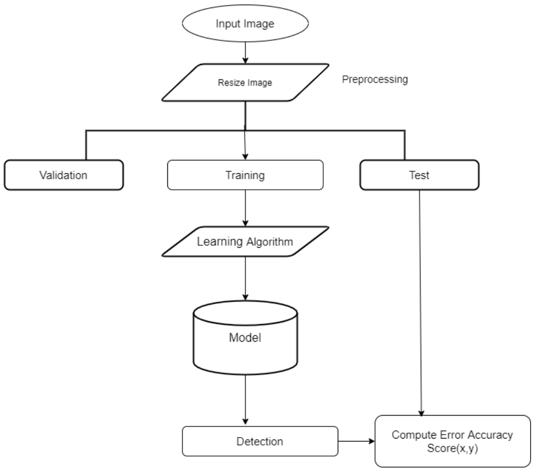


Chart of the System

## V. Advantages

The doctors identify the disease earlier and improve patient outcomes drastically. Today, advanced Medical Imaging offers numerous benefits to both the healthcare providers and the patients. CNN is the best approach for medical image processing to find accurate and quick result. Following some advantages of our system is helpful for:

1. Better Diagnosis
2. Complicated Surgeries
3. Affordable Health Care Costs
4. Safe & effective
5. File-sharing Ecosystem & Data Privacy

- High Accuracy.
- Less efficient.

## VI. Applications

- Leaf Disease Detection.

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-  Medical image processing

## VII. Conclusion

The main goal of this research work is to design efficient automatic brain tumor classification with high accuracy, performance and low complexity. This project consists of the details about the model which was used for the detection of brain tumor using the MRI images of the brain from the normal persons and the persons who had a brain tumor. If it is deployed in the real-time scenario then it will help many people in diagnosing the brain tumor without wasting the money on check-up. If the brain tumor is confirmed by the model, then the person can reach the nearest hospital to get the treatment. It can be the best way of practice for people to save money. As we know that the data plays a crucial role in every deep learning model, if the data is more specific and accurate about the symptoms of the brain tumor then that can help in reaching greater accuracy with better results in real-time applications..

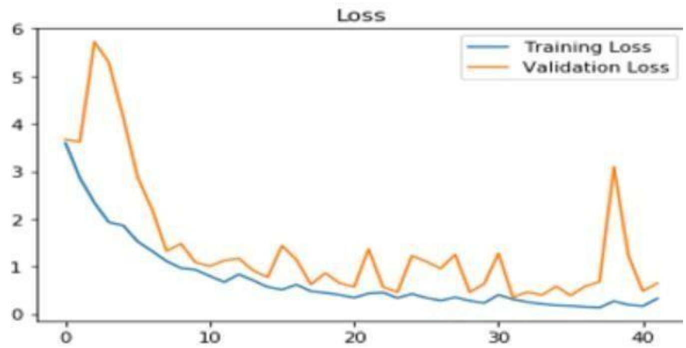
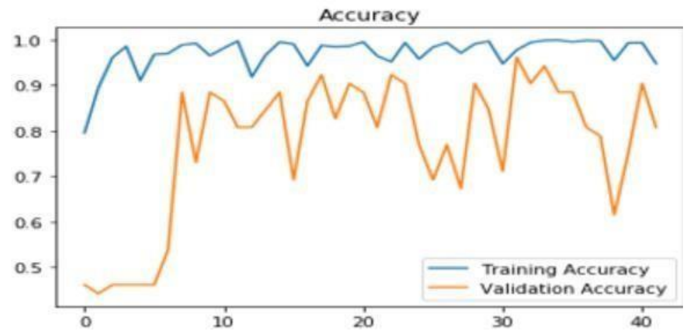


Figure5:Loss vs Epoch




*A. Dataset*

| Algorithm | Accuracy | loss | Epoch | Batch size | Learning Rate |
|---|---|---|---|---|---|
| CNN | 89% | 11% | 50 | 16 | 0.001 |

## VIII. Result

The Database was gathered from Kaggle, named 'Brain MRI Images for brain tumor Detection' By Navoneel Chakrabarty.[6] The dataset comprises 253 Brain MRI Images in the folders yes and no. The folder yes contains 155 timorous brain MRI images, whereas the folder no has 98 non-timorous brain MRI images.

Experiments were conducted on 2065 photos, 1085 of which had malignancies and 980 of which did not. The dataset is further split as: 70% as training, 10% as validation, and 20% as testing; each experiment was conducted for up to 50 epochs with early stopping to control overfitting. On the 32nd epoch, the model had a test accuracy of 89% and a test loss of 0.3033, learning rate is0.001.

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