

BRAIN TUMOR DISEASE DETECTION USING CNN

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Abstract—The primary regulator of the humanoid system is the human brain. A brain tumor develops when brain cells grow and divide abnormally, and brain cancer develops when brain tumors continue to grow. Computer vision is important in the field of human health because it eliminates the need for human judgment to produce correct results. The most dependable and secure imaging techniques for magnetic resonance imaging (MRI) are CT scans, X-rays, and MRI scans. MRI can identify minute items.

Our paper will concentrate on the many methods for using brain MRI to find brain cancer. The bilateral filter (BF) was used in this study's pre-processing to get rid of any noise that was present.

Keywords—Brain tumor, Magnetic resonance imaging, Adaptive Bilateral Filter, Convolution Neural Network.

I. INTRODUCTION

processing includes many types of techniques and operations such as image gaining, storage, presentation, and communication. This process pursues the disorder identification and management. This process creates a data bank of the regular structure and function of the organs to make it easy to recognize the anomalies. This process includes both organic and radiological imaging which used electromagnetic energies (X-rays and gamma), sonography, magnetic, scopes, and thermal and isotope imaging. There are many other technologies used to record information about the location and function of the body. Those techniques have many limitations compared to those modulates which produce images. An image processing technique is

the usage of a computer to manipulate the digital image. This technique has many benefits such as elasticity, adaptability, data storing, and communication. With the growth of different image resizing techniques, the images can be kept efficiently. This technique has many sets of rules to perform in the images synchronously. The 2D and 3D images can be processed in multiple dimensions

II. LITERATURE REVIEW

Brain tumors are one of the most common types of cancer, with over 24,000 new cases diagnosed each year in the United States alone. Early detection of brain tumors is critical for effective treatment, and medical imaging techniques such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) are widely used for diagnosis. However, accurately identifying the type, location, and size of a brain tumor can be challenging, even for experienced radiologists.

In recent years, there has been growing interest in developing computer-aided diagnosis (CAD) systems to assist radiologists in the detection and classification of brain tumors. These systems use machine learning algorithms to analyze medical images and identify abnormal tissue patterns that may indicate the presence of a tumor.

III. EXISTING SYSTEM

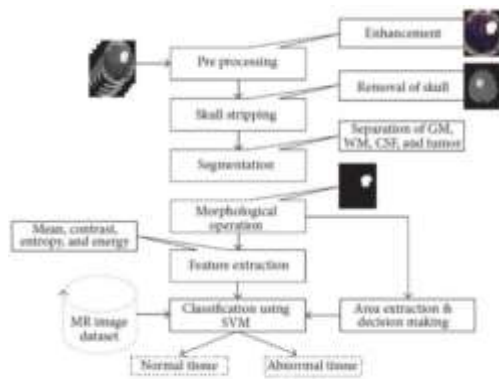


Fig.5.Existing work flow of brain tumor detection. [12]

In the first stage, there is a computer based procedures to detect tumor blocks and classify the type of tumor using Artificial Neural Network Algorithm for MRI images of different patients.

- The second stage involves the use of different image processing techniques such as histogram equalization, image segmentation, image enhancement, morphological operations and feature extraction are used for brain tumor detection in the MRI images for the cancer-affected patients.

- This work is introduced one automatic brain tumor detection method to increase the accuracy and decrease the diagnosis time.

- Image Preprocessing: As input for this system is MRI, scanned image and it contain noise. Therefore, our first aim is to remove noise from input image. As explained in system flow we are using high pass filter for noise removal and preprocessing.

- Segmentation: Region growing is the simple region-based image segmentation technique. It is also classified as a pixel based image segmentation technique since it is involve the selection of initial seed points.
- Morphological operation: The morphological operation is used for the extraction of boundary areas of the brain images. This operation is only rearranging the relative order of pixel value, not mathematical value, so it is suitable for only binary images. Dilation and erosion is basic operation of morphology. Dilation is add pixels to the boundary region of the object, while erosion is remove the pixels from the boundary region of the objects.

- Feature Extraction: The feature extraction is used for edge detection of the images. It is the process of collecting higher level information of image such as
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- Feature Extraction: The feature extraction is used

for edge detection of the images. It is the process of collecting higher level information of image such as shape, texture, color, and contrast.

- Connected component labeling: After recognizing connected components of an image, every set of connected pixels having same gray-level values are assigned the same unique region label.

- Tumor Identification: In this phase, we are having dataset previously collected brain MRIs from which we are extracting features. Knowledge base is created for comparison.

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IV. PROPOSED SYSTEM

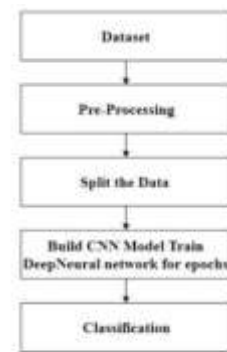


Fig. 7.Proposed work flow of brain tumor detection

The proposed system has mainly five modules. Dataset, Pre-processing, Split the data, Build CNN model train Deep Neural network for epochs, and classification. In dataset we can take multiple MRI images and take one as input image. In pre-processing image to encoded the label and resize the image. In split the data we set the image as 80% Training Data and 20% Testing Data. Then build CNN model train deep neural network for epochs. Then classified the image as yes or no if tumor is positive then it returns yes and the tumor is negative the it returns no.

V. .METHODLOGY

- Layer of CNN model

- Convolution 2D
- MAX Poolig2D
- Dropout
- Flatten
- Dense
- Activation

- **Convolution 2D:** In the Convolution 2D extract the featured from input image. It given the output in matrix form.
- **MAX Poolig2D:** In the MAX polling 2D it take the largest element from rectified feature map.
- **Dropout:** Dropout is randomly selected neurons are ignored during training.
- **Flatten:** Flatten feed output into fully connected layer. It gives data in list form.
- **Dense:** A Linear operation in which every input is connected to every output by weight. It followed by nonlinear activation function
- **Activation:** It used Sigmoid function and predict the probability 0 and 1.

Pandas:

Pandas is the most popular python library that is used for data analysis. It provides highly optimized performance with back-end source code is purely written in *C* or *Python*. We can analyze data in pandas with

1. Series
2. Data frames

VI. Software Requirements

- Windows: Python 3.6.2 or above, PIP and NumPy 1.13.1

Python:

Python is an interpreted, high-level, general purpose programming language

- III. **Naïve Bayes** - Naive Bayes is a machine learning algorithm that is commonly used for classification tasks, including the prediction of Parkinson's disease. It is a probabilistic algorithm that is based on Bayes' theorem, which states that the probability of a hypothesis can be calculated based on the probabilities of the observed evidence.

- IV. **Random Forest** - Random Forest is a

created by Guido Van Rossum and first released in 1991, Python's design philosophy emphasizes code Readability with its notable use of significant Whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed and garbage collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming.

PIP:

It is the package management system used to install and manage software packages written in Python.

NumPy:

NumPy is a general-purpose array-processing package. It provides a highperformance multidimensional array object, and tools for working with these arrays.

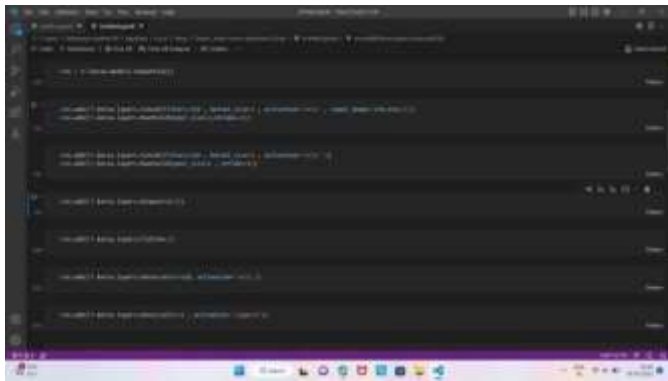
- Useful linear algebra, Fourier transform, and random number capabilities

VII. Hardware Configuration

- Processor: Intel core i5 or above.
- 64-bit, quad-core, 2.5 GHz minimum per core
- Ram: 4 GB or more
- Hard disk: 10 GB of available space or more.
- Display: Dual XGA (1024 x 768) or higher resolution monitors
- Operating system: Windows

popular machine learning algorithm that

VIII. EXPERIMENTAL RESULT



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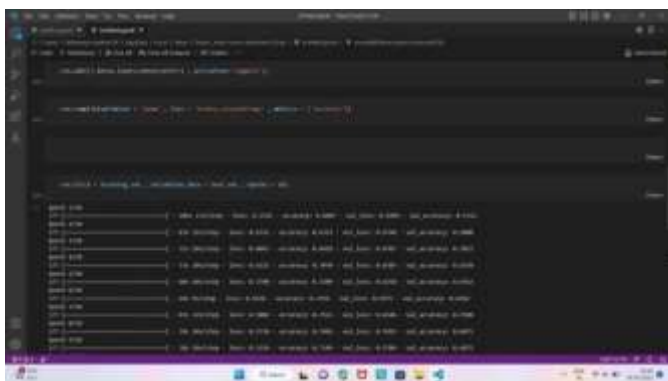
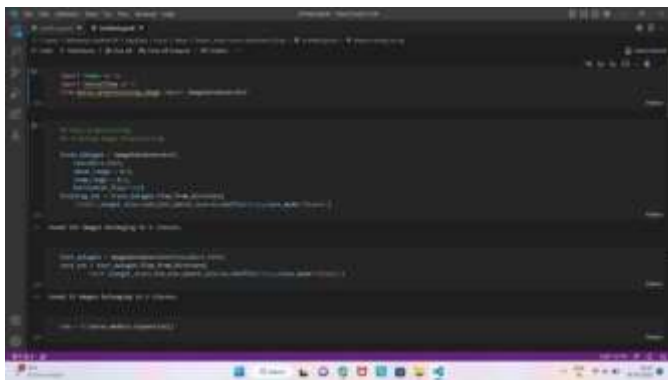
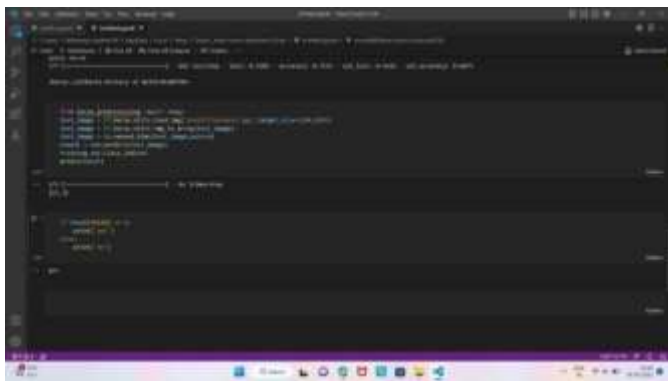


Figure 7.5 EXPERIMENTAL OUTPUT

IX. CONCLUSION

In brain tumor detection we have studied about feature based existing work. In feature based we have study about image processing techniques likes image pre-processing, image segmentation, features extraction, classification. And also study about deep learning techniques CNN and VGG16. In this system we have detect the tumor is present or not if the tumour is present then model return's yes otherwise it return no. and we have compared CNN with the VGG 16 Model. The result of comparison VGG 16 is more accurate than CNN. However, not every task is said to be perfect in this development field even more improvement may be possible in this application. I have learned so many things and gained alot of knowledge about development field

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