

A Proposed Method for Brain Tumor Detection using Artificial Intelligence

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Abstract - A brain tumor is an abnormal mass of tissue located inside the skull. In addition to putting pressure on the healthy parts of the brain, it can lead to significant health problems. Depending on the region of the brain tumor, it can cause a wide range of health issues. As malignant brain tumors grow rapidly, the mortality rate of individuals with this cancer can increase substantially with each passing week. Hence it is vital to detect these tumors early so that preventive measures can be taken at the initial stages.

The location of the brain tumor will affect different body functions. For example, a brain tumor in the cerebellum may affect movement, walking, balance, and coordination

Key Words: Brain, Tumor, Medical, MRI, Treatment.

1. INTRODUCTION

Brain tumours are a complex and challenging medical condition that affects countless individuals worldwide.

These abnormal growths within the brain can cause a multitude of symptoms and have the potential to significantly impact a person's quality of life. When it comes to brain tumours, early detection and accurate diagnosis are crucial for effective treatment.

Medical professionals employ various diagnostic tools such as imaging tests, biopsies, and neurological examinations to determine the presence and nature of a brain tumour.

Treatment options for brain tumours depend on factors such as tumour type, location, size, and overall health of the patient.

Through continued research efforts and comprehensive care approaches, we can strive towards better management and ultimately finding a cure for this complex condition.

2. Basic concepts and treatment options for Brain Tumours

Definition of Brain Tumour: Brain Tumours are abnormal growth of the brain within the brain or central spinal canal.

Brain tumours are classified into two types:

Benign (Non - Cancerous) - Benign (Non - Cancerous) Tumors - This type of tumor generally grows very slowly, and

it doesn't invade surrounding tissues, and these tumors are less likely to spread.

1. They can still cause symptoms due to their size and location.
2. Malignant (Cancerous) - Malignant Tumors - This type of tumor generally grows rapidly, and it invades surrounding tissues, and it can spread to other parts of the body.

Symptoms of brain tumors are :- Headache, Seizures, Cognitive change include memory problem, confusion and difficulty with concentration, Neurological deficits like weakness, vision problem, difficulty with speech, vomiting which is particularly in the morning.

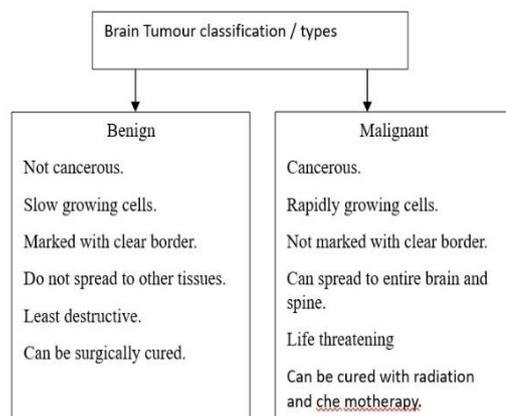
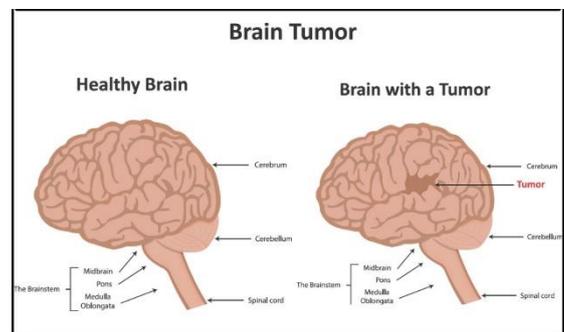


Fig. Brain Tumour and it's Types

Causes of brain tumours: - Causes are Genetic Mutation (Abnormal changes in DNA can lead to uncontrolled cell

growth) and Environment Factors (Exposure to certain chemicals or radiations may increase the risk)

There are different treatment options for brain tumour: -

1. **Surgery:** This is used to remove as much of the tumour while preserving brain function this can be done by using traditional open surgery.
2. **Radiation Therapy:** Target the tumour by using external beam radiation
3. **Chemotherapy:** Used to kill cancer cells or stop their growth.
4. **Targeted Therapy:** Target specific molecular pathways involved in tumour growth.
5. **Immunotherapy:** Stimulated the immune system to recognize and attack tumour cells.

There are some cancer organizations who provide information, support and resources for patients like American Cancer Society, Brain Tumour Foundation.

Existing brain tumor detection techniques:- As MRI images are prone to noise and interference, doctors felt difficulty detecting the tumor at the early stage. Doctors didn't feel only difficult to detect the tumor at the early stage, but they took too many days to detect the tumor manually.

Due to this difficulties, medical field faces certain problems

There are several existing methods to detect brain tumors. Here are some commonly used methods:-

1. **Magnetic Resonance Images (MRI):** MRI is the most common imaging technique used to detect brain tumors. It provides detailed images of the brain structure, allowing doctors to identify abnormal growths.
2. **Computed Tomography (CT) Scan:** CT scan uses X-rays to create a detailed image of the brain. They can detect the presents of the tumors and provide information about size and location.
3. **Positron Emission Tomography (PET):** PET scan involves allowing the injecting of a radioactive tracer into the blood stream, which is absorbed by the cells in the body. Tumor cells absorb more tracers than normal cells, allowing doctors to identify areas of increased metabolism activity which indicate the presence of a tumor.
4. **Biopsy :** A biopsy involves removing a small sample of tissue from the brain and examining under the microscope to look for signs of cancerous cells. This is often done after a tumor has been detected using a imaging techniques to confirm the diagnosis and determine the type of tumor.
5. **Electro Encephalon Grapy (EEG):** EEG measures the electrical activity in the brain and can be used to detect abnormalities associated with a certain type of tumor.
6. **Artificial Intelligence (AI) Algorithms:** AI algorithms are used to assist in the detection and diagnosis of brain tumors. These algorithms can analysis medical imaging and identify abnormalities that may indicate the presence of tumor.

Despite significant advantages, tumor detection systems face several challenges such as variability in tumor appearance, size and location. Additionally, the presence of image artifacts and noise can affect the accuracy of detection algorithms.

Brain Tumor detection by using Artificial Intelligence (AI) is a promising field. A proposed method for brain tumor detection using AI improves the accuracy and efficiency of brain tumor detection.

3. A Proposed System for Brain Tumor Detection

It is very important to detect the tumors at starting level for a healthy life of a patient. There are a lot of literatures on detecting different kinds of brain tumors and improving the detection accuracies.

In this paper, we estimate the brain tumor severity using Convolutional Neural Network algorithm which gives us accurate results.

This article focuses on the detection of a brain tumor location in magnetic resonance images. The aim of this work is not the precise segmentation of the tumor and its parts but only the detection of its approximate location. It will be used in future work for more accurate segmentation. For this reason, it also does not deal with detecting images containing the tumor. The algorithm expects a 2D T2-weighted magnetic resonance image of brain containing a tumor. The detection is based on locating the area that breaks the left-right symmetry of the brain. The created algorithm was tested on many images containing tumor, tumor with edema or only edema. These pathological structures had various sizes and shapes and were in various parts of the brain.

4. CONCLUSIONS

This review study has examined the definition, Types, Symptoms, and different treatment options for detection of brain tumor.

Medical imaging plays a key role in diagnosing brain tumors, and early detection increases the chance of effective treatment and recovery. Obtaining the correct diagnosis and identification by type of brain tumor requires the expertise of experienced radiologists and physicians. To reduce global death rates, diagnosis of brain cancers is essential. Brain tumors can be difficult to identify because of their complex architecture, size variability, and unusual forms.

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