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BRAIN TUMOR DETECTION USING DEEP LEARNING

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ABSTRACT

The population of abnormal cells called glial cells that takes place in the brain causes brain cancer. Over the years the number of patients who have brain cancer is increasing with respect to the aging population, is a worldwide health problem.The main purpose of our project is to develop a method to detect the brain tissues which are affected by cancer especially for grade-4 tumo, Glioblastoma Multiforme(GBM).GBM is one of the most malignant cancerous brain tumors as they are fast growing and more likely to spread to other parts of the brain.

Brain Cancer identification is really challenging task in early stages of life. Now-a-days, issue of brain cancer identification is of great interest. In order to detect the brain cancer of a patient, we consider the data of patients like MRI images of a Patient's Brain. Here our problem is to identify whether the cancer is present in Patient's or not. It is very important to detect the cancer at starting level for healthy life of a patient. This allows us to various image processing techniques to arrive at the best result that can help us to detect brain cancers in their early stages.

1.INTRODUCTION

In recent times, the introduction of information technology and e-health care system in the medical field helps clinical experts to provide better health care to the patient. The tumor is an uncontrolled growth of cancerous cells in any part of the body, whereas a brain tumor is an uncontrolled growth of cancerous cells in the brain. A brain tumor can be benign or malignant. The benign brain tumor has uniformity in structure and does not contain active (cancer) cells, whereas malignant brain tumors have a non-uniformity (heterogeneous) structure and contain active cells. Gliomas and meningiomas are examples of low-grade tumors, classified as begin tumors and glioblastoma and astrocytoma are a class of high-grade tumors, classified as

malignant tumors.According to the brain tumor statistics conducted by the American Brain Tumor Association, Brain tumors do not discriminate. They affect all ages, genders, ethnicities. Over 700,000 Americans are living with a brain tumor today.

Nearly 80,000 people will be diagnosed with a primary brain tumor this year. There are more than 120 different types of primary brain and CNS tumors. Approximately one-third (32 percent) of the brain and central nervous system (CNS) tumors are malignant. About 28,000 kids in the United States are fighting brain tumors right now. This year, nearly 16,000 people will die as a result of a brain tumor. Survival after diagnosis with a primary brain tumor varies significantly by age, tumor type, location, and molecular markers. In general, diagnosing a brain tumor usually begins with magnetic resonance imaging (MRI). Once MRI shows that there is a tumor in the brain, the most common way to determine the type ofbrain tumor is to look at the results from a sample of tissue after a biopsy or surgery.Brain cancer is treated as a worldwide predicament and is a major reason behind cancer-related deaths in humans around the globe. It is one of the deadliest cancers with the least survival rate after diagnosis.

A brain Tumor is described as the abnormal development of tissues in the brain. Analysis of brain tumors is somewhat problematic as the varied shape, size, tumor location, and the presence and appearance of tumor in the brain.

2.RELATED WORK

In the Existing System, brain cancer was detected using image processing techniques. Initially, a CT scan image is acquired and the preprocessing techniques are applied to it. Then the preprocessed image is segmented. Then some of the features are extracted. In these systems, the techniques used in the detection of brain cancer were confined to segmentation. These approaches are also suffered from certain issues which can be removed by improving the technology used in it.Many systems are confined only to segmentation. They suffer from certain technical issues. Some of the systems work only on cancerous images. Identification of Staging is not done. Less accuracy.The area of the tumor isn't computed.

In the proposed method, brain tumor detection follows four basic diagnostic tasks namely, preprocessing, feature

extraction, and classification. As stated above, the acquired MRI scan image is preprocessed. The preprocessed image is sent to convolution layers then the features from the images are used for classification. At last, we classify the image based upon the extracted features, area. In our proposed algorithm we have tried to solve the problems that we come across in the existed system. This system is identified whether the tumor is cancerous or not. If the tumor is glioma cancerous, it produces the results as gliomas like the same way meningioma or pituitary tumor is meningioma cancerous, it produces the results as glioma or pituitary. If the tumor is non- cancerous, it produces the results as No Cancer. Based on this information the tumor is curable by giving the proper treatment by the doctors. So, the patients can be curable from the tumor at an early stage in their life.

In our proposed system, we classified the image based upon the area of the tumor. More accuracy. The area and perimeter of the tumor are computed. No technological issue.

3. METHODOLOGY:

System design is the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. There is some overlap and synergy with the disciplines of systems analysis, systems architecture, and systems engineering.

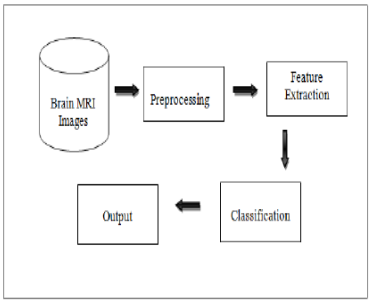

Figure 1: Architecture

A coherent computer-aided diagnosis system is built for brain tumor detection. Computer-aided diagnosis (CAD) is easy for doctors to identify the cancerous cells accurately. This system mainly deals with the identification of the brain cancer stage. The proposed method for brain tumor detection follows three basic tasks namely, preprocessing, feature extraction, and classification.

As stated above, the acquired MRI scan image is preprocessed. Next, we extract the features from the segmented image. At last, we classify the image based upon the extracted features and area. In our proposed algorithm we have tried to solve the problems that we come across in the existed system.

This system is identified whether the tumor is cancerous or not. If the tumor is cancerous, it produces the results as Cancer. If the tumor is non- cancerous, it produces the results as No Tumor. Based on this information the tumor is curable by giving the proper treatment by the doctors. So, the patient can be curable from the tumor at an early stage of life.

Input Design

Input design plays a vital role in the life cycle of software development, it requires very careful attention of developers. The input design is to feed data to the application as accurately as possible. So, inputs are supposed to be designed effectively so that the errors occurring while feeding as minimized. According to the software engineering concepts, the input forms or screens are designed to provide to have a validation control over the input limit, range, and other related validations.

This system has input screens in almost all the modules. Error messages are developed to alert the user whenever he commits some mistakes and guides him in the right way so that invalid entries are not made. Let us see deeply about this under module design.

Input design is the process of converting the user-created input into a computer-based format. The goal of the input design is to make the data entry logical and free from errors. The error is in the input are controlled by the input design. The application has been developed in a user-friendly manner. The forms have been designed in such a way during the processing

the cursor is placed in the position where must be entered. The user is also provided with an option to select an appropriate input from various alternatives related to the field in certain cases.

Validations are required for each data entered. Whenever a user enters erroneous data, an error message is displayed and the user can move on to the subsequent pages after completing all the entries on the current page.

Output Design

The output from the computer is required to mainly create an efficient method of communication within the company primarily among the project leader and his team members, in other words, the administrator and the client. The output of VPN is the system which allows the project leader to manage his clients in term of creating new clients and assigning new projects to them, maintaining a record of the project validity

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and providing folder level access to each client on the

user side depending on the project allotted to him. After completion of a project, a new project may be assigned to the client. User authentication procedures are maintained at the initial stages themselves. A new user may be created by the administrator himself or a user can himself register as a new user but the task of assigning projects and validation a new user sets with the administrator only.

The application starts running when it is executed for the first time. The server has to be started. The project will run on the local area network so the server machine will serve as the administrator while the other connected systems can act as the clients. The developed system is highly user-friendly and can be easily understood by anyone using it even for the first time.

4. STUDY OF RESULTS:

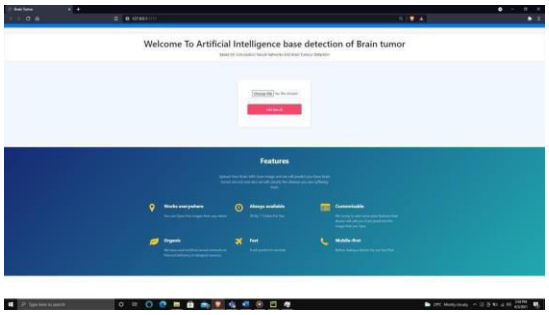

Figure 2:Loading Main Page (HTML) of our proposed system

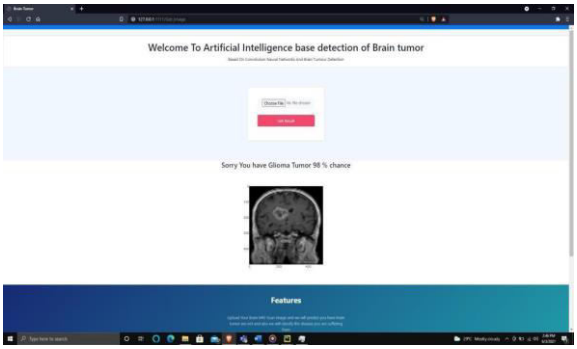

Figure 3:After Uploading Image, The probability of Tumor

5.CONCLUSION :

In this paper, we proposed an algorithm that can detect brain tumor and gives the outcomes, contrasting other used techniques. This algorithm can easily detect the tumor. If no tumor is found in the input image then it gives No Cancer. If the tumor is found in the input image then it gives Cancer. It gives an accuracy of 91.07% as all the images in the testing dataset were detected. The proposed system would be tenable in helping doctors recognizing the image whether it is cancerous or non-cancerous. so the patients can be recovered at an early stage. Further, we need to extract some more features called the size and location of the tumor. we will extract statistical features like contrast, homogeneity,… for a more graphical understanding of the image and we will identify the stages of cancer also. We try to apply our algorithm for other types of cancers also.

This application can further be developed by using object detection and object localization by developing a YoloV3 model and training a dataset with various patient's brain MRI images dataset. This requires deep knowledge about concepts of Selective search and semantic segmentation it will take a lot of time to accomplish the task as we need to reduce the greater number of errors when generated while training the model is trained.

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