

Discernment and Detection of Brain Tumor Classifying Using CNN and DNN

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Abstract - A human brain is center of the nervous system; it is a collection of white mass of cells. A tumor of brain is collection of uncontrolled increasing of these cells abnormally found in different part of the brain namely Glial cells, neurons, lymphatic tissues, blood vessels, pituitary gland and other part of brain which led to the cancer. Cancer of Brain is of two types. Benign which is not cancerous no danger at all, other one is Malignant which is cancerous tumor; it grows abnormally by multiplying the cells rapidly, which leads to the death of the person if not detected. However the malignant tumor is a cancerous tumor. So it spreads rapidly with indefinite boundaries to other region of the body easily. It leads to immediate death. Brain MRI image is Manually it is not so easily possible to detect and identify the tumor. Programming division method by MRI is way to detect and identify the tumor. In order to give precise output a strong segmentation method is needed. The segmentation, detection, and extraction of infected tumor area from magnetic resonance (MR) images are a primary concern but a tedious and time taking task performed by radiologists or clinical experts, and their accuracy depends on their experience only. So, the use of computer aided technology becomes very necessary to overcome these limitations. We estimate the brain tumor severity using Convolutional Neural Network algorithm which gives us accurate results.

Keywords: *mri, benign, neural networks, tumor*

I. INTRODUCTION

A brain tumor is defined as abnormal growth of cells within the brain or central spinal canal. Some tumors can be cancerous thus they need to be detected and cured in time. The exact cause of brain tumors is not clear and neither is exact set of symptoms defined, thus, people may be suffering from it without realizing the danger. Primary brain tumors can be either malignant (contain cancer cells) or benign (do not contain cancer cells).

The symptom having of brain tumor depends on the location, size and type of the tumor. It occurs when the tumor compressing the surrounding cells and gives out pressure. Besides, it is also occurring when the tumor blocks the fluid that flows throughout the brain. The common symptoms are having headache, nausea and vomiting, and having problem in balancing and walking. Brain tumor can be detected by the diagnostic imaging modalities such as CT scan and MRI. Both of the modalities have advantages in detecting depending on the location type and the purpose of examination needed. In

this paper, we prefer to use the CT images because it is easy to examine and gives out accurate calcification and foreign mass location. The CT image acquired from the CT machine give two-dimension cross sectional of brain. However, the image acquired did not extract the tumor from the image. Thus, the image processing is needed to determine the severity of the tumor depends on the size.

The focus of this project is CT brain images' tumor extraction and its representation in simpler form such that it is understandable by everyone. Humans tend to understand colored images better than black and white images, thus, we are using colors to make the representation simpler enough to be understood by the patient along with the medical staff. Contour plot and c-label of tumor and its boundary is programmed to give 3D visualization from 2D image using different colors for different levels of intensity. A user-friendly GUI is also created which helps medical staff to attain the above objective without getting into the code.

II. PROBLEM STATEMENT

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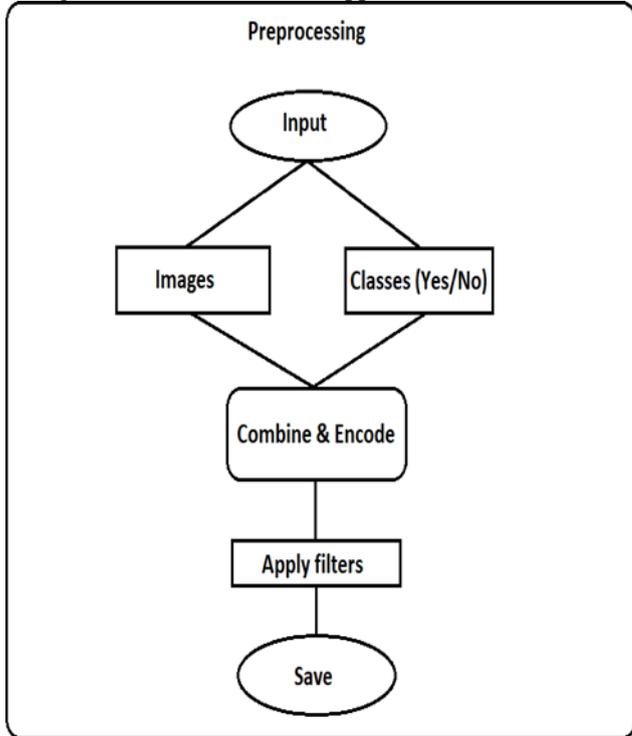
The objective of this work is to bring some useful information in simpler form in front of the users, especially for the medical staff treating the patient. Aim of this paper is to define an algorithm that will result in extracted image of the tumor from the CT brain image. The resultant image will be able to provide information like size, dimension and position of the tumor, plotting contour and c-label of the tumor and its boundary provides us within formation related to the tumor that can prove useful for various cases, which will provide a better base for the staff to decide the curing procedure.

III. PROPOSED METHODOLOGY

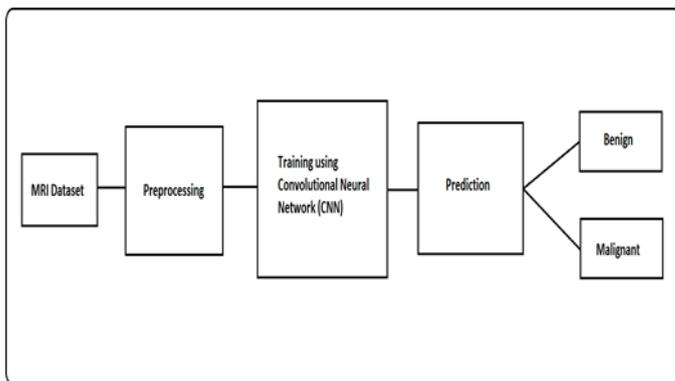
System design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specifies requirements. System design could be as seen as the application of systems theory to product development. It is about the physical organization of the system. It is demonstrated with the help of UML Diagram or block Diagrams etc. it is explained in a pictorial representation.

IV. FLASK (WEB): FRAMEWORK)

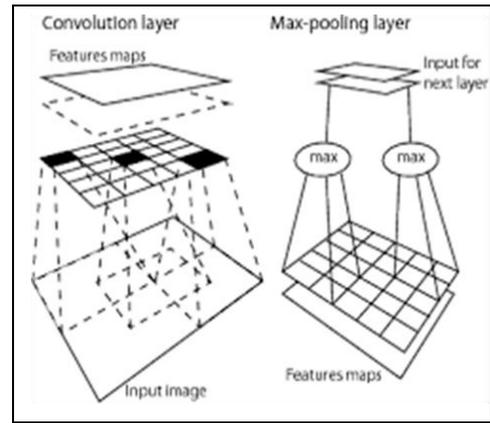
Flask is a micro web framework written in Python. It is classified as a micro framework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. Flask was created by Armin Ronacher of Pocomo, an international group of Python enthusiasts formed in 2004. According to Ronacher, the idea was originally an April Fool's joke that was popular enough to make into a serious application.



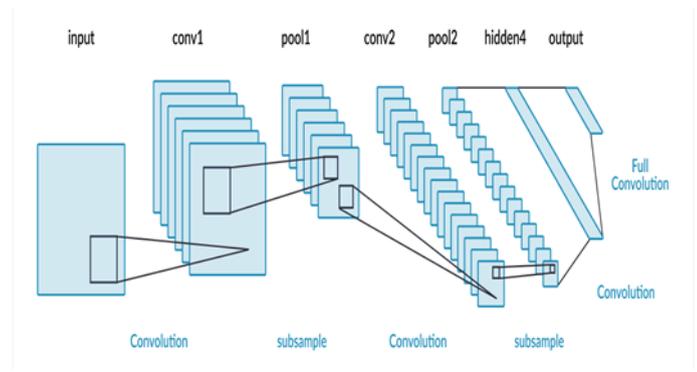
PRE-PROCESSING METHOD



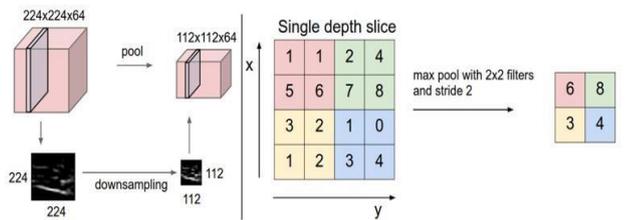
Convolutional Neural Network



Pooling in Convolutional Neural Network



Pooling Concept

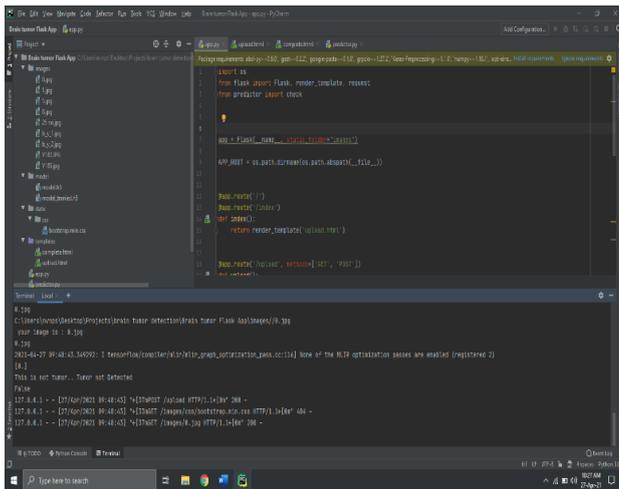
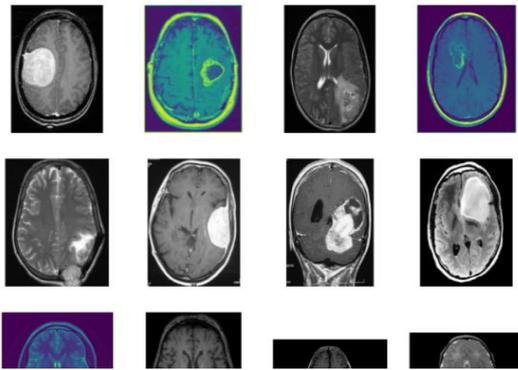


Pooling layer downsamples the volume spatially, independently in each depth slice of the input volume. Left: In this example, the input volume of size [224x224x64] is pooled with filter size 2, stride 2 into output volume of size [112x112x64]. Notice that the volume depth is preserved. Right: The most common downsampling operation is max, giving rise to **max pooling**, here shown with a stride of 2. That is, each max is taken over 4 numbers (little 2x2 square).

Pooling Example



V. RESULTS



VI. CONCLUSION AND FUTURE SCOPE

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. From the resultant graphs, it is proven that the accuracy of the model has reached good level, 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. There is a wide scope for future implementation of “Brain Tumor Detection using Convolutional Neural Networks” towards an interesting experience of modern technologies. Digital Platform is a ‘one stop shops’ for all kinds of Hospitals to serve the domestic and international user sat any time, any moment and anywhere in any parts of the world. Not being sticky to make packages within India only, it can be global - a “global platform” through a comprehensive.

VII. REFERENCES

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