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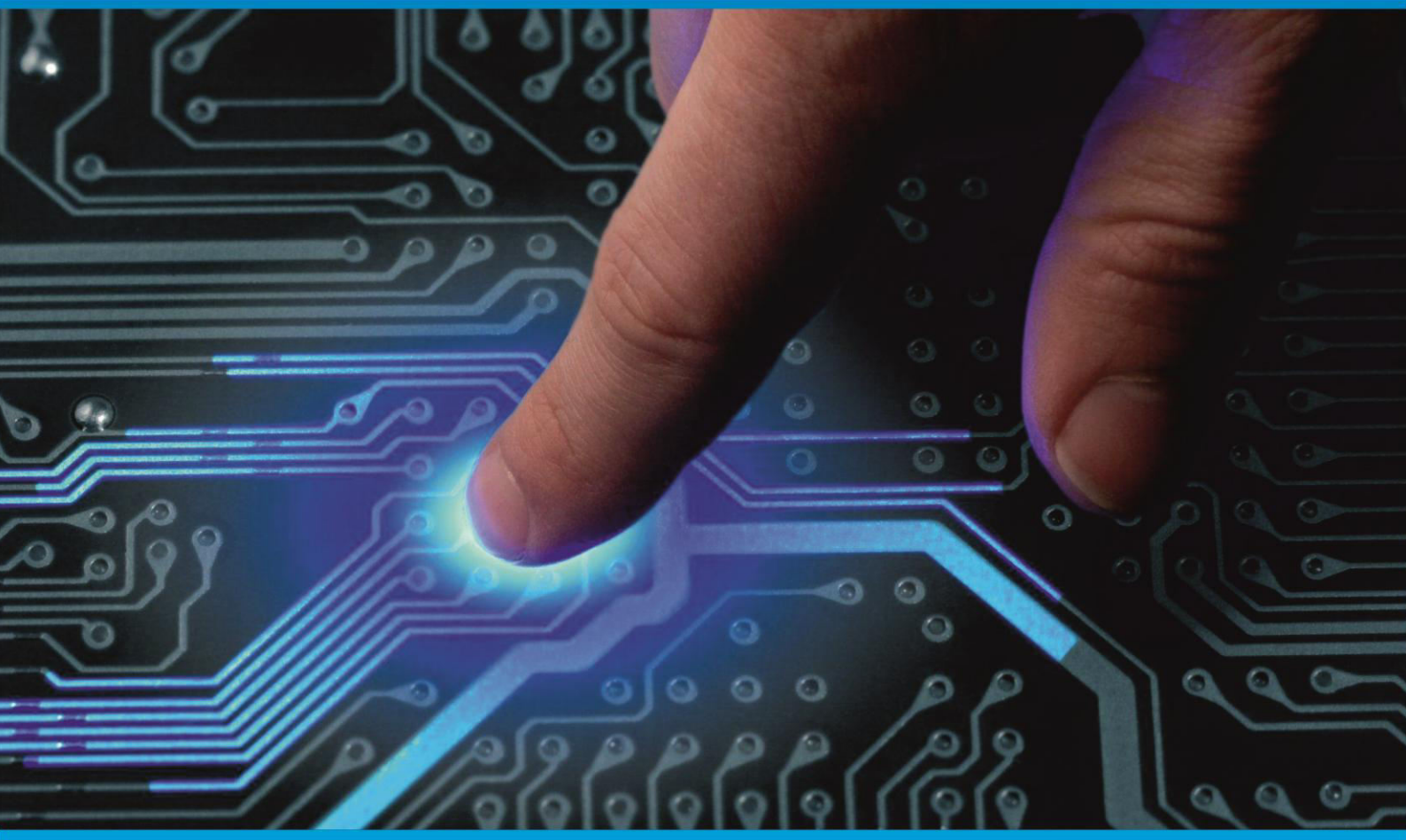

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A Survey on Brain Tumour Detection Using Image Processing

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ABSTRACT: Brain Tumour segmentation is one of the most crucial and arduous tasks in the terrain of medical image processing as a human-assisted manual classification can result in inaccurate prediction and diagnosis. Moreover, it is an aggravating task when there is a large amount of data present to be assisted. Brain Tumour have high diversity in appearance and there is a similarity between Tumour and normal tissues and thus the extraction of Tumour regions from images becomes unyielding. In this project, we proposed a method to extract brain Tumour from CT brain Images by convolutional neural network.

KEYWORDS: Convolutional Neural Network, Computed Tomography,Support Vector Machine,and Small Cell Lung Cancer.

I. INTRODUCTION

Medical imaging refers to a number of techniques that can be used as non-invasive methods of looking inside the body [1]. Medical image encompasses different image modalities and processes to image the human body for treatment and diagnostic purposes and hence plays a paramount and decisive role in taking actions for the betterment of the health of the people. Image segmentation is a crucial and essential step in image processing which determines the success of a higher level of image processing [2]. The primary goal of image segmentation in medical image processing is mainly Tumour or lesion detection, efficient machine vision and attaining satisfactory result for further diagnosis. Improving the sensitivity and specificity of Tumour or lesion has become a core problem in medical images with the help of Computer Aided Diagnostic (CAD) systems. According to [3], Brain and other nervous system cancerous the 10th leading cause of death, and the five-year survival rate for people with cancerous brain is 34 for men and 36 for women. Moreover, the World Health Organization (WHO) states that around 400,000 people in the world are affected bythe brain Tumour and 120,000 people have died in the previous year's [4]. Moreover, An estimated 86,970 new cases of primary malignant and non-malignant brain another Central Nervous System (CNS) Tumour are expected to be diagnosed in the United States in 2019 [5]

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II. LITERATURE SURVEY

Features \ Surveys		"Computer-Aided Diagnosis of Human Brain Tumor through MRI: A Survey and a New Algorithm" [58]	"Comparative Study for Brain Tumor Classification on MR/CT Images" [59]	"Review of Brain Lesion Detection and Classification using Neuroimaging Analysis Techniques" [60]	"MRI Based Medical Image Analysis: Survey on Brain Tumor Grade Classification" [30]	"A Review on a Deep Learning Perspective in Brain Cancer Classification" [61]	**Deep Learning for Multigrade Brain Tumor Classification in Smart Healthcare Systems: A Prospective Survey (Ours)**
Year		2014	2014	2015	2018	2019	2019
Literature coverage range		2003~2012	2009~2013	2004~2013	2003~2013	2008~2016	2016~2019
Number of reviewed papers		18	18	14	61	6	30
Remarks	Main theme	Brain tumor segmentation and classification	Brain tumor classification	Brain tumor segmentation and classification	Brain tumor segmentation and classification	Brain tumor segmentation and classification	Deep Learning based brain tumor classification
	Coverage (Number of years)	9	4	9	10	8	4
	Existing surveys are reviewed	No	No	No	No	No	Yes
	Type of learning methods covered	Traditional	Traditional	Traditional	Traditional	Traditional	Deep Learning
	Analyzed research trend	No	No	No	No	No	Yes
	Datasets coverage	No	No	No	Yes	Yes	Yes
	Detailed recommend-ation for future research	No	No	No	Yes	Yes	Yes

1. Ms.Priya Patil1, Ms.Seema Pawar2, Ms.Sunayna Patil3, Prof. Arjun Nichal(2017) et al,
In this paper, authors have proposed different techniques to detect and segment Brain tumor from MRI images. To extract and segment the tumor we used different techniques such as SOM Clustering, k-mean clustering, Fuzzy C-mean technique, curvelet transform. It can be seen that detection of Brain tumor from MRI images is done by various methods, also in future work different automatic methods achieve more accuracy and more efficient.

2. **Arshia Rehman1 Saeeda NazB1, Usman Naseem2, Imran Razzak2, and Ibrahim A Hameed3**
We presented the semantics segmentation architecture SegNet for the pixel-wise label segments. The SegNet produces good results for the segmentation and more accurate for the label predictions. It provided efficient performance with promising accuracy as compared to the patch based classification. It produces high results without the use of the post-processing CRF which elaborated the model to more time consuming without achieving the desired results. SegNet improves the computational time and memory as compared to the other segmentation models. The key point in the deployment of SegNet is the use of the less number of parameters. The high number of parameters for the model may cause interruptions in the network. The less number of parameters leads to the improved network efficient. SegNet enhanced both the quality and quantitative analysis for the brain tumor segmentation. Our presented SegNet based system gives the state of the art results as compared to the other studies using brain tumor dataset - Fig share and achieved 99.93% accuracy. The experiments on the Brain Tumor Dataset - Fig share indicates the quality results over the medical imaging. In future, SegNet architecture will be explored for the brain tumor using different combinations of layers. SegNet model will also be tested on another benchmark dataset for the brain tumor segmentation and classification. We also aim to explore FCN and Unet for this problem in future.

3.**Nilesh Bhaskarrao Bahadure,1 Arun Kumar Ray,1 and Har Pal Thethi2(2017) et al**
In this study, using MR images of the brain, we segmented brain tissues into normal tissues such as white matter, gray matter, cerebrospinal fluid (background), and tumor-infected tissues. Fifteen patients infected with a glial tumor, in benign and malignant stages, assisted in this study. We used pre-processing to improve the signal-to-noise ratio and to eliminate the effect of unwanted noise. We used a skull stripping algorithm based on threshold technique to improve the skull stripping performance. Furthermore, we used Berkeley wavelet transform to segment the images and support vector machine to classify the tumor stage by analysing feature vectors and area of the tumor. In this study, we investigated texture based and histogram based features with a commonly recognized classifier for the classification of brain tumor from MR brain images. From the experimental results performed on the different images, it is clear that the analysis for the brain tumor detection is fast and accurate when compared with the manual detection performed by radiologists or clinical experts. The various performance factors also indicate that the proposed algorithm provides better result by improving certain parameters such as mean, MSE, PSNR, accuracy, Sensitivity, specificity, and dice coefficient. Our experimental results show that the proposed approach can aid in the accurate and timely detection of

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brain tumor along with the identification of its exact location. Thus, the proposed approach is significant for brain tumor detection from MR images. The experimental results achieved 96.51% accuracy demonstrating the effectiveness of the proposed technique for identifying normal and abnormal tissues from MR images. Our results lead to the conclusion that the proposed method is suitable for integrating clinical decision support systems for primary screening and diagnosis by the radiologists or clinical experts. In the future work, to improve the accuracy of the classification of the present work, we are planning to investigate the selective scheme of the classifier by combining more than one classifier and feature selection techniques.

4. Debnath Bhattacharyya1 and Tai-hoon Kim2,*(2011) et all

Brain tumor is the most commonly occurring malignancy among human beings, so study of brain tumor is important. In this paper, we propose an image segmentation method to identify or detect tumor from the brain magnetic resonance imaging (MRI). There are many thresholding methodsdeveloped but they have different result in each image. So we need a method by which detection of tumor can be done uniquely. In this paper we propose a set of image segmentation algorithms which gives a satisfactory result on brain tumor images.

III. PROPOSED SYSTEM APPROACH

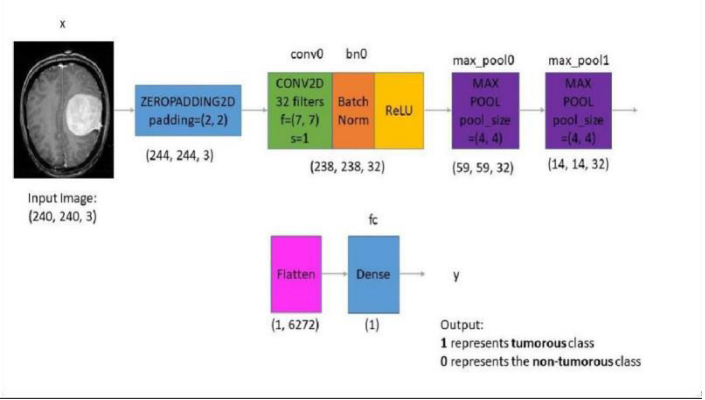

Fig.2 Block Diagram of Proposed System

In the proposed system, it will provide fluidity to traffic by continuously keeps the traffic moving according to the density of it on each route. This system will have 3 modules as Object Detection and Count, Signal Management, Emergency Vehicle Management. All these modules will work together to achieve the fluidity in traffic management.

IV. ADVANTAGES AND DISADVANTAGES

1. To overcome the difficulty of incomplete data, we use a latent factor model to reconstruct the missing data.
2.In China, chronic diseases are the main cause of death, according to a Chinese report over chronic diseases.
3. Used fusion of CT and MRI.
4. Time consuming due to use of SVM.
5. Significantly increase accuracy
6. Deep Learning method outperforms other
7. Which may lack in its performance when executed in local machines due to less amount of computational power.

Heart diseases when aggravated spiral way beyond control. Heart diseases are complicated and take away lots of lives eve

V. METHODOLOGY USED IN PROPOSED SYSTEM

1 Convolutional Neural Networks

CNN takes in processed images as input.Extract different features about the images regardless of their position using a series of mathematical operations to identify the pattern.Every layer in CNN has API which transforms input to output with differentiable functions.

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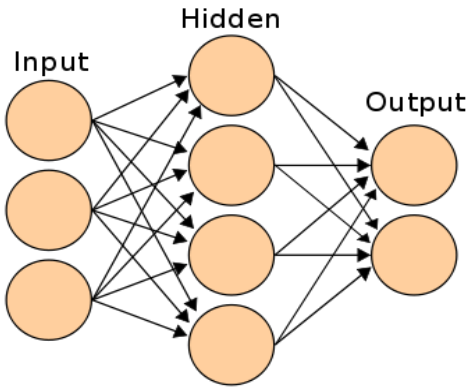
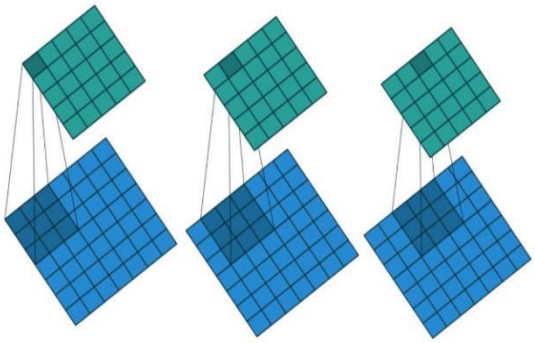


2. Convolutional Layer

We extract different features pixel wise by using feature detectors/kernels. Perform numerous convolutions on input, where each operation uses a different filter. This results in different feature maps. In the end, we take all of these feature maps and put them together as the final output of the convolution layer.



3.Flattening

Basically here we arrange the pooled feature into a single vector/column as a input for next layer(convert our 3D data to 1D)

4. Fully Connected Layer

Neurons in a fully connected layer have full connections to all the activations in the previous layer.Combining more neurons to predict more accurately.

5. Why we use CNN?

1. CNNs have repetitive blocks of neurons that are applied across space (for images) or time (for audio signals etc).
2. For images, these blocks of neurons can be interpreted as 2D convolutional kernels, repeatedly applied over each patch of the image.
3. For speech, they can be seen as the 1D convolutional kernels applied across time-windows.
4. At training time, the weights for these repeated blocks are 'shared', i.e. the weight gradients learned over various image patches are averaged.
5. The reason for choosing this special structure is to exploit spatial or temporal invariance in recognition.
6. Minimize computations, simplifies, handling.

VI. CONCLUTION

Image segmentation plays a significant role in medical image processing as medical images have different diversities. For brain Tumour segmentation, we used CT scan images. CT is most vastly used for brain Tumour segmentation and classification. The segmentation process was followed by feature extraction and classification using Convolutional Neural Network.

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VII. FUTURE WORK

Make android application for brain tumour detection system.

VIII. ACKNOWLEDGMENT

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