ADAPTIVE FEATURES SELECTION AND EDNN BASED BRAIN IMAGE RECOGNITION IN INTERNET OF MEDICAL THINGS

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Abstract: The continuous development of the technologies and people life style changes and affects entire life of human beings. Sometimes, the changes in the technology creates the depression, confusion, tension also leads to affect their brain function, cell activities and so on .In recent years, brain image recognition technology has played a good role in the analysis and processing of medical images, and has been gradually applied to the analysis and diagnosis of brain diseases, making great contributions to medical and medical undertakings .

Keywords:-Internet of Medical Things, Feature Selection, artificial neural network, EDNN .

1. INTRODUCTION

Used image processing technology and an artificial neural network-based image classifier to automatically analyse retinal images and classify images according to disease conditions [2], [3]. Applied artificial neural networks to brain images, using several pattern classifiers, including K-nearest neighbours, classification trees, support vector machines, and templates combined with feed forward neural networks for several coronary slice features of interest. Research is conducted to analyse the condition of patients with Alzheimer's disease, which will help early identification of Alzheimer's disease [4]. Support vector machines for the efficient classification of X-ray brain images to aid in the diagnosis and treatment of diseases [5].

The quality of feature selection directly affects the final result of classification recognition. Therefore, it is very important to select good features. However, in the traditional method, the selection of features is based on artificial; the process of manually selecting features is more complicated, and the obtained results are unstable and the adaptability is not strong. The convolution neural network theory breaks through the bottleneck of manual selection features, and continuously surpasses the traditional recognition algorithm in classification and recognition. The successful application in brain image classification and recognition has caused great response and provided new research for medical image classification and recognition research vitality[6].

2. RELATED WORK

Abdu Gumaei et al. [7] propose a hybrid feature extraction method with regularized extreme learning machine for developing an accurate brain tumour classification approach. The approach starts by extracting the features from brain images using the hybrid feature extraction method; then, computing the covariance matrix of these features to project them into a new significant set of features using principle component analysis (PCA). Finally, a regularized extreme learning machine (RELM) was used for classifying the type of brain tumour. To evaluate and compare the proposed approach, a set of experiments was conducted on a new public dataset of brain images.

Ming Li et al. [8] proposed the extension of the 2D-CNNs to multimodal 3D-CNNs, and can obtain brain lesions under different modal characteristics of three-dimensional space. It can solve the 2D-CNNs raw input requires large neighbourhood of faults, at the same time better to extract the modal of the differences between information. Then the real normalization layer was added between the convolution layers and pooling layer to improve the convergence speeds of the network and alleviate the problem of over fitting. In the end, the loss function was improved, and the weighted loss function was used to enhance the feature learning of the lesion area. The experimental results showed that the brain tumor detection method proposed could effectively locate tumour lesions, and better results were obtained in correlation coefficient, sensitivity, and specificity.

Chao Ma et al. [9] proposed a new methodology that combines random forests and active contour model for the automated segmentation of the gliomas from multimodal volumetric MR images. Specifically, they employed a feature representations learning strategy to effectively explore both local and contextual information from multimodal images for tissue segmentation by using modality specific random forests as the feature learning kernels. Different levels of the structural information were subsequently integrated into concatenated and connected random forests for gliomas structure inferring. Finally, a novel multiscale patch driven active contour model was exploited to refine the inferred structure by taking advantage of sparse representation techniques.

Ali M. Hasan et al. [10] proposed a deep learning feature extraction algorithm to extract the relevant features from MRI brain scans. In parallel, handcrafted features were extracted using the modified gray level co-occurrence matrix (MGLCM) method. Subsequently, the extracted relevant features were combined with handcrafted features to improve the classification process of MRI brain scans with support vector machine (SVM) used as the classifier. The obtained results proved that the combination of the deep learning approach and the handcrafted features extracted by MGLCM improves the accuracy of classification of the SVM classifier up to 99.30%.

Ramesh BabuVallabhaneni and V. Rajesh [11] presented an automatic brain tumour detection technique in noise corrupted images. The Denoising of the image was implemented using Edge Adaptive Total Variation Denoising Technique (EATVD). The technique was used to preserve the edges in the process of Denoising image. Once the noise was removed from the image, the image was segmented using mean shift clustering. The segmented parts were sent to gray level co-occurrence matrix for feature extraction. The features were used by multi class SVM to detect the tumour in the images. The step followed extracts the tumour with increased precision in noisy images.

3. PROBLEM STATEMENT

- In existing methods performed better for a limited number of data but when input data increases, the accuracy are degraded considering this existing methods.
- Most of the existing deep learning models for segmentation and classification are patch based in which one patch of an image is selected for input to the network.
- The major problem of patch based models includes the loss of core information from an image and also time consuming for training.

4. PROPOSED STATEMENT

We have tried to address the problem of recognition brain images by creating arobust and more accurate classifier which can act as an expert assistant to medical practitioners. In this work, an Adaptive Krill Herd (AKH) learning-based feature selection approach and Entropy based deep neural network (EDNN) in recognition of brain images.The proposed effective recognition procedure is described as; initially image collection device based on IoT technology, and medical images are collected as a research database. In preprocessing stage, the input brain image is undergoes to skull stripping for the brain region extraction. Subsequently, the effective features such as SFTA, geometric feature and LBPfeature are extracted from the preprocessed output images. Then select the best feature using Adaptive Krill Herd (AKH) learning. Finally, the proposed EDNNrecognition the brain images into normal brain or abnormal brain based on the extracted features. Here, theEDNNclassifier is adapted with the support value based normalization to mitigate the over-fitting in layers before the max pooling layer in the deep neural network. The results will be analyzed to demonstrate the performance of the recognition technique with the existing techniques. The proposed work process will be performed in MATLAB the block diagram of the proposed effective recognition technique is given in figure 1 and the architecture EDNN is given in figure 2.

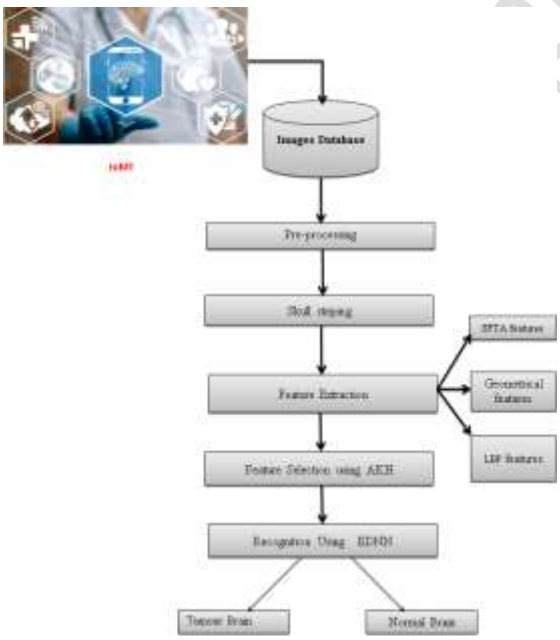

Figure 1: Block diagram of the proposed method

Support value based DNN

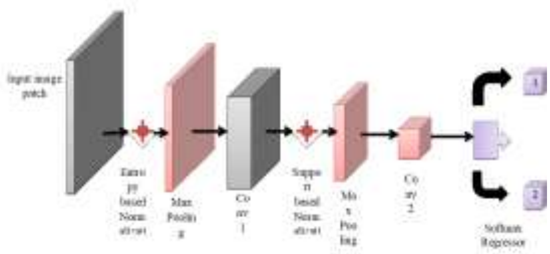

Figure 2: Architecture of the proposed EDNN

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